~~JANUARY~~ OCTOBER 2018

SANTA MARGARITA RIVER
WATERSHED MANAGEMENT AREA

Water Quality Improvement Plan

Submitted by

COUNTY OF RIVERSIDE, COUNTY OF SAN DIEGO, RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, CITIES OF MENIFEE, MURRIETA, TEMECULA, AND WILDOMAR

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List of Acronyms

AWM	Agriculture, Weights, and Measures Department
BMI	Benthic Macro-Invertebrate
BMP	Best Management Practice
BURC	Beneficial Use Risk Category
CA	California
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CIWQS	California Integrated Water Quality System
COA	Conditions of Approval
CRAM	California Rapid Assessment Method
CSCI	California Stream Condition Index
CTR	California Toxics Rule
DEH	Department of Environmental Health
DO	Dissolved Oxygen
DWQ	Division of Water Quality
ERP	Enforcement Response Plan
GIS	Geographic Information System
HMP	Hydromodification Management Plan
HPWQC	Highest Priority Water Quality Condition
HSPF	Hydrological Simulation Program FORTRAN
IBI	Index of Biotic Integrity
IC/ID	Illegal Connection/Illicit Discharge
IDDE	Illicit Discharge Detection and Elimination
IRWMP	Integrated Regional Water Management Program
JRMP	Jurisdictional Runoff Management Program
LAMP	Local Agency Management Program
LID	Low Impact Development
LIP	Local Implementation Plan
LOE	Lines of Evidence
LTEA	Long-Term Effectiveness Assessment

LTMS	Long Term Monitoring Station
MAP	Monitoring and Assessment Plan
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level
MCTSSA	Marine Corps Tactical Systems Support Facility
MEP	Maximum Extent Practicable
M-K	Mann-Kendall
MLOE	Multiple Lines of Evidence
MS4	Municipal Separate Storm Sewer System
NAL	Non-storm Water Action Level
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NNE	Nutrient Numeric Endpoint
NPDES	National Pollutant Discharge Elimination System
NRMP	Nutrient Reduction and Management Plan
NTR	National Toxics Rule
NWI	National Wetland Inventory
OAL	Office of Administrative Law
OWTS	Onsite Wastewater Treatment System
PDP	Priority Development Project
POTW	Publicly Owned Treatment Works
PWQC	Priority Water Quality Condition
QAPP	Quality Assurance Project Plan
RCFCWCD	Riverside County Flood Control and Water Conservation District
ROWD	Report of Waste Discharge
RTA	Rapid Trash Assessment
RWQCB	Regional Water Quality Control Board
SAL	Stormwater Action Level
SCCWRP	Southern California Coastal Water Research Project
SMARTS	Stormwater Multiple Applications and Report Tracking System
SMC	Stormwater Coalition Monitoring
SMR	Santa Margarita River
SMRNIG	Santa Margarita River Nutrient Initiative Group
SPAWAR	Space and Naval Warfare Systems Command

SQO	Sediment Quality Objective
SSO	Sanitary Sewer Overflow
SUSMP	Standard Urban Stormwater Mitigation Plan
SUSTAIN	System for Urban Stormwater Treatment and Analysis Integration
SWAMP	Surface Water Ambient Monitoring Program
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TMAR	Transitional Monitoring and Assessment
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TST	Test of Significant Toxicity
TUc	Chronic Toxicity Unit
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USMC	U.S. Marine Corps
VNS	Visited Not Sampled
WDR	Waste Discharge Requirement
WLA	Waste Load Allocation
WMA	Watershed Management Area
WMAA	Watershed Management Area Analysis
WQBEL	Water Quality-Based Effluent Limitation
WQI	Water Quality Index
WQO	Water Quality Objective

Executive Summary

The Counties of Riverside and San Diego, the Riverside County Flood Control and Water Conservation District (RCFCWCD), and the Cities of Murrieta, Temecula, and Wildomar (collectively known as Copermittees) as well as the City of Menifee have prepared this Water Quality Improvement Plan to comply with requirements in their Municipal Separate Storm Sewer System (MS4) Permit (Order No. R9-2013-0001 as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100; Permit) and to protect the beneficial uses of the receiving waters in the Santa Margarita River (SMR) watershed. The SMR watershed is unique as the least disturbed watershed along the Southern California coast, and the SMR is the longest free flowing, undammed river in the region. The SMR watershed supports a wide variety of beneficial uses related to water supply, agriculture, industry, and aquatic life. Habitat conservation and connectivity within the watershed are important issues to the Copermittees. The major surface water bodies in the SMR watershed are:

- Murrieta Creek;
- Temecula Creek;
- Santa Margarita River; and
- Santa Margarita River Estuary (SMR Estuary).

The Water Quality Improvement Plan was developed in three phases as outlined below, and will be implemented following the process outlined in **Figure ES-1**.

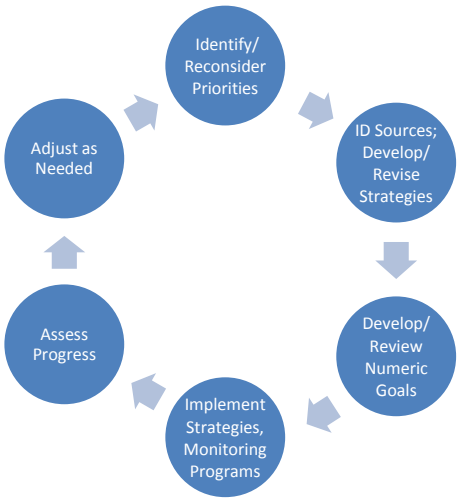


Figure ES-1. Water Quality Improvement Plan Implementation Process

1. The first phase~~ of development~~ identified the priority and highest priority water quality conditions for the watershed, along with potential water quality improvement strategies (Permit Provision B.2).
2. The second~~next~~ phase identified numeric goals for the highest priority water quality conditions in the watershed, strategies that the Copermittees and the City of Menifee will implement to achieve the numeric goals, and schedules for implementing strategies and attaining goals (Permit Provision B.3).
3. The third phase included development of a monitoring and assessment program to provide feedback to program managers.

During implementation, adaptive management will be utilized to assess progress towards goals and adjust the implementation process as needed.

Chapter 1 provides a brief overview of the SMR watershed and describes the extensive stakeholder process that contributed to the development of the Water Quality Improvement Plan. A Consultation Committee consisting of representatives from the San Diego Regional Water Quality Control Board (Regional Water Board), the environmental community, the development community, and at-~~-~~large members provided important feedback during development. The public participation process involved the following activities:

- A widely distributed data request to solicit data from the public;
- The public were invited to Consultation Committee meetings, when~~where~~~~n~~ they received updates on project progress and had the opportunity to provide comments;
- Updates on Water Quality Improvement Plan progress were provided through other watershed meetings that are open to the public; and
- Comments received from the public and the Consultation Committee were considered during the development of the Water Quality Improvement Plan.

PRIORITY WATER QUALITY CONDITIONS

Chapter 2~~ of this document~~ describes the process to determine priority water quality conditions (PWQCs) for the SMR watershed. To facilitate data analysis for the water quality prioritization process, the watershed was divided into three~~two~~ subwatersheds. ~~The Area Upstream from Vail Lake and Lake Skinner, and the~~~~The~~ The Upper, Middle, and Lower SMR Subwatersheds were delineated based on their hydrologic boundaries (Figure 1-1). The process to determine the PWQCs considered all available data and information on receiving water conditions, Clean Water Act Section 303(d) List of Water Quality Limited Segments (303(d) listings), Total Maximum Daily Loads (TMDLs) (established or in development), known impacts to beneficial uses, ~~storm drain~~MS4 contributions to water quality conditions~~ (note: the terms "storm drain" and "storm drain conveyance" are used synonymously with MS4 as defined in the Glossary of Terms, see **Chapter 7**),~~ ~~and~~ local knowledge about watercourse function, environmental values, community goals, habitat preservation, and input from members of the public and Consultation Committee. Data collected were used to conduct extensive analyses regarding the comparison between historic and current water quality conditions, constituent exceedances, beneficial use impacts, as well as contributions from ~~storm drain~~MS4s to receiving waters. Wet and dry weather conditions were considered independently, as water quality priorities can vary with season. All of these analyses

contributed to developing the list of PWQCs. Results show that on the whole, water quality during both dry and wet weather conditions observed in the watershed are trending towards improvement.

The highest priority water quality condition (HPWQC) was selected from the list of PWQCs. The HPWQC provides the basis for selecting watershed strategies and developing goals and schedules during the subsequent phases of Water Quality Improvement Plan development. The HPWQC was determined by evaluating each PWQC against ten criteria related to the extent and impact of the condition. Each PWQC was also evaluated for potential improvements in conditions of receiving water and ~~storm drain~~MS4 discharge quality that can be achieved. Based on the assessment, eutrophication was identified as the highest priority to address. (See **Table ES-1**)

Eutrophication was identified as the HPWQC largely due to 303(d) listings for nutrients, an existing TMDL in Rainbow Creek, the TMDL Alternative (under development) for nutrients and biostimulatory substances in the SMR Estuary and the watershed, the potential impact on beneficial uses from those conditions, the nutrient objective exceedances observed throughout the watershed, and the extent of potential improvements that could be achieved in the condition of the Watershed Management Area (WMA) and discharge quality from ~~storm drain~~MS4s. The eutrophication HPWQC includes two components: 1) eutrophication impacts (elevated algal biomass) and 2) nutrient loading to ~~TMDL~~ waterbodies with an adopted TMDL or listed as impaired, including dry weather nutrient loading from both ~~both the Upper~~ Middle, and Lower SMR Subwatersheds to address the TMDL Alternative for the SMR Estuary, and dry and wet weather nutrient loading to Rainbow Creek to address the Rainbow Creek Nutrient TMDL.

Table ES-1. Highest Priority Water Quality Condition (Eutrophication)

Beneficial Use Category	Highest Priority Water Quality Condition	Temporal Extent	Geographic Extent
Aquatic Life: Eutrophication	Eutrophication impacts (elevated algal biomass)	Dry	SMR Estuary [1], Warm Springs, Redhawk Channel [2]
	Nutrient loading to waterbodies with an adopted TMDL or listed as impaired~~waterbody~~	Dry	All ~~Upper~~ Middle and Lower SMR Subwatershed subareas ~~except Vail Lake~~, Fallbrook Creek and Sandia Creek[1]
		Wet	Rainbow Creek

1. ~~Storm drain~~MS4 discharges within the following subareas may reach the SMR Estuary during dry weather and contribute to the Eutrophication HPWQC in the Santa Margarita River Estuary: Upper Murrieta Creek and Tributaries, Warm Springs, Santa Gertrudis, Murrieta Creek and Long Canyon, Temecula Creek and Redhawk Channel, Upper Santa Margarita River, Lower Santa Margarita River, Rainbow Creek and De Luz Creek.
2. Other areas may be added as result of TMDL Alternative development during adaptive management process.

Chapter 3 of this document includes an assessment of potential sources within the watershed contributing to eutrophication and nutrient loading. The source assessment is based on a review of available data and information for potential sources that are likely to be present in the watershed. The main contributor to eutrophication was identified to be algal biomass. Excess algal biomass can be caused by nutrient loading of nitrogen and phosphorus. Such loading is primarily linked to land uses such as orchards, vineyards and nurseries, open scrublands and grasslands, and residential land uses. Additionally, irrigated agriculture was identified as a contributor of total nitrogen loading and roads as a contributor for total phosphorus loading. The mechanisms identified for these non-point source loads to reach a receiving water include stormwater runoff,

irrigation return flow (excess irrigation water that reaches a receiving water), and subsurface flow associated with shallow groundwater pathways.

WATER QUALITY IMPROVEMENT GOALS, STRATEGIES, AND SCHEDULES

Chapter 4 defines the goals developed to measure progress, the strategies to be implemented to achieve the goals, and the schedules for implementation of strategies and goal achievement. Through the implementation of strategies and an iterative, adaptive management approach, it is anticipated that the numeric goals will be achieved and the water quality will be improved. The strategies were developed with multiple benefits in mind. They were designed to address the HPWQC, as well as other PWQCs identified in **Chapter 2**.

Within the ~~Upper~~ Middle SMR Subwatershed, the Copermittees and the City of Menifee have the option of demonstrating compliance through one of six pathways. Each pathway includes interim goals, with at least one goal per Permit term, to demonstrate progress toward achieving the final goals. The final goals and timeframe for achieving the goals are based on the *proposed* allocations and schedule in the TMDL Alternative for the SMR Estuary. The Water Quality Improvement Plan goals and schedules may be revised through the adaptive management process, if necessary, to be consistent with the requirements for implementation ~~resolution for~~ the TMDL Alternative for the SMR Estuary ~~once it is adopted~~.

Within the Lower SMR Subwatershed, numeric goals and schedules were also developed for the Nutrient TMDL in Rainbow Creek. Compliance with the Rainbow Creek Nutrient TMDL final numeric goals can be met in one of five ways, similar to the approach for the eutrophication impacts HPWQC.

Given the different potential sources and jurisdictions in the Upper, Middle, and Lower SMR Subwatersheds, sets of strategies were developed for each jurisdiction in each subwatershed.

For the ~~Upper~~ Middle SMR Subwatershed, the Copermittees and the City of Menifee developed jurisdictional, optional jurisdictional, and optional watershed scale strategies to address the HPWQC. The Copermittees and the City of Menifee also developed an adaptive management approach to implement and evaluate strategies. Each Copermittee will develop and implement a Jurisdictional Runoff Management Program (JRMP) that contains strategies to address the requirements in Provisions E.2 through E.7 of the Permit. As required by the Santa Ana Phase I MS4 Permit, Menifee's jurisdictional program is laid out in its LIP rather than a JRMP. Jurisdictional programs, strategies, and all minimum best management practices (BMPs) established per each Copermittee's JRMP will be implemented across all areas within the respective jurisdiction upon~~within 90 days of~~ the Regional Water Board's acceptance of the Water Quality Improvement Plan.

Strategy implementation will also include enhanced jurisdictional strategies that are specific, locally appropriate, and focused in target areas. Program implementation will be evaluated on an annual basis, and overall progress toward achieving the final W~~w~~ater Q~~q~~uality I~~i~~mprovement P~~p~~lan goals will be assessed at five year intervals in the Report of Waste Discharge as required for National Pollutant Discharge Elimination System (NDPES) permit renewals. If triggered, and depending on the procurement of funding and necessary approvals, enhanced jurisdictional strategies will be implemented.

In the Lower SMR Subwatershed, San Diego County has developed jurisdictional strategies to address known and suspected sources identified within their inventories, including persistently

flowing outfalls and specific land use types (e.g., orchards, vineyards and nurseries, and residential land uses). Jurisdictional strategies target reductions in dry weather flow and address the types of land use sources that are within the ~~storm drain system~~MS4 drainage area. Specific structural strategies such as nutrient-sensitive biofiltration, wetland channels, stream restoration, and channel improvements have also been identified.

Schedules for strategy implementation reflect the time necessary to fully fund, develop, initiate, and complete the chosen strategies. Strategies with relatively high benefit outcomes and low resource requirements are scheduled for earlier implementation. Strategies planned for later years may have implementation requirements that depend on the outcomes of earlier strategies, or might have significant funding needs. Strategies, including schedules for implementation, are included in **Table 4-6** through **Table 4-11** and in **Table 4-14**.

MONITORING AND ASSESSMENT PLAN (MAP)

Chapter 5 outlines the Monitoring and Assessment Plan (MAP) for the SMR watershed to support assessment of progress toward numeric goals and schedules, progress addressing eutrophication and nutrient loading, and each agency's overall efforts to implement the Water Quality Improvement Plan. The SMR watershed MAP is designed with the overall goal of answering the following monitoring questions, which correspond to the numeric goals presented in **Chapter 4**:

- How much has total nitrogen and total phosphorus loading been reduced in the SMR watershed?
- How much has non-storm water flow been reduced at Copermittee outfalls?
- How much has total nitrogen and total phosphorus loading been reduced at Copermittee outfalls?
- Are there sources of pollutants outside of Copermittee control that are causing exceedances of targets?

These questions will be answered through a multi-pronged monitoring approach that includes water quality monitoring in creeks and rivers, the SMR Estuary, and at major outfalls~~in storm drains~~ discharging to these waterbodies.

ITERATIVE APPROACH AND ADAPTIVE MANAGEMENT

Chapter 6 outlines the adaptive management process that will be used to evaluate and adapt the Water Quality Improvement Plan. The adaptive management process will be implemented using data~~,~~ collected as part of the MAP, to evaluate whether modifications to goals, schedules, and/or strategies are necessary. Triggers that may prompt program modification include persistent exceedances of water quality standards in receiving waters, new information (e.g., ~~adopted~~ TMDL Alternative implementation requirements, new regulations, etc.), Regional Water Board recommendations, and input received during the public participation process.

1 Introduction

1.1 PURPOSE OF THE WATER QUALITY IMPROVEMENT PLAN

The purpose of this Water Quality Improvement Plan (WQIP) is to guide the development and implementation of jurisdictional runoff management programs of the Counties of Riverside and San Diego, the Riverside County Flood Control and Water Conservation District (RCFCWCD), and the Cities of Murrieta, Temecula, and Wildomar (hereafter referred to as the Copermittees), as well as the City of Menifee, towards achieving the outcome of improved water quality in MS4 (Municipal Separate Storm Sewer System) ~~storm drain~~ discharges and receiving waters within the Santa Margarita River (SMR) watershed management area (WMA). ~~(Note: The terms "storm drain" and "storm drain conveyance" are used synonymously with Municipal Separate Storm Sewer System (MS4) as defined in the Glossary of Terms, see Chapter 7.)~~

1.2 REGULATORY BACKGROUND

On May 8, 2013, the California Regional Water Quality Control Board (RWQCB) - San Diego Region (Regional Water Board) adopted Order No. R9-2013-0001; National Pollutant Discharge Elimination System (NPDES) Permit No. CAS0109266, NPDES Permit and Waste Discharge Requirements (WDRs) for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds within the San Diego Region (Permit). The Permit was amended by Order No. R9-2015-0001 and Order No. R9-2015-0100 in 2015 to include all participating agencies (Copermittees) in the San Diego Region. The most recent amendment (Order No. R9-2015-0100), which enrolled the Riverside County Copermittees, became effective on January 7, 2016. The Permit covers portions of the counties of San Diego, Orange, and Riverside that reside within the Regional Water Board's jurisdiction.

The Permit has two primary goals[1]:

1) Bring a consistent set of permit requirements to all of the Copermittees within the San Diego Region; and
2) Provide permit requirements that will allow the Copermittees to focus their efforts and resources on achieving goals and desired outcomes toward the improvement of water quality rather than completing specific actions.

As such, the Permit incorporates a strategic planning component that includes short-term and long-term goal setting as well as a requirement to develop a comprehensive program to further the Clean Water Act's objective to protect, preserve, enhance, and restore the water quality and designated beneficial uses of the waters of the state.

The Permit requires two types of planning efforts and plans:

1) Water Quality Improvement Plans (WQIPs) - developed on a watershed basis, these plans identify the highest priority water quality condition(s) (HPWQC(s)) in a

[1] Permit, Attachment F, page F-16.

watershed as well as the goals, strategies, and schedules to improve discharge and receiving water quality.

2) Jurisdictional Runoff Management Plans (JRMPs)[2] – developed on a jurisdictional basis, describe how the individual Copermittees implement the Permit requirements, these plans provide a way for the Permittees to demonstrate that they are implementing programs to effectively prohibit non-stormwater discharges to the MS4storm drain system and reduce pollutants in stormwater discharges from MS4sstorm drains to the Maximum Extent Practicable (MEP). The JRMPs must also identify how the Water Quality Improvement Plan strategies will be implemented within each jurisdiction.

Permit Provisions B.1 through B.6 identify the technical requirements that must be addressed during the development and implementation of the Water Quality Improvement Plan.

- Provision B.1 – Watershed Management Areas - describes the WMAs and responsible agencies covered under the Permit.
- Provision B.2 – Priority Water Quality Conditions - provides the requirements for assessing and determining the priority water quality conditions for the watershed.
- Provision B.3 – Water Quality Improvement Goals, Strategies, and Schedules - contains requirements for developing the goals, strategies, and schedules to guide implementation.
- Provision B.4 – Water Quality Improvement Monitoring and Assessment Program - addresses the monitoring and assessment program that is required to support implementation and assess progress.
- Provision B.5 – Iterative Approach and Adaptive Management Process - describes the iterative approach and the adaptive management process that will be implemented over time to make improvements to the Water Quality Improvement Plan.
- Provision B.6 – Water Quality Improvement PlanWQIP Submittal, Updates, and Implementation - specifies the submittal and update requirements for the Water Quality Improvement Plan.

These provisions were adhered to during the development of this Water Quality Improvement Plan.

1.2.1 RCFCWCD and the City of Menifee

Unlike cities and counties, the RCFCWCD does not own or operate any sanitary sewer systems, public streets, roads, or highways. In 1945, the California State Legislature enacted Act 6642 creating the RCFCWCD. The Act empowered the RCFCWCD to manage flood risk and conserve stormwater for groundwater recharge. In coordination with the United States Army Corps of Engineers, the RCFCWCD developed and constructed a comprehensive system that provides for the regulation and control of flood waters through the use of reservoirs and flood channels. The RCFCWCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The RCFCWCD has no planning, zoning, development permitting, or other land use authority within its service area.

[2] Strategies for the City of Menifee are described in its equivalent plan referred to as Local Implementation Plan (LIP).

The City of Menifee is located primarily within the geographic jurisdiction of the Santa Ana RWQCB, but a small portion of the city, totaling less than 1.3 square miles, is within the SMR WMA~~watershed~~, which is in the geographic jurisdiction of the San Diego RWQCB. Per the Regional Water Board Designation Letter dated October 26, 2015, the entire City of Menifee, including the portion within the SMR watershed, is regulated under the Santa Ana Region MS4 Permit (Order No. R8-2010-0033, as it may be amended or reissued) except for certain provisions specified in the Regional Water Board Designation Letter. One of these provisions is that the City of Menifee is required to participate in the development and implementation of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ for the SMR WMA. Furthermore, the Regional Water Board Designation Letter states that, "The San Diego Water Board shall continue to regulate the City of Menifee under the San Diego Phase I MS4 Permit for the limited purpose of implementing any applicable TMDL."

1.3 PHYSICAL SETTING

The SMR WMA is a unique area because it is the least disturbed watershed along the Southern California coast, and the Santa Margarita River is the longest free flowing, undammed river in the region. The lower 27 miles of the SMR and its estuary~~ have remained relatively undeveloped,~~ are not channelized~~,~~ and support a large population of federally- or state-listed endangered species~~.~~ (County of San Diego, 2005). The SMR WMA encompasses a total area of approximately 741 square miles, spans the southern border of Riverside County and the northern border of San Diego County, and is bordered to the south by the San Luis Rey Watershed and to the west by the San Mateo Creek, Las Flores Creek, and Aliso Creek Watersheds. The watershed is comprised of the following waterbodies: Diamond Valley Lake, Lake Skinner, Vail Lake, Murrieta Creek, Temecula Creek, the SMR, and the SMR Estuary. The ~~Upper~~ Middle SMR Subwatershed includes two major basins, drained by Murrieta and Temecula Creeks.

Murrieta Creek flows between two lengthy strands of the Elsinore fault zone on land that has been down dropped, relatively, by the faulting. Murrieta Creek flows southeasterly from the Wildomar area through the cities of Murrieta and Temecula to the confluence with Temecula Creek. Murrieta Creek and its tributaries drain approximately 222 square miles, with over 50 square miles tributary to Skinner Reservoir, in the northwest portion of the watershed. Temecula Creek has a drainage area of 366 square miles, with steep rugged topography in the Palomar and Thomas Mountain areas and rolling hills below. The upper 316 square miles of this basin is controlled by Vail Lake (completed in 1949).

At the Elsinore fault zone, located at the top of Temecula Gorge and near the City of Temecula, Temecula and Murrieta Creeks merge forming the Santa Margarita River. The Temecula Gorge and Santa Ana Mountains just south of the confluence of the Temecula and Murrieta Creeks serve as a natural barrier delineating the ~~Upper~~ Middle and Lower SMR Subwatersheds. (Rancho California Water District, 2014) From this point, the river flows through the Temecula Gorge and then west into San Diego County for approximately thirty miles before ultimately draining to the SMR Estuary and into the Pacific Ocean.

1.4 SMR WMA SUBWATERSHED AREAS

For purposes of this analysis, the SMR WMA has been divided into three subwatersheds (Figure 1-1):

- The ~~Area Upstream of Vail Lake and Lake Skinner, the Eastern~~ Upper~~most~~ SMR Subwatershed;

The ~~Upper~~Middle SMR ~~W~~Subwatershed; and

The Lower SMR ~~W~~Subwatershed.

The ~~Eastern Uppermost~~Upper SMR Subwatershed includes all the area in the SMR WMA which drains to the three major manmade lakes: Diamond Valley Lake, Lake Skinner, and Vail Lake; and comprises approximately 385 square miles. Approximately 316 square miles of the subwatershed drain to Vail Lake, 51~~69~~ square miles drain to Lake Skinner, and 18~~x~~ square miles of undeveloped area drain to Diamond Valley Lake. Land uses for the subwatershed are shown in Figure 3-1. The ~~Eastern Uppermost~~Upper SMR Subwatershed includes the following entities/areas:

County of Riverside – 55% of the land area (213 square miles)

- Anza[3] – 12% of the County of Riverside land area (25 square miles)
- Aguanga[3] – 6% of the County of Riverside land area (14 square miles)
- Lake Riverside[3] – 3% of the County of Riverside land area (7 square miles)

Tribal, State and Federal lands – 37% of the land area (143 square miles)

County of San Diego – 8% of the land area (29 square miles)

RCFCWCD – <0.01% of the land area (0.013 square miles)

The ~~Upper~~Middle SMR Subwatershed is located inland along and east of the I-15 corridor and is approximately 201 square miles. The ~~Upper~~Middle SMR Subwatershed includes the following entities/areas:

County of Riverside – 53% of the land area (106 square miles)

City of Murrieta – 16% of the land area (33 square miles)

City of Temecula – 15% of the land area (30 square miles)

City of Wildomar – 8% of the land area (16 square miles)

Tribal, State and Federal lands – 6% of the land area (12 square miles)

City of Menifee – 1% of the land area (2 square miles – 815 acres)

RCFCWCD – 1% of the land area (2 square miles – 836 acres)

County of San Diego – <0.1% of the land area (0.13 square miles)

The Lower SMR Subwatershed spans the area downstream of the Temecula Gorge entrance to the Pacific Coast and is approximately 156 square miles. The Lower SMR Subwatershed includes the following entities/areas:

Tribal, State and Federal lands – 46% of the land area (71 square miles)

County of San Diego – 28% of the land area (43 square miles)

[3] Census Designated Area

County of Riverside – 26% of the land area (40 square miles)

City of Temecula – 1% of the land area (1 square mile – 738 acres)

Vail Lake, Lake Skinner, and Diamond Valley Lake are operated to provide potable water supply. The 44,200 acre-feet Lake Skinner was formed by construction of a dam on Tucalota Creek. Vail Lake is a 49,370 acre-feet reservoir located at the confluence of Temecula Creek, Wilson Creek, and Kolb Creek. Diamond Valley Lake is Southern California's largest reservoir with a capacity of approximately 810,000 acre-feet (264 billion gallons). Diamond Valley Lake covers 4,500 surface acres and holds enough water to meet the area's emergency and drought needs for six months. Vail Lake, Lake Skinner, and Diamond Valley Lake provide important resources for municipal water supply for use by local water agencies. Vail Lake is owned by Rancho California Water District (RCWD); Diamond Valley Lake and Lake Skinner are owned by the Metropolitan Water District of Southern California.

Vail Lake and Skinner Lake capture the majority of incoming flows from Temecula Creek, Wilson Creek, Kolb Creek, and Tucalota Creek. These lakes are operated based on water supply and groundwater recharge considerations, and not for flood control purposes. Virtually all runoff received in these reservoirs is conserved for municipal, industrial, and agricultural use. Nonetheless, the storage capacity of each reservoir typically allows most storm events to be captured and stored. At these reservoirs, the majority of flows are contained and are only released into the downstream channels during higher magnitude storm events or when a series of back-to-back storms occurs. For example, storm flows have only been released from Vail Lake during two storm seasons since 1947. Lake Skinner has not released uncontrolled storm flows since 1975. Diamond Valley Lake releases flows to downstream drainage channel only in emergencies.. Therefore, the ~~Area Upstream of Vail Lake and Lake Skinner~~Upper SMR Watershed is hydrologically disconnected from the ~~Upper~~Middle SMR Watershed in all but the very largest storms or storm series.

In most years, controlled releases from Vail Lake during the wet season (November – April) are infiltrated in the extensive Valle de los Caballos spreading basins. Although RCWD is required to meet in-stream flow requirements at the Temecula Gorge by releasing 4,000 acre-feet of water per year, this requirement is currently met by a separate discharge of untreated imported water directly into Murrieta Creek, and not by any releases from Vail Lake.

Beneficial Uses for the streams in the SMR WMA are shown in Appendix 2. However, the lakes also have important Beneficial Uses including:

- MUN: Municipal and Domestic Supply
- AGR: Agricultural Supply
- IND: Industrial Service Supply
- PROC: Industrial Process Supply
- GWR: Ground Water Recharge (potential Beneficial Use for Lake Skinner)
- REC-1: Contact Water Recreation (limited to fishing from shore or boat)
- REC-2: Non-contact Water Recreation
- WARM: Warm Freshwater Habitat
- WILD: Wildlife Habitat

- POW: Hydropower Generation (Diamond Valley Lake only)

The WQIP recognizes the importance of protecting the lakes from any adverse water quality impacts. The importance of these lakes is called out in the Basin Plan (Section XX):

> "The water resources with the greatest diversity of beneficial uses in the Region are the manmade water storage reservoirs and lakes. Located in nearly all of the Region's hydrologic units, these reservoirs and lakes intercept surface runoff and store imported water supplies.
>
> As such, the storage reservoirs serve as: (1) sources of supply for municipalities, agricultural areas, and industrial operations; (2) recreational bodies; and (3) habitats for fish and wildlife. In a few cases, such as reservoirs used primarily for drinking water, REC-1 uses can be restricted or prohibited by the entities that manage these waters. Many of these reservoirs, however, are designated as potential for REC-1, reflecting federal Clean Water Act goals."

Population

The Upper SMR Subwatershed has very low population density compared to the Middle SMR Subwatershed (Figure 1-2). Recent estimates from the California Department of Finance 2017 show that there are 321,150 people living in the entire SMR WMA, whereas 2010 Census data shows approximately 15,400 people (5% of the total WMA population) live in the Upper SMR Subwatershed, which comprises approximately 52% of the total SMR WMA. Overall, the population density is low relative to the other subwatersheds. The census-designated areas of Anza, Lake Riverside, and Aguanga, and an area east of Lake Skinner contain most of the population. The small area of density shown in the southwestern corner of the WMA in San Diego County in Figure 1-2 is part of a larger census tract that contains Pala Reservation, and most of the population is actually in the San Luis Rey watershed. There is very little developed land in this area.

Infrastructure

Drainage facilities, roads, and receiving waters identified in the Basin Plan are shown in Figure 1-3. There is very limited drainage infrastructure present in the subwatershed. There are two facilities owned by the RCFCWCD: 1) Anza Creek Channel is a 3,500-foot long 30-foot wide X 7-foot deep trapezoidal concrete drainage channel adjacent to and on the south side of Highway 371 in the Anza area; 2) Sage Road Bridge over Wilson Creek is an approximately 750-foot long bridge and a 1.25 acre vegetated mitigation area. Figure 1-3 also shows 115 culverts owned by the County of Riverside that are primarily associated with County roads. No major outfalls have been identified within this portion of the WMA within either Riverside or San Diego County.

Roads

The County of Riverside owns and maintains Primary, Secondary and lesser roads in the subwatershed as shown in Figure 1-3. Most roads lack curb and gutter, and storm runoff from these roads is managed by infiltration along the road shoulders, by conveying flows under roads via culverts, in some cases surface drainage in natural channels flows over and across roads. Storm runoff may also flow along roadside ditches for short distances. The County of San Diego maintains one single road in this portion of the WMA. The road cuts across the south eastern portion of the WMA through a sparsely populated area for about 6 miles. The county maintains approximately 35 culverts along this road.

Tribal, State, and Federal Lands

The Upper SMR Subwatershed contains large areas of land that are outside the jurisdiction of the counties of Riverside and San Diego, including the Cahuilla, Pechanga, and Ramona Reservations, National Forest and Bureau of Land Management Lands, and the San Felipe Valley Wildlife Area managed by the California Department of Fish and Wildlife (Figure 1-2). These areas comprise approximately 37% of the Upper SMR Subwatershed.

~~The 44,200 acre-feet Lake Skinner was formed by construction of a dam on Tucalota Creek. Vail Lake is a 49,370 acre-feet reservoir located at the confluence of Temecula Creek, Wilson Creek, and Kolb Creek. Diamond Valley Lake is Southern California's largest reservoir with a capacity of approximately 810,000 acre-feet (264 billion gallons). Diamond Valley Lake covers 4,500 surface acres and holds enough water to meet the area's emergency and drought needs for six months. Vail Lake, Lake Skinner, and Diamond Valley Lake provide important resources for municipal water supply for use by local water agencies. The lakes capture the majority of incoming flows from Temecula Creek, Wilson Creek, Kolb Creek, and Tucalota Creek.~~

~~Vail Lake and Skinner Lake are operated based on water supply and groundwater recharge considerations, and not for flood control purposes. Virtually all runoff received in these reservoirs is conserved for municipal, industrial, and agricultural use. Nonetheless, the storage capacity of each reservoir induces a management of peak flow rates and durations during storm events. At these reservoirs, the majority of flows are contained, as stormwater may only overtop the spillway(s) and be discharged into the downstream channels during higher magnitude events (10-year and higher magnitude events).~~

~~Due to this storage capacity, peak flow rates during major flow events downstream of the lakes will be lower than under natural conditions (assuming average storage conditions in the reservoirs) (PWA, 1998). The lakes effectively create a hydrologic disconnect between the eastern portion of the watershed, shown in green in **Figure 1-1**, and the rest of the watershed during dry weather and lower magnitude storm events (less than 10-year events).~~

~~The Upper SMR Subwatershed is located inland along and east of the I-15 corridor and is approximately 585 square miles. The Upper SMR Subwatershed includes the following entities/areas:~~

~~County of Riverside – 53% of the land area (308 square miles)~~

~~Tribal, State and Federal lands – 30% of the land area (177 square miles)~~

~~City of Murrieta – 6% of the land area (33 square miles)~~

~~City of Temecula – 5% of the land area (30 square miles)~~

~~City of Wildomar – 3% of the land area (16 square miles)~~

~~County of San Diego – 3% of the land area (20 square miles)~~

~~City of Menifee – <0.5% of the land area (1.27 square miles – 815 acres)~~

~~RCFCWCD – < <0.5% of the land area (1.3 square miles – 836 acres)~~

~~The Lower SMR Subwatershed spans the area downstream of the Temecula Gorge entrance to the Pacific Coast and is approximately 156 square miles. The Lower SMR Subwatershed includes the following entities/areas:~~

~~Tribal, State and Federal lands – 46% of the land area (71 square miles)~~

~~County of San Diego – 28% of the land area (43 square miles)~~

~~County of Riverside – 26% of the land area (40 square miles)~~

~~City of Temecula – 1% of the land area (1 square mile – 738 acres)~~

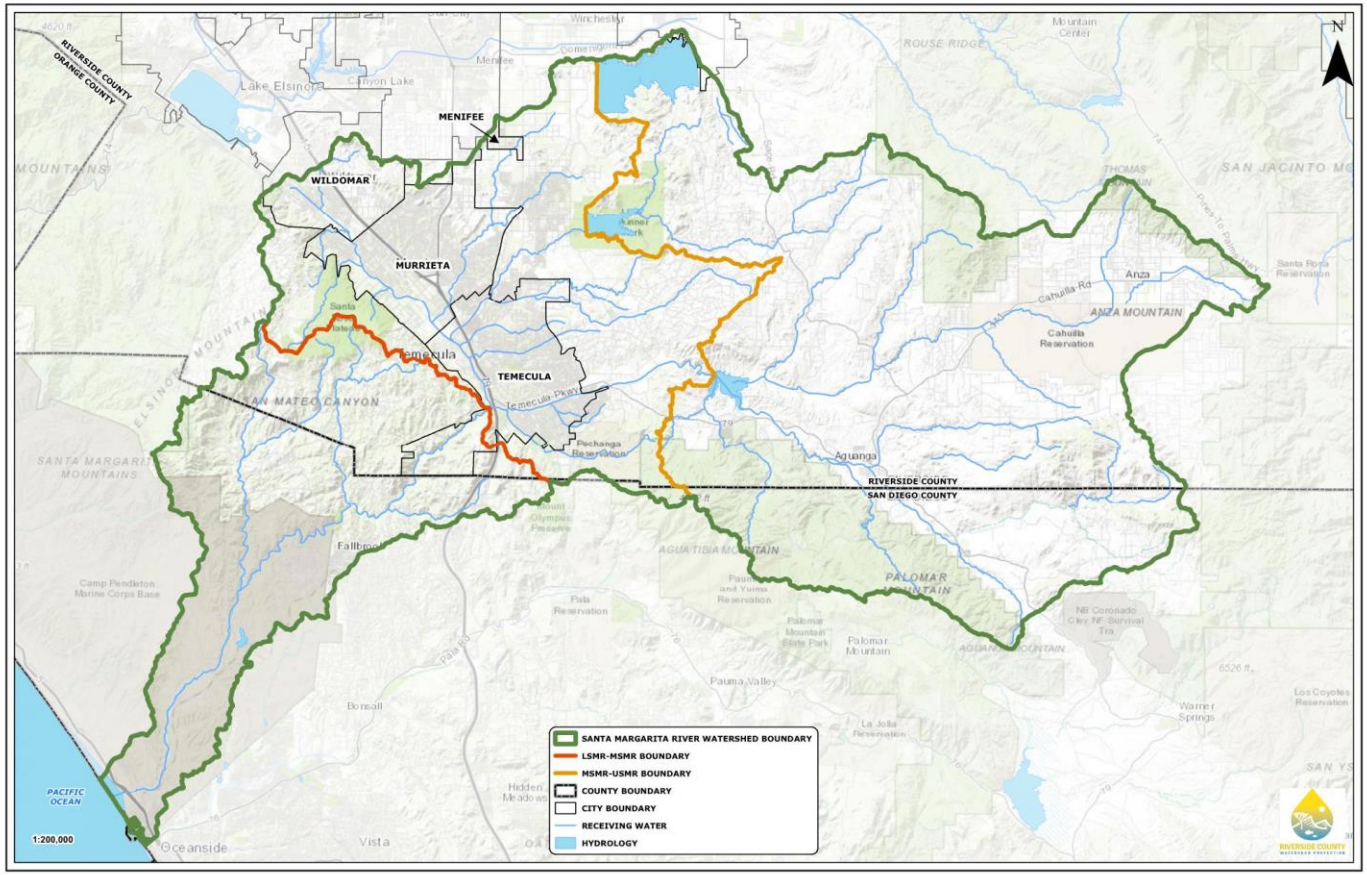


Figure 1-1. Santa Margarita River Watershed Management Area

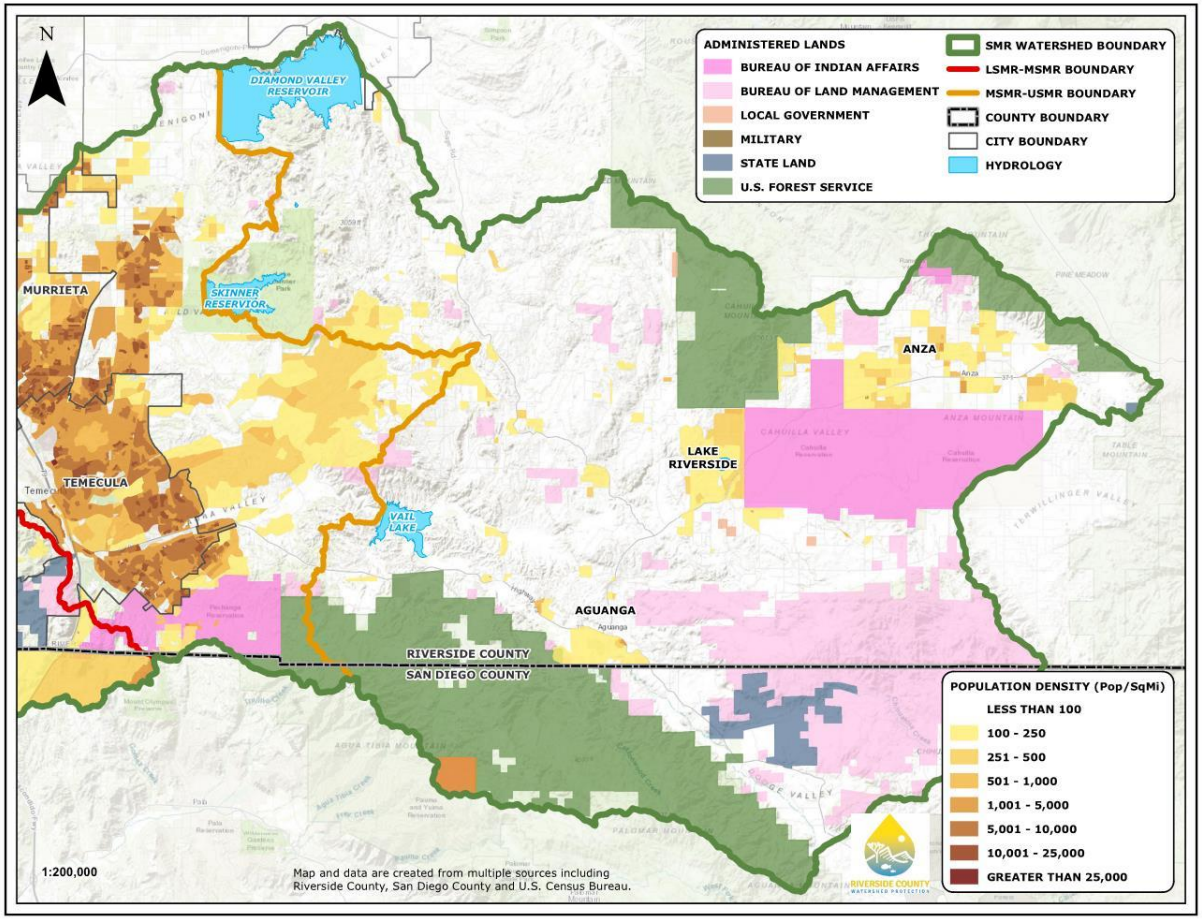


Figure 1-2. Population Density in the Upper SMR Subwatershed

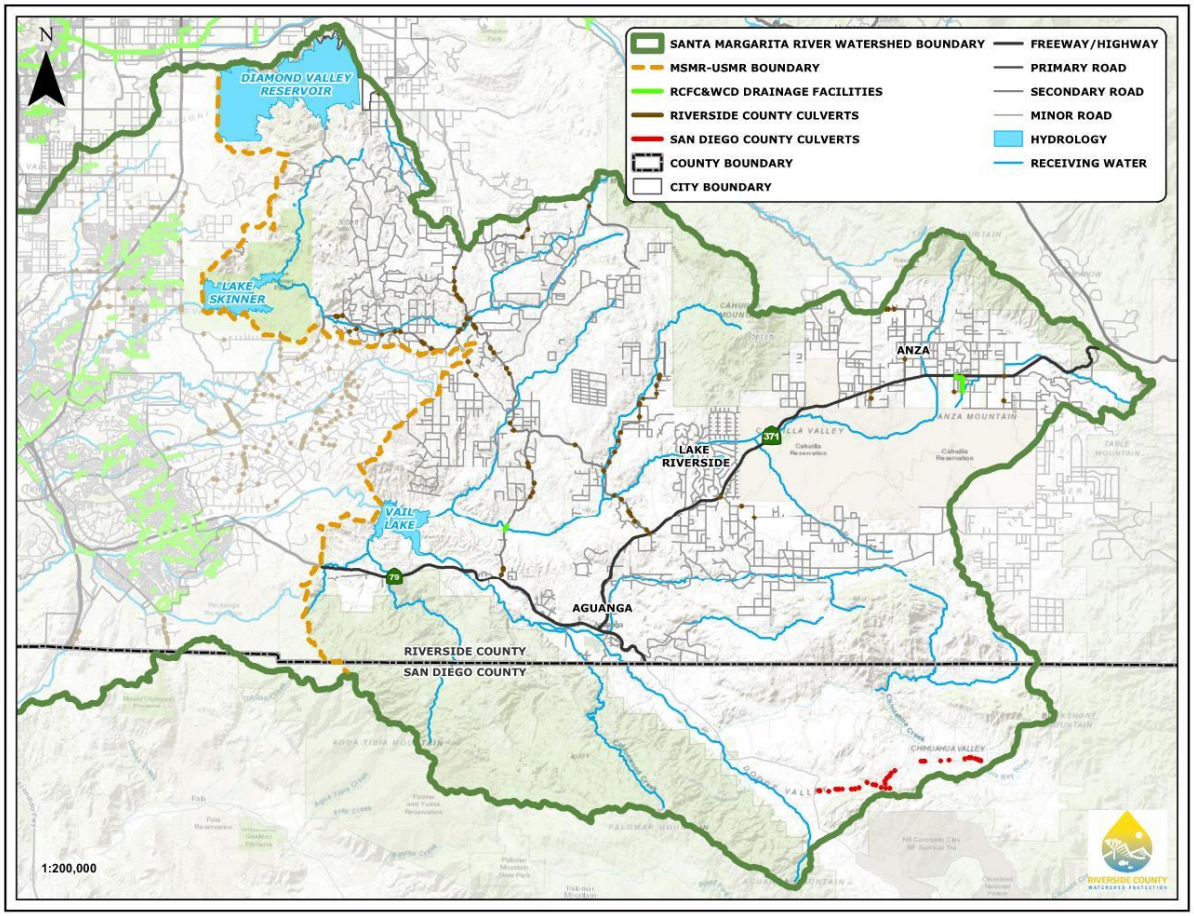


Figure 1-3. Infrastructure in the Upper SMR Subwatershed

~~1.4~~1.5 WATER QUALITY IMPROVEMENT PLAN DEVELOPMENT AND IMPLEMENTATION PROCESS

The W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ has been developed in three phases, according to the process described within the Permit (Provision F.1).

Phase 1: Priority water quality conditions, the high priority water quality conditions, potential sources, and potential water quality improvement strategies were identified (Provision B.2).

Phase 2: Numeric goals for the HPWQC and strategies that the Copermittees and the City of Menifee will implement to achieve the numeric goals were developed (Provision B.3).

Phase 3: A monitoring and assessment program was designed to provide feedback to program managers on progress towards goals (Provision B.4).

An adaptive management process will be utilized during implementation to assess progress towards goals and adjust the implementation process as needed (Provision B.5). The process for implementation of the ~~Water Quality Improvement Plan~~WQIP is outlined in **Figure 1-42~~Figure 1-42~~~~Figure 1-2~~**.

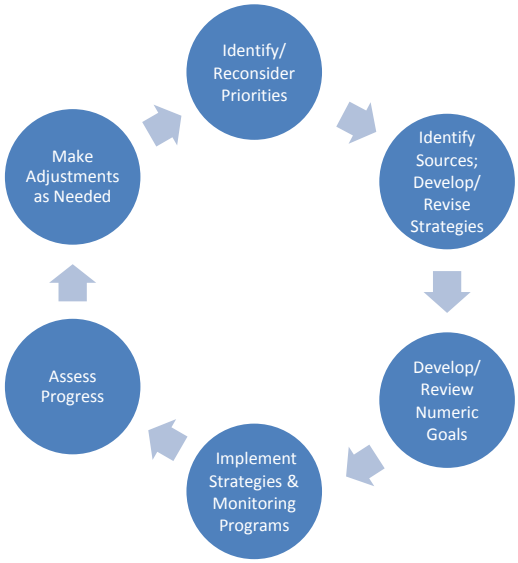


Figure 1-42. Water Quality Improvement Plan Implementation Process

~~1.4.1~~1.5.1 Document Overview

The ~~Water Quality Improvement Plan~~WQIP is organized into seven chapters. **Chapters 2 - 6** address specific Permit requirements for Plan development (**Table 1-1**). **Chapter 7** contains a glossary of terms and **Chapter 8** contains a list of references cited within the document.

Table 1-1. Structure of the Water Quality Improvement Plan and Associated Permit Requirements

Chapter Content	Permit Requirements Addressed (Provision)
Chapter 1. Introduction	
Chapter 2. Priority Water Quality Conditions	
Water quality priorities identified after evaluating receiving water conditions and impacts from MS4~~storm drain~~ discharges and potential water quality improvement strategies.	B.2.a-c. Priority Water Quality Conditions
Chapter 3. Identification of MS4 Sources of Pollutants and/or Stressors	
An analysis to identify and prioritize known and suspected sources of stormwater and non-stormwater pollutants associated with MS4s~~storm drain~~ discharges that may cause or contribute to eutrophication or nutrient loading within the watershed.	B.2.d. Identification of MS4 Sources of Pollutants and/or Stressors B.2.e. Identification of Potential Water Quality Improvement Strategies
Chapter 4. Water Quality Improvement Goals and Schedules	
Watershed interim and final goals, along with strategies and schedules developed to achieve the goals.	B.3 Water Quality Improvement Goals, Strategies and Schedules
Chapter 5. Monitoring and Assessment Program	
Integrated Monitoring and Assessment Program developed based on the requirements of the Permit and Plan process.	B.4. Monitoring and Assessment Program D. Monitoring and Assessment Program Requirements
Chapter 6. Iterative Approach and Adaptive Management	
Elaboration on the adaptive management processes, including the frequencies of adaptation required by the Permit (annual versus once per Permit term), triggers, and resulting actions.	B.5 Iterative Approach and Adaptive Management
Chapter 7. Glossary of Terms	
Chapter 8. References	

In addition, as part of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~'s development, the Copermittees and the City of Menifee ~~have~~ created a "crosswalk" to identify which Permit provisions are addressed in specific document sections (**Appendix 1A**). This crosswalk is intended to ease the review process and is based on the Permit checklist used by the Regional Water Board to evaluate the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~. The crosswalk includes Permit requirements, comments from the Regional Water Board based on their review of the draft documents, and responses by agencies to comments based on revisions to the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~.

~~1.4.2~~1.5.2 Public Participation Process

The Copermittees and the City of Menifee implemented a public participation process as part of Plan development in accordance with Permit Provision F. The process included data solicitation, the formation and participation of a Consultation Committee, presentations at public meetings and other outreach to the community, and participation in the Santa Margarita River Nutrient Initiative Group (SMRNIG), to provide opportunities for public input on the W~~ater~~ Q~~uality~~ I~~mprovement~~

P~~lan~~. Drafts of the priority water quality conditions, numeric goals, water quality improvement strategies, and schedules were submitted to the Regional Water Board as required and were subsequently posted for public review. Feedback and comments received during Plan development were considered in the process and helped to shape the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~.

~~1.4.2.1~~1.5.2.1 Data Solicitation

On April 22, 2016, the Copermittees issued a public request for data to a distribution list of 83 interested parties, and posted the data solicitation on the RCFCWCD's website, allowing 30 days for submittal of information. The data solicitation closed on May 23, 2016. The notice requested any available quantitative or qualitative data related to water quality within the watershed. Although widely distributed and targeting relevant stakeholders, as well as the general public, no data was received in response to the data solicitation. As a follow-up, Copermittees and the City of Menifee requested and received water quality data from the SMRNIG which was incorporated into the analysis and assisted in prioritization of water quality conditions.

~~1.4.2.2~~1.5.2.2 Consultation Committee

The Copermittees and the City of Menifee formed a Consultation Committee to receive recommendations during the development of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ (Provision F.1.a.(1)(b)). The Permit includes requirements for the Consultation Committee to review and provide recommendations at key points during the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ development process. Feedback from the Committee is vital to the development of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~. The Consultation Committee consisted of representatives from the Regional Water Board, the environmental community, the development community, community organizations, neighborhood groups, and businesses all sharing a commitment to improve water quality. The Consultation Committee included the following individuals:

Required Members

Erica Ryan (San Diego Regional Water Quality Control Board)

Terri Biancardi (Environmental Community)

Dr. Mark Grey, Clint Lorimore (*alternate*) (Development Community)

At Large Members

Ben Drake (Temecula Winegrowers Association)

Andy Domenigoni (Riverside County Farm Bureau)

Kyle Cook (Camp Pendleton Marine Base)

Pablo Bryant (Santa Margarita Ecological Reserve)

Laurie Correa (Western Riverside County Regional Conservation Authority)

Rick Neugebauer (Temecula/Elsinore/Anza/Murrieta Resource Conservation District (TEAM-RCD))

The Copermittees and the City of Menifee hosted three Consultation Committee meetings during development of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~. The meetings were all open to the public, were held at varied times and locations, and publicly noticed to provide ample time and opportunity for the public to participate. Dates and content of the Consultation Committee meetings are

summarized in **Table 1-2**. A summary of comments received and their consideration within Plan development are included in the Public Review Process discussion in **Section 1.5.2.5~~1.5.2.5~~~~1.4.2.5~~**.

Table 1-2. Summary of Consultation Committee Meetings

Consultation Committee Meeting Date/Location	Key Content of the Meeting
September 7, 2016 Rancho California Water District	• Overview of the Planning Process • Preliminary Prioritization Methodology • Results and Initial Priority Water Quality Conditions • Potential Water Quality Improvement Strategies
May 17, 2017 City of Wildomar	• Revisions to the Prioritization Process • Priority Water Quality Conditions • Proposed goal and schedules • Overview of strategies and schedules • Watershed Management Area Analysis
October 17, 2017 City of Temecula	• Watershed Management Area Analysis Updates • Monitoring and Assessment Program • Adaptive Management

~~1.4.2.3~~1.5.2.3 Additional Public Participation

In August 2017, the issue of poor attendance at public meetings convened to support Water Quality Improvement Plan development in the San Juan WMA was discussed with RWCQB staff. Arising from this discussion was agreement to implement an alternate approach based on presentations at scheduled council meetings. This approach was accepted, contingent upon informational materials being clearly made available to all individuals attending the meeting and the presentations, including a request for further public engagement. Based on this acceptance, presentations on the SMR W~~ater~~ Quality I~~mprovement~~ P~~lan~~ were made at the following council meetings:

October 24, 2017 – City Council Presentation, City of Temecula

November 1, 2017 – City Council Presentation, City of Menifee

November 7, 2017 – City Council Presentation, City of Murrieta

November 8, 2017 – City Council Presentation, City of Wildomar

The same presentation was also provided to the following County Supervisors:

October 18, 2017 – Supervisor Washington briefing, Riverside County Administration Center

October 30, 2017 – Supervisor Jeffries briefing, Riverside County Administration Center

In addition to the presentations, the Copermittees participated in the following public meetings and events to solicit input on the ~~Water Quality Improvement Plan~~WQIP:

June 1, 2016 – Upper Santa Margarita River Watershed Integrated Regional Water Management Region Stakeholder Meeting

July 12, 2016 – Riverside County Board of Supervisors Meeting

August 9, 2016 – City Manager's Roundtable Meeting

September 7, 2016 – Upper Santa Margarita River Watershed Integrated Regional Water Management Region Stakeholder Meeting

January 19, 2017 – Western Riverside Council of Governments (WRCOG) Technical Advisory Committee

January 30, 2017 – Meeting with City Managers and Public Works Directors

April 22, 2017 – RCFCWCD booth at the Earth Day Celebration

June 7, 2017 – Upper Santa Margarita River Watershed Integrated Regional Water Management Region Stakeholder Meeting.

~~1.4.2.4~~1.5.2.4 Santa Margarita River Nutrient Initiative Group (SMRNIG)

The Copermittees also regularly participate in the SMRNIG which includes cities and counties, utility districts, Caltrans, scientists, tribes, non-governmental organizations (NGOs), United States Geological Survey (USGS), Camp Pendleton, Farm Bureau, and RWQCB staff that periodically meet to focus on nutrient-~~-~~related issues in the SMR Estuary. While the SMRNIG did not participate directly in W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ development, they have conducted extensive modeling efforts in support of a Total Maximum Daily Load (TMDL) Alternative for the SMR Estuary for nutrients, and their work has provided valuable insight and scientific information used in the development of this Plan. With respect to the SMR Copermittees, this W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ will be a key~~the~~ implementation mechanism for the TMDL Alternative. The TMDL Alternative is expected to be activated through the issuance of an Investigative Order by the Regional Water Board. For simplicity, hereinafter this WQIP will use the term "TMDL Alternative" to refer to this action, pending finalization of the implementation approach to be conducted by the Regional Water Board. Further discussion of the TMDL Alternative process and how it dovetails with the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ is provided in **Chapters 2, 3,** and **4**.

~~1.4.2.5~~1.5.2.5 Public Review Process

In addition to public outreach conducted and input received during development ~~to~~ of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~, **Chapters 2** and **3** underwent ~~a~~ formal public review processes upon submittal to the Regional Water Board.

~~1.4.2.5.1~~1.5.2.5.1 Chapter 2 – Priority Water Quality Conditions and Potential Strategies

Following the first Consultation Committee meeting, draft work products of **Chapter 2** were distributed to the Consultation Committee for review and feedback in September 2016. Draft work products distributed included:

- Summary table of the Clean Water Act Section 303(d) List of Water Quality Limited Segments (303(d) listings) in the watershed,
- Summary table of the datasets used in the evaluation of water quality conditions,

- Maps of the monitoring locations within the watershed,
- Flowchart describing the draft prioritization process,
- Summary tables showing the results of the ranking process (including all evaluations and scoring), and
- Table of potential strategies to address the priority and highest priority water quality conditions identified for the watershed.

In September 2016, the Copermittees and the City of Menifee received two sets of comments from members of the Consultation Committee. To keep the Consultation Committee informed of progress and direction, Copermittees and the City of Menifee provided drafts of the Executive Summary and section related to Highest Priority Water Quality Conditions with updated results for review and additional comments on November 23, 2016. Several sets of comments were received from Consultation Committee members, including one set of written comments from the Regional Water Board received on December 8, 2016.

The initial complete draft of **Chapter 2** (Priority Water Quality Conditions) considered and addressed all comments received, as appropriate, and was submitted to the Regional Water Board on January 5, 2017 and subsequently released for public comment. The public comment period ended on February 20, 2017. Comment letters were received from one member of the public on January 22, 2017 and from the Regional Water Board on March 30, 2017. All comments received were considered in revisions to **Chapter 2**. The primary focus of the comments was related to the process to identify priority water quality conditions (PWQCs) and the HPWQC(s) for the watershed and source information (i.e., municipal parks and landfills).

All comments received during development of **Chapter 2** are included in the crosswalk provided in **Appendix 1A** and **Appendix 1B** and have been considered and addressed as appropriate.

In response to comments received from the Consultation Committee and from the public, the following changes were made to the analyses and findings presented in **Chapter 2**:

- Watershed delineations were revised based on hydrology only, not on political boundaries;
- PWQCs and the HPWQC were identified by hydrologic subareas and subwatersheds and Copermittees and the City of Menifee were assigned responsibility based on their land areas within the hydrologic subareas;
- The prioritization process was revised to consider current TMDLs, TMDLs under development, and 303(d) listings more explicitly and earlier in the process;
- Included assessment of California Rapid Assessment Method (CRAM) index scores and evidence of erosion in the analysis;
- Available loading information was considered specific to various sources;
- The prioritization process was revised and includes a detailed description of how sensitive or highly valued received waters were considered and the results;
- Perennial/non-perennial criteria were removed from the revised prioritization process and the assessments no longer exclude areas based on flow;

- The HPWQC selection process was revised to address all requirements under Permit Provision B.2;
- Source information was updated to ensure that consistent, accurate information was included for all Copermittees and the City of Menifee;
- Language was added to source discussion to clarify the extent to which Copermittees and the City of Menifee have jurisdiction over agriculture;
- IC/ID information was updated to include five years of IC/ID data and related sources;
- Potential strategies tables were updated to better reflect the relationships between the strategies and the benefits to the PWQCs and HPWQC;
- Text and figures were modified for clarity and simplicity to better reflect the information considered within the prioritization process;
- The public participation process was updated to include additional outreach through public meetings;
- Clarification was added to describe how the City of Menifee and RCFCWCD were included in the assessment and prioritization process.

Based on comments received on the draft of **Chapter 2**, subsequent discussions with Regional Water Board and stakeholders, and a second Consultation Committee meeting held on May 17, 2017, the Copermittees and the City of Menifee submitted a revised draft of **Chapter 2** and an initial draft of **Chapter 3** to the Regional Water Board on July 7, 2017. The combined document was subsequently posted for public review by the Regional Water Board, with comments due by August 10, 2017. There were no further comments received from the public. Four sets of comments were received from Consultation Committee members, however, only comments from the Regional Water Board, received on October 11, 2017, are relevant to **Chapter 2**. Based on these comments, further revisions were made to **Chapter 2**. A summary of the key changes is provided below:

- Additional studies were considered in the evaluation of priorities and sources;
- Facilities, areas, and activities for which RCFCWCD is responsible were described in greater detail and a figure was added;
- Clarification was provided related to the geographic extent of the PWQCs and HPWQC with respect to the connectivity of ~~storm drain~~MS4 discharges to receiving waters;
- Technical work related to the TMDL Alternative for eutrophication in the SMR Estuary was more fully incorporated into the evaluation of priorities and sources;
- Potential nutrient contributions from agriculture were better characterized for the watershed as a whole and for discharges that could be conveyed through the Copermittees' ~~storm drain~~MS4s;

- Clarification was added related to regulation of discharges from agriculture, noting that discharges from agriculture that enter the Copermittee's MS4~~storm drain system~~ is under their control;
- Source information, previously included in an appendix, was moved into **Chapter 2** and additional source information was added (subsequently updated to **Chapter 3**); and
- Potential strategies were updated to better relate to the PWQCs and HPWQC and to provide more detail.

~~1.4.2.5.2~~1.5.2.5.2 Chapter 3 – Goals, Strategies, and Schedules[4]

In addition to the second Consultation Committee meeting, each Copermittee and the City of Menifee met with Regional Water Board staff during May 2017 to discuss their jurisdictional strategies. Following these meetings, an initial draft of **Chapter 3** (Goals, Strategies, and Schedules) was distributed to the Consultation Committee for review and feedback in June 2017. Comments received from the Consultation Committee by June 15, 2017 on **Chapter 3** are included in **Appendix 1B**. A combined document including a revised **Chapter 2** and the initial public draft of **Chapter 3** incorporated these comments and was submitted to the Regional Water Board on July 7, 2017. The draft was subsequently posted for public review, with comments due by August 10, 2017. There were no further comments received from the public. Four sets of comments were received from Consultation Committee members, including one set of written comments from the Regional Water Board received on October 11, 2017. Based on these comments, revisions have been made to **Chapter 3**. A summary of the key changes to **Chapter 3** in response to comments is provided below:

- Definitions were added for specific terms where needed (e.g., controllable);
- Rainbow Creek Nutrient TMDL compliance analysis and approach was revised;
- The "menu" approach for strategies was abandoned and tables of selected strategies were included in the document;
- Strategies were updated to ensure that each Copermittee addressed Permit Provisions E.2 – E.7;
- Strategies have been modified to include coordination with water districts;
- Strategies updated to include more specificity with respect to which PWQCs/HPWQC, sources, and conditions (i.e., dry/wet/both weather conditions) are addressed;
- Strategies were updated to include frequency as applicable; and
- Optional strategies were updated to include a better description of resources and triggers.

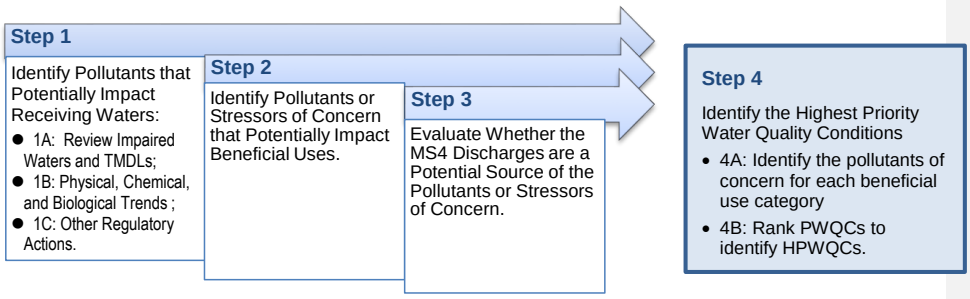
[4] In consideration of further comments, Chapter 3 – Goals, Strategies, and Schedules, was subsequently re-numbered to Chapter 4 with the addition of a chapter discussing sources.

2 Priority Water Quality Conditions

The first phase of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ development identified the PWQCs associated with ~~storm drain~~MS4 discharges that will be addressed by the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~.~~.~~ PWQCs are "pollutants, stressors and/or receiving water conditions that are highest threat to receiving water quality or that most adversely affect the quality of receiving waters."[5] To identify the PWQCs, the Copermittees and the City of Menifee used a prioritization process that identified the pollutants, stressors, and conditions that could impact each of the beneficial uses present in the watershed, assessed whether those pollutants, stressors, and conditions were present at levels that could be of concern for the beneficial uses, and assessed the potential contribution from ~~storm drain~~MS4s to the identified conditions. The prioritization process utilized available physical, chemical, and biological data, considered known impacts to beneficial uses, and incorporated local knowledge and information about watercourse function, environmental values, community goals, and habitat preservation to determine the PWQCs and HPWQC. **Chapter 2** provides an overview of this prioritization process, the assessment results for each step in the process, and the resulting PWQCs and HPWQC identified as a result of the analysis.

2.1 PROCESS TO PRIORITIZE WATER QUALITY CONDITIONS

The developed prioritization process follows the order outlined in Permit Provisions B.2.a (Assessment of Receiving Water Conditions), B.2.b (Assessment of Impacts from MS4 Discharges), and B.2.c (Identification of Priority Water Quality Conditions). Available data were compiled and prepared for analysis by grouping the data into assessment areas, identifying the beneficial uses in the assessment areas, determining the physical, chemical and biological indicators that could impact the beneficial uses, and determining the analysis process and thresholds to use to assess potential impacts on beneficial uses. After the data were compiled and prepared for analysis, a four step process was used to identify the PWQCs. An overview of the prioritization approach is illustrated in **Figure 2-1** and detailed in **Figure 2-2**. **Table 2-1** provides an overview of how the prioritization process relates to the Permit requirements and the section that provides the assessment process and results for each prioritization step.



[5] Provision B.2.c.(1).

Figure 2-1. Prioritization Process

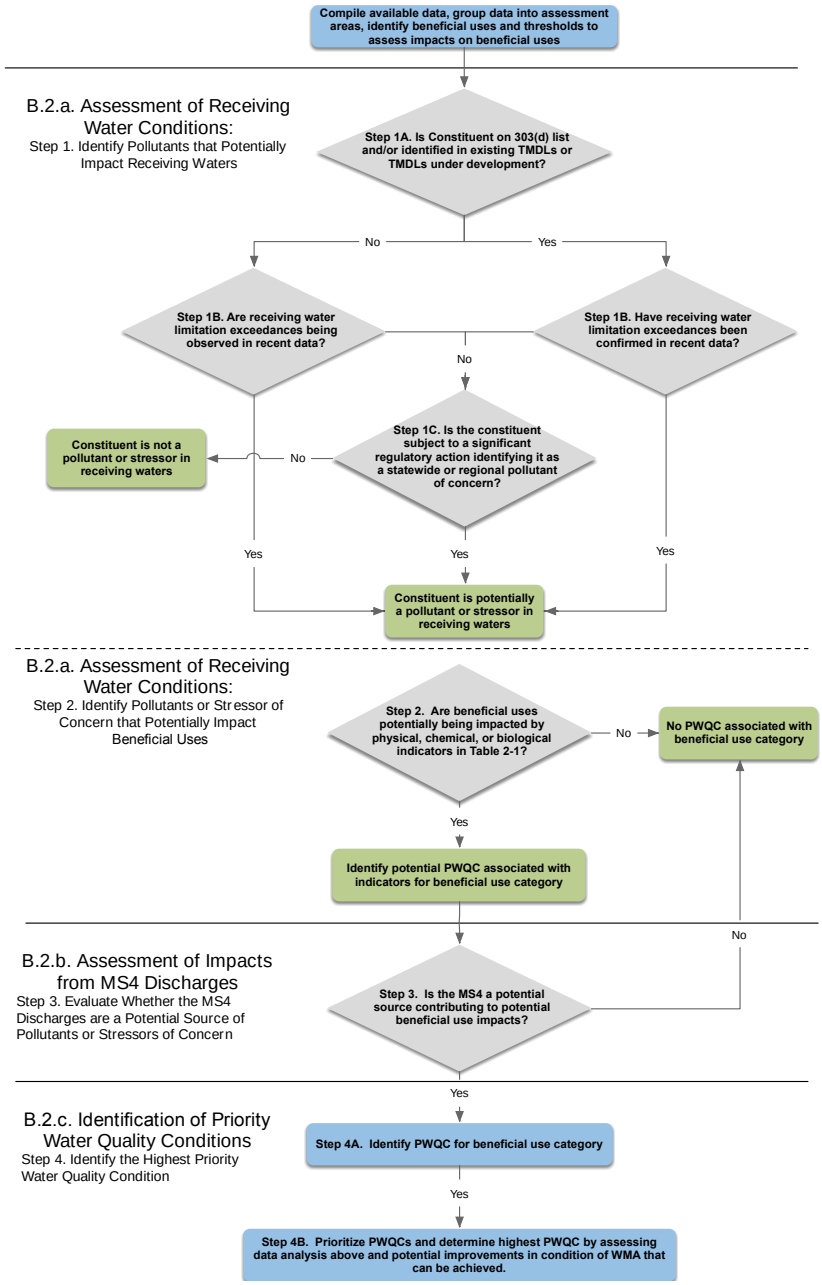


Figure 2-2. Prioritization Process for the SMR WMA

Table 2-1. Prioritization Process Overview and Associated Permit Requirements

Prioritization Step	Permit Requirements Addressed (Provision)
2.3 - B.2.a. ASSESSMENT OF RECEIVING WATER CONDITIONS	
2.3.1 - Step 1. Identify Pollutants and Stressors of Potential Concern in Receiving Waters	
2.3.1.1 – Step 1A. Impaired Receiving Waters and Total Maximum Daily Loads	B.2.a(1) Receiving waters listed as impaired on the Clean Water Act Section 303(d) List of Water Quality Limited Segments (303(d) List)
2.3.1.2 – Step 1A. Impaired Receiving Waters and Total Maximum Daily Loads	B.2.a(2) TMDLs adopted and under development by the Regional Water Board
2.3.1.3 – Step 1B. Evaluation of Receiving Water Limitation Exceedances and Comparison to Historical Conditions	B.2.a(4) Receiving water limitations of Permit Provision A.2 B.2.a(5) Known historical versus current physical, chemical, and biological water quality conditions B.2.a(6) Available, relevant, and appropriately collected and analyzed chemical receiving water monitoring data
2.3.1.4 – Step 1C. Identify Significant Regulatory Actions	N/A
2.3.2 - Step 2. Identify PWQCs Potentially Impacting Beneficial Uses	B.2.a(3) Sensitive or highly valued receiving waters[6] B.2.a(6) Available, relevant, and appropriately collected and analyzed physical, chemical, and biological receiving water monitoring data B.2.a(7) Available evidence of erosional impacts in receiving waters due to accelerated flows (i.e., hydromodification) B.2.a(8) Available evidence of adverse impacts to the chemical, physical, and biological integrity of receiving waters;
2.4 - B.2.b. ASSESSMENT OF IMPACTS FROM MS4 DISCHARGES	
2.4 – Step 3. Assessment of Potential ~~Storm Drain~~MS4 Discharge Impacts	B.2.b(1) The discharge prohibitions of Provision A.1 and effluent limitations of Provision A.3 B.2.b(2) Available monitoring data from the Copermittees' MS4~~storm drain~~ outfalls B.2.b(3) Locations of each Copermittees' MS4~~storm drain~~ outfalls that discharge to receiving waters B.2.b(4) Locations of MS4~~storm drain~~ outfalls that are known to persistently discharge non-stormwater to receiving waters likely causing or contributing to impacts on receiving water beneficial uses B.2.b(5) Locations of MS4~~storm drain~~ outfalls that are known to discharge pollutants in stormwater causing or contributing to impacts on receiving water beneficial uses

[6] Defined in Order No. R9-2013-0001 as estuaries designated under the National Estuary Program under Clean Water Act Section 320, marine protected areas, 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 (BIOL) beneficial use designation, and receiving waters identified as Areas of Biological Significance, or areas recognized as sensitive or highly valued by the Copermittees.

Prioritization Step	Permit Requirements Addressed (Provision)
2.5 and 2.6 - B.2.c. IDENTIFICATION OF PRIORITY WATER QUALITY CONDITIONS	
2.5. – Step 4A. Priority Water Quality Conditions	B.2.c(1) The Copermittees must use the information gathered for Provisions B.2.a and B.2.b to develop a list of priority water quality conditions as pollutants, stressors and/or receiving water conditions that are the highest threat to receiving water quality or that most adversely affect the quality of receiving waters. The list must include the following information for each priority water quality condition: • The beneficial use(s) associated with the priority water quality condition; • The geographic extent of the priority water quality condition within the Watershed Management Area, if known; • The temporal extent of the priority water quality condition (e.g., dry weather and/or wet weather); • The Copermittees with ~~storm drain~~MS4 discharges that may cause or contribute to the priority water quality condition; and • An assessment of the adequacy of and data gaps in the monitoring data to characterize the conditions causing or contributing to the priority water quality condition, including a consideration of spatial and temporal variation.
2.6 – Step 4B. Highest Priority Water Quality Conditions	B.2.c(2) The Copermittees must identify the highest priority water quality conditions to be addressed by the Water Quality Improvement Plan, and provide a rationale for selecting a subset of the water quality conditions identified pursuant to Provision B.2.c.(1) as the highest priorities. B.2.a(9) The potential improvements in the overall condition of the watershed management area that can be achieved. B.2.b(6) The potential improvements in the quality of discharges from the ~~storm drain~~MS4s that can be achieved.

2.2 AVAILABLE, RELEVANT AND APPROPRIATELY COLLECTED AND ANALYZED DATA RECEIVED

The Copermittees and the City of Menifee identified the available data and information for receiving water conditions, ~~storm drain~~MS4 discharges, and sources of pollutants within the SMR WMA. Data were obtained from Copermittees, publicly available datasets, and through a public request for data (as described in **Section 1.5.2~~1.5.2~~~~1.4.2~~.1)**.

Sources of raw data available for the assessment are listed in **Table 2-2**. The datasets obtained were from the following sources:

- RCFCWCD MS4 NPDES permit monitoring data, which included data from the Southern California Stormwater Coalition Monitoring (SMC).
- County of San Diego MS4 NPDES permit monitoring data.
- Santa Margarita River Nutrient Initiative Group (SMRNIG) dataset from the water quality database developed for the *Hydrological and Biological Support to the Lower Santa Margarita Watershed Monitoring Program* final report (Stetson, 2010).
- California Environmental Data Exchange Network (CEDEN), which was a combined dataset from the United States Environmental Protection Agency (USEPA), Southern California Bight Program, SMC and Surface Water Ambient Monitoring Program (SWAMP) extracted from the CEDEN website.

- California Storm Water Multiple Applications and Report Tracking System (SMARTS) and California Integrated Water Quality System (CIWQS) Project databases were also reviewed to identify industrial and Publicly Owned Treatment Works (POTW) data. No relevant data and information were found in these databases.

The types of data and information that were obtained from these datasets generally included field measurements, field observations, photographs, site/field reconnaissance findings and mapping, water quality chemistry, bioassessment, toxicity, algal biomass and CRAM information. Where multiple datasets contained data from the same monitoring program (e.g. SMC), duplicates were removed from the compiled dataset.

Table 2-2. SMR WMA Receiving Water Data Sources- Raw Datasets

Data Source	Program	Period of Record	# of Locations	Data Type: Chemistry	Field Data	Observations/ Photographs	Biological	Toxicity	Physical Habitat
RCFCWCD	MS4 Permit	1993 – 2015	41	X	X	X	X	X	-
	SMC	2009 – 2015	41	X	X	X	X	X	X
CEDEN	SMC	2009 – 2015	41	X	X	X	X	X	-
	SWAMP	2003 – 2013	15	X	X	X	X	-	-
	So. Cal Bight Program	2003 – 2008	6	X	X	X	-	-	-
SMRNIG (Stetson)	State Water Board	1951 – 1988	9	X	X	-	-	-	-
	USEPA	1949 – 2001	32	X	X	-	X	-	-
	Law Crandall	1948 – 2000	6	X	X	-	-	-	-
	Mission Resource Conservation District	1995 – 1999	2	X	X	-	-	-	-
	RCFCWCD	1993 – 2007	15	X	X	-	-	X	-
	Rancho California Water District	1997 – 2007	5	X	X	-	-	-	-
	Regional Water Board	1998	8	X	-	-	-	-	-
	Stetson 2004 and 2009	2003 – 2009	35	X	X	-	X	-	-
	SWAMP	2005 - 2011	7	X	X	-	-	-	-
	Unknown	1963 – 1999	8	X	X	-	-	-	-
	USGS	1966 – 1982	3	X	X	-	-	-	-
	Water Master	1971 – 2002	33	X	X	-	-	-	-
	USEPA	2001	1	X	X	X	X	-	-
San Diego County	MS4 Permit	2008 - 2015	22	X	X	-	X	X	X

Note: Available data are indicated in the table by a "X.". Dashes indicate data were not available in the dataset for the given data type.

In addition to these programs, multiple special studies have been performed for areas within the SMR WMA. These studies provided additional information related to sources of nutrients in the watershed, contributions from other sources such as federal, state, and tribal lands, the effects of hydromodification on receiving waters, sediment toxicity, sources of iron and manganese in the watershed, the presence of trash in the watershed, and TMDL-related information. The special studies used in the prioritization process are shown in **Table 2-3**. Other studies used for evaluating sources are discussed in **Appendix 3A**.

Table 2-3. Other Types of Data Used for PWQC Identification [1]

Special Study Title	Type of Data	Notes
Eutrophication and Nutrient Cycling in Santa Margarita River Estuary: A Summary of Baseline Studies for Monitoring Order R9-2006-0076 (Estuary Data Report)	Algal biomass and percent cover, dissolved oxygen, total nitrogen and total phosphorus concentrations and fluxes between water and sediment.	---
Status of Eutrophication over a Two Year Period (2015-2016) in Lower Santa Margarita River, San Diego, California (SMRNIG Phase I Data Report)	Benthic algal abundance, benthic organic carbon, dissolved oxygen, pH, total nitrogen and total phosphorus concentrations, stream velocity, depth, discharge, channel substrate and riparian canopy cover.	Two year study in three portions of river.
Santa Margarita River Watershed Phase II-Sediment and Nutrient Calibration Memorandum	Results of Watershed Loading Model calibration for nitrogen and phosphorus.	---
Calibration of Linked Hydrodynamic and Water Quality Model for Santa Margarita Lagoon	Results of estuary model calibration for algae, dissolved oxygen, nitrogen and phosphorus.	---
Application of watershed loading and estuary water quality models to inform nutrient management in the Santa Margarita River Watershed.	Results of using the watershed loading model and estuary model to inform major science objectives for the SMRNIG, including understanding the major pathways that supply nutrients to the SMR Estuary, estimate the range of allowable loads to the SMR Estuary, evaluate potential numeric targets, identify preliminary scenarios for evaluating nutrient management, and estimate sources of nutrients to SMR Estuary.	---
Hydromodification Monitoring Project	Channel and bank conditions (gradient, particle size, channel width), location of discharge points, habitat integrity (individual CRAM attribute scores and selected parameters from SWAMP stream physical habitat characterization), quantification of bank eroded areas, and vertical and lateral susceptibility ratings.	Three monitoring locations.

Special Study Title	Type of Data	Notes
Sediment Toxicity Special Study, Santa Margarita Region, 2013-2014 Final Report	Analytical results for particle size, general chemistry, trace metals, organochlorine pesticides, and synthetic pyrethroids. Acute and chronic solid phase toxicity bioassay results, rapid stream bioassessment results (including IBI scores for four reaches).	---
Transitional Monitoring and Assessment Program Report for the Santa Margarita River Watershed Management Area (2014 - 2015)	Dry and wet weather receiving water trends.	One monitoring location

1. Pesticides Subcommittee Annual Report and Effectiveness Assessment 2014-2015 contains qualitative updates regarding short-term and long-term pesticide management efforts and concerns that are not immediately relevant to the assessment of receiving water conditions.

2.2.1 Assessment Areas

~~For this evaluation, a~~All available data were compiled and reviewed to conduct this assessment. Based on the data review, virtually no water quality data were identified to support the evaluation of the Upper SMR subwatershed, which is comprised of a total of 15 subareas~~ Area UVS~~ ~~in the eastern portion of the watershed that drains to the lakes (**Figure 1-1**)~~. Where available, data for the Upper SMR Subwatershed are included in the tables in Sections 2 and 3.

As described in Section 1.3, the ~~Area UVS~~Upper SMR subwatershed has much lower population density and limited infrastructure relative to the ~~Upper~~Middle SMR subwatershed, and is hydrologically disconnected from the ~~Upper~~Middle and Lower SMR subwatersheds in all but very large storm events or storm series. ~~While there may be limited storm drain infrastructure above the lakes, based on~~ Due to the lack of water quality data, very few documented water quality concerns, the absence of impaired beneficial uses in the lakes, and the ~~ and~~ hydrologic disconnection from~~disconnect with the rest of~~ the downstream subwatersheds ~~watershed~~ created by the lakes, the Upper SMR subwatershed ~~Area UVS~~ could not be fully evaluated using the process described in Sections 2.3 – 2.6 and Section 3. In particular, although there are 303(d) listings for Temecula Creek (Step 1A), the data used to support the listings were collected downstream from Vail Lake, and there are no data documenting exceedances within this subwatershed; so Step 1B of the process could not be completed. There were also no available data regarding erosional or other adverse impacts to receiving waters, and Step 2 could not be completed. In addition, data were not available from the Upper SMR Subwatershed to characterize discharges or potential impacts from developed areas, so Step 3 could not be completed. ~~Upper eastern portion of the watershed shown in green in **Figure 1-1** was not further assessed and no~~

Therefore, although the Upper SMR Subwatershed was characterized and evaluated, there were insufficient recent data to assign PWQCs and/or HPWQCs~~were identified for that area~~. ~~Should data be collected in the future or receiving water conditions of concern~~However, a new Receiving Water Monitoring Site will be identified upstream of Vail Lake and montoring will be conducted as specified in Section 5. As part of the WQIP adaptive management process, further evaluation of this subwatershed area will be conducted in the future as more data become available and in consideration of any new receiving water conditions of concern, and this WQIP will be updated accordingly. Although PWQCs and HPWQCs were not identified for the Upper SMR Subwatershed in this evaluation, the strategies identified in Section 4 will be implemented as applicable in the Upper SMR Subwatershed and as described in the JRMPs to ensure any potential water quality impacts are avoided. ~~be identified in those areas, modifications to the PWQCs to incorporate these areas may be considered during the adaptive management process.~~

The ~~remainder of the~~ three subwatersheds of the SMR WMA are comprised of the 28 hydrologic subareas listed in Table 2-4 and shown in Figure 2-3.~~was divided into two subwatersheds (Upper Middle and Lower SMR Subwatersheds), which are comprised of a total of 13 subareas (six in the Upper Middle SMR Subwatershed and seven in the Lower SMR Subwatershed).~~ This delineation was based on a combination of watershed hydrologic subareas and the 2010 Clean Water Act Section 303(d)/305(b) Integrated Report (~~see~~ **Figure 2-3** and **Table 2-4**).

Table 2-4. Subareas in the SMR Subwatersheds

Upper SMR Subwatershed	~~Upper~~Middle SMR Subwatershed	Lower SMR Subwatershed

Chihuahua Creek	Upper Murrieta Creek and Tributaries	Upper Santa Margarita River
Rattlesnake Creek-Temecula Creek	Warm Springs	Lower Santa Margarita River
Tule Creek	Murrieta and Long Canyon Creeks	Rainbow Creek
Long Canyon	Santa Gertrudis Creek	Sandia Creek
Cottonwood Creek-Temecula Creek	Temecula Creek and Redhawk Channel	De Luz Creek
Upper Cahuilla Creek	~~Vail Lake and~~ Pechanga Creek	Fallbrook Creek
Lower Cahuilla Creek	---	Santa Margarita River Estuary
Upper Wilson Creek		
Lower Wilson Creek		
Arroyo Seco Creek		
Rawson Canyon		
Upper Tucalota Creek		
Temecula Creek		
Warm Springs Creek		
Lower Tucalota Creek		

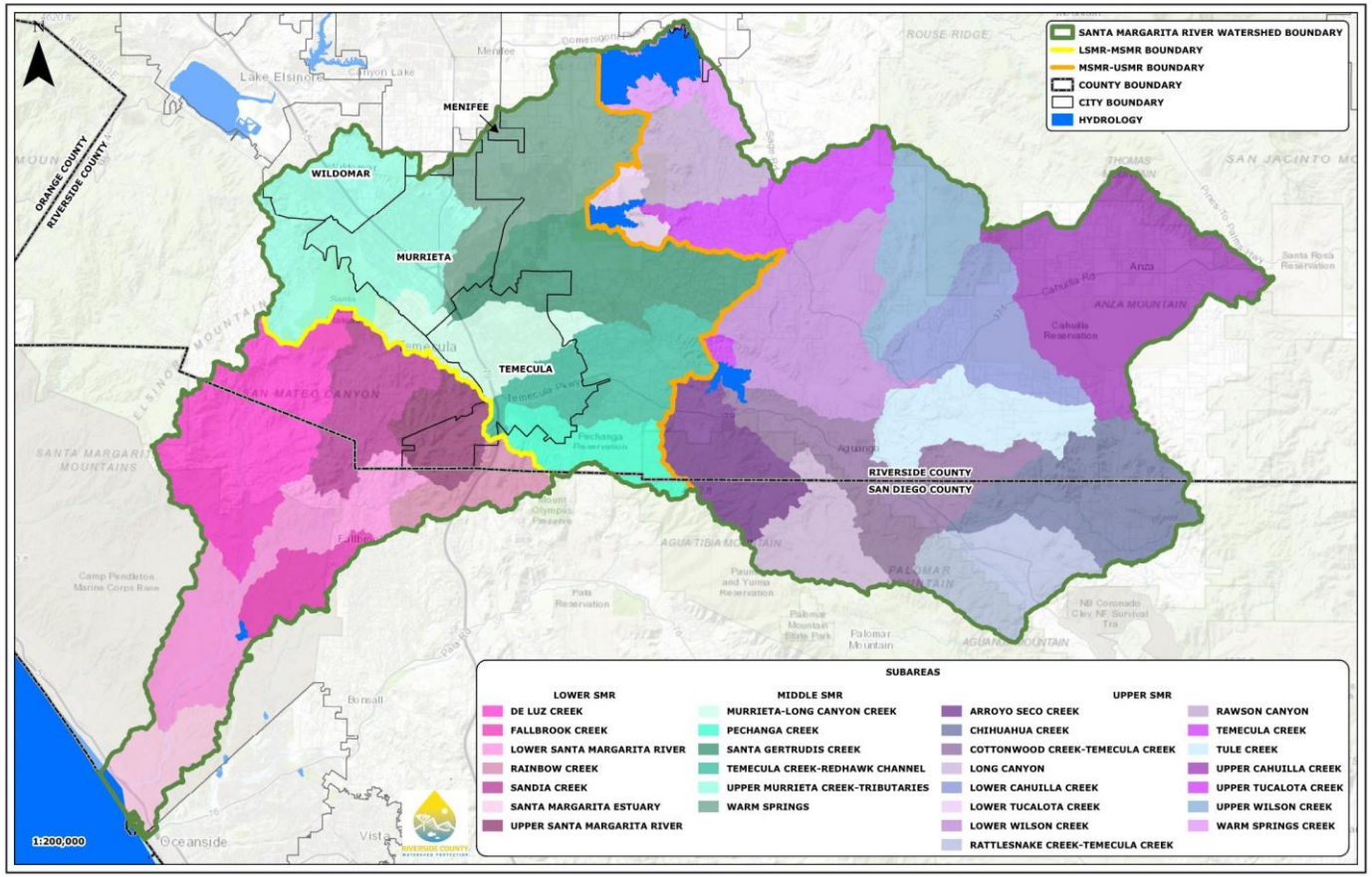


Figure 2-3. Priority Condition Assessment Subareas

2.2.2 Beneficial Uses and Thresholds to Assess Data

Beneficial uses for the SMR WMA are designated in the Water Quality Control Plan for the San Diego Basin (Basin Plan) (California Regional Water Quality Control Board, 1994 as amended in 2016). Per the Basin Plan, "Beneficial uses are defined as the uses of water necessary for the survival or well being of man, plants and wildlife." "The designated beneficial uses for the SMR WMA are summarized in **Appendix 2**. Beneficial uses for Diamond Valley Lake, Lake Skinner, and Vail Lake are also described in Section 1.3, above. Per the Basin Plan:

"Existing beneficial uses were originally determined as part of a use survey of water resources in the Region described in Chapter 1, History of Basin Planning in the San Diego Region. Beneficial use designations have also been determined using additional information gathered since 1975. Beneficial uses are designated as "potential" for a variety of reasons, including:

- Plans are proposed to put the water to a future use;
- Potential exists to put the water to a future use;
- The public desires to put the water to future use;
- The water is potentially suitable for municipal or domestic water supply under the terms of the Sources of Drinking Water Policy (State Board Resolution No. 88-63); or
- The Regional Board has designated a beneficial use as a regional water quality goal."

Designated beneficial uses can only be modified through a use attainability analysis that meets the requirements of Title 40 of the Code of Federal Regulations (CFR) 131.10(g).

The W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ is designed to support protection of the thirteen designated beneficial uses in the SMR WMA. Many of these beneficial uses have overlapping or related pollutants, stressors, and conditions that could be pollutants of concern. To streamline the analysis and aid in identifying PWQCs, the thirteen designated beneficial uses were grouped into five beneficial use categories (shown in **Table 2-5**). The groupings provide an organized framework for the large amount of data that is included in the analysis and focus the analysis on beneficial use impacts. The beneficial use categories do not represent Basin Plan designated beneficial uses. The assessments conducted in Steps 1 through 3 are all organized around these five beneficial use categories.

Based on the review of the available data summarized above, physical, chemical and biological indicators were identified that could be used to assess impacts to the beneficial use categories in the Subwatersheds. For each of these indicators, thresholds developed to protect beneficial uses were identified. Water quality objectives (WQOs) were used as the threshold where available, but WQOs do not exist for all identified chemical, physical, and biological indicators. For indicators without WQOs, thresholds were identified from available literature and guidance. The WQOs used for the assessment are included in **Appendix 2**. Other identified thresholds are discussed in **Section 2.3.2** in the summary of the assessment process for the indicator.

The beneficial use category, associated beneficial uses, and associated physical, chemical and biological indicators used to assess the potential impact on the beneficial uses are shown in **Table 2-5**. The assessments conducted to develop PWQCs are based on these beneficial use categories and indicators. Per the Basin Plan, "Designated beneficial uses are generally, but not always, present throughout the entire reach of a particular hydrologic unit, area, subarea, or water body.

Designated beneficial uses may not be present throughout the year." However, the Regional Water Board has noted that there are no seasonal variations identified in the designated surface waters (which includes the unlisted tributaries to these surface waters) in the Basin Plan tables. As a result, the assessments were conducted for all receiving water conditions, even though surface waters may not be present year-round.

Table 2-5. Beneficial Uses and Associated Physical, Chemical, and Biological Indicators Within the Santa Margarita River WMA

Beneficial Use Category [4]	Beneficial Uses	Physical, Chemical, and Biological Indicators
Aquatic Life	WARM COLD WILD RARE BIOL (limited) SPWN (limited)	Algal biomass Benthic community indices (IBI/CSCI) Dissolved Oxygen Total Nitrogen Total Phosphorus Ammonia Pesticides [1] Metals [2] Toxicity Sediment – visual observations [5] Physical habitat scores (CRAM) Evidence of erosion and hydromodification Trash
Recreation	REC-1 REC-2	Trash Fecal Coliform *E. coli*
Water Supply	MUN GWR	Nitrate Title 22 Constituents[3]
Agricultural Supply	AGR	Total Dissolved Solids Chloride Boron
Industry	IND PROC	pH Total Dissolved Solids

1. Pesticides include: Organophosphorus, Organochlorine, and Pyrethroid pesticides.
2. Metals include: Copper, Nickel, Zinc, and Selenium.
3. A full list of the California Code of Regulations Title 22 (Title 22) Constituents is included in **Appendix 2**.
4. Beneficial use categories were developed to group related designated beneficial uses from the Basin Plan for ease of assessment in the Water Quality Improvement Plan. Beneficial use categories are not designated in the Basin Plan.
5. Visual observations provided by Consultation Committee.

2.3 ASSESSMENT OF RECEIVING WATER CONDITIONS

The assessment of receiving water conditions consisted of two steps. Step 1 identified all constituents that could potentially impact beneficial uses. The identification was completed by summarizing constituents on the 303(d) list and identified in TMDLs or TMDLs under development that are causing impairments (Step 1A), comparing chemical data to WQOs to identify other pollutants with the potential to impair waterbodies (Step 1B), assessing known historic conditions and identifying if conditions are of potential concern based on more recent data by evaluating trends (Step 1B), and reviewing regulatory actions to determine if any other constituents have been identified as a priority by Regional or State Water Boards (Step 1C).

Step 2 identifies potential beneficial use impacts through a comparison of physical and biological data to identified thresholds.

2.3.1 Step 1. Identify Pollutants and Stressors of Potential Concern in Receiving Waters

2.3.1.1 Step 1A. Impaired Receiving Waters - 303(d) Listings (Permit Provision B.2.a(1))

In this step, the Copermittees identified constituent/water body combinations that are on the 303(d) list that could be considered pollutants or stressors of potential concern in receiving waters.

The Clean Water Act Section 303(d)/305(b) Integrated Report (Integrated Report) identifies the condition of the region's surface waters as well as the water quality limited segments that are identified as "impaired" or "threatened" (the 303(d) list). In California, water bodies are assessed and listed consistent with the State Water Board's Listing Policy. (California State Water Resources Control Board, 2004)

The receiving waters in the SMR WMA listed as impaired in the 2010 Integrated Report are summarized in **Table 2-6**. The 2010 Integrated Report is currently being updated. A proposed 2014/2016 list of impaired waters was approved by the State Water Board on October 3, 2017, but has not yet been approved by USEPA. Because the proposed listings are not yet effective, they have not been included within **Table 2-6**. However, the Step 1B assessment includes a review of the data used for the development of the 2014/2016 list to identify additional constituents that may be contributing to impairments based on data collected since the 2010 303(d) list and the State Water Board approved list was considered in the identification of PWQCs.

Table 2-6. 2010 303 (d) Listings for the SMR WMA

	Water Body [3]											
	Upper Santa Margarita River Subwatershed	~~Upper~~Middle Santa Margarita River Subwatershed						Lower Santa Margarita River Subwatershed				
Pollutant/ Stressor	Temecula Creek [2]	Warm Springs	Long Canyon Creek [1]	Murrieta Creek [1]	Santa Gertrudis Creek	Temecula Creek [2]	Redhawk Channel [2]	Santa Margarita River Upper	Santa Margarita River Lower	Rainbow Creek [4]	De Luz Creek	Sandia Creek	Santa Margarita River Estuary [5]
Aluminum										•		•	
Chlorpyrifos	•	•	•	•	•	•	•		•				
Copper	•			•	•	•	•						
Diazinon	•						•						
Escherichia coli (*E. coli*)	•	•			•		•						
Enterococcus								•	•				
Eutrophic													X X
Fecal Coliform	•	•	•		•		•		•				
Fecal Indicator Bact								•					
Iron	•	•	•	•	•		•	•		•	•	•	
Manganese	•	•	•	•	•		•	•			•		
Nitrogen	•			•			•	•		X	•		
Phosphorus	•	•		•	•	•	•	•	•	X			
Selenium												•	
Silver												•	
Sulfates										•	•	•	
Total Dissolved Solids	•					•	•			•		•	
Total Nitrogen as N		•							•				
Toxicity				•		•		•					

1. Both reaches are within the Murrieta and Long Canyon Creeks subarea.
2. Both reaches are within the Temecula Creek and Redhawk Channel subarea. Listed extent of Temecula Creek lies within the Temecula Creek-Redhawk Channel, Cottonwood Creek-Temecula Creek, and Rattlesnake Creek-Temecula Creek subareas.
3. There are no 303(d) listed~~ings for any~~ waterbodies in the ~~Vail Lake and~~ Pechanga Creek subarea in the Middle SMR Subwatershed; ~~or~~ Fallbrook Creek subarea~~s~~ in the Middle SMR Subwatershed; or in the Chihuahua Creek, Tule Creek, Long Canyon, Upper Cahuilla Creek, Lower Cahuilla Creek, Upper Wilson Creek, Lower Wilson Creek, Arroyo Seco Creek, Rawson Canyon, Upper Tucalota Creek, Temecula Creek, Warm Springs Creek or Lower Tucalota Creek subareas in the Upper SMR Subwatershed. There are no 303(d) listings for Vail Lake, Lake Skinner, or Diamond Valley Lake.

4. X – Currently being addressed by a TMDL.
5. XX – Currently being addressed by development of a TMDL Alternative project.

2.3.1.2 Step 1A. TMDLs

In this step, the Copermittees identified TMDLs that have been adopted or are under development.

2.3.1.2.1 Adopted TMDLs

The only adopted TMDL in the SMR WMA is the Rainbow Creek Nutrient TMDL (Basin Plan Amendment: Resolution No. R9-2005-0036), which became effective in 2006 (San Diego RWQCB, 2006). The TMDL includes targets and allocations to address nitrogen and phosphorus 303(d) listings in Rainbow Creek. In 2013, the TMDL was incorporated into Attachment E.3 of the Permit. The County of San Diego is the only Copermittee subject to this TMDL.

2.3.1.2.2 SMR Estuary TMDL Alternative

In 2011, a diverse group of stakeholders (cities and counties, utility districts, Caltrans, scientists, tribes, environmental groups, USGS, Camp Pendleton, Farm Bureau, Regional Water Board staff) formed the SMRNIG with the goal of addressing eutrophic, nitrogen and/or phosphorus 303(d) listings in the SMR WMA. The multi-year process will address the 303(d) listings in four reaches: SMR Estuary, Lower Santa Margarita River to confluence with De Luz Creek, Upper Santa Margarita River, and the Tributaries to the Santa Margarita River (hereafter called the Upper SMR Subwatershed[7]). The Regional Water Board is currently planning to formalize the regulatory requirements for the ~~adopt a~~ TMDL Alternative for the SMR Estuary by the end of~~in~~ 2018. The work that has been completed to date is summarized below. The listings in the remaining portions of the watershed will be addressed as funding is available.

The SMRNIG received two Proposition 84 grants to conduct studies and analyses to support the development of a TMDL Alternative for the watershed.

1. The first grant covered data analysis in the SMR Estuary to identify potential targets as well as monitoring in the SMR below the confluence with De Luz Creek.
2. The second grant covered the data analysis for the river monitoring conducted under the first grant as well as monitoring of the remainder of the SMR and tributaries.

The results of the monitoring and data analysis are summarized in two reports:

1. *Eutrophication and Nutrient Cycling in Santa Margarita River Estuary: A Summary of Baseline Studies for Monitoring Order R9-2006-0076* (Estuary Data Report)*;* and
2. *Status of Eutrophication over a Two Year Period (2015-2016) in Lower Santa Margarita River, San Diego, California* (SMRNIG Phase I Data Report).

The major findings of the reports were that the SMR Estuary is "exhibiting symptoms of eutrophication, as documented by high biomass and cover of macroalgae and episodes of low dissolved oxygen." Additionally, high dry weather concentrations of nutrients in the SMR Estuary indicate the presence of anthropogenic sources of nutrients. Findings from the SMRNIG Phase I Data Report~~Lower SMR study~~ identified significant variations in concentrations depending on the season for all parameters measured. The majority of the nitrogen and phosphorus observed results were below Basin Plan WQOs. The monitoring showed some periods of low DO in the summer. Higher algal biomass was observed in 2015 as compared to 2016 when concentrations were similar

[7] For the purpose of this TMDL Program the "Upper SMR Subwatershed" refers to both the Upper and Middle subwatershed areas as defined under the WQIP

to reference conditions. The results of the studies identified that eutrophication is a concern in the SMR Estuary and nutrient loading from the watershed is contributing to the eutrophication in the Estuary. Results are less clear in the Lower SMR and eutrophication was not identified in the river as part of the SMRNIG Phase I Data Report~~Lower SMR study~~.

As part of the development of the TMDL Alternative for the SMR Estuary, the SMRNIG partner, Marine Base Camp Pendleton, sponsored Space and Naval Warfare Systems Command (SPAWAR) to develop an estuary model using monitoring data for total nitrogen, total phosphorus, algal biomass, and dissolved oxygen collected in 2008 and 2009 in the SMR Estuary. The Estuary model predicts the dissolved oxygen and algal biomass concentrations resulting from total nitrogen and total phosphorus loading to the SMR Estuary. Several model scenarios were run to assess the changes in dissolved oxygen and algal biomass concentrations predicted to result from reducing loadings of total nitrogen and total phosphorus to the SMR Estuary. The results of the model scenarios are summarized in the Model Application Report (Sutula, et al., 2016).

In addition to the Estuary model, a watershed loading model was developed by Tetra Tech on behalf of the Regional Water Board for the SMR W~~w~~atershed. The purpose of this model was to predict the loadings from the watershed into the SMR Estuary and estimate the contributions from various land based sources (e.g. agricultural, open space, Caltrans, federal lands, and ~~storm drain~~MS4s). The watershed loading model was only calibrated at the base of the watershed at the point of entry into the SMR Estuary. As a result, the loading estimates for areas upstream of the SMR Estuary are preliminary and will likely be refined as future phases are completed. The results of the watershed loading model are also presented in the Model Application Report.

The relevant findings for the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ development from the Model Application Report were as follows:

- Eutrophication is a dry weather concern in the SMR Estuary. Eutrophication symptoms are present during dry weather, and exhibit their peak during summer dry weather. Uncertainties exist regarding the impact of wet weather discharges on groundwater concentrations that could ultimately result in baseflows during dry weather.
- As configured in the Estuary model, major external sources of total nitrogen (TN) to the SMR Estuary during dry weather consist of surface water and local groundwater inputs, while major total phosphorus (TP) sources include surface water and upstream aquifer discharge, though many uncertainties exist in the estimates.
- Dissolved oxygen and macroalgal biomass and cover have demonstrated linkages to beneficial uses, have a predictive relationship with nutrient loading to the SMR Estuary, and have practical and generally cost-effective methods for measurement and interpretation of data. These two indicators seem to be well suited for further consideration as numeric targets for the SMR Estuary. Use of TN and TP targets is not recommended because ambient TN and TP concentrations do not have a strong linkage to beneficial use impairments.
- The watershed loading model provides a quantitative basis for summarizing the nutrient loads and sources for the SMR watershed, for the purpose of supporting nutrient management discussions. While tools for modeling watershed loading can be improved, the basic requirements for quantitative analysis are met.

While the Rainbow Creek Nutrient TMDL used a numeric interpretation of the narrative Basin Plan WQOs to derive TN and TP targets and associated allocations for various sources, the TMDL Alternative for the SMR Estuary is focused on reducing nutrient loading to the SMR Estuary to prevent low dissolved oxygen and benthic community impacts that result from excess algal biomass, based on the findings in the Model Application Report. As a result, the TMDL Alternative for the SMR Estuary will likely have targets based on some combination of DO, algal biomass and benthic community scores rather than TN and TP concentrations. Then, necessary TN and TP load reductions to meet those targets in the SMR Estuary (based on the Estuary model scenarios) will be used to develop load and wasteload allocations based on the watershed loading model.

To facilitate this process, several technical memoranda have been prepared by the SMRNIG and provided to the Regional Water Board for consideration in the TMDL Alternative development. These technical memoranda, combined with the Model Application Report, were used to inform the selection of the PWQCs and to develop goals and strategies for the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~. Because the TMDL Alternative for the SMR Estuary is still under development, the information provided in the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ is subject to revision once the TMDL Alternative for the SMR Estuary is approved. Additionally, if future phases of the project are funded, relevant findings~~they~~ will be incorporated into the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ as part of the adaptive management process.

2.3.1.3 Step 1B. Evaluation of Receiving Water Limitation Exceedances and Comparison to Historical Conditions (Provisions B.2.a.(4) and B.2.A.(5))

To assess the receiving water quality conditions, Step 1B of the prioritization process included two types of analyses: 1) evaluation of exceedances of receiving water limitations and a comparison of the results to the 303(d) listings, TMDLs, and known historic conditions; and 2) historic data review and a trend analysis to compare current conditions to known historic conditions. The data used for the two assessments is described in the following section.

2.3.1.3.1 Data Used in the Assessment

The available raw data included samples from 1950 to 2015. All historic data was included in a qualitative review for an assessment of historic conditions. However, upon review of the full dataset, it became clear that data prior to 1998 was not collected with established Quality Assurance Project Plans (QAPPs) and, therefore, lacked sufficient data quality to be used in assessing the receiving waters (e.g., inconsistent methods, issues with reporting limits; discussed further in **Section 2.5.2**). Therefore, the time period from 1998 to 2015 was selected to perform the data evaluation and assess trends. For the evaluation of exceedances of receiving water limitations, data from 2005 to 2015 was selected to represent the current conditions because monitoring data during that time period reflects requirements from the two most recent MS4 NPDES permit cycles. Locations of the monitoring sites used for the assessment are shown in **Figure 2-4**.

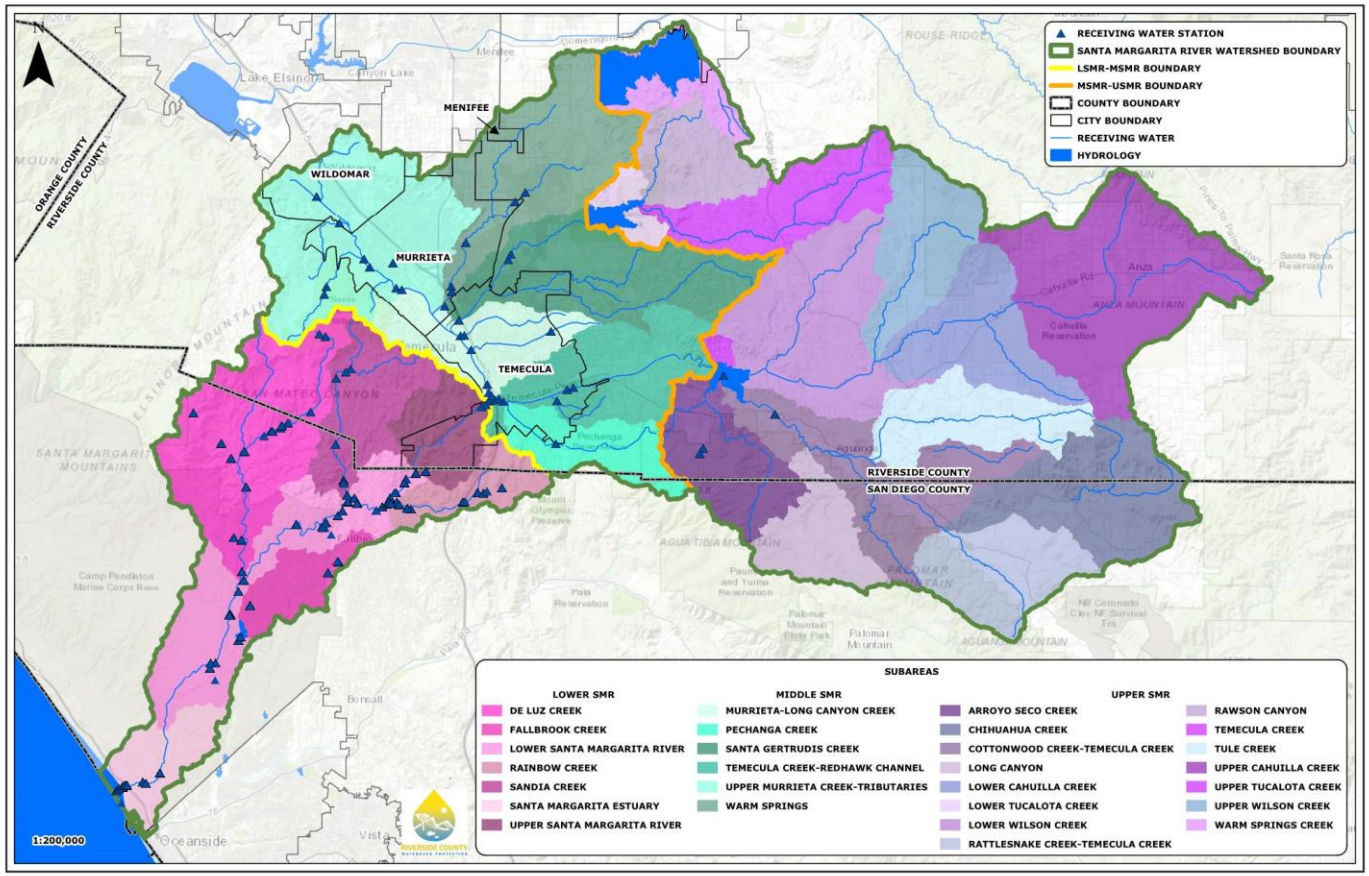


Figure 2-4. Historic Receiving Water Monitoring Stations Used in Assessment

2.3.1.3.2 Evaluation of Receiving Water Limitation Exceedances

The evaluation of receiving water limitation exceedances was conducted by comparing all constituents to applicable WQOs for the designated beneficial uses in the subarea. WQOs contained in the Basin Plan, California Toxics Rule (CTR), and the National Toxics Rule (NTR) identified as receiving water limitations in Permit Provisions A.2 and B.2 were compiled for the evaluation and are included in **Appendix 2**. The following approach was used to select the WQOs used for the exceedance evaluation. Where conflicting objectives were identified, the most conservative objective was chosen.

- For dry weather samples, the lowest applicable acute, chronic, or human health objective from either the CTR/NTR or the Basin Plan was used for the evaluation.
- For wet weather samples, the lowest acute objective between the CTR/NTR and the Basin Plan was selected. If there were no acute objectives, the CTR/NTR or Basin Plan WQOs with the shortest averaging period was selected.
- Reach-specific objectives apply for total dissolved solids (TDS), sulfate, chloride, and dissolved oxygen and were applied appropriately for the reach where the sample was collected.
- For WQOs that are calculated using pH, temperature or hardness, the pH, temperature and/or hardness of the sample was used to calculate the objective if available. If not available, the median value for all wet and/or dry samples was used to calculate the value of the objective.

For this evaluation, exceedances were defined as a subarea that has not met an applicable WQO in at least two samples and more than 10% of all samples in the subarea. The ≥10% threshold was used as it is an allowable exceedance frequency for objectives for biostimulatory substances, dissolved oxygen, and all constituents in Tables 3-2 in the Basin Plan and it approximates the thresholds used for evaluation in the State Water Board's Listing Policy[8] (California State Water Resources Control Board, 2004). **Figure 2-5** summarizes the constituents with current exceedances during dry and wet weather conditions. Constituents on the 303(d) list for the subarea are bolded and underlined in the figure.

In some cases, the exceedance analysis demonstrated that WQOs are no longer being exceeded for some constituents on the 303(d) list. While there were insufficient data to delist the constituents in most cases, the lack of recent exceedances, combined with a stable or decreasing trend analysis, was determined to be sufficient evidence that these constituents were likely no longer a pollutant of concern in receiving waters (e.g., chlorpyrifos).

[8] The Listing Policy uses a binomial distribution approach based on the number of samples that has a hypothesis that the actual exceedance proportion is between 10 and 25% for conventional pollutants and between 3 and 18% for toxicants. Ten percent was selected as a threshold for streamlined analysis that was on the lower end for conventional pollutants and in the range of the thresholds for toxic pollutants.

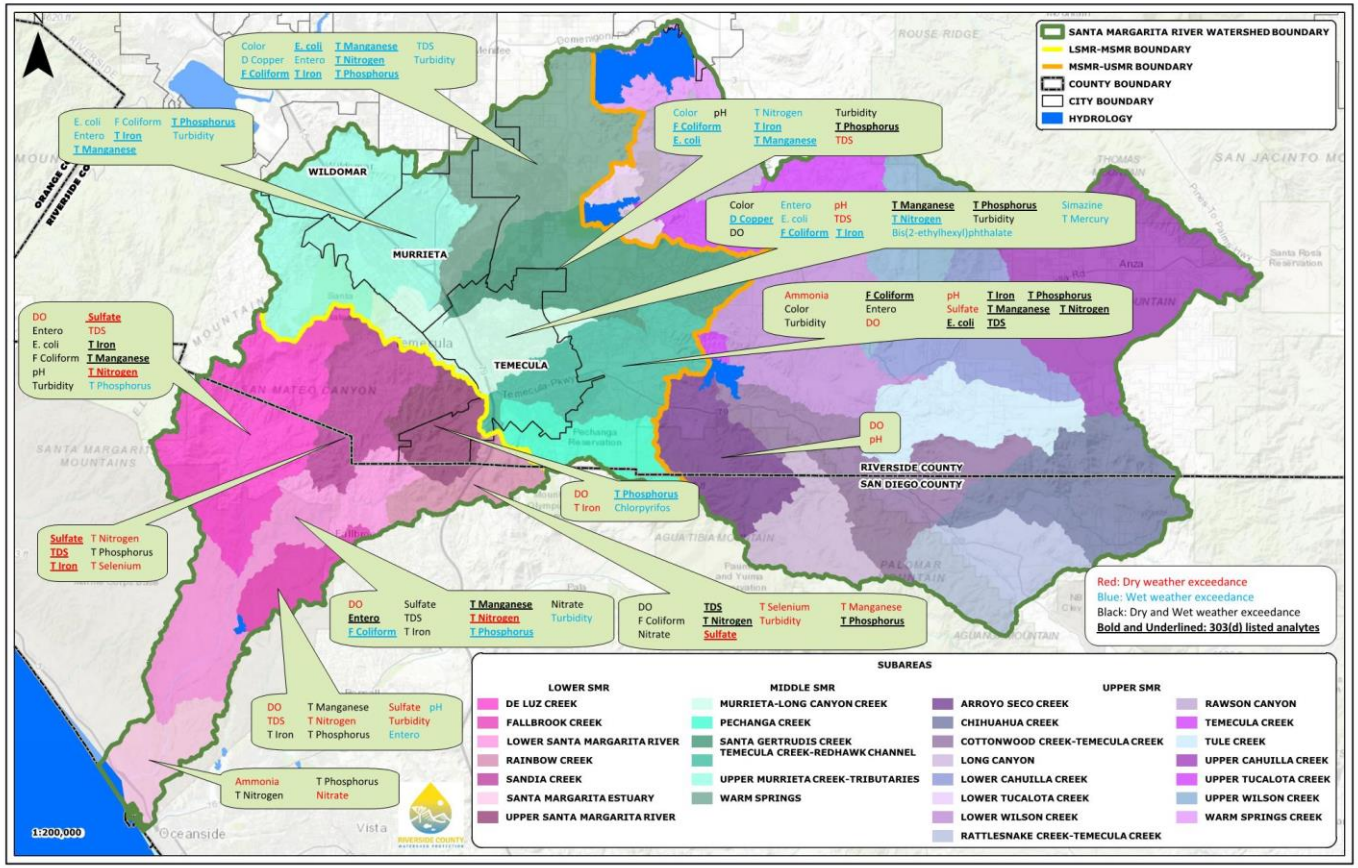


Figure 2-5. Water Quality Objective and Threshold Exceedances Identified in Receiving Waters (Recent Data: 2005 – 2015)

2.3.1.3.3 Comparison to Historical Conditions

Comparison of current data to known historic conditions was evaluated through a trends analysis.

For the ~~Upper~~ Middle SMR Subwatershed, a trend analysis was conducted using data from 1998-2015, grouped by subarea, to assess whether the water quality indicator conditions were improving, declining, or stable. The trend analyses were conducted using the Mann-Kendall (M-K) test (Helsel, Hirsch, 2002). The M-K test is a simple but robust statistical method to find trends in datasets. The M-K test cannot assess trends for datasets with three or fewer samples.

The statistic of the M-K test (S) is computed by evaluating differences between all possible pairs of measurements in the dataset. An S value greater than zero indicates that the majority of later measurements are larger than the earlier ones, suggesting an upward trend over time. Similarly, a negative S value implies that earlier measurements are larger and the trend over time is decreasing. The decision for how the water quality of the receiving water is changing (or not) was made according to the rules shown in **Table 2-7** (Aziz, 2003):

Table 2-7. Trend Estimation Based on M-K Test Statistic (S) and Critical S Value ($S_{crit95\%}$)

Rule	Condition	Trend
1	$S > 0$ and $S > S_{crit\ 95\%}$	Declining
2	$S > 0$ and $S_{crit\ 90\%} < S < S_{crit\ 95\%}$	Probably Declining
3	$0 < S < S_{crit\ 90\%}$	No trend
4	$S \leq 0$, $\lvert S \rvert < S_{crit\ 90\%}$, and $COV \geq 1$	No trend
5	$S \leq 0$, $\lvert S \rvert < S_{crit\ 90\%}$, and $COV < 1$	Stable
6	$S < 0$ and $S_{crit\ 90\%} < \lvert S \rvert < S_{crit\ 95\%}$	Probably Improving
7	$S < 0$ and $\lvert S \rvert > S_{crit\ 90\%}$	Improving

COV: Coefficient of variation

DO is the only exception to the stated rules, given that an increasing DO concentration results in an improving condition, and decreasing DO values are linked to a declining condition.

For the Lower SMR Subwatershed, due to readily available trends analysis from the recent SMR WMA Transitional Monitoring and Assessment (TMAR) Report (County of San Diego, 2016), the statistical analysis was not needed for the Lower SMR. The TMAR Report presented an analysis of receiving water trends using the historical dataset for the SMR-MLS-2 Long Term Monitoring Station (LTMS).

The trend analyses are presented in **Table 2-8** for wet weather and **Table 2-9** for dry weather. The detailed statistical results for the trend analysis for exceedances in the ~~Upper~~ Middle SMR Subwatershed are included in **Appendix 2**.

Table 2-8. Trend Analysis of Current versus Historical Water Quality Conditions in Wet Weather

Subarea	Murrieta and Long Canyon Creeks	Santa Gertrudis Creek	Temecula Creek and Redhawk Channel	Upper Murrieta Creek and Tributaries	Warm Springs	Santa Margarita River Upper	Santa Margarita River Lower	Rainbow Creek	Sandia Creek
Nitrogen	→	→	↗↘	—	→	—	—	—	—
Phosphorus	↑☺	→	↑☺	—	↗↘	NT☺	↑☺	—	↑☺
Unionized Ammonia/Ammonia	—	—	—	—	—	NT☺	↑☺	↑☺	↑☺
Dissolved Oxygen	—	—	—	—	—	—	—	—	—
Metals	↘	—	—	—	→	—	—	—	—
Fecal Coliform	NT☺	NT☺	↑☺	—	↗↘	—	—	—	—
E. Coli	NT☺	NT☺	↗↘	↑☺	NT☺	—	—	—	—
Title 22	↑☺	↑☺	↑☺	—	↑☺	—	—	—	—
Total Dissolved Solids	—	—	↘↗	—	—	—	—	—	—
pH	—	—	—	—	—	—	—	—	—
Color	→	NT☺	→	—	→	—	—	—	—
Enterococcus	NT☺	—	NT☺	—	—	—	—	—	—
Turbidity	↑☺	↑☺	↑☺	—	↑☺	—	↑☺	↑☺	↑☺
Dissolved Organic Carbon	—	—	—	—	—	—	↑☺	↑☺	↑☺
Surfactants (MBAS)	—	—	—	—	—	—	↓☹	↓☹	↓☹
Biochemical Oxygen Demand	—	—	—	—	—	—	↑☺	↑☺	↑☺
Total Cadmium	—	—	—	—	—	—	↑☺	↑☺	↑☺
Dissolved Selenium	—	—	—	—	—	—	↓☹	↓☹	↓☹
Dissolved Antimony	—	—	—	—	—	—	—	—	—
Conductivity	—	—	—	—	—	—	↓☹	↓☹	↓☹

↗↘ probably improving ↑☺ improving ↘↗ probably declining ↓☹ declining → stable NT☺ no trend — no exceedance/no data
Reaches not included did not have any trends data available

Table 2-9. Trend Analysis of Current versus Historical Water Quality Conditions in Dry Weather

Subarea	Murrieta and Long Canyon Creeks	Santa Gertrudis Creek	Temecula Creek and Redhawk Channel	~~Vail Lake and Pechanga Creek~~Arroyo Seco Creek	Santa Margarita River Upper	Santa Margarita River Lower	Rainbow Creek	Sandia Creek
Nitrogen	—	—	↗↘	—	—	—	↓☹	—
Phosphorus	—	—	↑☺	—	—	↑☺	↑☺	↑☺
Unionized Ammonia/Ammonia	—	—	NT☺	—	NT☺	—	—	—
Dissolved Oxygen	→	—	→	NT☺	—	—	—	—
Metals	—	—	—	—	—	—	—	—
Fecal Coliform	—	—	↑☺	—	—	—	—	—
E. Coli	—	—	↑☺	—	—	—	—	—
Title 22	NT☺	—	NT☺	—	—	—	—	—
Total Dissolved Solids	→	NT☺	↓☹	—	—	—	—	—
pH	→	NT☺	NT☺	—	—	—	—	—
Color	NT☺	—	NT☺	—	—	—	—	—
Enterococcus	—	—	NT☺	—	—	—	—	—
Turbidity	NT☺	→	↑☺	—	—	—	—	—
Dissolved Organic Carbon	—	—	—	—	—	—	—	—
Surfactants (MBAS)	—	—	—	—	—	—	—	—
Biochemical Oxygen Demand	—	—	—	—	—	↑☺	↑☺	↑☺
Total Cadmium	—	—	—	—	—	—	—	—
Dissolved Selenium	—	—	—	—	—	—	—	—
Dissolved Antimony	—	—	—	—	—	↑☺	↑☺	↑☺
Conductivity	—	—	—	—	—	—	—	—

↗↘ probably improving ↑☺ improving ↘↗ probably declining ↓☹ declining → stable NT☺ no trend — no exceedance/no data
Reaches not included did not have any trends data available

Where sufficient data were available for the assessment and trends could be developed, the trend analysis demonstrates that most conditions in the ~~Upper~~ Middle SMR Subwatershed appear to either show no trend or are trending towards improvement. The exceptions include some subareas where conditions are declining for TDS. For the Lower SMR Subwatershed, most trends were toward improvement~~decreasing~~ with some declin~~increas~~ing trends for nitrogen, dissolved selenium, conductivity and surfactants.

2.3.1.4 Step 1C. Identify Significant Regulatory Actions

In Step 1C, Copermittees identified constituents that are subject to significant regulatory action (other than 303(d) listings and TMDLs, which are addressed in Step 1A). Constituents subject to significant regulatory actions were evaluated to determine if any other constituents have been identified as a priority by Regional or State Water Boards.

The Statewide Trash Amendments (California State Water Resources Control Board, 2015) constitute a significant regulatory action affecting all Copermittees with land use jurisdiction over designated priority land uses pursuant to the amendments. This includes all subareas in the ~~Upper~~ Middle SMR Subwatershed~~except the Vail Lake and Pechanga Creek subarea~~, and the Fallbrook Creek subarea in the Lower SMR Subwatershed. The Upper SMR Subwatershed has not been evaluated regarding priority land uses pursuant to the amendments.

No other existing or proposed significant regulatory actions were identified.

2.3.1.5 Step 1 Results

Based on the Step 1A assessment of 303(d) listings and TMDLs, eutrophication, nitrogen, phosphorus, pesticides (chlorpyrifos and diazinon), metals (copper), toxicity, bacteria (*E. coli*, *Enterococcus*, fecal coliform), some Title 22 constituents (iron and manganese), Total Dissolved Solids, and sulfate were identified as pollutants and stressors of potential concern in receiving waters.

The Step 1B exceedance and trend analyses confirmed most of the Step 1A analysis and identified a few additional constituents in limited locations. The analysis also demonstrated that chlorpyrifos in the ~~Upper~~ Middle SMR Subwatershed was no longer exceeding and should likely be delisted once sufficient samples are collected.

Step 1C resulted in the addition of trash for subareas with priority land uses to the list of pollutants and stressors of potential concern.

Table 2-10. Summary of Step 1 Results: Pollutants and Stressors of Potential Concern

Beneficial Use Category	Pollutants of Potential Concern in Receiving Waters
Aquatic Life	Eutrophication, nitrogen, phosphorus, chlorpyrifos, simazine, copper, selenium, toxicity, turbidity, trash
Recreation	Bacteria, trash
Water Supply	Nitrate, iron, manganese, Total Dissolved Solids, sulfate
Agricultural Supply	Total Dissolved Solids
Industrial Supply	Total Dissolved Solids, pH

2.3.2 Step 2. Identify PWQCs Potentially Impacting Beneficial Uses (Provisions B.2.a.(3), B.2.a.(6), B.2.a.(7), B.2.a.(8))

Based on the constituents identified in Step 1 as pollutants and stressors of potential concern in the receiving waters, Step 2 was completed to evaluate the potential impacts on beneficial uses from physical, chemical, and biological indicators and develop potential PWQCs. The evaluation consisted of the following:

- Assessing locations of known beneficial use impacts and sensitive receiving waters in the watershed.
- Evaluating biological and physical indicators using identified assessment thresholds (chemical factors were assessed in Step 1).
- Incorporating the results from Step 1 for the chemical indicators to identify potential PWQCs by beneficial use category.

2.3.2.1 Location of Known Beneficial Use Impacts and Sensitive Receiving Waters

For each subarea, a series of questions related to the beneficial use categories were used to evaluate where beneficial uses may be impacted as a result of the physical, chemical, and biological indicators identified in **Table 2-12**. The questions included the following:

Aquatic Life: Are sensitive areas present that could be impacted?

Recreation: Are there areas of known contact recreation and are flow conditions supportive of contact recreation (REC-1)?

Municipal Supply: Are there any known municipal supply diversions?

Agricultural Supply: Are there any known agricultural supply diversions?

Industrial Supply: Are there any known industrial diversions?

Table 2-11 and the text below provides a summary of this analysis, which was conducted in order to elevate water bodies recognized as sensitive or highly valued to potential priority areas. Sensitive receiving waters in the ~~Upper~~ Middle SMR Subwatershed include streams with the Preservation of Biological Habitats of Special Significance (BIOL) designated beneficial use and bodies of water recognized as wetlands by the State or U.S. Fish and Wildlife Service's National Wetland Inventory (NWI) (www.fws.gov/wetlands/). The Upper and Lower SMR Subwatersheds do~~es~~ not include any BIOL designated waterbodies but do~~es~~ include NWI recognized waterbodies. Sensitive water bodies in the ~~Upper~~ Middle and Lower SMR Subwatersheds are identified in **Figure 2-6**.

Known locations of contact recreation beneficial uses were identified in the Murrieta Creek and Long Canyon subarea and all subareas of the Lower SMR Subwatershed. Flow conditions to support contact recreation were identified in the Warm Springs, Murrieta Creek and Long Canyon, Santa Gertrudis Creek subareas and all subareas of the Lower SMR Subwatershed.

Known municipal diversions were identified in the Lower SMR subarea. Known agricultural diversions were identified in Sandia Creek and the De Luz Creek subareas. No known industrial diversions were identified in any subarea. Active diversions in the watershed are included in **Appendix 2**.

Table 2-11. Beneficial Use Associated Questions

Subwatershed	Subarea	Aquatic Life: Sensitive Areas Potentially Impacted?	REC: Location of Known Recreation?	REC: Flow Conditions Supportive of Recreation?	MUN: Location of Known Municipal Supply Diversion?	AGR: Location of Known Agricultural Supply Diversion?	IND: Location of Known Industrial Diversion?
Upper SMR	Arroyo Seco Creek	No	No	No	No	No	No
~~Upper~~Middle SMR	Upper Murrieta Creek and Tributaries	No	No	No	No	No	No
	Warm Springs	No	No	**Yes**	No	No	No
	Murrieta and Long Canyon Creek	**Yes**	**Yes**	**Yes**	No	No	No
	Santa Gertrudis Creek	**Yes**	No	**Yes**	No	No	No
	Temecula Creek and Redhawk Channel	**Yes**	No	No	No	No	No
	~~Vail Lake and Pechanga Creek~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~
Lower SMR	Upper Santa Margarita River	No	**Yes**	**Yes**	No	No	No
	Lower Santa Margarita River	**Yes**	**Yes**	**Yes**	**Yes**	No	No
	Rainbow Creek	No	**Yes**	**Yes**	No	No	No
	Fallbrook Creek	No	**Yes**	**Yes**	No	No	No
	De Luz Creek	No	**Yes**	**Yes**	No	**Yes**	No
	Sandia Creek	No	**Yes**	**Yes**	No	**Yes**	No
	Santa Margarita River Estuary	No	**Yes**	**Yes**	No	No	No

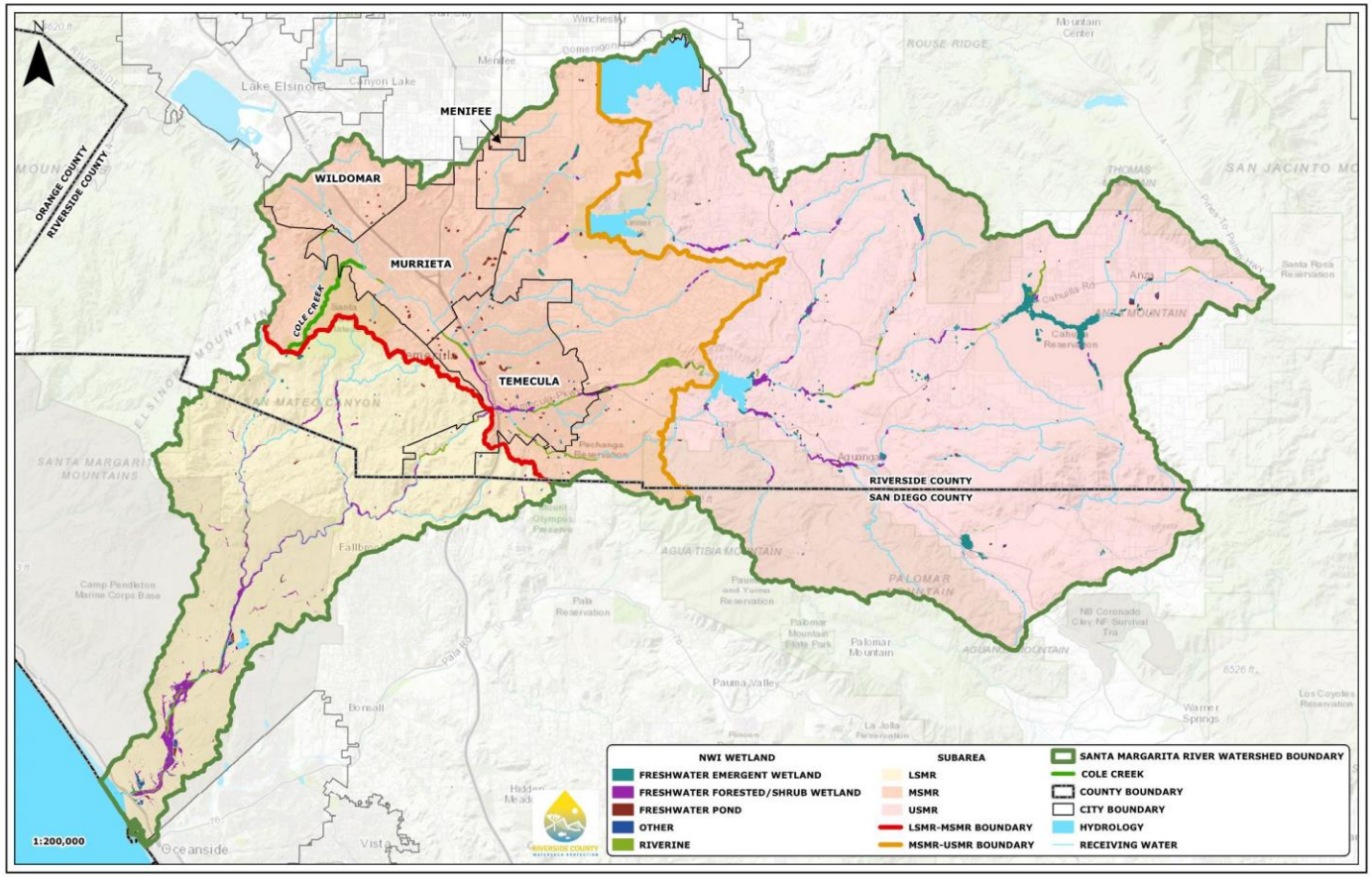


Figure 2-6. SMR Sensitive Waters – Wetlands Designated by the NWI and Cole Creek (with BIOL Beneficial Use)

2.3.2.2 Step 2A. Biological and Physical Indicator Assessment

As discussed in **Section 2.2.2**, the beneficial uses in the SMR WMA were grouped into a number of beneficial use categories. In addition to the chemical data assessed in Step 1, some beneficial use categories are potentially impacted by physical and biological indicators. The physical and biological indicators assessed are summarized in **Table 2-12**. Only the aquatic life and recreation beneficial use categories had associated physical and biological indicators that were evaluated in this step.

Table 2-12. Beneficial Uses and Associated Physical and Biological Indicators Within the Santa Margarita River WMA

Beneficial Use Category	Beneficial Uses	Physical, Chemical, and Biological Indicators
Aquatic Life	WARM COLD WILD RARE BIOL (limited) SPWN (limited)	Algal biomass Benthic community indices Physical habitat scores (CRAM) Evidence of erosion and hydromodification Trash
Recreation	REC-1 REC-2	Trash

2.3.2.2.1 Algal Biomass Assessment

No WQOs or established thresholds are available for algal biomass. In the early 2000s, the State Water Board began a process for establishing a biostimulatory policy. As part of that process, they developed an initial assessment of potential thresholds that included benthic algal biomass. (Tetra Tech, 2006) The metrics presented in **Table 2-13** were developed for freshwater streams and are indicative of three beneficial use risk categories. Category I is considered presumptively unimpaired (use is supported), Category II is considered potentially impaired, and Category III is considered presumptively impaired (use is not supported or is highly threatened). While the science being used to develop the State Water Board's biostimulatory policy is still evolving, the thresholds developed as part of this initial effort have been used in TMDL development in Southern California and represent the best available information for determining thresholds for algal biomass at this time.

Table 2-13. Benthic Algal Biomass Thresholds for SMR WMA Beneficial Uses (Tetra Tech, 2006)

Beneficial Use Risk Category [2]	Benthic Algal Biomass In Streams (mg chl-a/m^2)		
	Beneficial Use[1]		
	COLD	WARM	SPWN
I/II	100	150	100
II/III (maximum)	150	200	150

1. Although the 2006 TetraTech Report included additional beneficial uses, only the beneficial uses presented are applicable to reaches in the Santa Margarita River Watershed.
2. Thresholds shown are the break point between the two beneficial use risk categories.

The benthic algal biomass chlorophyll-a concentrations observed within the SMR watershed were compared to a threshold of 150 milligram per cubic meter (mg/m^2). This threshold was selected as it represents an unimpaired condition for the WARM beneficial use, which applies to all waters in the WMA, and is the maximum threshold for the COLD beneficial use under the cited framework. It is also consistent with the numeric targets for TMDLs for similar watersheds with both WARM and COLD beneficial uses (Malibu Creek and Ventura River). Chlorophyll-a data for SMR WMA are shown in **Table 2-14**. In the ~~Upper~~ Middle SMR Subwatershed, data from 2005 to 2015 were obtained from the SMC dataset and the annual reports. In the Lower SMR Subwatershed, data from 2008 to 2015 were obtained from the SMC and SWAMP datasets. Results exceeding 150 mg/m^2 were considered indicative of eutrophic conditions.

Table 2-14. Chlorophyll-a Concentrations Observed Within the SMR WMA During Dry Weather

Subwatershed	Subareas	Reach Name	Chlorophyll-a (mg/m^2)
Upper SMR	Arroyo Seco Creek	Arroyo Seco Creek	9
~~Upper~~ Middle SMR	Upper Murrieta Creek and Tributaries	Slaughterhouse Canyon	48
		Cole Canyon	122
	Warm Springs	Warm Springs Creek	43
		French Valley	**179**
	Santa Gertrudis Creek	Tucalota Creek	85
	Murrieta and Long Canyon Creek	Murrieta Creek	49
	Temecula Creek and Redhawk Channel	Redhawk Channel	**2300**
		Temecula Creek	85
	~~Vail Lake and Pechanga Creek~~	~~Arroyo Seco Creek~~	~~9~~
Lower SMR	Upper Santa Margarita River	Santa Margarita River	125
	Lower Santa Margarita River	Santa Margarita River	23
	Rainbow Creek	Rainbow Creek	-
	Fallbrook Creek	Fallbrook Creek	-
	De Luz Creek	Adobe Creek	111
	Sandia Creek	Sandia Canyon Creek	72
		Sandia Canyon	4

BOLDED values exceed the identified threshold of 150 mg/m2 and were considered indicative of eutrophic conditions
A dash means no data available

Elevated algal biomass concentrations were only observed in two subareas, indicating potential eutrophication conditions.

2.3.2.2.2 Benthic Macroinvertebrate Assessment

Benthic macroinvertebrate community condition is assessed using the California Stream Condition Index (CSCI) and the Benthic Macro-Invertebrate (BMI) index of biotic integrity (IBI). The BMI IBI is a multi-metric index developed specific to Southern California and is used to evaluate the conditions of the benthic macro-invertebrate community structure (Ode, et al., 2005). This metric has been calculated at various monitoring locations in the watershed based on bioassessment data.

The BMI IBI score is calculated based on several metrics including taxa richness, EPT[9] taxa, percent intolerant individuals, percent tolerant taxa, and percent collector filterers and collector gatherers. In addition, the CSCI is used throughout the state in a similar fashion and may be available for some or all sites. Because water quality objectives are not currently available for IBI and CSCI results, thresholds were developed for the assessment based on literature values as shown in **Table 2-15**.

Table 2-15. Thresholds Associated with Benthic Macro-Invertebrate Index of Biotic Integrity and California Stream Conditions Index Scores

Threshold	IBI Score[1]	CSCI Score[1]
Very High	56 – 70	≥ 0.92
Good	41 – 55	0.79 – 0.91
Moderate	27 – 40	0.63 – 0.78
Low	14 – 26	0 – 0.63
Very Low	0 - 13	

1. Weston, 2015.

Subareas were considered to be potentially impacted if CSCI < 0.78 or IBI < 40 (i.e., very low, low, or moderate thresholds). In cases where both CSCI and IBI data were available, the CSCI data were used in the assessment as this index represents the latest science and assessment methodology for benthic macroinvertebrate community conditions. The CSCI and IBI scores for subareas with available benthic macroinvertebrate data are presented in **Table 2-16**. Reaches within subareas with potentially impacted biological condition are identified using an "X". Biological data were included in the SMC and MS4 Permit compliance monitoring datasets~~ and the Upper Middle SMR annual reports~~. Data ranged from 2005 to 2015.

[9] Relative abundance of taxa within the groups, Trichoptera, Ephemeroptera, and Plecoptera.

Table 2-16: CSCI and IBI Scores Observed Within the SMR WMA During Dry Weather

Subwatershed	Subarea	Reach Name	CSCI	IBI
Upper SMR	Arroyo Seco Creek	Arroyo Seco Creek	-	-
~~Upper~~ Middle SMR	Upper Murrieta Creek and Tributaries	Slaughterhouse Canyon	0.87	-
		Cole Canyon	**0.61**	-
	Warm Springs	Warm Springs Creek	0.82	-
		French Valley	**0.49**	-
	Santa Gertrudis Creek	Tucalota Creek	0.79	-
	Murrieta and Long Canyon Creek	Murrieta Creek	**0.55**	**30.26**
	Temecula Creek and Redhawk Channel	Redhawk Channel	**0.641**	-
		Temecula Creek	**0.78**	**27.39**
	~~Vail Lake and Pechanga Creek~~	~~Arroyo Seco Creek~~	~~-~~	~~-~~
Lower SMR	Upper Santa Margarita River	Santa Margarita River	0.98	-
	Lower Santa Margarita River	Santa Margarita River	0.87	**22.7**
	Rainbow Creek	Rainbow Creek	1.04	**35.4**
	Fallbrook Creek	Fallbrook Creek	-	-
	De Luz Creek	Adobe Creek	0.93	65.5
	Sandia Creek	Sandia Canyon Creek	1.05	-

BOLDED values exceed the identified threshold of CSCI<0.79 or IBI<40 and are indicative of a potentially impacted biological condition.
A dash means no data available.

Four subareas had lowered benthic community scores based on the CSCI. Two subareas in the Lower SMR subwatershed had lowered IBI scores, but the CSCI scores were similar to reference. As the CSCI scores are based on the most recent science and are representative of a broader reference data set, the CSCI scores were used to determine the subareas with lowered scores. The lower scores are indicative of potential aquatic life beneficial use impacts, but need to be considered along with other information (such as algal biomass concentrations and physical habitat scores) to identify potential causes of the impacts.

2.3.2.2.3 Toxicity Data Assessment

Receiving water monitoring for toxicity is conducted as required by the Permit during wet and dry weather conditions. Toxicity results are evaluated using the Test of Significant Toxicity (TST) as outlined in the NPDES Test of Significant Toxicity Implementation Document. Results are considered to be either "pass" or "fail" depending on whether the response observed is significantly different than the control. (USEPA, 2010) In subareas where TST results are not available, the chronic toxic unit calculation (i.e., TUc) is used. When the TUc is above 1.0, the sample is considered to be exceeding the threshold; the larger the toxic unit, the greater the toxicity.

The 1.0 TUc threshold was selected based on its use in NPDES permits as a trigger for additional investigation of the causes of toxicity.

Results of chronic toxicity analyses for receiving waters within the SMR WMA are presented in **Table 2-17** and **Table 2-18** for dry and wet weather conditions, respectively, based on data collected from 2005 - 2015.

Table 2-17. Chronic Toxicity Test Results Number of Samples Collected by Category in the SMR WMA During Dry Weather

Subarea	Reach Name	TUc Count			TST Count	
		TUc<1	TUc=1	TUc>1	TST Pass	TST Fail
Upper Murrieta Creek and Tributaries	Slaughterhouse Canyon Cole Canyon	-	-	-	-	-
Warm Springs	Warm Springs Creek French Valley	-	-	-	-	-
Santa Gertrudis Creek	Tucalota Creek	-	-	-	-	-
Murrieta and Long Canyon Creek	Murrieta Creek	-	28	-	-	-
Temecula Creek and Redhawk Channel	Redhawk Channel	-	13	**2**	-	-
	Temecula Creek	-	23	**3**	-	-
~~Vail Lake and Pechanga Creek~~ Arroyo Seco Creek	Arroyo Seco Creek	-	-	-	-	-
Upper Santa Margarita River	Santa Margarita River	-	13	-	-	-
Lower Santa Margarita River	Santa Margarita River	-	2	-	17	-
Rainbow Creek	Rainbow Creek	-	-	-	-	-
Fallbrook Creek	Fallbrook Creek	-	-	-	-	-
De Luz Creek	Adobe Creek	-	27	**3**	-	-
Sandia Creek	Sandia Canyon Creek	-	11	-	-	-

TUc and TST Test are two different ways of measuring toxicity. When TUc is greater than 1.0 or TST is Fail **(bolded)** the sample is considered to be exceeding thresholds.

Table 2-18. Chronic Toxicity Test Results Number of Samples Collected by Category in the SMR WMA During Wet Weather

Subarea	Reach Name	TUc Count			TST Count	
		TUc<1	TUc=1	TUc>1	TST Pass	TST Fail
Upper Murrieta Creek and Tributaries	Cole Canyon	1	6	**1**	-	-
Warm Springs	Warm Springs Creek French Valley	**-**	**-**	**-**	**-**	**-**
Santa Gertrudis Creek	Tucalota Creek	**-**	**-**	**-**	**-**	**-**
Murrieta and Long Canyon Creek	Murrieta Creek	-	20	**2**	-	-
Temecula Creek and Redhawk Channel	Temecula Creek	-	22	-	-	-
~~Vail Lake and Pechanga Creek~~ Arroyo Seco Creek	Arroyo Seco Creek	**-**	**-**	**-**	**-**	**-**
Upper Santa Margarita River	Santa Margarita River	**-**	**-**	**-**	**-**	**-**
Lower Santa Margarita River	Santa Margarita River	-	-	-	16	**1**
Rainbow Creek	Rainbow Creek	**-**	**-**	**-**	**-**	**-**
Fallbrook Creek	Fallbrook Creek	**-**	**-**	**-**	**-**	**-**
De Luz Creek	Adobe Creek	-	22	**3**	-	-
Sandia Creek	Sandia Canyon Creek	-	5	-	-	-

TUc and TST Test are two different ways of measuring toxicity. When TUc is greater than 1.0 or TST is Fail **(bolded)** the sample is considered to be exceeding thresholds.
A dash means no data available

The majority of the toxicity samples collected during both dry and wet weather were not toxic. On occasion, toxicity was observed in three subareas during dry weather and four subareas during wet weather. The presence of toxicity indicates potential impacts to aquatic life beneficial uses, but the associated water quality data needs to be evaluated to determine the cause of the toxicity. Toxicity in the SMR WMA has been previously correlated with pyrethroid pesticides. However, neither toxicity nor pyrethroid pesticides are currently persistent in the mass loading station monitoring data. Furthermore, the organophosphate pesticides, chlorpyrifos and diazinon, that have been shown to cause toxicity in other areas of Southern California are no longer regularly detected in the SMR WMA receiving waters.

2.3.2.2.4 Physical Habitat –Erosional Impacts Data Assessment (Provision B.2.a.(7))

The physical habitat conditions of the subareas (**Table 2-20**) were assessed using the California Rapid Assessment Method (CRAM) index. Additionally, information from studies and the public were used to identify potential areas of hydromodification, erosion and sedimentation. CRAM provides an overall summary score for the physical habitat of the monitoring location. (www.cramwetlands.org) CRAM scores range from 25 – 100 and can be divided to reflect physical habitat quality as shown in **Table 2-19**. The CRAM scores account for channel substrate and evidence of erosion within the assessment methodology.

Four attributes of riverine stream evaluation:

1. buffer and landscape context (i.e., stream corridor continuity, stream buffers)
2. hydrology (i.e., water source, channel stability, hydrologic connectivity),
3. physical structure (i.e., structural patch richness, topographic complexity), and
4. biotic structure (i.e., plant community composition, horizontal interspersion, and vertical biotic structure).

Table 2-19. Habitat Quality Indicated by CRAM Score

Habitat Quality	CRAM Score
High	> 75
Moderate	50 - 75
Low	< 50

In the ~~Upper~~ Middle SMR Subwatershed, the CRAM scores were obtained from the SMC dataset and the hydromodification project monitoring report (from 2005 to 2015). In the Lower SMR Subwatershed, the CRAM scores were obtained from the SMC and SWAMP datasets (from 2008 to 2015). Results of the physical habitat assessment are presented in **Table 2-20**, respectively. For the purposes of the assessment, CRAM scores below 50 alone (i.e., a low habitat quality) and CRAM scores between 50 and 75 (i.e., a moderate habitat quality), combined with evidence of hydromodification, were considered indicative of potential impacts to aquatic life.

Table 2-20. CRAM Scores Observed Within the SMR WMA During Dry Weather

Subwatershed	Subarea	Reach Name	CRAM Score	Evidence of Hydromodification
Upper SMR	Arroyo Seco Creek	Arroyo Seco Creek	-	-
~~Upper SMR~~	Upper Murrieta Creek and Tributaries	Slaughterhouse Canyon	67	-
	Warm Springs	Warm Springs Creek	**63**	✓
		French Valley	70	-
	Santa Gertrudis Creek	Tucalota Creek	78	-
	Murrieta and Long Canyon Creek [1]	Long Canyon	**-**	✓
		Murrieta Creek	74	-
	Temecula Creek and Redhawk Channel	Temecula Creek	73	-
	~~Vail Lake and Pechanga Creek~~	~~Arroyo Seco Creek~~	~~-~~	~~-~~
Lower SMR	Upper Santa Margarita River	Santa Margarita River	84	-
	Lower Santa Margarita River	Santa Margarita River I	84	-
	Rainbow Creek	Rainbow Creek	73.4	-
	Fallbrook Creek	Fallbrook Creek	-	-
	De Luz Creek	Adobe Creek	74	-
	Sandia Creek	Sandia Canyon Creek	86	-
		Sandia Canyon Creek	80	-

CRAM scores below 50 are automatically considered indicative of potential impacts to aquatic life. A CRAM score between 50 and 75 with other evidence of hydromodification was also considered to be potentially impacting (**bolded**).
A dash means no data available

1. CRAM index scores from Murrieta Creek and evidence of hydromodification on Long Canyon Creek. The WMAA analysis found that the hydromodification exemption could be applied to Murrieta Creek, indicating hydromodification is not a concern in that reach of the subarea.

In addition to the CRAM index scores, stream conditions and potential areas of erosion and observed hydromodification were considered in the assessment. The Consultation Committee provided comments with areas recommended for investigation for potential erosion/hydromodification concerns in the ~~Upper~~ Middle SMR Subwatershed. These areas, along with the characteristics of the channels are shown in **Figure 2-7**. Similar information is not available for the Lower SMR Subwatershed and no areas for investigation were identified in the Lower SMR Subwatershed.

Evidence of erosion/hydromodification was assessed by reviewing available reports and information provided during the data request. Two key documents were identified that discussed physical habitat conditions, potential hydromodification, and erosion/sedimentation impacts. The Hydromodification Monitoring Project documented hydromodification surveys at two streams within the Cities of Temecula and Murrieta in the ~~Upper~~ Middle SMR Subwatershed; however, this report contained no hydromodification surveys for sites in the Upper or Lower SMR Subwatersheds. Parameters observed and measured in this report included channel dimensions, hydrological and geomorphic conditions, presence and condition of vegetation and habitat, location of discharge points, habitat integrity, dimensions of existing channel bed or bank erosion and known or suspected causes of existing downstream erosion or habitat impact. Two areas were

identified as having evidence of erosion/hydromodification based on this report, Long Canyon Creek in the Murrieta Creek and Long Canyon subarea, and Warm Springs Creek in the Warm Springs subarea.

The Bioassessment of Perennial Streams in Southern California: A Report on the First Five Years of the Stormwater Monitoring Coalition's Regional Stream Survey was also reviewed for evidence of erosion/hydromodification in the SMR WMA. This report was conducted at a regional level, evaluating watersheds at a hydrologic scale larger than the SMR WMA that ranged from Ventura to San Diego. This report utilized data from the SMC dataset and contained summary statistics for physical habitat variables relating to biomass, instream habitat, riparian characteristics and stream substrates. No mention of erosion processes was included and, therefore, no additional areas of concern were identified based on this report.

In addition to the reviewed reports and data, the analysis conducted to evaluate the potential for a hydromodification exemption for Murrieta Creek, Temecula Creek, and the Upper and Lower Santa Margarita River as part of the Watershed Management Area Analysis (**Appendix 4B**) was also considered. The analysis determined that the hydromodification exemption could be applied to Murrieta Creek and the Upper and Lower Santa Margarita River reaches. As a result, evidence of hydromodification/erosion was not identified for these areas. The potential for erosion was identified in the lower portion of Temecula Creek in the analysis.

The results of the assessment show that the CRAM scores were generally good throughout the SMR WMA, although there were a few areas in the ~~Upper~~ Middle SMR Subwatershed where there is evidence of erosion/hydromodification and some other subareas of potential concern identified by the Consultation Committee and in the WMAA analysis (**Figure 2-7**).

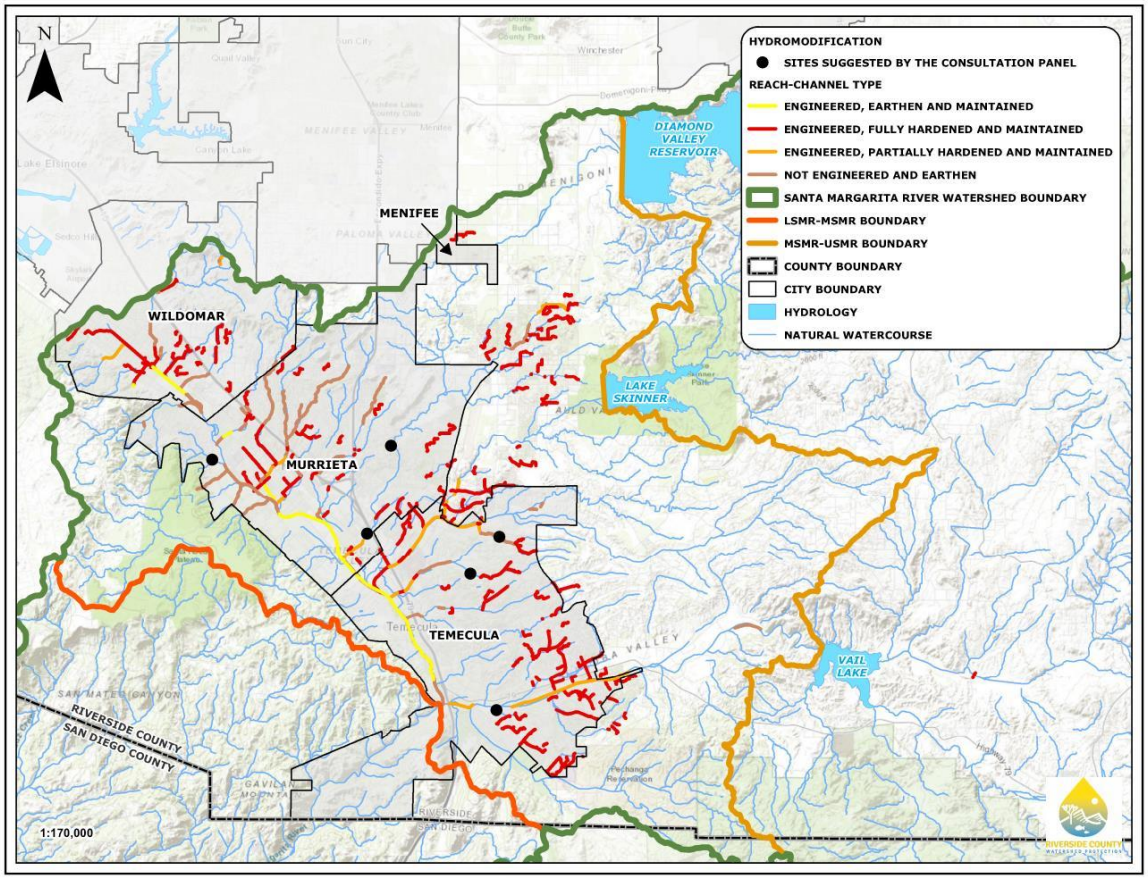


Figure 2-7. ~~Upper~~ Middle SMR Subwatershed Channel Characteristics and Areas Identified by Consultation Committee for Investigation

2.3.2.2.5 Trash Data Assessment

The Statewide Trash Amendments identify specific priority land uses for trash for which the amendments are applicable, based on the potential to impact aquatic life and recreational beneficial uses in receiving waters. While the ~~Upper~~ Middle SMR Subwatershed and Fallbrook Creek are the only areas that have been identified with priority land uses, additional data available from special studies were assessed to determine if any additional subareas should be added. The Upper SMR Subwatershed has not been evaluated for potential priority land use areas pursuant to the trash amendments. Results from trash assessments conducted within the ~~Upper~~ Middle SMR Subwatershed and Lower SMR Subwatershed are summarized in **Table 2-21** and **Table 2-22**, respectively.

Table 2-21. Trash Conditions Within the ~~Upper~~ Upper and Middle SMR Subwatershed Subareas

Subwatershed	Subarea	Dry Weather		Wet Weather	
		Rating	Score	Rating	Score
Upper SMR	Arroyo Seco Creek	N/A	N/A	N/A	N/A
~~Upper~~ Middle SMR	Upper Murrieta Tributaries	Optimal	111	Optimal	119
	Warm Springs	Suboptimal	85	Suboptimal	88
	Murrieta Creek and Long Canyon Creek	Suboptimal	86	Suboptimal	90
	Santa Gertrudis Creek	Optimal	107	Optimal	103
	Temecula Creek and Redhawk Channel	Suboptimal	80	Suboptimal	81
	~~Vail Lake~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~

[1] Results from Trash and Litter Investigation Special Study.
[2] Assessment conducted in accordance with Rapid Trash Assessment (RTA) protocols to develop scores. Scores were assigned to the categories of optimal and suboptimal in accordance with the RTA category descriptions.
[3] N/A – no data for assessment

Table 2-22. Dry Weather ~~Storm Drain~~MS4 Outfall Field Screening Trash Assessments Within the Lower SMR Subwatershed (Source: 2015-2016 TMAR)

Copermittee	Hydrologic Subarea	Trash Present (# of sites)			
		None	Low (<50 pieces)	Medium (50 to 400 pieces)	High (>400 pieces)
County of San Diego	902.13	1	5	2	2
	902.23	1	8	1	0
	Total	2	13	3	2

Based on the data presented above showing minimal trash in the measured areas, no additional subareas were identified for consideration of impacts due to trash.

2.3.3 Identification of Potential PWQCs in Receiving Waters Based on Step 1 and Step 2 Data Assessments

Potential PWQCs were identified by integrating the Step 1 assessments with the Step 2 assessments of locations of known beneficial use locations and an evaluation of physical and biological indicators for each beneficial use category. The potential PWQCs and associated chemical, physical, and biological indicators for each beneficial use category are summarized in **Table 2-23**.

Table 2-23. Potential PWQCs by Beneficial Use Category

Potential PWQCs	Physical, Chemical, and Biological Indicators	Beneficial Use Category
Eutrophication	Algal biomass Benthic community indices Dissolved Oxygen	
Nutrient Loading to TMDL Waterbodies	Total Nitrogen Total Phosphorus	
Toxicity	Ammonia Pesticides [1] Metals [2] Toxicity	Aquatic Life
Physical Habitat	Sediment Physical habitat scores (CRAM) Evidence of erosion and hydromodification	
Nuisance	Trash	Aquatic Life and Recreation
Indicator Bacteria	Fecal Coliform *E. coli*	Recreation
Constituents of concern for drinking water supplies	Nitrate Title 22 Constituents[3]	Water Supply
Constituents of concern for agricultural supply	Total Dissolved Solids Chloride Boron	Agricultural Supply
Constituents of concern for industrial supply	pH Total Dissolved Solids	Industry

This section summarizes the results of the analysis from the previous sections of the indicators shown in **Table 2-23** to determine the subareas with each potential PWQC based on the receiving water analysis. In Step 3, the potential contributions from ~~storm drain~~MS4 discharges will be compared to the potential PWQCs identified from the receiving water analysis to determine the PWQCs for the ~~Water Quality Improvement Plan~~WQIP. Each column in the following set of tables represents a type of analysis that was conducted by geographic reach. By reviewing the data in this way, this section 2B will result in a complete list of Potential PWQCs (**Table 2-30**).

2.3.3.1 Aquatic Life-Eutrophication PWQC

Eutrophication is caused by excessive growth of algal biomass. Elevated biomass levels cause changes in water column and sediment chemistry that can cause fish kills and impact benthic communities. As shown in **Figure 2-8**, eutrophication can be assessed by measuring macroalgae and phytoplankton and the associated changes in DO and pH in the water column. Additionally, eutrophication symptoms can result from excess TN and TP loading. While TN and TP may not cause eutrophication in all areas of the watershed, even when above assessment thresholds, the elevated nutrient concentrations can contribute to downstream eutrophication impacts. Therefore, all of these indicators were evaluated in the assessment of the potential PWQC of eutrophication.

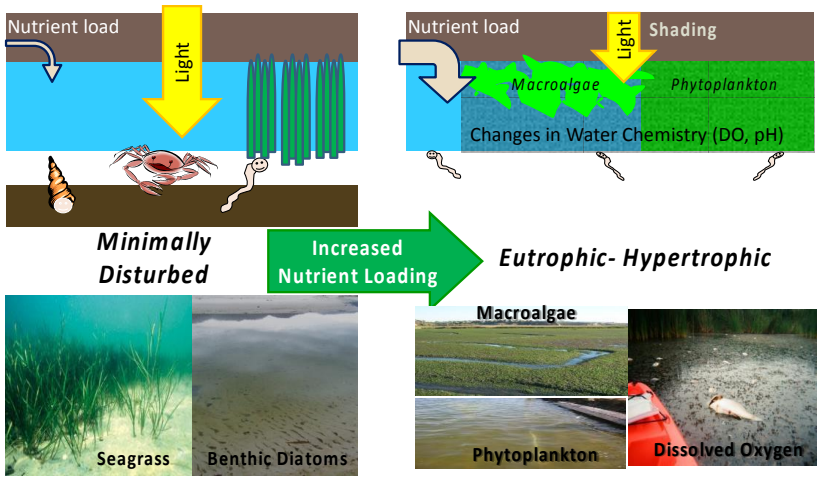


Figure 2-8. Conceptual Model of Eutrophication in Mediterranean Estuaries (from Model Application Report)

While all of the metrics discussed above are indicative of eutrophication, elevated levels of nutrients or other indicators may or may not have an impact on aquatic life beneficial uses, due to physical factors or other waterbody conditions (Sutula, et al., 2016). Benthic macroinvertebrate community condition can be used to assess whether the elevated algal biomass is impacting aquatic life beneficial uses. As a result, the benthic community condition data were also used in the eutrophication assessment. The results of the assessment are summarized in **Table 2-24**.

Table 2-24. Summary of Eutrophication PWQC Assessment Results

Subwatershed	Subarea	303(d) Listings for Associated Chemical Indicators	TMDL	Nitrogen Above Assessment Threshold	Phosphorus Above Assessment Threshold	Algal Biomass Above Threshold	Benthic Below Threshold	Dissolved Oxygen
Upper SMR	Arroyo Seco Creek	No	No [1] ~~Yes [1]~~	No	No	No	N/A	D
Upper SMR	Upper Murrieta Creek and Tributaries	No	No [1] ~~Yes [1]~~	No	W	No	No	No
	Warm Springs	Yes	No [1] ~~Yes [1]~~	W	W	D	D	No
	Murrieta and Long Canyon Creek	Yes	No [1] ~~Yes [1]~~	W	D, W	No	D	D
Middle SMR	Santa Gertrudis Creek	Yes	No [1] ~~Yes [1]~~	W	D, W	No	No	No
	Temecula Creek and Redhawk Channel	Yes	No [1] ~~Yes [1]~~	D, W	D, W	D	D	D
	~~Vail Lake and Pechanga Creek~~	~~No~~	~~Yes [1]~~	~~No~~	~~No~~	~~No~~	~~N/A~~	~~D~~
Lower SMR	Upper Santa Margarita River	Yes	No [1] ~~Yes [1]~~	No	W	No	No	D
	Lower Santa Margarita River	Yes	No [1] ~~Yes [1]~~	D	W	No	No	D
	Rainbow Creek	Yes	Yes [2]	D, W	D, W	N/A	No	D, W
	Fallbrook Creek	No	No	D	D, W	N/A	N/A	D
	De Luz Creek	Yes	No [1] ~~Yes [1]~~	D	W	No	N/A	D
	Sandia Creek	No	No [1] ~~Yes [1]~~	D	D, W	No	No	No
	Santa Margarita River Estuary	Yes	No [1] ~~Yes [1]~~	D, W	D, W	N/A	N/A	No

N/A: no data for assessment; Threshold exceedance: D for dry weather; W for wet weather.

1. TMDL Alternative (under development) for the SMR Estuary identifies dry weather nutrient loading from the subarea to be potentially contributing to eutrophication concerns in the SMR Estuary.
2. Effective TMDL with dry and wet weather allocations for MS4s.

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Results of the analysis show that many subareas are above the assessment threshold for nitrogen and phosphorus and have the potential to contribute nutrient loading to eutrophic conditions in the SMR Estuary. All subareas that have elevated nitrogen or phosphorus concentrations and are considered as part of a TMDL or TMDL Alternative have a potential PWQC of nutrient loading to a TMDL waterbody. Additionally, Warm Springs and Temecula Creek and Redhawk Channel have elevated algal biomass levels and lowered benthic community condition results, indicating the potential for localized eutrophication concerns and are, therefore, assigned a potential PWQC of eutrophication along with SMR Estuary which is listed for eutrophication. Murrieta and Long Canyon Creek subarea had benthic community measurements below thresholds, but did not have associated elevated algal biomass above thresholds so were not assigned a potential eutrophication PWQC. Santa Gertrudis Creek subarea benthic community scores were around the threshold, but the algal biomass levels were not above thresholds and, therefore, the subarea was not assigned a potential eutrophication PWQC.

2.3.3.2 Aquatic Life-Toxicity PWQC

Toxicity can be assessed in the water column and in sediment, each of which can affect the aquatic life. Toxicity is directly measured through toxicity testing, but the potential for toxicity can also be assessed through the examination of constituents that have the potential to cause toxicity to water quality objectives. The assessment of toxicity considered both the results of toxicity tests and evaluation of constituents most likely to cause toxicity. Toxicity in the Santa Margarita River WMA has been previously correlated with pyrethroid pesticides. Organophosphate pesticides, ammonia and metals are other constituents that have the potential to cause or contribute to receiving water toxicity.

The assessment of chemical, physical and biological indicators associated with toxicity are summarized in **Table 2-25**. The assessment included the Step 2 evaluation of toxicity samples and results from the exceedance analyses of pesticides, metals, and ammonia conducted in Step 1B.

Table 2-25. Summary of Toxicity PWQC Assessment Results

Subwatershed	Subarea	303(d) Listings	TMDL	Toxicity Above Assessment Threshold	Pesticides Above Assessment Threshold	Metals Above Assessment Threshold	Ammonia Above Assessment Threshold
Upper SMR	Arroyo Seco Creek	No	No	N/A	No	No	No
~~Upper~~ Middle SMR	Upper Murrieta Creek and Tributaries	No	No	No	No	No	No
	Warm Springs	**Yes[6]**	No	N/A	No	**W[2]**	No
	Murrieta and Long Canyon Creek	**Yes[6]**	No	**W**	**W[1]**	**W[2]**	No
	Santa Gertrudis Creek	**Yes[5]**	No	N/A	No	No	No
	Temecula Creek and Redhawk Channel	**Yes**	No	**D, W**	No	No	**D**
	~~Vail Lake and Pechanga Creek~~	~~No~~	~~No~~	~~N/A~~	~~No~~	~~No~~	~~No~~
Lower SMR	Upper Santa Margarita River	**Yes[7]**	No	No	W[3]	No	No
	Lower Santa Margarita River	No	No	No	N/A	No	No
	Rainbow Creek	No	No	N/A	N/A	No	No
	Fallbrook Creek	No	No	No	N/A	No	No
	De Luz Creek	No	No	N/A	N/A	No	No
	Sandia Creek	No	No	No	N/A	**D[4]**	No
	Santa Margarita River Estuary	No	No	N/A	N/A	No	**D**

N/A: no data for assessment; Threshold exceedance: D for dry weather; W for wet weather.

1. Simazine is the only pesticide with exceedances in this subarea.
2. Copper is the only metal with exceedances in this subarea.
3. Chlorpyrifos is the only pesticide with exceedances in this subarea.
4. Selenium is the only metal with exceedance in this subarea.
5. Listings for chlorpyrifos and copper were not confirmed during the Step 1B exceedance analysis.
6. Listing for chlorpyrifos was not confirmed during the Step 1B exceedance analysis.

7. Listing for toxicity was not confirmed by the Step 2 toxicity data assessment.

Results of the analysis show that observed toxicity is limited to a few subareas and the organophosphate pesticides, that may have historically contributed to toxicity, are no longer exceeding in receiving waters.

Constituents potentially contributing to toxicity, including diazinon and copper, exceeded thresholds in a few subareas. Additionally, although 303(d) listings for constituents potentially contributing to toxicity (e.g. copper and chlorpyrifos) exist in most subwatersheds, most of these listings were not confirmed in the Step 1B exceedance analysis and the pesticide trends indicate improving conditions. The Murrieta and Long Canyon Creek and Temecula Creek and Redhawk Channel subareas were assigned potential PWQCs of observed toxicity due to observed toxicity in the subareas and continuing exceedances of WQOs for constituents that could potentially contribute to toxicity. Warm Springs, Sandia Creek and SMR Estuary had some constituents that were above objectives, but no associated toxicity so were not assigned this potential PWQCs.

2.3.3.3 Aquatic Life-Physical Habitat PWQC

Physical habitat is important for protection of aquatic life. Erosion of stream channels, increased sediment deposition, and modified channels can alter conditions necessary to support spawning and macroinvertebrate communities. Several factors can be used to evaluate physical habitat including channel substrate, evidence of erosion, and the creek rapid assessment methods.

Table 2-26. Summary of Physical Habitat PWQC Assessment Results

Subwatershed	Subarea	303(d) Listing	TMDL	CRAM Index Score below threshold	Benthic Below Threshold	Evidence of Hydromodification[1]
Upper SMR	Arroyo Seco Creek	No	No	N/A	N/A	No
~~Upper~~ Middle SMR	Upper Murrieta Creek and Tributaries	No	No	No[2]	No	(4)
	Warm Springs	No	No	No[2]	**D**	**Yes**
	Murrieta and Long Canyon Creek[3]	No	No	No[2]	**D**	**Yes**
	Santa Gertrudis Creek	No	No	No	No	No
	Temecula Creek and Redhawk Channel	No	No	No[2]	**D**	(4)
	~~Vail Lake and Pechanga Creek~~	~~No~~	~~No~~	~~N/A~~	~~N/A~~	~~No~~
Lower SMR	Upper Santa Margarita River	No	No	No	No	N/A
	Lower Santa Margarita River	No	No	No	No	N/A
	Rainbow Creek	No	No	No[2]	No	N/A
	Fallbrook Creek	No	No	N/A	N/A	N/A
	De Luz Creek	No	No	No[2]	N/A	N/A
	Sandia Creek	No	No	No	No	N/A
	Santa Margarita River Estuary	No	No	N/A	N/A	N/A

N/A: no data for assessment; Threshold exceedance: D for dry weather; W for wet weather.

1. As reported in the Hydromodification Monitoring Project Report.
2. As described above, the CRAM threshold is <50. However, for scores between 50 and 75, physical habitat impacts were considered a PWQC if there was also evidence of hydromodification. These reaches had CRAM scores between 50 and 75.
3. CRAM index scores from Murrieta Creek and evidence of hydromodification on Long Canyon Creek. The WMAA analysis found that the hydromodification exemption could be applied to Murrieta Creek, indicating hydromodification is not a concern in that reach of the subarea.
4. Areas are under investigation for erosion/sediment impacts at the sites identified by the Consultation Committee and in Temecula Creek based on the results of the WMAA.

Warm Springs and Murrieta and Long Canyon Creek were identified as subareas having potential PWQCs for lowered physical habitat scores (CRAM) or evidence of hydromodification/erosional impacts. Subareas with sites under investigation based on input from the Consultation Committee and the WMAA may be included as a PWQC in the future if the investigations confirm evidence of hydromodification/erosional impacts. The Temecula Creek and Redhawk Channel subarea was not assigned this PWQC at this time because the elevated algal biomass values are likely contributing to the lowered benthic community scores, but may be added after further investigation of potential erosion impacts in the reach as follow up to the WMAA and Consultation Committee input.

2.3.3.4 Recreation-Indicator Bacteria PWQC

Recreation beneficial uses are impacted by the presence of pathogens that have the potential to cause illness. Indicator bacteria, such as *E. coli*, fecal coliform, and *Enterococcus* are used to assess the potential risk of illness. No other physical or biological indicators were identified as

indicators for the recreation beneficial use category. The assessment for recreation utilizes indicator bacteria results from the Step 1 analysis as summarized in **Table 2-27**.

Table 2-27. Summary of Recreational Beneficial Use Impact Assessment

Subwatershed	Subarea	303(d) Listings	TMDL	Fecal Coliform Above Threshold	*E. coli* Above Threshold	Location of Known Recreation	Flow Condition Supportive of Recreation
Upper SMR	Arroyo Seco Creek	No	No	No	No	No	No
~~Upper~~ Middle SMR	Upper Murrieta Creek and Tributaries	No	No	**W**	**W**	No	No
	Warm Springs	**Yes**	No	**W**	**W**	No	**Yes**
	Murrieta and Long Canyon Creek	**Yes**	No	**W**	**W**	**Yes**	**Yes**
	Santa Gertrudis Creek	**Yes**	No	**W**	**W**	No	**Yes**
	Temecula Creek and Redhawk Channel	**Yes**	No	**D,W**	**D,W**	No	No
	~~Vail Lake and Pechanga Creek~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~
Lower SMR	Upper Santa Margarita River	No	No	No	No	**Yes**	**Yes**
	Lower Santa Margarita River	**Yes**	No	**W**	No	**Yes**	**Yes**
	Rainbow Creek	No	No	No	No	**Yes**	**Yes**
	Fallbrook Creek	No	No	No	No	**Yes**	**Yes**
	De Luz Creek	No	No	**D,W**	**D,W**	**Yes**	**Yes**
	Sandia Creek	No	No	No	No	**Yes**	**Yes**
	Santa Margarita River Estuary	No	No	No	No	**Yes**	**Yes**

Threshold exceedance: D for dry weather; W for wet weather.

All subareas with fecal coliform or E. coli values above thresholds were assigned to this potential PWQC.

2.3.3.5 Municipal Supply-Constituents of Potential Concern for Municipal Supply PWQC

The municipal supply beneficial use can be impacted by elevated concentrations of constituents that have the potential to impact the health of people drinking the water. The constituents that could impact the municipal supply beneficial use are those that have identified objectives for the protection of human health as outlined in Title 22. A list of these constituents is included in **Appendix 2**. No physical or biological indicators were identified for consideration for the municipal supply beneficial use category. The assessment of chemical indicators associated with municipal supply are summarized in **Table 2-28** based on the analysis conducted in Step 1.

Table 2-28. Summary of Municipal Supply Beneficial Use Impact Assessment

Subwatershed	Subarea	303(d) Listings	TMDL	Nitrate Above Threshold	Title 22 Above Threshold	Location of Known Municipal Supply Diversion
Upper SMR	Arroyo Seco Creek	No	No	No	No	No
~~Upper~~ Middle SMR	Upper Murrieta Creek and Tributaries	No	No	No	W[1,2]	No
	Warm Springs	Yes[1,2]	No	No	W[1,2,4,5]	No
	Murrieta and Long Canyon Creek	Yes[1,2]	No	No	D,W[1,2,4,5]	No
	Santa Gertrudis Creek	Yes[1,2]	No	No	D,W[1,2,4,5]	No
	Temecula Creek and Redhawk Channel	Yes[1,2,4]	No	No	D,W[1,2,3,4,5]	No
	~~Vail Lake and Pechanga Creek~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~
Lower SMR	Upper Santa Margarita River	No	No	No	D[1]	No
	Lower Santa Margarita River	No	No	D,W	D,W[1,2,3,4]	Yes
	Rainbow Creek	Yes[1,3,4]	No	D,W	D,W[2,3,4]	No
	Fallbrook Creek	No	No	No	D,W[1,2,3,4]	No
	De Luz Creek	Yes[1,2,3]	No	No	D,W[1,2,3,4]	No
	Sandia Creek	Yes[1,3,4]	No	No	D,W[1,3,4]	No
	Santa Margarita River Estuary	(6)	(6)	(6)	(6)	(6)

N/A: no data for assessment; Threshold exceedance: D for dry weather; W for wet weather.

1. Iron
2. Manganese
3. Sulfate
4. TDS
5. Color
6. Municipal drinking water beneficial use does not apply to the Santa Margarita River Estuary so the analysis was not conducted for this subarea.

All subareas with nitrate or Title 22 constituents values above thresholds were assigned to this potential PWQC.

Agricultural and Industrial Supply

Potential impacts to agricultural and industrial supply were evaluated through assessments of the potential PWQCs: constituents of potential concern for agricultural and industrial supply.

Agricultural and industrial supply beneficial uses are potentially impacted by constituents, that at elevated concentrations, can impact the viability of agriculture or impact industrial processes. TDS, chloride and boron are constituents that could adversely impact agriculture and TDS and pH could potentially impact industrial uses. No physical or biological indicators were identified for consideration for these beneficial use categories. The assessment of chemical indicators associated with agricultural and industrial supply are summarized in **Table 2-29** based on the analysis conducted in Step 1.

Table 2-29. Summary of Agricultural and Industrial Supply Beneficial Use Impact Assessment

Subwatershed	Subarea	303(d) Listings	TMDL	TDS Above Threshold	Chloride Above Threshold	Boron Above Threshold	pH Above Threshold	AGR: Location of Known Agricultural Supply Diversion?	IND: Location of Known Industrial Diversion?
Upper SMR	Arroyo Seco Creek	No	No	No	No	N/A	D	No	No
~~Upper~~ Middle SMR	Upper Murrieta Creek and Tributaries	No	No	No	N/A	N/A	No	No	No
	Warm Springs	No	No	W	No	N/A	No	No	No
	Murrieta and Long Canyon Creek	Yes	No	D	No	No	D	No	No
	Santa Gertrudis Creek	No	No	D	No	N/A	D,W	No	No
	Temecula Creek and Redhawk Channel	Yes	No	D, W	No	No	D	No	No
	~~Vail Lake and Pechanga Creek~~	~~No~~	~~No~~	~~No~~	~~No~~	~~N/A~~	~~D~~	~~No~~	~~No~~
Lower SMR	Upper Santa Margarita River	No	No	No	No	No	No	No	No
	Lower Santa Margarita River	No	No	D, W	No	No	No	No	No
	Rainbow Creek	Yes	No	D, W	No	No	No	No	No
	Fallbrook Creek	No	No	D	No	No	W	No	No
	De Luz Creek	No	No	D	No	No	D,W	Yes	No
	Sandia Creek	Yes	No	D	No	No	W	Yes	No
	Santa Margarita River Estuary	No	No	No	No	No	No	No	No

N/A: no data for assessment; Threshold exceedance: D for dry weather; W for wet weather.

All subareas with TDS, chloride, boron, and pH values above thresholds were assigned to this potential PWQC.

Table 2-30 summarizes the potential PWQCs identified from the receiving water analysis.

Table 2-30. Summary of Step 2-Potential PWQCs

Beneficial Use Category	Potential PWQCs	Physical, Chemical, and Biological Indicators	Upper SMR Subwatershed	~~Upper~~ Middle SMR Subwatershed						Lower SMR Subwatershed						
			Arroyo Seco Creek	Upper Murrieta Creek and Tributaries	Warm Springs	Murrieta and Long Canyon Creek	Santa Gertrudis Creek	Temecula Creek and Redhawk Channel	~~Vail Lake and Pechanga Creek~~	Upper Santa Margarita River	Lower Santa Margarita River	Rainbow Creek	Fallbrook Creek	De Luz Creek	Sandia Creek	Santa Margarita River Estuary
Aquatic Life	Eutrophication	Algal biomass	-	-	X	-	-	X	-	-	-	-	-	-	-	X[1]
		Benthic community indices	-	-	X	X	-	X	-	-	-	-	-	-	-	-
		Dissolved Oxygen	X	-	-	X	-	X	~~X~~	X	X	X	X	X	-	X[1]
	Nutrient Loading to TMDL waterbodies	Total Nitrogen	-	-	X	X	X	X	-	-	X	X	X	X	X	X
		Total Phosphorus	-	X	X	X	X	X	-	X	X	X	X	X	X	X
	Toxicity	Ammonia	-	-	-	-	-	X	-	-	-	-	-	-	-	X
		Pesticides	-	-	-	X	-	-	-	X	-	-	-	-	-	-
		Metals	-	-	X	X	-	-	-	-	-	X	-	-	X	-
		Toxicity	-	-	-	X	-	X	-	-	-	-	-	-	-	-
	Physical Habitat	Sediment	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Physical habitat index scores (CRAM)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Evidence of erosion and hydromodification	-	-	X	X[2]	-	-	-	-	-	-	-	-	-	-

Beneficial Use Category	Potential PWQCs	Physical, Chemical, and Biological Indicators	Upper SMR Subwatershed	~~Upper~~ Middle SMR Subwatershed						Lower SMR Subwatershed						
			Arroyo Seco Creek	Upper Murrieta Creek and Tributaries	Warm Springs	Murrieta and Long Canyon Creek	Santa Gertrudis Creek	Temecula Creek and Redhawk Channel	~~Vail Lake and Pechanga Creek~~	Upper Santa Margarita River	Lower Santa Margarita River	Rainbow Creek	Fallbrook Creek	De Luz Creek	Sandia Creek	Santa Margarita River Estuary
Recreation	Nuisance	Trash	-	X	X	X	X	X	-	-	-	-	X	-	-	-
			-													
	Indicator Bacteria Concentrations	Fecal Coliform	X	X	X	X	X	X	-	-	X	X	-	X	-	-
		E. coli		X	X	X	X	X	-	-	-	-	-	X	-	-
Water Supply	Constituents of potential concern for drinking water supplies	Nitrate	-	-	-	-	-	-	-	-	X	X	-	-	-	-
		Title 22 Constituents	-	X	X	X	X	X	-	X	X	X	X	X	X	-
Agricultural Supply	Constituents of potential concern for agricultural supply	Total Dissolved Solids		-	X	X	X	X	-	-	X	X	X	X	X	-
		Chloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Industry	Constituents of potential concern for industrial supply	pH	-	-	-	X	X	X	~~X~~	-	-	-	-	X	-	-
		Total Dissolved Solids	-	-	X	X	X	X	-	-	X	X	X	X	X	-

Note: Potential PWQCs are indicated by an "X" in the table.

1. Identified as potential PWQC based on TMDL Alternative studies.
2. Evidence of hydromodification on Long Canyon Creek only. The WMAA analysis found that the hydromodification exemption could be applied to Murrieta Creek, indicating hydromodification is not a concern in that reach of the subarea.

2.4 STEP 3. ASSESSMENT OF POTENTIAL IMPACTS FROM ~~STORM DRAIN~~MS4 DISCHARGES

The assessment of receiving water conditions in Steps 1 and 2 identified potential PWQCs of concern in receiving waters within the SMR WMA. Step 3 assesses if discharges from ~~storm drain~~MS4s could cause or contribute to the potential PWQCs. The assessment was conducted by identifying the locations where ~~storm drain~~MS4 discharges occur. Then, representative chemical monitoring data and persistent flow data were reviewed to determine which constituents the ~~storm drain~~MS4 discharges may be contributing to receiving waters to create the list of PWQCs.

2.4.1 Locations of ~~Storm Drain~~MS4 Discharges (Provision B.2.b.(3))

As a first step, the locations of each Copermittee's MS4~~storm drain~~ outfalls, as defined in the Regional Permit, that discharge to receiving waters were identified to assess where ~~storm drain~~MS4 discharges were most likely to contribute to receiving water conditions identified in Step 2. For most of the subareas, ~~storm drain~~MS4 contributions are a possibility where there are ~~storm drain~~MS4 outfalls and jurisdictional area within or upstream of the subarea (see **Figure 3-4**).

2.4.2 Identification of Potential PWQCs Which ~~Storm Drain~~MS4 Discharges May be Contributing (Provisions B.2.b.(1), B.2.b.(2), B.2.b.(4) and B.2.b.(5))

Monitoring data from Copermittee's MS4~~storm drain~~ outfalls was compared to established thresholds to determine whether or not MS4s ~~storm drain~~s are contributing pollutants. All relevant and appropriate data for both stormwater and non-stormwater discharges were~~as~~ considered. ~~Locations of the~~ MS4~~storm drain~~ outfall monitoring locations are shown in **Figure 2-10**. The outfall monitoring stations shown in Figure 2-10~~on the map~~ represent the best available information on the locations ofMS4~~ storm drain~~ outfalls that discharge pollutants and are considered representative of all MS4~~storm drain~~ outfalls that discharge to receiving waters. Locations of outfalls with persistent non-stormwater flow are shown in **Figure 2-11**. All of the ~~T~~he Upper SMR Subwatershed, and ~~wo subareas, Vail Lake and~~ the Pechanga Creek and~~s well as~~ Sandia Creek subareas~~,~~ do not have storm drain outfall monitoring data and are primarily comprised of open space and federal lands. Due to the lack of data and the minimal amount of urban land use in these subareas, MS4~~storm drain~~ discharges were not identified as contributing to potential PWQCs in these subareas. As a result, no PWQCs are assigned for these subareas, but modifications will be considered during the adaptive management process if data are collected that identify MS4~~storm drain~~ contributions to potential PWQCs in these areas.

As discussed further in **Section 2.5.2**, ~~storm drain outfall data are limited and~~ the assessment of potential impacts of the MS4~~storm drain~~ discharges on the receiving waters is based on limited MS4 outfall data~~an acknowledged data limitation~~. While the available data generally support characterization of~~es~~ the discharges from the MS4~~storm drain~~s, the limited spatial extent of data from the MS4~~storm drain~~ outfalls means the assessment of the potential impacts from storm drain outfalls for a whole subarea is based on data from a single outfall and the results may not be fully representative of conditions across the whole subarea. The assessment of MS4~~storm drain~~ discharge impacts on receiving waters will improve over time as this data gap is addressed by future outfall monitoring and non-stormwater field screening.

Although limitations on the amount of MS4~~storm drain~~ outfall discharge data exist, the available data were considered representative for the purposes of the analysis. At least one MS4~~storm drain~~

outfall monitoring location was available in each subarea within the Middle and Lower SMR Subwatersheds, with the exception of the ~~Vail Lake and~~ Pechanga Creek, Sandia Creek, and SMR Estuary subareas, which have a minimal amount of urban land use and are primarily comprised of open space and federal lands. Therefore, the analysis assumes that all ~~storm drain~~MS4 outfalls within a subarea have the potential to discharge any pollutants that are observed in the representative outfall(s) for that subarea.

The procedure for assessing the contribution of ~~storm drain~~MS4 discharges to the potential PWQCs identified in Step 2 is shown in **Figure 2-9**. The potential for non-storm water discharges to cause or contribute to impacts on beneficial uses was assessed in the same method as storm water discharges and all outfalls identified as persistent in Figure 2-11 are assumed to potentially contribute pollutants to receiving waters under dry weather conditions. Based on the Step 3 assessment, the subareas with identified ~~storm drain~~MS4 discharges potentially contributing to PWQCs are~~is~~ shown in **Figure 2-9~~Figure 2-9~~~~Figure 2-9~~12**. ~~A summary of the storm drain discharge contribution to the potential PWQCs identified in Step 2 is shown in~~ **Table 2-31**~~. The~~ summarizes~~y table below shows~~ the results of the ~~storm drain~~MS4 discharge assessment for each of the potential PWQCs identified in Step 2. If the indicator of the impact was not available for the MS4~~storm drain~~ outfall data, the potential PWQC was noted as "N/A" in the table. If the MS4~~storm drain~~ outfall data demonstrated exceedances, the potential PWQC is identified with an "X" in the table. If the MS4~~storm drain~~ outfall data did not demonstrate exceedances of an indicator, a footnote is referenced in the table to explain the assessment.

Impacts are summarized by wet and dry weather conditions and organized according to beneficial use category. Further investigation of the contribution of discharges from ~~storm drain~~MS4 outfalls to the PWQCs will be conducted as part of the Monitoring and Assessment Program and may result in refinement of the PWQCs or the geographic extent of these conditions.

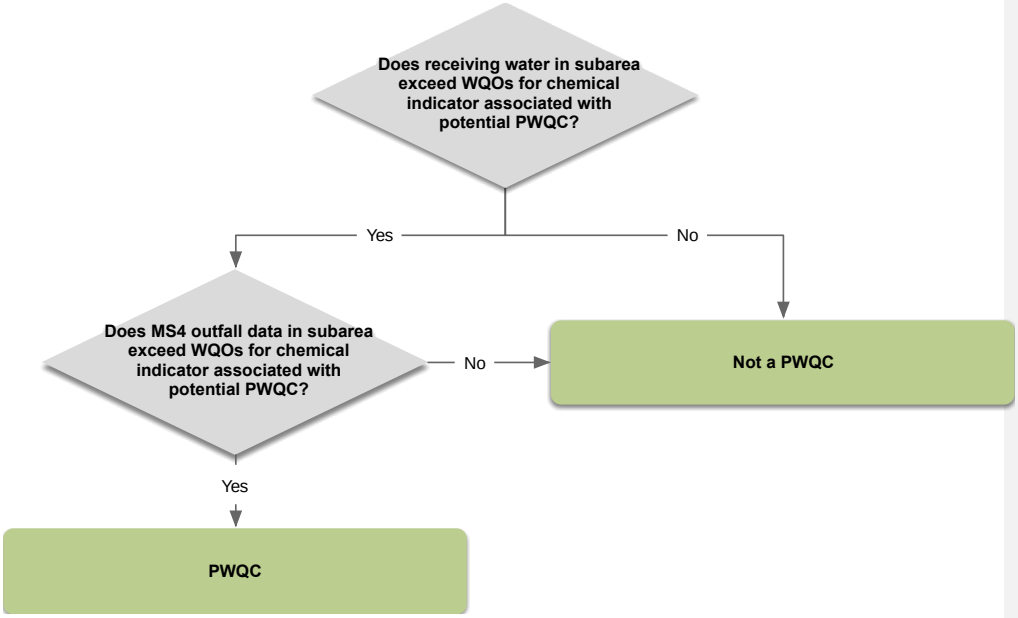


Figure 2-9. Procedure for Assessing Potential Impact of ~~Storm Drain~~MS4 Discharges to Potential PWQCs in a Subarea

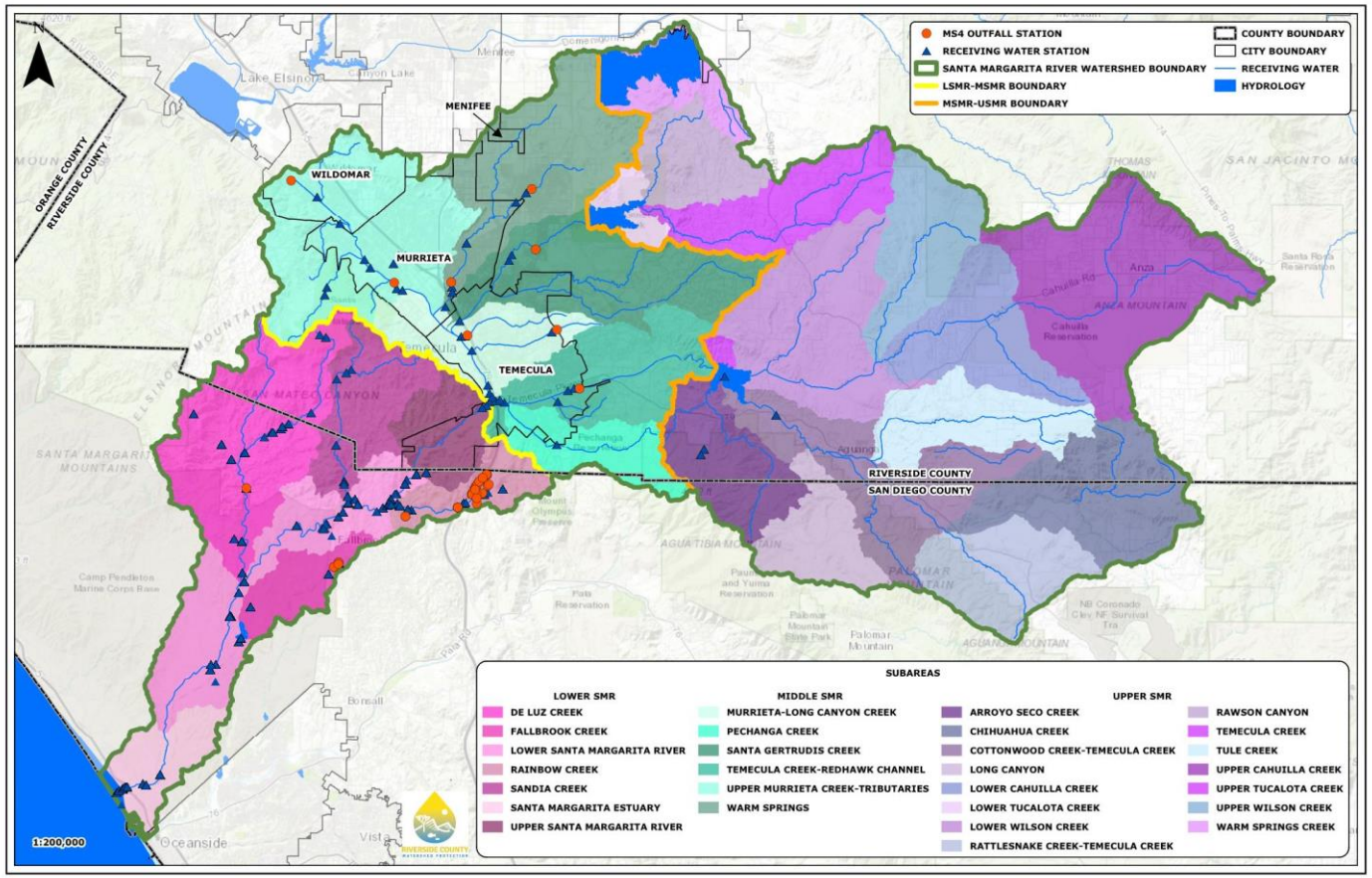


Figure 2-10. SMR WMA Receiving Water and Outfall Monitoring Stations (with Available Data)

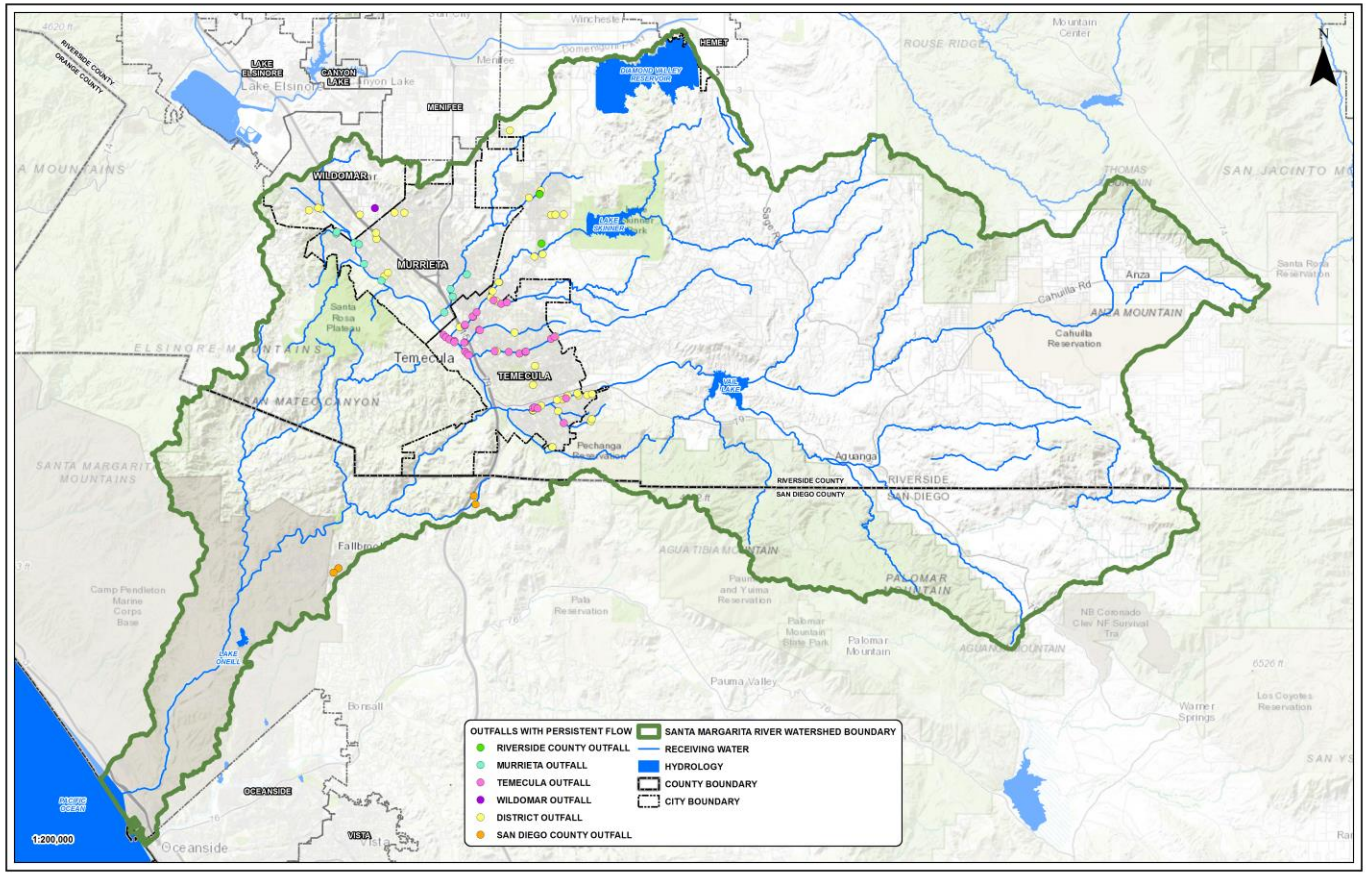


Figure 2-11. Major ~~Storm Drain~~MS4 Outfalls Identified through Field Screening as Having Persistent Non-stormwater Discharges

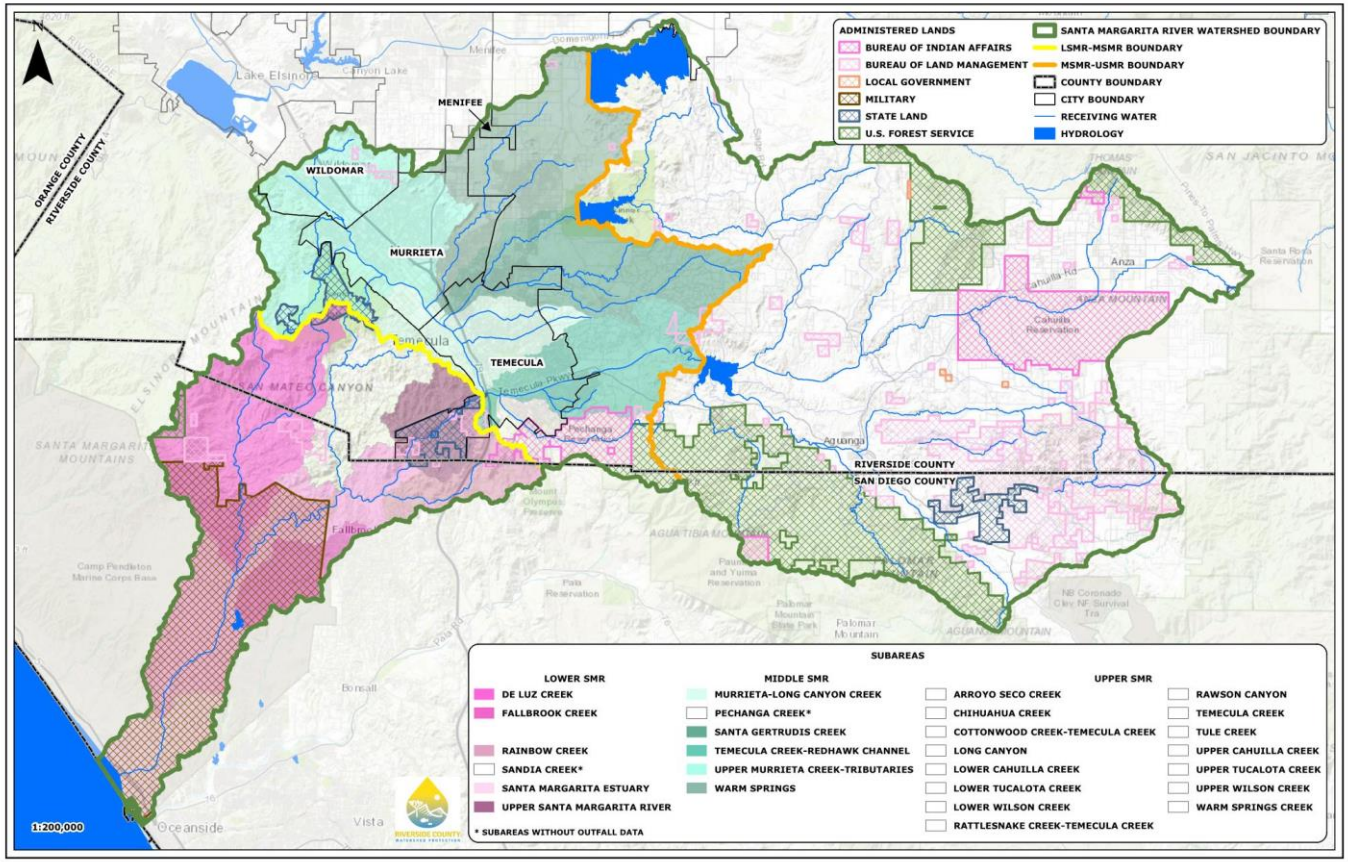


Figure 2-12. Subareas Identified Based on the Step 2 Assessment as Having ~~Storm Drain~~MS4 Discharges that Contribute to Potential PWQCs

Table 2-31. Summary of Step 3- Potential PWQCs Identified Based on Assessment of ~~Storm Drain~~MS4 Discharge Impacts

Beneficial Use Category	Potential PWQCs	Physical, Chemical, and Biological Indicators	Upper SMR Subwatershed	~~Upper~~ Middle SMR Subwatershed						Lower SMR Subwatershed						
			Arroyo Seco Creek	Upper Murrieta Creek and Tributaries	Warm Springs	Murrieta and Long Canyon Creek	Santa Gertrudis Creek	Temecula Creek and Redhawk Channel	~~Vail Lake and Pechanga Creek~~	Upper Santa Margarita River	Lower Santa Margarita River	Rainbow Creek	Fallbrook Creek	De Luz Creek	Sandia Creek	Santa Margarita River Estuary
Aquatic Life	Eutrophication	Algal biomass			N/A			N/A								N/A
		Benthic community indices			N/A	N/A		N/A								
		Dissolved Oxygen	(4)			N/A		N/A	~~(4)~~	(3)	N/A	N/A	N/A	N/A		N/A
	Nutrient Loading to TMDL waterbodies	Total Nitrogen			X	(1)	(1)	X			X	X	X	(1)	(4)	(3)
		Total Phosphorus		X	X	X	X	X		(3)	(1)	X	X	(1)	(4)	(3)
	Toxicity	Ammonia						1								(3)
		Pesticides				(2)				(3)						
		Metals			(1)	X						(1)			(4)	
		Toxicity				X		X								
	Physical Habitat	Sediment CRAM scores														
		Evidence of erosion and hydromodification			N/A	N/A										

Beneficial Use Category	Potential PWQCs	Physical, Chemical, and Biological Indicators	Upper SMR Subwatershed	~~Upper~~ Middle SMR Subwatershed						Lower SMR Subwatershed						
			Arroyo Seco Creek	Upper Murrieta Creek and Tributaries	Warm Springs	Murrieta and Long Canyon Creek	Santa Gertrudis Creek	Temecula Creek and Redhawk Channel	~~Vail Lake and Pechanga Creek~~	Upper Santa Margarita River	Lower Santa Margarita River	Rainbow Creek	Fallbrook Creek	De Luz Creek	Sandia Creek	Santa Margarita River Estuary
Recreation	Nuisance	Trash [5]		X	X	X	X	X					X			
	Indicator Bacteria Concentrations	Fecal Coliform		X	X	X	X	X			X	X		X		
		E. coli		X	X	X	X	X						(1)		
Water Supply	Constituents of potential concern for drinking water supplies	Nitrate									X	X				
		Title 22 Constituents[3]		X	X	X	X	X		(3)	X	X	X	X	(4)	
Agricultural Supply	Constituents of potential concern for agricultural supply	Total Dissolved Solids Chloride Boron			(1)	X	X	X			X	X	X	X	(4)	
Industry	Constituents of potential concern for industrial supply	pH	(4)			(1)	(1)	(1)	~~(4)~~					X		
		Total Dissolved Solids			(1)	X	X	X			X	X	X	X	(4)	

1. ~~Storm drain~~MS4 outfall data do not exceed in at least two samples and more than 10% of the time for this indicator.
2. Simazine is the only pesticide observed as having exceedances in receiving waters. No outfall data for simazine are available. Other pesticides, particularly bifenthrin, that may contribute to toxicity have been observed above thresholds in these outfalls, but receiving water data for other pesticides did not exceed thresholds.
3. No ~~storm drain~~MS4 outfalls are located in the subarea to assess potential impacts. No ~~storm drain~~MS4 outfalls are present. Upstream ~~storm drain~~MS4 discharges may contribute to any PWQC identified in the receiving waters in the subarea.
4. No ~~storm drain~~MS4 outfall data~~discharge~~ for ~~to~~ this subarea so no PWQCs are identified.
5. ~~Storm drain~~MS4s are presumptively assumed to be contributing trash from priority land uses under the Statewide Trash Amendments.

2.5 STEP 4A PRIORITY WATER QUALITY CONDITIONS

2.5.1 Priority Water Quality Conditions (Provisions B.2.c.(1)(a-d))

PWQCs were determined based on the analysis conducted in Steps 1-3. The potential PWQCs were identified in **Table 2-30** and the potential impact of the discharges from ~~storm drain~~MS4 outfalls on those potential PWQCs is shown in **Table 2-31**. As shown in **Table 2-31**, not all physical, chemical, and biological indicators can be assessed with~~in~~ ~~storm drain~~MS4 outfall data and outfall data are not available in some areas. As a result, the PWQCs were determined using the following procedure:

1. If the ~~storm drain~~MS4 contributed a chemical indicator that was associated with the PWQC to a subarea, the potential PWQC was identified as a PWQC for all indicators associated with the PWQC. For example, if a ~~storm drain~~MS4 contributed nitrogen or phosphorus to a subarea and the receiving water exceeded algal biomass thresholds, eutrophication was assigned as a PWQC even though algal biomass cannot be measured in the ~~storm drain~~MS4 outfalls.
2. If no ~~storm drain~~MS4 outfall data were available for a subarea that receives MS4 discharges (e.g. Upper Santa Margarita River), the potential PWQC was considered a PWQC if the upstream ~~storm drain~~MS4 outfall data exceeded for the indicator.

Based on this procedure, the identified PWQCs are summarized in **Table 2-32** along with the beneficial use category, geographic and temporal extent, and the responsible agency(ies) for each PWQC. The PWQCs identified for each subarea are shown in **Figure 2-13.** The industrial supply beneficial use category did not have any identified PWQCs because no industrial diversions were identified and the related exceedances of TDS are addressed by the agricultural BU category PWQCs.

Table 2-32. Priority Water Quality Conditions

BU Category	Priority Water Quality Condition	Temporal Extent	Geographic Extent	Responsible Agency(ies)
Aquatic Life Use: Eutrophication	Eutrophication (elevated algal biomass)	Dry	SMR Estuary[1], Warm Springs, Redhawk Channel	All Agencies
	Nutrient loading to waterbodies with an adopted TMDL or listed as impaired~~waterbody~~	Dry	All ~~Upper~~ Middle and Lower SMR subareas ~~except Vail Lake~~, Fallbrook Creek and Sandia Creek[1]	All Agencies
		Wet	Rainbow Creek	San Diego County
Aquatic Life Use: Toxicity	Observed toxicity	Dry	Temecula Creek and Redhawk Channel	RCFCWCD Riverside County Temecula
		Wet	Murrieta Creek and Long Canyon	Menifee Murrieta Temecula RCFCWCD

BU Category	Priority Water Quality Condition	Temporal Extent	Geographic Extent	Responsible Agency(ies)
				Riverside County Wildomar
Aquatic Life Use: Physical Habitat	Lowered physical habitat scores (CRAM) or evidence of hydromodification/ erosional impacts	Wet	Warm Springs, Murrieta Creek and Long Canyon	Menifee Murrieta RCFCWCD Riverside County Temecula Wildomar
Aquatic Life Use / Recreation: Nuisance Conditions	Trash	Dry	All ~~Upper~~ Middle SMR subareas ~~except Vail Lake~~, Fallbrook Creek	All Agencies
		Wet	All ~~Upper~~ Middle SMR subareas ~~except Vail Lake~~, Fallbrook Creek	All Agencies
Recreation	Indicator Bacteria Concentrations	Dry	Temecula Creek and Redhawk Channel and De Luz Creek	RCFCWCD Riverside County San Diego County Temecula
		Wet	Upper Murrieta Creek, Warm Springs, Murrieta Creek and Long Canyon, Santa Gertrudis Creek, Temecula Creek and Redhawk Channel	Menifee Murrieta Temecula RCFCWCD Riverside County Wildomar
Municipal Supply	Constituents of potential concern for municipal supplies (Iron, Manganese)	Dry	Murrieta Creek and Long Canyon, Temecula Creek and Redhawk Channel, Upper Santa Margarita River, Rainbow Creek, Lower Santa Margarita River, Fallbrook Creek, De Luz Creek	Murrieta Temecula RCFCWCD Riverside County San Diego County
		Wet	All ~~Upper~~ Middle SMR subareas ~~except Vail Lake~~, Rainbow Creek	All Agencies
Agricultural Supply	Constituents of potential concern for agricultural supply (TDS)	Dry	Santa Gertrudis Creek, Murrieta Creek and Long Canyon, Temecula Creek and Redhawk Channel, Rainbow Creek, Lower Santa Margarita River, Fallbrook Creek	Murrieta Temecula RCFCWCD Riverside County San Diego County
		Wet	Rainbow Creek	San Diego County

1. Discharges from ~~storm drain~~MS4 outfalls within these subareas may reach the SMR Estuary during dry weather and contribute to the Eutrophication PWQC in the Santa Margarita River Estuary: Upper Murrieta Creek and Tributaries, Warm Springs, Santa Gertrudis, Murrieta Creek and Long Canyon, Temecula Creek and Redhawk Channel, Upper Santa Margarita River, Lower Santa Margarita River, Rainbow Creek and De Luz Creek.

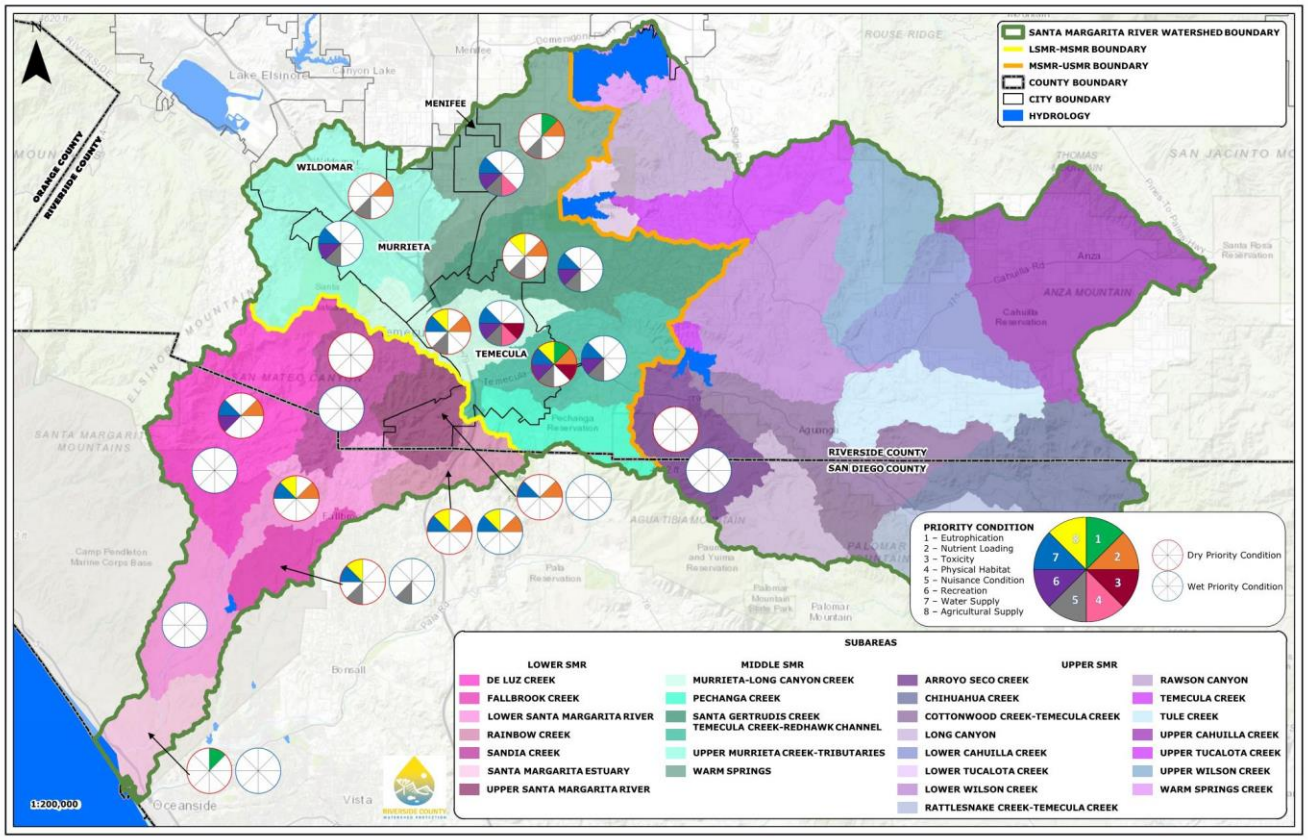


Figure 2-13. Priority Water Quality Conditions in the SMR WMA

2.5.2 Monitoring Data Adequacy and Data Gaps (Provision B.2.c.(1)(e))

Data gaps were evaluated for the SMR WMA analyses of receiving water conditions and potential impacts from discharges from ~~storm drain~~MS4 outfalls.

Receiving water conditions were found to have data gaps for specific analyses, particularly for:

- Biological indices;
- Toxicity;
- Algal biomass; and
- Physical habitat.

Other datasets for receiving water assessments (e.g., chemistry) were adequate to assess receiving waters conditions in the Lower and Middle SMR Subwatersheds. However, recent receiving water data were not available for the Upper SMR Subwatershed.

Data to characterize ~~storm drain~~MS4 discharges is spatially limited, particularly in the ~~Upper~~ Middle SMR Subwatershed. Thus, ~~storm drain~~MS4 outfall data is a limiting factor in gaining a comprehensive understanding of the ~~storm drain~~MS4 contribution to watershed conditions.

Streams~~Waterbodies~~ in the ~~Upper~~ Middle SMR Subwatershed are ~~generally~~ predominantly ephemeral or intermittent~~non-perennial during dry weather~~. In many cases, site visits indicated that receiving waters, especially in the ~~Upper~~ Middle SMR Subwatershed, were dry. Receiving water and outfall sites that were observed to be dry during site visits are indicated by a designation of "visited not sampled" or VNS. The percentage of time that a site was dry during site visits is shown in **Figure 2-14**. The limited data resulting from the ephemeral or intermittent ~~non-perennial~~ nature of the watershed drainage network~~waterbody results is a data limitation that~~ constrain~~impact~~s the ability to fully assess ~~storm drain~~MS4 impacts on receiving waters.

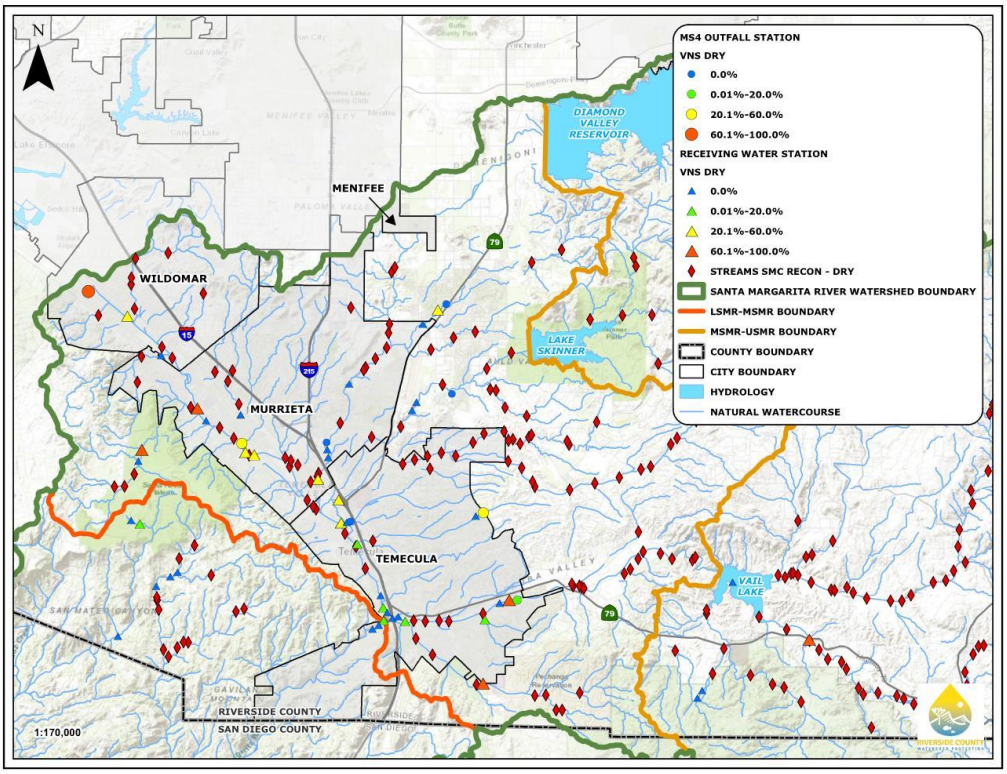


Figure 2-14. Reaches and Receiving Water Monitoring Locations within the Upper and Middle Santa Margarita River Subwatersheds and Monitored Flow Conditions (Perennial to Dry)

VNS = Visited Not Sampled (dry or discontinuous channel or outfall)

As a part of the development of goals, strategies, and the monitoring program, data gaps will be further evaluated by identifying specific questions to support assessment of watershed conditions and implementation to address PWQCs. In addition, work that could address some data gaps may be conducted as part of the SMRNIG should grant funds be available.

2.6 STEP 5B. HIGHEST PRIORITY WATER QUALITY CONDITION (PROVISION B.2.C.(2))

The HPWQC to be addressed by the ~~Water Quality Improvement Plan~~WQIP (**Table 2-34**) was selected from the list of PWQCs by evaluating them against a set of ten considerations outlined in **Table 2-33**.

- The first seven considerations include many of the components evaluated in Prioritization Steps 1-4. The existence of a TMDL/significant regulatory action, impaired waters 303(d) listing, current WQO and threshold exceedances, as well as historic conditions, location, and geographic extent of the conditions were all taken into account.
- The last three considerations include potential improvements in condition of waterbodies in the WMA and ~~storm drain~~MS4 discharge quality that can be achieved as stated in Permit Provisions B.2.a.(9) and B.2.b.(6) in the Permit.

Each of the PWQCs was given a binary score of 1 if it met the consideration or 0 if it did not. These scores were then summed to give a final score to each of the PWQCs out of a highest possible score of 10. These total scores were then used to rank the PWQCs such that the highest score determined the HPWQC.

Based on the assessment of HPWQC considerations, eutrophication was selected as the HPWQC (See **Table 2-34**) in comparison to other PWQCs. In general, the scoring reflects the limited geographic scope of other PWQCs and the lack of evidence of beneficial use impacts, combined with limited availability of technology available to effectively treat all constituents affecting recreation, water supply, and agricultural supply.

Given the 303(d) listings, the existing TMDL, and the TMDL Alternative~~s~~ under development for nutrients and biostimulatory substances that cover most subareas in the Middle and Lower Subwatersheds,~~WMA~~, the potential impact on aquatic life from those conditions, and the threshold exceedances observed in those subareas~~ throughout the WMA~~, eutrophication is the clear HPWQC for the Middle and Lower SMR Subwatersheds~~WMA~~. The eutrophication HPWQC includes all subareas with observed eutrophication impacts (elevated algal biomass and impacted benthic scores), dry weather nutrient loading to those subareas to address the eutrophication, and dry and wet weather nutrient loading to Rainbow Creek to address the Rainbow Creek Nutrient TMDL.

The intent of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ is to address the HPWQC identified through this prioritization process. As implementation progresses and more information is collected to support the prioritization process, the Copermittees and the City of Menifee could determine that other watershed conditions are of a higher priority or that addressing an identified priority may not result in the most beneficial or cost-effective way to protect beneficial uses. If this were to occur, the Copermittees and the City of Menifee may choose to change their focus, and potentially adjust their priorities, as part of the adaptive management process.

Table 2-33. Summary of Rationale for Selection of Highest Priority Water Quality Conditions

Beneficial Use Category	Aquatic Life			Aquatic Life/ Rec.			
Considerations	**Eutrophication**	**Toxicity**	**Physical Habitat**	**Nuisance (Trash)**	**Recreation**	**Water Supply**	**Agricultural Supply**
TMDL existing/under development (Permit Provision 2.a.(2)) or significant regulatory action	**1**			1			
303(d) Listing (Permit Provision 2.a.(1))	**1**	1			1	1	1
Threshold exceedances (to assess Permit Provision 2.a.(4)-Receiving Water Limitation, Permit Provision 2.a.(6)-analysis of physical, chemical, and biological Receiving Water data, Permit Provision 2.a.(8)-evidence adverse impacts to waterbody integrity):							
Current WQO exceedances (water chemistry)	**1**	1			1	1	1
Current threshold exceedances (other indicators) or evidence of impacts (Permit Provision 2.a.(7))	**1**		1	1	1		
Known historical compared to current conditions (Permit Provision 2.a.(5)) (increasing trends)	**1**						
Known locations of potential beneficial use impacts	**1**	1	1		1		
Geographic extent (majority of subareas have PWQC)	**1**			1	1	1	
Assessment of potential improvements in condition of WMA and ~~storm drain~~MS4 discharge quality that can be achieved (Permit Provisions 2.a.(9) and 2.b.(6)) based on score from following questions:							
Feasible projects or programs that could be considered to improve PWQCs?	**1**	1	1	1	1		
If PWQCs are improved through actions taken by the Copermittees, would opportunities related to the beneficial use be realized?	**1**	1	1	1			
Are there other social benefits gained by restoring the beneficial uses?	**1**	1	1	1	1		
Total	**10**	6	5	6	7	3	2

Table 2-34. Highest Priority Water Quality Condition (Eutrophication)

Beneficial Use Category	Priority Water Quality Condition	Temporal Extent	Geographic Extent
Eutrophication	Eutrophication impacts (elevated algal biomass)	Dry	SMR Estuary [1], Warm Springs, Redhawk Channel [2]
	Nutrient loading to waterbodies with an adopted TMDL or listed as impaired ~~waterbody~~	Dry	All ~~Upper~~ Middle and Lower SMR subareas ~~except Vail Lake~~, Fallbrook Creek and Sandia Creek[1]
		Wet	Rainbow Creek

1. ~~Storm drain~~MS4 discharges within the following subareas may reach the SMR Estuary during dry weather and contribute to the Eutrophication PWQC in the Santa Margarita River Estuary: Upper Murrieta Creek and Tributaries, Warm Springs, Santa Gertrudis, Murrieta Creek and Long Canyon, Temecula Creek and Redhawk Channel, Upper Santa Margarita River, Lower Santa Margarita River, Rainbow Creek and De Luz Creek.
2. Other subareas may be added as result of TMDL Alternative development during adaptive management process.

The geographic extent of the HPWQC is shown in **Figure 2-15**.

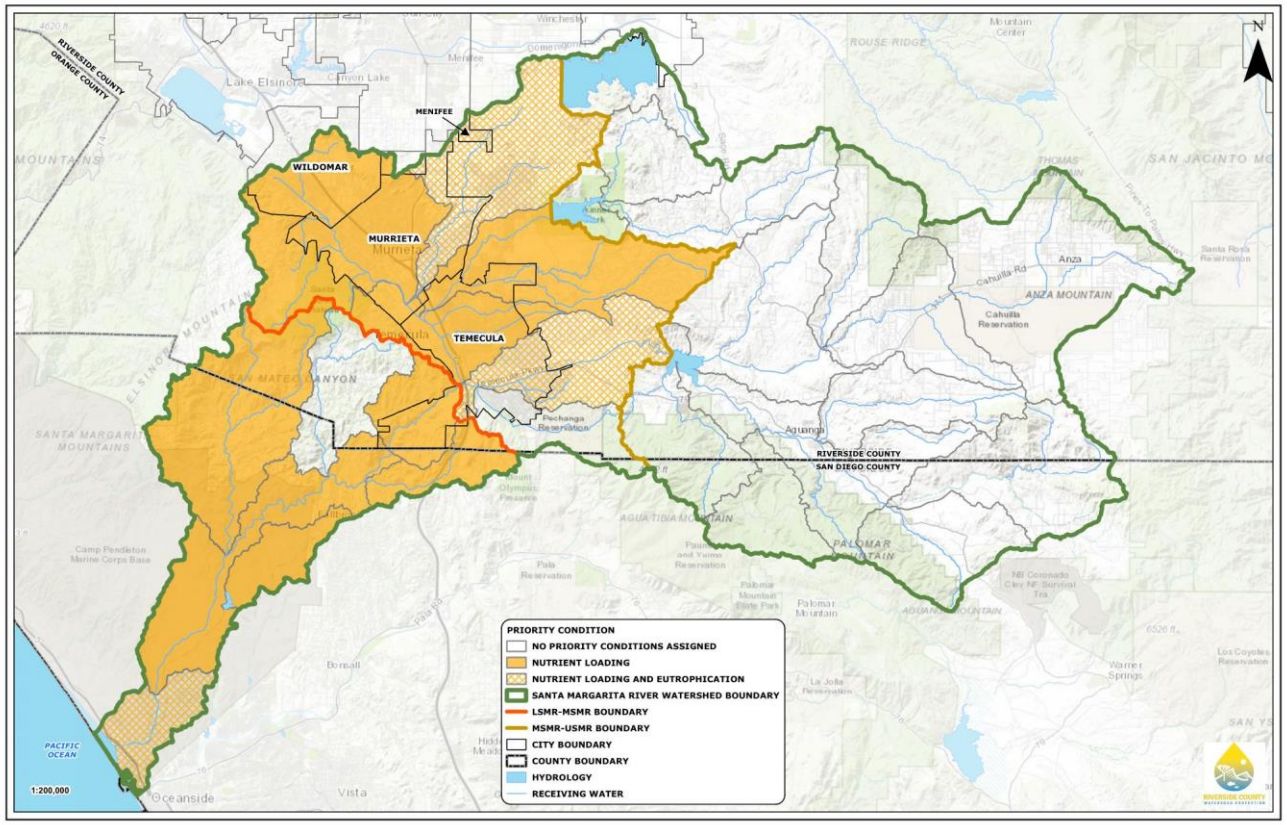


Figure 2-15. Geographic Extent of HPWQC

3 Identification of MS4 Sources of Pollutants and/or Stressors

As a part of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~, the Copermittees must "identify and prioritize known and suspected sources of stormwater and non-stormwater pollutants and/or stressors associated with discharges that cause or contribute to the highest priority water quality conditions". The purpose of the source identification is to evaluate the presence or absence of key sources within the watershed that have the potential to contribute to the HPWQC. The results of the source identification will drive the selection of strategies designed to address these sources, and thereby address the HPWQC. As part of this effort, the following was considered:

- Pollutant generating facilities, areas, and/or activities within the watershed;
- Locations of the Copermittee's stormwater conveyance systems;
- Other known and suspected sources of non-stormwater or pollutants in stormwater discharges to receiving waters within the watershed;
- Review of available data; and
- Adequacy of available data to identify and prioritize sources and/or stressors associated with discharges from ~~storm drain~~MS4 outfalls.

The items listed above were used to identify pollutants and stressors that potentially contribute to the identified HPWQC (eutrophication impacts/nutrient loading). This Plan considers watershed conditions and priorities in the context of the Copermittees' obligations to control ~~storm drain~~MS4 discharges, and the evaluation of potential sources of the HPWQC focuses on ~~storm drain~~MS4 discharges. For sources outside of the regulatory authority of the Copermittees and those impacting water quality within the WMA, the Copermittees may consider opportunities to collaborate with other entities to control the sources. Sources described in this section are not exhaustive, but are generally representative of the types of sources present within the WMA. Reducing nutrient loading from watershed sources will address both elements of the HPWQC – eutrophication impacts (elevated algal biomass) and nutrient loading to TMDL waterbodies.

The identification of sources begins with considering land uses but includes many types of other source information to identify areas and activities within the watershed that contribute total nitrogen and total phosphorus loading to the ~~storm drain~~MS4 ~~system~~. The distribution (in acreage) of land uses (i.e., agriculture, commercial, industrial, etc.) for each agency are shown in **Table 3-1** and the land uses within the watershed are shown in **Figure 3-1**.

Table 3-1. Santa Margarita River WMA Land Use (acre) by Agency [a]

Type of Land Use [b]	City of Menifee	City of Murrieta	City of Temecula [c]	City of Wildomar [d]	County of Riverside	Riverside County Flood Control and Water	County of San Diego	Total	% of Land Use
Agriculture	0	295	0	297	21,953	0	5,389	27,934	5.9%
Commercial	8	1,028	1,476	164	884	0	112	3,672	0.8%
Industrial	0	227	1,075	40	136	0	51	1,529	0.3%
Open space	115	3,941	6,980	2,971	42,660	0	3,100	59,767	12.6%
Parks and Recreation	<1	598	794	105	1,083	0	30	2,610	0.6%
Rural Residential	585	7,185	3,408	2,910	105,475	0	6,144	125,707	26.5%
Urban Residential	35	4,919	5,947	1,586	2,956	0	839	16,282	3.4%
Streets	72	6,468	3,248	908	8,020	0	548	19,264	4.1%
>>>Total	815	24,661	22,928	8,981	183,167	0	16,213	256,763	

a. Other land uses not within the Agencies' jurisdictions comprise the remaining percentage (37%) of land uses found within the ~~Upper~~ Upper, Middle and Lower Santa Margarita River Subwatersheds, totaling 156,185 acres. These land uses are comprised of federal and tribal lands, as well as vacant, undeveloped land, and waterbodies.

b. Land use Sources: Riverside County – July 2017 County Assessor Parcel Data; San Diego County, 2017 SANDAG.

c. Please note the City does not have any land uses zoned for agricultural. However agricultural operations are allowed on all residentially zoned land uses. All commercially operated agricultural operations within the city require a business license and the city uniquely identifies these in its business license inventory. There are currently no commercially operated vineyards or orchards within City limits. "Temecula Wine Country" is located outside Temecula City Limits

d. Only includes land use data within the Santa Margarita River watershed

e. Facilities owned and operated by RCFCWCD, and their respective acreage, are included in **Table 3-3** and illustrated in **Figure** 3-3~~**Figure** 3-3~~~~**Figure** 3-3~~.

Residential land uses (29.9%) comprise the largest proportion of land use within the jurisdiction of the Copermittees, followed by open space (12.6%). Commercial and industrial together make up about 1% of the total SMR WMA~~watershed area~~. Agriculture comprises 5.9% of land use in both subwatersheds. Forty-six percent of the land use is comprised of federal and tribal lands, as well as vacant, undeveloped land and waterbodies outside of the Copermittees jurisdiction. **Figure 3-1** illustrates the distribution of land uses within the SMR watershed.

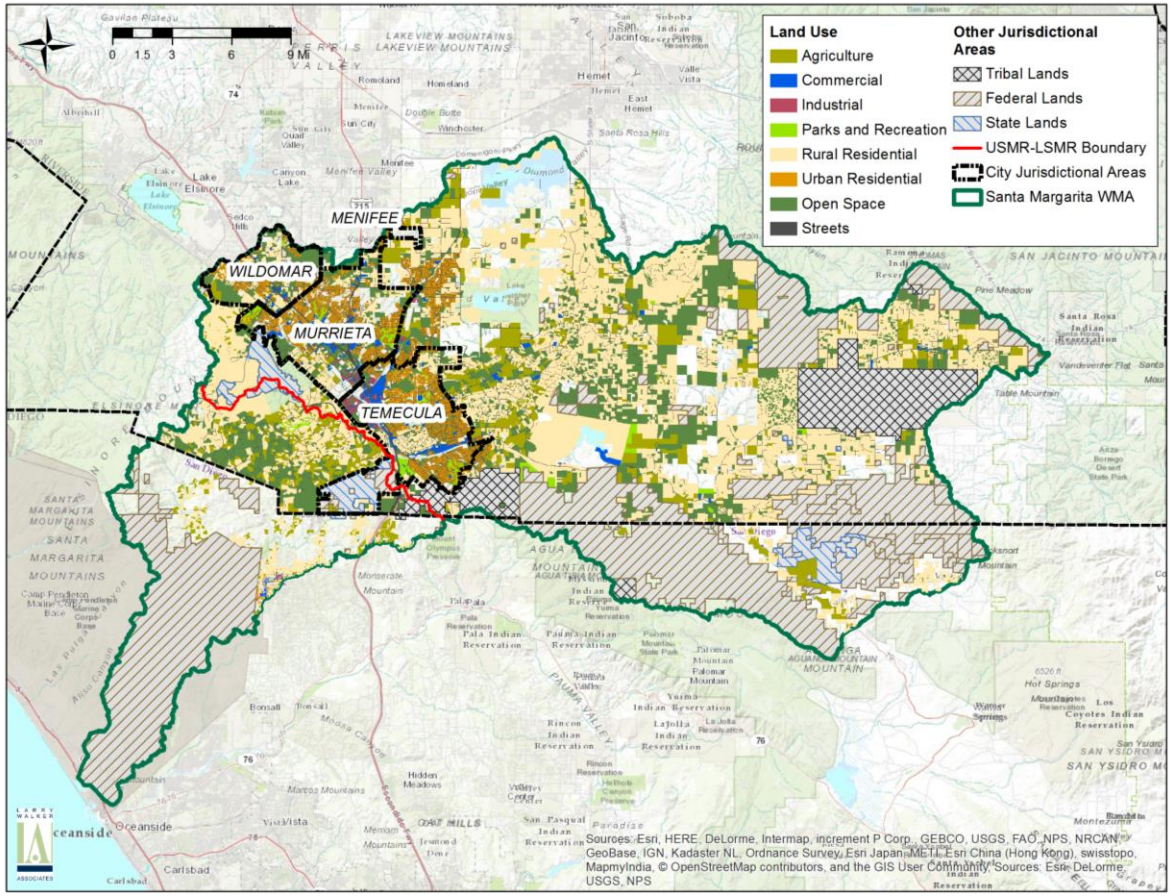


Figure 3-1. Land Uses within Santa Margarita River Watershed

3.1 POLLUTANT GENERATING FACILITIES, AREAS, AND/OR ACTIVITIES

The Copermittees and the City of Menifee considered pollutant generating facilities, areas, and/or activities within the watershed, including, but not limited to, the following:

1. Each agency's inventory of construction sites, commercial, industrial, and municipal facilities, and residential areas;
2. Publicly owned parks and/or recreational areas;
3. Open space areas;
4. All currently operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste; and
5. Areas not within the agencies' jurisdictions (e.g., Phase II ~~storm drain~~MS4~~ systems~~, tribal lands, state lands, federal lands) that are known or suspected to discharge to MS4~~stormwater conveyance system~~s.

3.1.1 Pollutant Generating Facilities, Areas, and Activities

The Copermittees and the City of Menifee maintain a list of construction sites, commercial, industrial, and municipal facilities, and residential areas that can be used to assist in identifying areas that have the potential to contribute nutrient loading to receiving waters. During dry weather, pollutants from these potential sources may reach the ~~storm drain~~MS4~~ system~~ through illicit discharges or illegal dumping.

- All Copermittees and the City of Menifee maintain construction inventories within their jurisdictions, which can span the various types of land uses across the watershed. There is the potential for sediment discharges, primarily during the rainy season, which could transport phosphorus or other ~~legacy~~ pollutants to the ~~storm drain~~MS4~~ system~~. In particular, sites that are being converted from prior agricultural land uses may warrant specific attention when in active construction.
- Commercial sites include existing development such as restaurants, nurseries, car washes, auto repair shops, and other facilities. Based on activities at these sites and the nature of their operations, some commercial sources may be sources of nutrients (e.g., nurseries, restaurants). Restaurants and nurseries are more likely to be sources of illicit discharges due to their onsite activities (e.g., illegal washing, tail water), while any of the sites that have landscaping could contribute to nutrient loading through irrigation runoff. While they only represent approximately 1% of the land use within the watershed, commercial facilities are concentrated more in the Cities of Murrieta and Temecula and the County of Riverside than in other areas. As illustrated in **Figure 3-2**, there are very few commercial nurseries within the incorporated areas of the watershed.
- Industrial sites include, but are not limited to, manufacturing and large-scale production facilities. These sites are generally regulated through other permits (e.g., Industrial General Permit), typically have materials stored inside, and are not as likely to have illicit discharges as a result of their typical activities and operations. However, as with other facilities, those with landscaping could contribute to nutrient loading through irrigation runoff. Industrial facilities are not common within the watershed, representing <1% of the land use.

- Municipal sites include, but are not limited to, municipal buildings, offices, maintenance yards, parks, community centers, fire stations, and libraries. While these sites are not as likely to contribute nutrients through their activities, any of them with landscaping could contribute to nutrient loading through irrigation runoff. This may be particularly applicable to municipal parks, where there tends to be more grass, landscaping, and irrigation. Parks and recreation facilities only represent approximately 1% of the land use within the watershed.
- Residential areas within the watershed are the predominant land use within the agencies' jurisdictions, comprising approximately 30% of the land use within the watershed. These areas have several potential activities that could contribute to nutrient loading including, but not limited to, landscape irrigation and overwatering, small "backyard" agricultural operations, and equestrian uses.

Table 3-2 presents the current inventory of active commercial, industrial, construction, and municipal sites within the agencies' jurisdictions. The RCFCWCD does not have any commercial, industrial, or municipal sites; therefore, its facilities are summarized in **Table 3-3**.

Table 3-2. Summary of Applicable Pollutant Generating Facilities, Areas, and/or Activities by Agency within the Santa Margarita River Watershed.

Potential Pollutant Generating Sites	City of Menifee	City of Murrieta	City of Temecula[1]	City of Wildomar [3]	County of Riverside	County of San Diego	Riverside County Flood Control and Water Conservation District
Construction Sites	0	31	92	32	112	63	9[2]
Commercial Sites	3	267	648	52	196	153	0
Industrial Sites	0	6	126	2	52	18	0
Municipal Sites	0	65	53	5	43	8	0

1. Number of construction sites determined by active Construction Notices of Intent obtained from SMARTS on December 05, 2017.
2. Construction sites are listed pursuant to encroachment permits issued by the RCFCWCD or federal agreement and are not RCFCWCD projects.
3. Only within the Santa Margarita River watershed.

Table 3-3. Summary of Facilities Owned and Operated by Riverside County Flood Control and Water Conservation District

Type of Facility	Description
Linear Facilities (e.g., storm drains, channels)	435,180 linear feet (82.4 linear miles)
Basins (1 retention basin, 1 detention basin, 1 desilting basin)	3 facilities (15 acres)
Owned Parcels (e.g., basins, channels, access roads)	836 acres[1]

1. The RCFCWCD maintains the as-built capacity/lines and grades of existing flood control facilities within the 836 acres. Maintenance activities include sediment and debris removal, slope and erosion repairs, side-slope tracking and/or reshaping, vegetation maintenance, structure rehabilitation and/or replacement, rip-rap and grout repair, removal and replacement of concrete channel linings, and washout backfill and repair.

Figure 3-2 shows the location and distribution of commercial and industrial facilities within the ~~Upper~~ Upper, Middle, and Lower SMR Subwatersheds based on inventories maintained by each Copermittee. Where available within inventories, the figure includes specific types of commercial facilities identified as potential sources of nutrient loading including orchards, vineyards, nurseries, and horse ranches. The RCFCWCD's facilities are illustrated in **Figure 3-3**. Additional information regarding potential commercial and industrial sources within the Lower SMR Subwatershed can be found in the Long-Term Effectiveness Assessment. (San Diego Stormwater Copermittees, 2011) Available watershed-specific loading information related to these sources is also discussed below in **Section 3.3**.

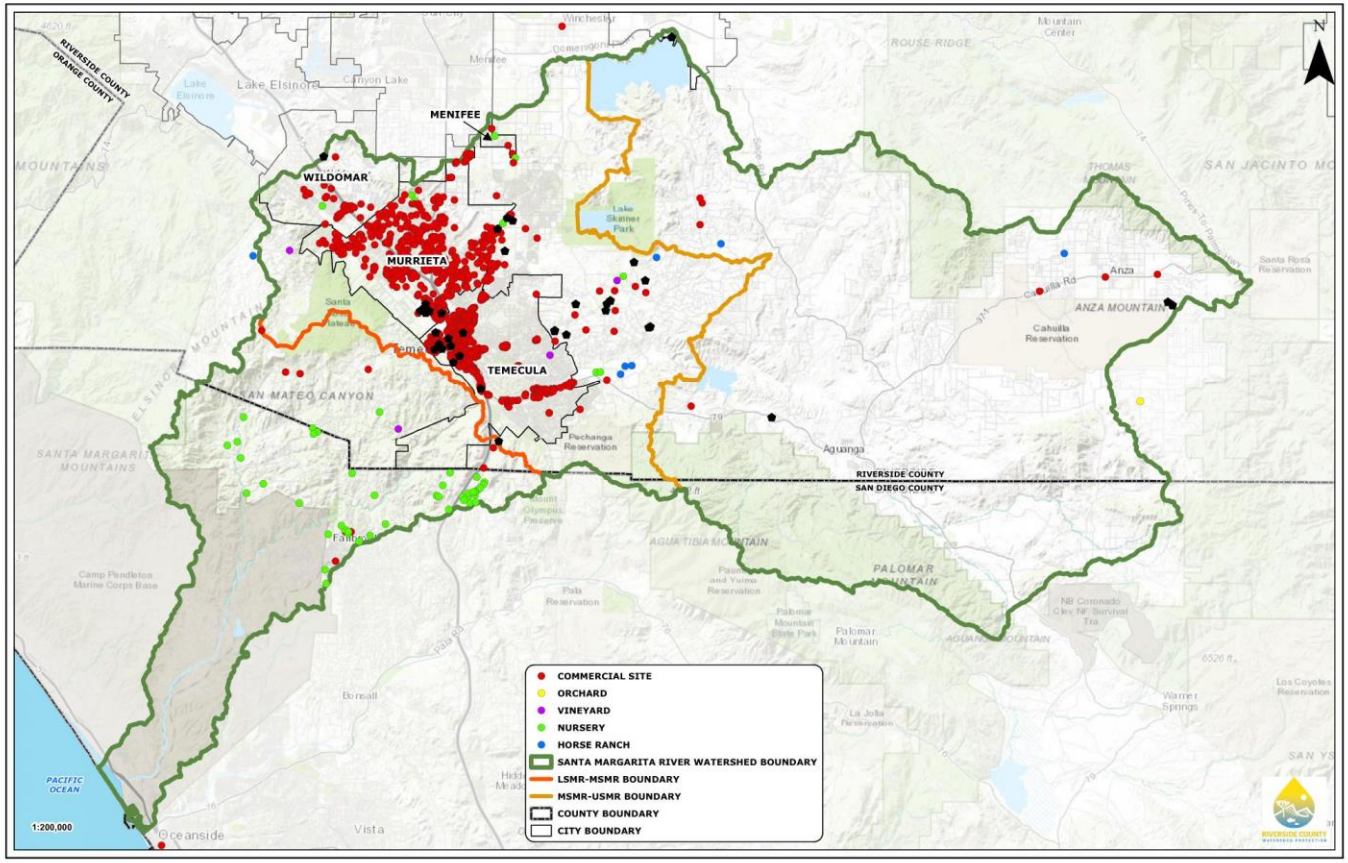


Figure 3-2. Location and Distribution of Commercial and Industrial Facilities within the Santa Margarita River Watershed

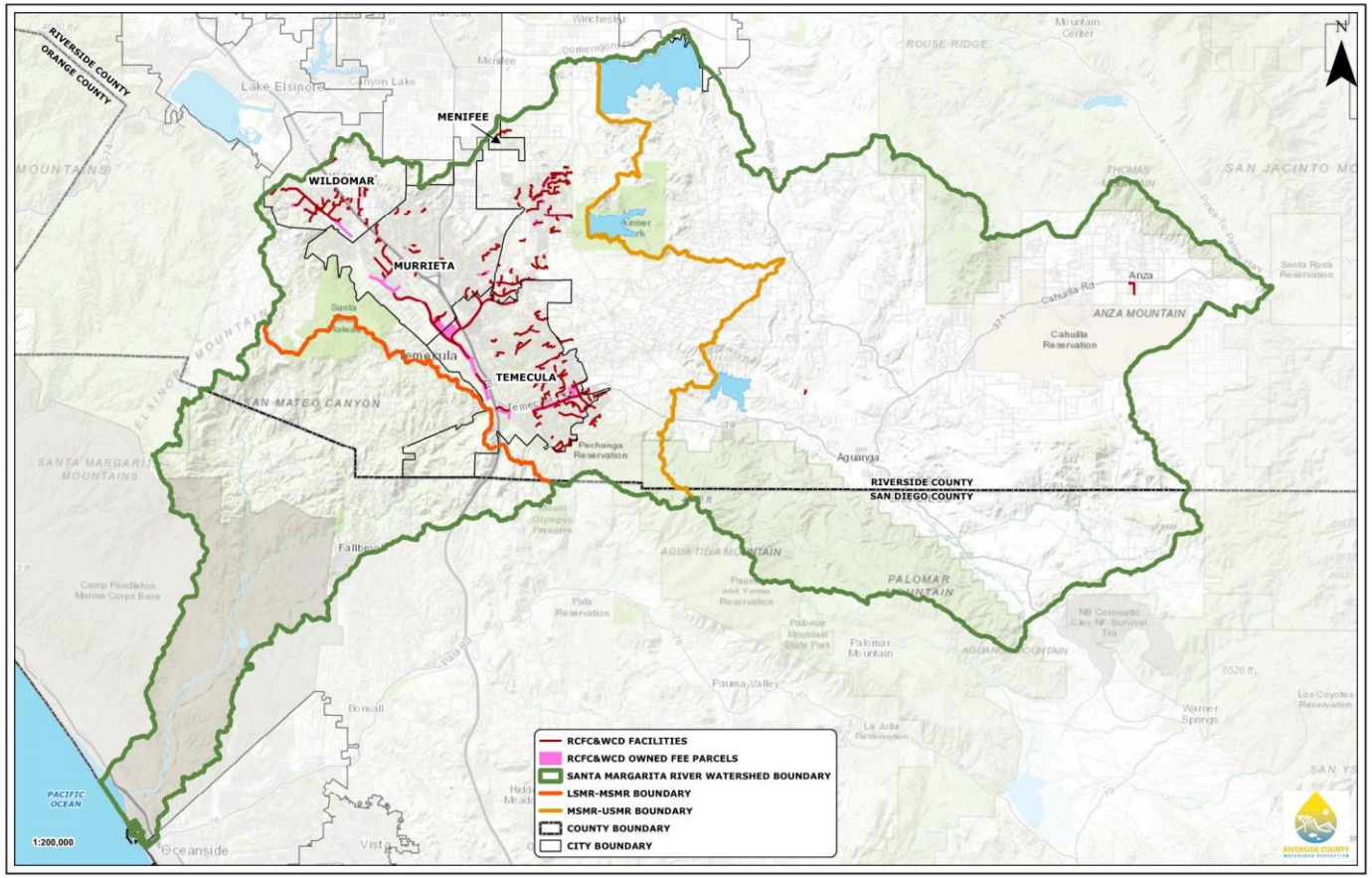


Figure 3-3. Location and Distribution of RCFCWCD Facilities within the Santa Margarita River Watershed

3.1.2 Parks, Recreational and Open Space Areas

Publicly owned parks and/or open space areas make up 13% (62,377 acres) of the SMR WMA~~watershed~~. Overall, the area of individual parks within the agencies' jurisdictions is small (2,610 acres) as compared to the overall extent of open space throughout the watershed as a whole (59,767 acres). Parks and open space are summarized by jurisdiction in **Table 3-3**.

Table 3-4. Summary of Parks and Open Space Areas within the SMR WMA

Agency	Number of Parks	Acres of Open Space[2]
City of Menifee	0	115
City of Murrieta	50	3,941
City of Temecula	40	6,980
City of Wildomar[1]	2	2,971
County of Riverside	22	42,660
County of San Diego	1	3,100
RCFCWCD	0	0

1. Only includes land use data within the SMR Watershed.
2. Land use Source: July, 2017 County Assessor Parcel Data; 2017 SANDAG.

Open space and parks contribute to the nutrient loading for all jurisdictions included in the model analysis, further discussed in **Section 3.3**. The predicted nutrient loads from municipal parks and recreation areas are relatively low, between 0 to 2.5% of the overall nutrient loading from the ~~storm drain~~MS4s, depending on the jurisdiction. Although loading from parks is estimated to be a small part of the overall nutrient load from the watershed, this may be due to the limited acreage of parks within the watershed. Because parks can be a source of nutrients and are often owned and maintained by the Copermittees, the Copermittees have developed strategies to address potential nutrient loading from these areas.

3.1.3 Landfills or Other Treatment Facilities for Municipal Waste

There are four operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste within the agencies' jurisdictions; one located in the City of Temecula, one in the City of Wildomar (closed), one in the County of Riverside (closed), and one in the County of San Diego. There are no landfills or other treatment facilities for municipal waste within the Cities of Menifee, Murrieta, or the Riverside County Flood Control and Water Conservation District. Due to their relatively low numbers and significant regulation, these facilities are not expected to be significant sources of nutrient loads to the ~~storm drain~~MS4s. Landfills in the watershed are summarized in **Table 3-5**.

Table 3-5. Number of Landfills or Other Treatment Facilities for Municipal Waste within the Santa Margarita River Watershed

Agency	Number of Landfills or Other Treatment Facilities for Municipal Waste
City of Menifee	0
City of Murrieta	0
City of Temecula	1
City of Wildomar	1[1]
County of Riverside	1[2]
County of San Diego	1
RCFCWCD	0

1. Site is closed (Bundy Canyon Landfill is partially located within the SMR watershed).
2. Site is closed (Anza).

3.1.4 Areas not Within the Agencies' Jurisdictions

Tribal lands, federal lands, state parks, and lands regulated by the State Water Board or USEPA may be located within an agency's boundary, but are outside of the jurisdictional land use authority of the agency. Regardless, each of these land uses has the potential to contribute to nutrient loading. Where these areas contribute pollutants to a Copermittee~~n agency~~'s ~~storm drain~~MS4~~ system~~, the Copermittee~~agency~~ will work with the land owner to ensure that any illicit discharges cease and/or notify the permitting authority. In general, while models do predict that nutrient loads from these sources could impact receiving waters, the amount of loading from these land uses entering and, therefore, discharging from Copermittees' MS4s~~storm drain~~s is very low. Specific loading predictions from these sources are further discussed in **Section 3.3**. As illustrated in **Table 3-1**, there are significant areas of land within the watershed that are outside of the Copermittee~~agencie~~s' jurisdictions, including tribal lands, state lands, and federal lands. In the ~~Upper~~ Upper, andMid dle SMR Subwatersheds, these areas account for approximately 70,000 acres or 20% of the land area. In the Lower SMR Subwatershed, these areas occupy approximately 60% of the land area, totaling over 40,000 acres.

3.1.5 Location of the Agencies' Stormwater Conveyance Systems

The Copermittees identified and mapped the locations of their stormwater conveyance systems, including, but not limited to, the following:

1. All ~~storm drain~~MS4 outfalls that discharge to receiving waters; and
2. Locations of major structural controls for stormwater and non-stormwater (e.g., retention basins, detention basins, major infiltration devices, etc.).

The locations of the 345 major ~~storm drain~~MS4 outfalls within the watershed are shown in **Figure 3-4** and the locations of major structural controls are illustrated in **Figure 3-5**. The figures were developed based on 2017 data provided by each Copermittee. **Table 3-6** presents the number of major structural controls for stormwater and non-stormwater by agency.

Table 3-6. Number of Major Structural Controls for Stormwater and Non-Stormwater Within Agencies' Jurisdictions Within the ~~Upper~~ Upper & Middle SMR Subwatersheds.

Structural BMP	City of Menifee	City of Murrieta	City of Temecula [1]	City of Wildomar	County of Riverside [2]	County of San Diego [3]	Riverside County Flood Control and Water Conservation District
Retention Basins	0	11	21	0	0	0	1
Detention Basins	0	18	11	3	4	0	1
Infiltration BMPs	4	34	74	0	9	0	0
Other major Structural Controls	0	0	505	0	7	0	1
Total Number of Structural BMPs	**4**	**63**	**611**	**3**	**20**	**0**	**3**

1. Tabulation of Structural BMPs does not include over 100,000 square feet of porous asphalt or pervious pavers.
2. Number of sites containing post-construction BMPs is provided. Each site may have multiple BMPs.
3. No major, publicly-owned and operated structural controls within the County of San Diego's jurisdiction in the Lower SMR Subwatershed.

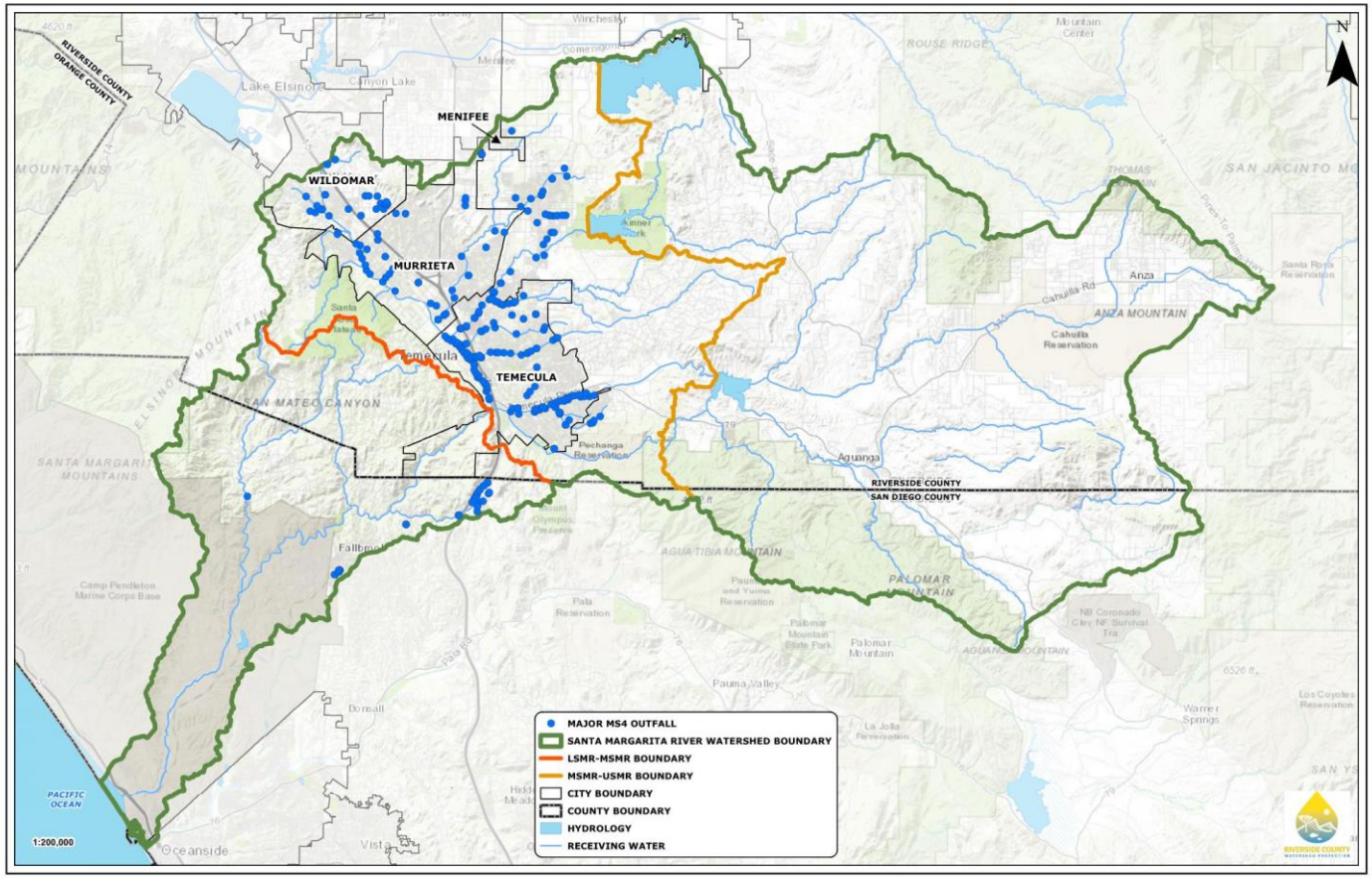


Figure 3-4. Locations of Major ~~Storm Drain~~MS4 Outfalls within the Santa Margarita River Watershed

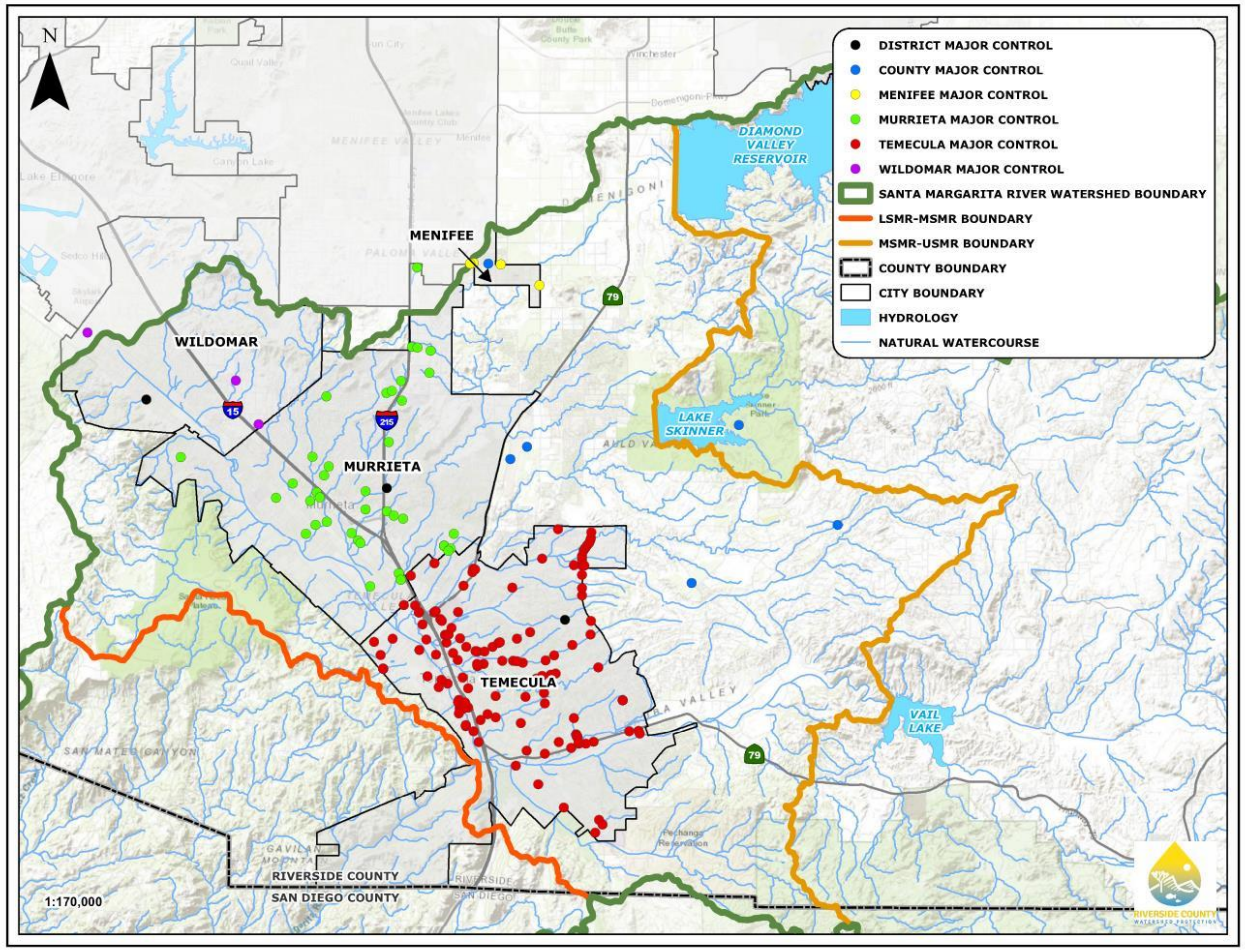


Figure 3-5. Locations of Major Structural Controls Locations within the Santa Margarita River Watershed

3.2 OTHER POTENTIAL SOURCES

Other known and/or suspected sources of non-stormwater discharges or pollutants in stormwater discharges to receiving waters within the watershed, including, but are not limited to, the following:

- Other ~~storm drain~~MS4 outfalls (e.g., Phase II and Caltrans);
- Other NPDES permitted discharges;
- Any other discharges that may be considered point sources (e.g., private outfalls); and
- Any other discharges that may be considered non-point sources (e.g., agriculture, wildlife or other natural sources).

3.2.1 Other ~~Storm Drain~~MS4 Outfalls

In addition to discharges from areas not within the agencies' jurisdictions as discussed in **Section 3.1.4**, there are entities covered by NPDES Permits issued by the State Water Board, including the Phase II MS4 Permit (California State Water Resources Control Board, 2013) and the Caltrans MS4 Permit (California State Water Resources Control Board, 2012b).

There are no traditional or non-traditional Phase II facilities within the ~~Upper~~ Upper and Middle SMR Subwatersheds. Camp Pendleton, which is located on federal land in the Lower SMR Subwatershed, is currently the only non-traditional Phase II entity in the SMR WMA that is regulated under the ~~State Water Board's~~ Phase II MS4 Permit. Nutrient loading from Camp Pendleton is relatively small and does not discharge to Copermittee-owned ~~storm drain~~MS4s, however, their discharges may impact conditions in the SMR Estuary and they do participate in watershed management activities with the Copermittees through the SMRNIG. For example, there are fallow agricultural fields (i.e., Stuart Mesa) on Camp Pendleton that may contribute nutrient loading to the estuary. Models developed by the SMRNIG have estimated nutrient loading from Camp Pendleton as illustrated in Figure 3-6.

Caltrans does own and operate state highways within the watershed and associated ~~storm drain~~MS4 infrastructure. Discharges from Caltrans' ~~storm drain~~MS4s are regulated by the State Water Board. Caltrans participates in the SMRNIG; models developed by the group have estimated nutrient loading from Caltrans as illustrated in **Figure 3-6**.

3.2.2 Other NPDES Permitted Discharges

There are point source discharges within the watershed that are regulated under other statutes by the Regional Water Board and/or State Water Board. Examples of discharges and the associated regulatory mechanisms include:

- Publicly Owned Treatment Works: Individual NPDES permits issued by the Regional Water Board;
- Industrial sites: State Water Board Industrial Storm Water General Permit Order 2014-0057-DWQ;
- Construction sites (>1 acre): State Water Board Construction Storm Water General Permit Order No. 2012-0006-DWQ; and

- Pumped Groundwater (i.e., dewatering): Multiple Regional Water Board Permits (e.g., Order R9-2008-0002).
- Caltrans MS4 Permit: Order 2012-0011-DWQ as amended by Order WQ 2014-0006-EXEC, Order WQ 2014-0077-DWQ, an Order WQ 2015-0036-EXEC; NPDES NO. CAS000003 National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit Waste Discharge Requirements (WDRs) for State of California Department of Transportation.

Regulation of these sources is generally performed by the permitting agency (i.e., State Water Board, Regional Water Board); however, some are regulated by both the permitting authority and the Copermittees and the City of Menifee (e.g., industrial sites, construction sites, illicit discharges). Publicly Owned Treatment Works (POTWs) (i.e., publicly owned sewage treatment plants) may also be another potential source, however, POTWs are traditionally regulated through individual NPDES permits.

3.2.3 Other Point Sources

Copermittees and the City of Menifee have not identified other point source discharges within the watershed (e.g., privately owned ~~storm drain~~MS4~~ system~~s). However, where there are privately owned systems that contribute flows, during dry or wet weather, into an~~the~~ agency's ~~storm drain~~MS4~~ system~~, these discharges are regulated by the agency through various programs and ordinances (e.g., commercial or residential inspections programs). There is also potential for the sanitary sewer collections systems within the watershed to act as a point source discharge if there are sanitary sewer overflows. These systems are regulated under State Water Board Order No. 2006-0003-DWQ. Copermittees and the City of Menifee may also address these types of discharges through their IDDE and existing development programs where appropriate.

3.2.4 Non-Point Sources

There are non-point source discharges within the watershed that are regulated under other statutes by the Regional Water Board and/or State Water Board. Non-point sources (and their regulatory mechanism, where applicable) that may contribute to nutrient loads within the watershed include:

3.2.4.1 Onsite Wastewater Treatment Systems (OWTSs): Regional Water Board Conditional Waiver #1 (California Regional Water Quality Control Board, 2007) and State Water Board OWTS Policy (California State Water Resources Control Board, 2012c)

Due to the presence of OWTSs within the watershed, the Copermittees have identified OWTSs (i.e., septic systems) as a potential non-point source discharge that could contribute nutrient loading to receiving waters. Septic systems are widely distributed throughout the Copermittees' ~~storm drain system~~ jurisdiction~~area~~s in the ~~Upper~~ ~~Upper and Middle~~ SMR WMA.~~Subwatersheds~~, ~~totaling over 1,500 acres within the storm drainage areas.~~ ~~In addition to s~~Septic systems~~ that~~ could impact Copermittee's ~~storm drain~~MS4~~ system~~s, and~~septic systems~~ are commonly found upstream of~~ the~~ reaches identified as impacted by eutrophication impacts or nutrient loading. A total of 3,940 parcels within the Riverside County portion of the~~Upper and Middle~~ SMR WMA~~ Subwatersheds~~ are permitted to use~~utilize~~ septic systems and comprise an area of approximately 35,689 acres~~.~~(**Figure 3-7**). ~~illustrates the locations and distribution of parcels with septic systems within the Upper~~ ~~Upper and Middle~~ ~~SMR Subwatersheds.~~ The extent and influence of septic systems in the

San Diego portion of the~~Lower~~ SMR WMA~~Subwatershed~~ is undetermined. Leaking or malfunctioning septic systems have the potential to contribute to dry weather nutrient loads through two mechanisms: 1) direct infiltration to the receiving water and 2) infiltration to the ~~storm drain~~MS4~~ system~~.

3.2.4.2 Agricultural Discharges

- ~~Regional Water Board Order No. R9-2016-0004 General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers that are Members of a Third-Party Group~~
- ~~Regional Water Board Order No. R9-2016-0005 General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers that are not Participating in a Third-Party Group~~

A commercial agricultural operation is defined as any agricultural business or trade activity, including farms, nurseries, and orchards, that produces crops with the intent to make a profit. Discharges from commercial agriculture have been shown to contribute significant nutrient loads to receiving waters within the watershed as shown in **Figure 3-6**. The Regional Water Board regulates commercial agricultural operations under these~~ir~~ agricultural waste discharge requirements (WDRs)~~,~~ issued in 2016:~~.~~

- Regional Water Board Order No. R9-2016-0004 General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers that are Members of a Third-Party Group
- Regional Water Board Order No. R9-2016-0005 General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers that are not Participating in a Third-Party Group

Agricultural operations enrolled under these orders are required to implement BMPs, perform monitoring, and report on implementation and results. Agricultural operations currently enrolled under the WDRs are illustrated in **Figure 3-8**.

The SMRNIG modeling efforts demonstrate that very little loading of TN and TP is discharged from commercial agriculture operations into the MS4s within the incorporated cities in the watershed (see **Table 3-8**). Conversely, multiple commercial agricultural operations are present in the unincorporated areas within the watershed and may contribute to TN and TP loading in MS4s, as shown in **Table 3-8**.

Strategies to address nutrient sources from commercial agricultural discharges are included in **Chapter 4**. When illicit dry weather discharges and wet weather runoff with potentially high levels of nutrients from these operations are encountered, the agencies will coordinate with the agricultural dischargers and the Regional Water Board to ensure that the facilities are aware of the agricultural WDRs, as applicable, and compliant with local water quality ordinances.

Some agricultural operations are not required to enroll under the general agricultural orders. These small growing operations on residential lots are not producing with the intent to make a profit. These operations may discharge to the ~~storm drain~~MS4~~ system~~s and will be addressed primarily through the Permitte~~agenci~~es' IDDE programs.

All Permitte~~agenci~~es within the SMR watershed maintain adequate legal authority through their stormwater ordinances to require and enforce the implementation of control strategies to address illicit discharges of nutrients to their MS4s. Examples of BMPs to be implemented by various agencies are provided below. The list is a compilation of strategies from the agencies that may be applied to agricultural operations whether or not they are enrolled under the applicable Water Board Agricultural WDRs. The list is not meant to apply to a single agency, nor is it inclusive of all options at an agency's disposal.

Dry Weather

- Enhancement of the commercial / industrial / municipal inspection~~s~~ programs to focus on irrigation systems;
- Utilization of municipal personnel and contractors to monitor storm water outfalls for discharges of potential illicit connections and illicit discharges; and
- Enforce escalating legal authority established for all inventoried existing development, including residential and agricultural, to conserve water and eliminate dry weather flows.

Dry and Wet Weather

- Identification, investigation, and elimination of illicit discharges to the MS4;
- Require implementation of BMPs to address application, storage, and disposal of pesticides, herbicides, and fertilizers on commercial, industrial, agricultural (e.g., large commercial nurseries), residential, and municipal properties;
- Notify agricultural business license holders of requirement to enroll in the Regional Water Board Agricultural Order;
- Develop and implement enhanced outreach programs targeting nurseries;
- Develop and distribute informational brochures for nurseries and vineyards that focus on BMPs that reduce nutrients in runoff;
- Collaborate with watershed partners to develop consistent messaging to targeted audiences, such as commercial residents to conserve water and reduce dry weather flows; and
- Implement escalating enforcement responses to compel compliance with ordinances, permits, contracts, orders, and other requirements for ICID, development planning, construction management, industrial/commercial, municipal, and residential development (including residential equestrian and livestock activities).

3.2.4.3 Groundwater Seepage

Groundwater seepage is another potential non-point source of nutrients to ~~storm drain~~MS4s and receiving waters within the watershed. Modeling performed by the SMRNIG has estimated loading from groundwater to receiving waters as illustrated in **Figure 3-6**.

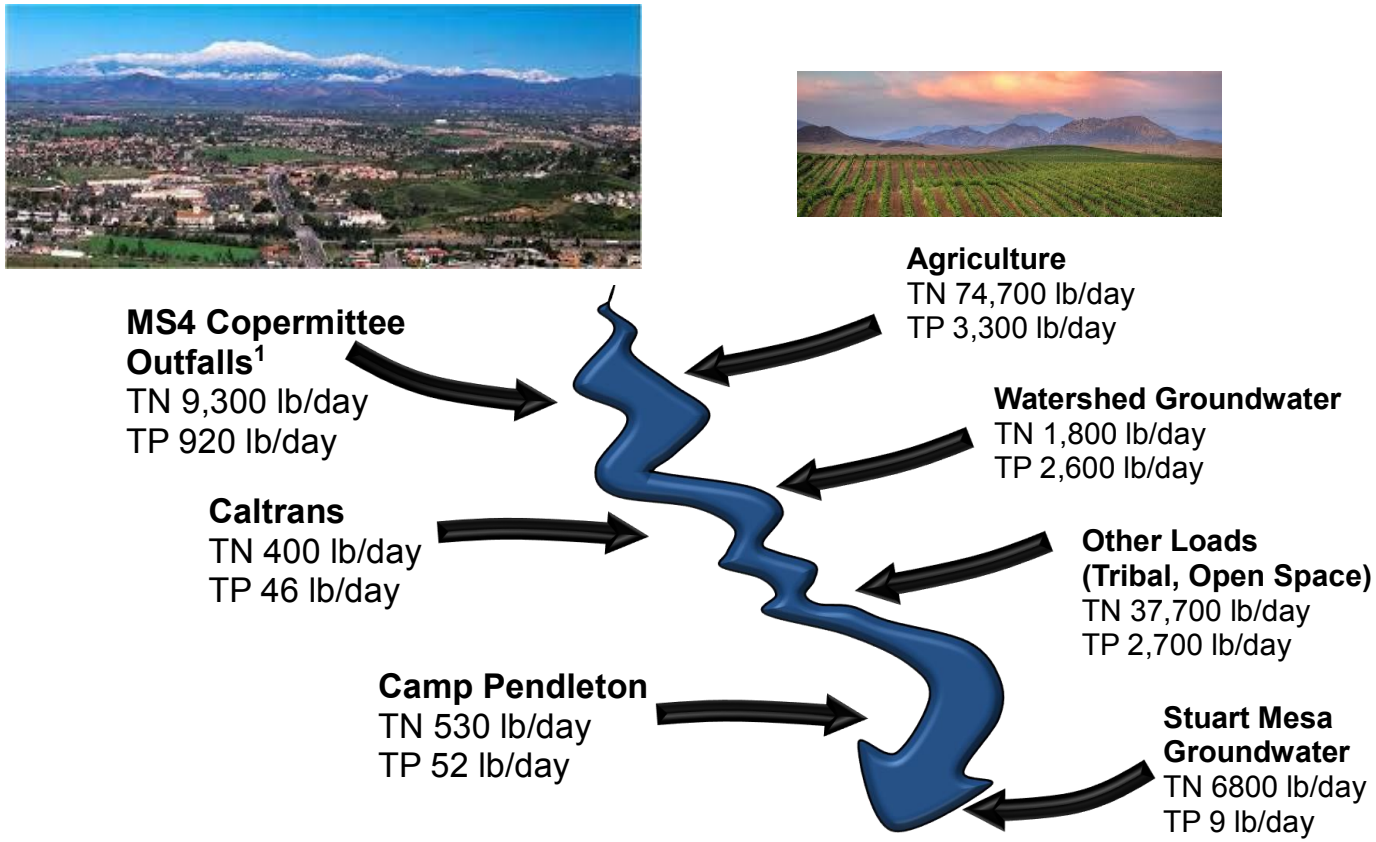
3.2.4.4 Homeless Encampments

Copermittees also have information indicating the presence of homeless encampments within the watershed. While these encampments are likely non-point sources of human waste to receiving waters, the impacts of encampments on water quality have not been quantified.

3.2.4.5 Natural Sources

Environmental sources are most often non-point or diffuse in nature. These include sources of pollution that are naturally present in the environment. Copermittees have limited control over these sources. Examples of environmental sources of pollution present within the WMA include atmospheric deposition, leaf litter and debris, natural wildlife sources, natural erosion, and natural groundwater, all of which may be present in open space areas. Natural sources that can be anthropogenically influenced include groundwater quality altered by imported water supplies, aerial deposition of transportation and industrial pollutants, and erosion exacerbated by hydromodification[10]. Contributions of nutrient loads from open space have been estimated through models developed by the SMRNIG and are shown in **Figure 3-6**.

[10] In contrast to other anthropogenically influenced natural sources, erosion caused by hydromodification is addressed under the Permit through the Land Development requirements in Provision E.3.



1. "MS4 Copermittee Outfalls" includes loading from agricultural operations draining to the ~~storm drain~~MS4 ~~system~~.

Figure 3-6. Sources and Associated Loads of Total Nitrogen and Total Phosphorus in the SMR Watershed (Sutula, et al., 2016)

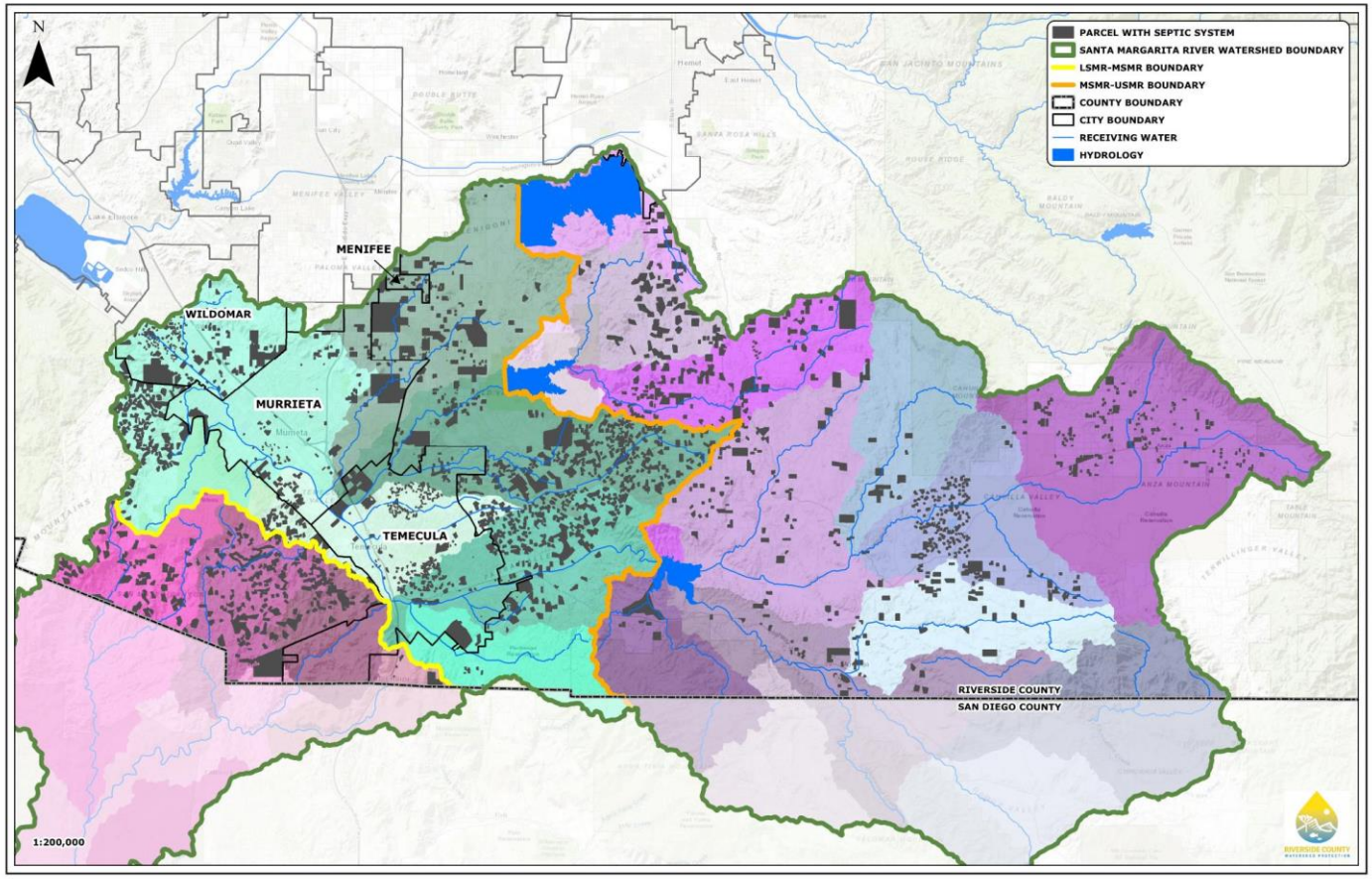


Figure 3-7. ~~Locations and Distribution of~~ Parcels with Septic Systems within the Riverside County portion of the ~~Upper~~ Santa Margarita River WMA~~Subwatershed~~ (Source: Riverside County Department of Environmental Health)

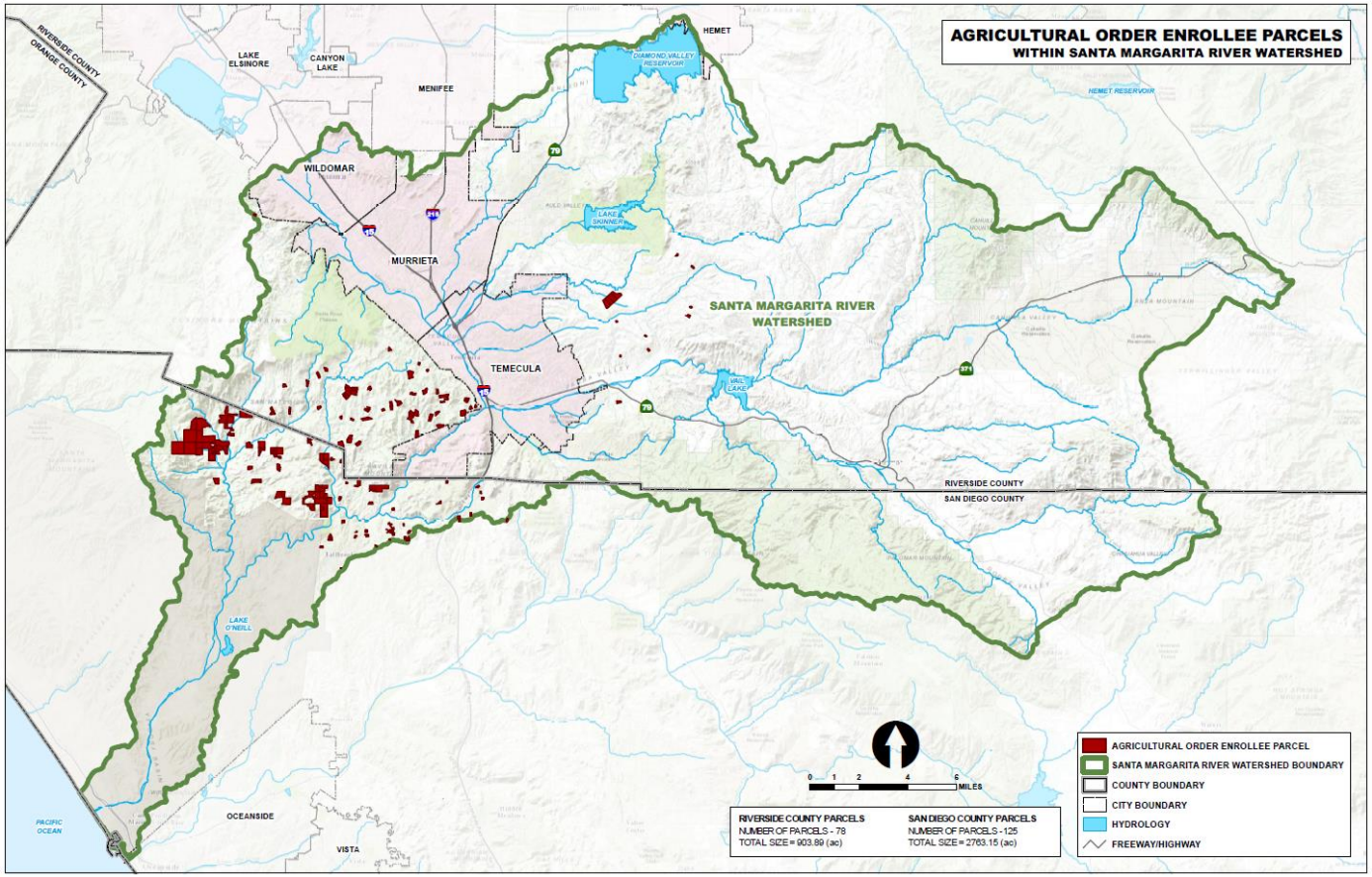


Figure 3-8. Parcels Within the SMR Watershed Enrolled in the Regional Water Board Agricultural Order

3.3 REVIEW OF AVAILABLE DATA

The Permit requires that the Copermittees provide the findings of sources of pollutants and/or stressors from the available data reviewed, including, but not limited to, the following:

- Findings from illicit discharge detection and elimination programs;
- Findings from outfall discharge monitoring, receiving water monitoring, and outfall discharge and receiving water assessments; and
- Other available, relevant, and appropriately collected data, information, or studies related to pollutant sources and/or stressors that contribute to the HPWQC.

3.3.1 Illicit Discharge Detection and Elimination (IDDE) Programs

Municipalities operate illicit discharge detection and elimination (IDDE) programs that involve conducting illegal connection/illicit discharge (IC/ID) investigations and inspections to comply with program requirements. A summary of IC/ID activities by agency is shown in **Table 3-7**~~**Table 3-7Table 3-7**~~. The IC/ID data was provided by the agencies with an assessment of the predominant sources most commonly associated with IC/IDs in their jurisdictions.

Table 3-7. Number of IC/ID Activities Conducted as Part of the IDDE Program

						Predominant Source(s) Associated with Discharge(s)						
IC/ID Activities	**FY 11-12**	**FY 12-13**	**FY 13-14**	**FY 14-15**	**FY 15-16**	**Commercial**	**Industrial**	**Residential**	**Parks and Recreation**	**Horse Ranches**	**Orchards, Vineyards, Nurseries**	**Other Agricultural**
City of Menifee	ND	0	0	0	0				N/A			
City of Murrieta	ND	ND	11	13	54			X				
City of Temecula	13	14	8	37	25	X	X		X			
City of Wildomar	0	0	5	6	7	X		X				
County of Riverside	ND	54	45	92	ND	X		X			X	
County of San Diego	ND	ND	78	56	56	X		X				
Riverside County Flood Control and Water Conservation District	3	4	7	8	6			X				

ND = no data; N/A = not applicable

3.3.2 Findings from Major ~~Storm Drain~~MS4 Discharge and Receiving Water Monitoring and Associated Assessments

The Permit requires the Copermittees to present the findings of potential pollutant sources from available ~~storm drain~~MS4 outfall monitoring, receiving water monitoring, and ~~storm drain~~MS4 outfall discharge and receiving water assessment data. A preliminary assessment of the receiving

water conditions (Permit Provision B.2.a.) and an assessment of impacts from ~~storm drain~~MS4 discharges (Permit Provision B.2.b) were conducted as the first step in the process used to develop a list of priority water quality conditions. Detailed findings from these assessments can be found in **Section 2.4**. While the monitoring data identifies concentrations of pollutants, potential sources of nutrients to the ~~storm drain~~MS4 ~~system~~s have not been well-identified in the assessments. The best assessment of sources comes from the SMRNIG technical reports which are summarized in **Section 3.3.4**. Those reports identify residential land uses as the primary nutrient source for most jurisdictions, but several other sources, including commercial, industrial, nurseries, horse ranches and other agriculture could contribute loads depending on their presence within jurisdictions.

3.3.3 Other Data or Studies Related to Pollutant Sources

The Permit requires the Copermittees to consider other available, relevant, and appropriately collected data, information, or studies related to pollutant sources and/or stressors that contribute to the highest priority water quality condition. Available other data and studies that were reviewed as part of the development of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ are summarized in **Appendix 3A**.

Study results from the SMRNIG efforts are further discussed in **Section 3.3.4**. The three non-SMRNIG related studies that are relevant to nutrient loading in the watershed are discussed below.

3.3.3.1 Agricultural, Federal, Tribal, and State Input Special Study, 2014 Annual Progress Report

The Agricultural, Federal, Tribal, and State Input Special Study (Weston Solutions, 2014) was conducted in order to determine the type, quantity, and estimated loading of pollutants in runoff from discrete areas of agricultural, federal, tribal, and state lands, as well as state highway source areas.

Based upon the two years of monitoring data, the pollutant concentrations were characterized for the target source inputs. At Tribal Site 1, constituents measured above water quality criteria during at least one monitoring storm included bacteria (*Enterococcus*, *E. coli*, and fecal coliform), total phosphorus, surfactants (MBAS), turbidity, and some metals (total iron, total manganese, dissolved copper, and dissolved zinc). At Agriculture Site 8, constituents measured above water quality criteria during at least one monitored storm included bacteria (*Enterococcus*, *E. coli*, and fecal coliform), turbidity, total phosphorus, and some metals (total iron, total and dissolved manganese, and total chromium). At Federal Site 1, concentrations of turbidity, total phosphorus, and *Enterococcus* were greater than applicable water quality criteria during the monitoring storm event. Although limited in scope, this study demonstrates that agriculture, tribal, and other federal lands contribute nutrient loads to the watershed. These findings, are further supported by the modeling performed in the watershed as part of the SMRNIG, discussed in **Section 3.3.4**.

3.3.3.2 2011 Long-Term Effectiveness Assessment, San Diego Stormwater Copermittees Urban Runoff Management Programs, Final Report

As part of the Long-Term Effectiveness Assessment (San Diego Stormwater Copermittees, 2011) (LTEA) required for permit renewal in 2011, the Copermittees examined the various sources of pollutants required to be regulated by the Permit in an effort to determine which sources had the most potential to contribute loads of various pollutants of interest to the ~~storm drain~~MS4 ~~system~~ (source loading potential). The analysis looked at several pollutants/pollutant groups including

nutrients and qualitatively assigned a source loading potential of none, unknown, unlikely, or likely to each of 36 source areas or activities. Although not specific to the S~~anta~~ M~~argarita~~ R~~iver~~ WMA~~atershed~~, the findings align well with and support the source analysis in this Plan. The analysis concludes that the following sources have a likely potential to contribute nutrients to ~~storm drain~~MS4 discharges and/or receiving waters: residential areas and activities; roads, streets, highways, and parking facilities; parks and recreational facilities; botanical or zoological gardens and nurseries/greenhouses; mobile landscaping; and animal kennels.

3.3.3.3 Geotracker Site 1120 (Camp Pendleton Marine Corps Base Site – 1120 Stuart Mesa)

Stuart Mesa West and East Agricultural Fields is an area of approximately 376 acres on the Camp Pendleton Marine Corps Base. The area is bordered on the northeast by Stuart Mesa Road, on the southwest by the Pacific Ocean, on the south and southeast by the SMR and the SMR Estuary, and by the Marine Corps Tactical Systems Support Facility (MCTSSA) on the west and northwest. The agricultural fields were used for growing tomatoes and strawberries and other agricultural uses for at least 70 years.

In March 2011, the Stuart Mesa Agricultural Fields property lease was terminated, and the fields have been fallow. However, runoff from the fallow agricultural fields has the potential to impact the SMR Estuary, as noted in a letter from the Regional Water Board to the Marine Corps Base (California Regional Water Quality Control Board, San Diego Region, 2017a). For example, unmaintained earthen berms can be erosive and contribute to nutrient loading. Since termination of the lease, the west and east agricultural fields have undergone remediation for identified areas with contaminants of potential concern. Data obtained from the Geotracker website was reviewed and it did not appear that nutrients were included in the monitoring program. However, modeling performed as part of the SMRNIG studies does indicate the site as a potential source of nutrients in the Lower SMR Subwatershed. Estimated loading of nutrients for the site is illustrated in **Figure 3-6**.

3.3.4 Findings from TMDL Alternative Technical Reports

Based on the watershed modeling performed for the SMRNIG to support development of the TMDL Alternative for the SMR Estuary (Sutula, et al., 2016), several land use categories have been identified as having potential to contribute loads of total nitrogen and total phosphorus to the SMR WMA.

- Total Nitrogen - The model identifies irrigated agriculture, orchards, vineyards and nurseries, open scrublands and grasslands, and residential land uses as the largest contributors of total nitrogen load to the Santa Margarita River.
- Total Phosphorus - The model identifies total phosphorus loading as being contributed by roads, orchards, vineyards and nurseries, open scrublands and grasslands, and residential land uses.

Figure 3-6 shows the major pathways and sources identified in the Model Application Report and subsequent technical memorandums for Total Nitrogen and Total Phosphorus.

As shown in the figure, sources of nutrients reach the SMR Estuary through several pathways. Discharges from agricultural areas, Caltrans, Camp Pendleton, and other federal lands, including tribal lands, can discharge directly to receiving waters and the SMR Estuary. Some of these

sources also can enter the ~~storm drain~~MS4~~ system~~ and contribute to loadings from the ~~storm drain~~MS4, along with commercial, industrial, and open space sources. Many of the land uses that the model identifies as contributing to nutrient loading in the SMR Estuary can be found adjacent to the reaches the Copermittees have identified as impacted by eutrophic conditions and/or nutrient loading. **Table 3-8** shows the relative contribution of each of these sources to the ~~storm drain~~MS4 ~~system~~. RCFCWCD and the City of Menifee were not included in the modeling efforts and do not have loads assigned. If determined to be necessary by the SMRNIG, these agencies may be added during future iterations of the model as part of the adaptive management process to provide a more complete understanding of nutrient loading from all agencies in the watershed.

Table 3-8. Dry Weather Sources of Total Nitrogen (TN) and Total Phosphorus (TP) within Each Jurisdiction based on the Tetra Tech Loading Analysis Memo Dated May 15, 2017 Percentage of Total Loading from ~~Storm Drain~~MS4 Discharges Attributable to Each Source[1, 2]

	San Diego County		Riverside County		City of Murrieta		City of Temecula		City of Wildomar	
	TN	TP	TN	TP	TN	TP	TN	TP	TN	TP
Residential	20.9%	23.3%	35.6%	33.6%	66.2%	64.2%	71.7%	70.5%	67.4%	61.0%
Commercial	1.6%	2.8%	3.6%	3.4%	10.0%	9.7%	13.2%	13.0%	3.6%	3.3%
Industrial	2.8%	3.4%	2.3%	2.1%	5.1%	5.0%	7.5%	7.4%	2.1%	1.9%
Parks and Recreation	0.4%	0.0%	1.4%	1.3%	2.5%	2.4%	2.2%	2.2%	0.0%	0.0%
Orchards, Vineyards and Nurseries	56.6%	53.4%	27.6%	26.3%	5.9%	5.8%	0.3%	0.3%	3.5%	3.2%
Horse Ranches	0.0%	0.0%	10.6%	10.0%	2.5%	2.4%	0.7%	0.7%	3.7%	3.4%
Other Agriculture	5.0%	4.5%	6.5%	6.5%	2.6%	2.7%	2.0%	2.1%	1.4%	1.7%
Open Space	12.6%	12.5%	8.4%	12.5%	5.0%	7.5%	2.2%	3.6%	18.2%	25.5%
Caltrans	0.0%	0.0%	5.0%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Federal (Tribes)	0.0%	0.0%	2.0%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

~~1.~~ Under the Regional Water Board Designation Letter dated October 26, 2015 Menifee is required to participate in the development and implementation of the SMR WQIP and the implementation of any applicable TMDL. However, no specific load allocations have been assigned to Menifee. Menifee was not included in the modeling efforts. Because Menifee only has a small jurisdictional area in the WMA (less than 2 square miles), Menifee will participate in the overall load reduction by implementing its WQIP and LIP strategies. ~~Based on land area and potential sources of nutrients, for the purposes of the Water Quality Improvement Plan development, Menifee is considered to be a less than significant contributor to nitrogen and phosphorus loading. If determined necessary by the SMRNIG, loading estimates may be developed in the future, at which time, they will be included within the Water Quality Improvement Plan through the adaptive management process.~~

~~2.~~1. N~~Based on land area and potential sources of nutrients, i~~trogen and phosphorus loads for the RCFCWCD were not calculated or included in the SMRNIG model. Therefore, for the purposes of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ development, RCFCWCD is considered to be a less than significant contributor to nitrogen and phosphorus loading. Nonetheless, the RCFCWCD will implement their JRMP, including the strategies identified in Table 4-11 to address the HPWQCs and PWQCs. If determined

necessary by the SMRNIG, loading estimates may be developed in the future, at which time, they will be included within the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ through the adaptive management process.

The findings of the SMR technical reports demonstrate that residential sources are the most significant source of nutrients to the storm drain system for most jurisdictions with some portion of the loading coming from all other sources. Only in San Diego County orchards, vineyards and nurseries are the most significant, with residential sources secondary. As part of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ development, San Diego County conducted additional modeling to separate contributions of nurseries from orchards and vineyards in the Rainbow Creek Subwatershed and determined that nurseries are the largest source of nutrients to the storm drain system. (Tetra Tech, 2017)

3.4 DATA ADEQUACY

While the available data is considered accurate, appropriately collected, and analyzed for potential sources contributing to eutrophication impacts and nutrient loading, information to determine if the potential sources are contributing to problems in the receiving waters is relatively sparse. To provide this linkage, source information has been used in combination with efforts to model nutrient loads to provide adequate rationale for identifying and prioritizing sources and/or stressors.

3.5 CONCLUSIONS FROM SOURCE INFORMATION

Based on the available source information as discussed above, combined with information generated through local studies for eutrophication in the watershed, and best professional judgement, each agency was able to prioritize the top three types of sources within their jurisdiction that may be contributing nutrients to their storm drain system. The prioritization is intended to provide guidance to agencies in selecting appropriate strategies to address sources of nutrients contributing to the storm drain system within their respective jurisdictions. These relative source rankings are summarized in **Table 3-9**.

Table 3-9. Prioritized Sources by Agency Based on Available Information

Sources	County of San Diego[1]	County of Riverside[2]	City of Menifee[3]	City of Murrieta[4]	City of Temecula[5]	City of Wildomar[6]	RCFCWCD[7]
Residential	2	1	1	1	1	1	1
Commercial	-	-	3	2	2	3	2
Industrial	-	-	-	-	3	-	-
Parks and Recreation	-	-	-	-	-	-	-
Orchards, Vineyards and Nurseries	1	2	-	-3	-	-	3
Horse Ranches	-	3	2	-	-	2	-
Other Agriculture	3	-	-	-	-	-	-

1. The source prioritization for the County of San Diego is primarily based on modeling results produced by the SMRNIG, source information related to the TMDL for Rainbow Creek, and land use information for their areas of the watershed.
2. The source prioritization for the County of Riverside is primarily based on modeling results produced by the SMRNIG, land use information, and inventory information.
3. The source prioritization for the City of Menifee is primarily based on land use information and modeling results produced by the SMRNIG. Although no loading estimates were provided for the City of Menifee, the model does demonstrate the general significance of loading from residential areas.
4. The source prioritization for the City of Murrieta is primarily based on the City's knowledge of facilities in this portion of the City, land use information, and inventory information.
5. The source prioritization for the City of Temecula is primarily based on modeling results produced by the SMRNIG, land use information, and inventory information.
6. The source prioritization for the City of Wildomar is primarily based on modeling results produced by the SMRNIG, land use information, and inventory information.
7. The source prioritization for the RCFCWCD is primarily based on available IC/ID information, including the predominant sources of illicit discharges as identified in **Table 3-7**~~**Table 3-7**~~~~**Table 3-7**~~. Because other agencies discharge to RCFCWCD facilities, the source prioritization results for the other agencies in the ~~Upper~~ Upper and Middle SMR Subwatersheds were also considered.

4 Water Quality Improvement Goals, Strategies, and Schedules

Provision B.3 of the Permit, "Water Quality Improvement Goals, Strategies and Schedules," describes the requirements to develop specific water quality improvement goals and strategies to address the PWQCs identified as per Permit Provision B.2 (and described in **Chapter 2**) for the SMR WMA. These goals and strategies must effectively prohibit non-stormwater discharges to the MS4~~stormwater conveyance system~~, reduce pollutants in stormwater discharges from the MS4~~stormwater conveyance system~~ to the maximum extent practicable, and protect water quality in receiving waters. In practical terms, the strategies will address the key sources of nutrients contributing to the MS4~~storm drain systems~~ within each jurisdiction and/or change the physical factors in the receiving water to reduce the growth of algae or improve dissolved oxygen conditions (e.g. restoration of stream channels) and the goals will be used to assess improvements in water quality and effectiveness of the strategies.

Chapter 4 defines the goals, along with strategies and schedules for achieving those goals. The goals include interim and final numeric (i.e., quantifiable) goals for the HPWQC as described in **Chapter 2**, and summarized in **Table 4-1**.

Table 4-1. Highest Priority Water Quality Condition

Beneficial Use Category	Highest Priority Water Quality Condition	Temporal Extent	Geographic Extent
Aquatic Life: Eutrophication	Eutrophication impacts (elevated algal biomass)	Dry	SMR Estuary [1], Warm Springs, Redhawk Channel [2]
	Nutrient loading to waterbodies with an adopted TMDL or listed as impaired~~waterbody~~	Dry	All ~~Upper~~ Middle and Lower SMR subareas ~~except Vail Lake~~, Fallbrook Creek and Sandia Creek[1]
		Wet	Rainbow Creek

1. MS4~~Storm drain~~ discharges within the following subareas may reach the SMR Estuary during dry weather and contribute to the Eutrophication PWQC in the SMR Estuary: Upper Murrieta Creek and Tributaries, Warm Springs, Santa Gertrudis, Murrieta Creek and Long Canyon, Temecula Creek and Redhawk Channel, Upper Santa Margarita River, Lower Santa Margarita River, Rainbow Creek and De Luz Creek.
2. Other areas may be added as result of TMDL Alternative development during adaptive management process.

As shown in the table, the HPWQC consists of in-stream eutrophication impacts in the SMR Estuary, Warm Springs and Redhawk Channel. As shown in **Figure 2-8**, increased nutrient loading to the waterbody can cause eutrophication, but other factors, such as shading, temperature, flow, and substrate influence whether increased nutrient loading causes eutrophication. As a result, while nutrient loading occurs throughout the watershed, evidence of eutrophication is not present in all reaches. The other part of the HPWQC to be addressed is the nutrient loading to the waterbodies where eutrophication is occurring. Because the SMR Estuary is at the base of the watershed, all MS4~~storm drain~~ discharges that might reach the SMR Estuary during dry weather are addressed by the goals and strategies in this chapter. Additionally, nutrient loadings during wet weather to Rainbow Creek are a HPWQC.

Through the implementation of strategies developed to address potential sources of nutrients and an iterative, adaptive management approach, it is anticipated that the numeric goals will be achieved and the water quality will be improved. Each agency will implement a JRMP or LIP that contains strategies to meet the requirements of Permit Provisions E.2 through E.7. The JRMPs/L~~ocal~~ I~~mplementation~~ P~~lans (LIPs)~~ contain all BMPs that will be implemented across programs as required by Provision E of the Permit. Additionally, each agency will implement additional strategies to address anthropogenic sources of nutrients that contribute pollutants via the MS4~~storm drains~~ (as described in Permit Provisions B.3.b(1)(a)(i)-(vi)). Jurisdictional strategies will address sources of nutrients within the agency's jurisdiction. Optional strategies have also been developed for each jurisdiction, but will be implemented only if certain triggers are met (e.g., where interim goals are not met). WMA strategies have been developed that are also optional (i.e., must be triggered), but are regional or multi-jurisdictional in nature.

4.1 GOALS AND SCHEDULES TO ADDRESS EUTROPHICATION AND NUTRIENT LOADING

The purpose of establishing goals is to support W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ implementation and measure reasonable progress towards addressing the HPWQC. The Permit requires that goals be reflective of criteria or indicators to measure incremental progress towards addressing the HPWQC over the course of implementation of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~. Goals for the HPWQC, and the process to achieve them, are fundamental to the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~. Permit Provision B.3 outlines requirements for goals, which include numeric targets for interim and final goals for the HPWQC:

- Interim Goals must be based on measureable criteria or indicators capable of demonstrating reasonable incremental progress toward achieving the final numeric goals. Each final goal must have one or more interim goal, with at least one interim numeric goal expressed as a reasonable increment toward achievement of the final numeric goal, to be accomplished during each 5-year period between the acceptance of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ and the achievement of final numeric goals.
- Final Goals must be based on measureable criteria or indicators capable of demonstrating one or more of the following: (i) discharges from Copermittees' MS4~~storm drain~~s will not cause or contribute to exceedances of water quality standards in receiving waters; (ii) the conditions in receiving waters and associated habitat are protected from MS4~~storm drain~~ discharges; or (iii) beneficial uses of receiving waters are protected from MS4~~storm drain~~ discharges and will be supported.

4.1.1 Geographic Extent of Eutrophication HPWQC

The HPWQC for eutrophication was identified for three subareas in the watershed: SMR Estuary, Warm Springs and the Redhawk Channel portion of the Temecula Creek and Redhawk Channel subarea. Warm Springs and Redhawk Channel are located in the ~~Upper~~ Middle SMR Subwatershed, and evidence of eutrophication was limited to one location in each of these creeks with limited sampling data (see **Chapter 2**). The 192-acre SMR Estuary is located at the base of the watershed in the southwestern portion of Marine Corps Base Camp Pendleton. The SMR Estuary receives drainage from both the ~~Upper~~ Middle and Lower SMR Subwatersheds. In contrast to Warm Springs and the Redhawk Channel portion of the Temecula Creek and Redhawk Channel

subarea, the SMR Estuary has been extensively studied and monitored. **Figure 4-1** shows the SMR Estuary and its location within the SMR WMA.

Eutrophication can be caused by both physical factors (flow conditions, waterbody shading, substrate, etc.) and discharges of nutrients. While the geographic extent of the evidence of eutrophication is limited to three subareas in the SMR WMA, dry weather discharges of nutrients from MS4~~storm drain~~ outfalls to all areas of the watershed have the potential to contribute to the eutrophication in the SMR Estuary. Consistent with the TMDL Alternative, dry weather is defined to include dry conditions (where there is less than 0.1 inch of rainfall within the previous 72 hours) year-round, encompassing both the dry and wet seasons[11]. The subareas with dry weather MS4~~storm drain~~ discharges that could potentially reach the SMR Estuary are: Upper Murrieta Creek and Tributaries, Warm Springs, Murrieta and Long Canyon Creek, Santa Gertrudis Creek, Temecula Creek and Redhawk Channel, Upper Santa Margarita River, Lower Santa Margarita River, Rainbow Creek, and De Luz Creek. As a result, all subareas where dry weather flows from the MS4~~storm drain system~~ may occur and include nutrient loading are included in the geographic extent of the HPWQC. ~~The Eastern Uppermost~~Upper SMR Subwatershed does not contribute flows downstream of Diamond Valley Lake, Lake Skinner, or Vail Lake during dry weather conditions.

[11] Defined in Permit Provision D.1.c.

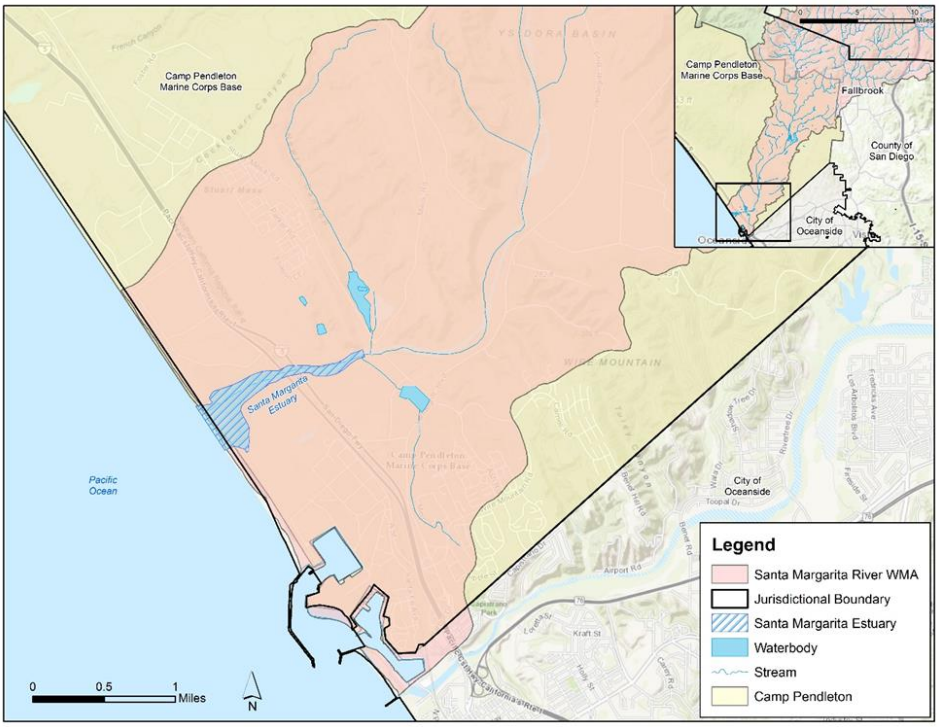


Figure 4-1. Santa Margarita River Estuary Location in the Santa Margarita River WMA

In the ~~Upper~~ Middle SMR Subwatershed, goals and schedules that will address both localized eutrophication in Warm Springs and Redhawk Channel and nutrient loadings to the downstream SMR Estuary have been identified. In the Lower SMR Subwatershed, goals and schedules have been developed to address the eutrophic conditions in the SMR Estuary as well as the nutrient loading in the Rainbow Creek subarea.

All of the goals and schedules have been structured to achieve the anticipated targets for the TMDL A~~a~~lternative for the Estuary, as described in more detail in **Section 4.1.2**. Differences among goals and schedules were identified to match jurisdiction and subwatershed-specific strategies and schedules. This approach provides the framework for a more accurate assessment of progress toward achieving goals within each subwatershed. Ultimately, protection of the receiving waters is the desired outcome.

4.1.2 TMDL Alternative Background

The Copermittees and the City of Menifee have developed goals to address the TMDL Alternative for the SMR Estuary that is currently under development. However, ~~Because t~~he TMDL Alternative for the SMR Estuary is not yet final~~under development~~, and targets and allocations are still being established. The Copermittees and the City of Menifee have utilized the available TMDL Alternative information in developing their respective goals. This section provides a

discussion of the available information and how it was appropriately considered to help inform the selection of the goals.

The Basin Plan WQOs can be described as narrative WQOs with numeric guidance for interpretation of the narrative language. These numeric interpretations have been utilized historically for 303(d) listing decisions, TMDLs, and permit conditions. However, the objectives were established in the 1970s and regulatory and scientific approaches to evaluating biostimulatory objectives have since evolved. It is now recognized that due to site-specific factors (such as hydrology, shading, temperature), total nitrogen and total phosphorus concentrations and loads that can contribute to primary producer overproduction at levels that impact beneficial uses, vary greatly among streams and estuaries.

Current numeric interpretations of the narrative Basin Plan nitrogen and phosphorus WQOs do not consider site-specific factors. An alternative regulatory approach advocated by Regional Water Board staff and USEPA Region 9, is currently under development as part of the Statewide Biostimulatory and Bio-objectives Amendment (Biostimulatory Substances Amendment) being developed by the State Water Board. The State Water Board is proposing to adopt a statewide WQO for biostimulatory substances along with a program of implementation as an amendment to the Water Quality Control Plan for Inland Surface Water, Enclosed Bays and Estuaries of California (ISWEBE Plan). The Biostimulatory Substances Amendment will likely include a statewide narrative objective (with numeric guidance for interpretation), and various regulatory control options for point and non-point sources. This framework will be used to develop scientifically-sound water quality goals for biostimulatory substances that are protective of beneficial uses.

Although the State Water Board's work is still in process, the framework described above is being utilized for the TMDL Alternative development. As a result, TMDL Alternative targets for the SMR Estuary will not be set equal to the numeric interpretation of the Basin Plan objectives (i.e., 1.0 mg/L for total nitrogen and 0.1 mg/L for total phosphorus) that were used as the basis for the 303(d) listings. Instead, the TMDL Alternative for the SMR Estuary is expected to~~will~~ include some combination of dissolved oxygen, algal biomass, and benthic macroinvertebrate targets.

As discussed in more detail in **Section 0.2**, two models have been developed to support the TMDL Alternative development: the Estuary model and Watershed Loading model. The Estuary model was used to evaluate a range of possible water quality targets for the SMR Estuary that would align with the Biostimulatory Substances Amendment framework. The Watershed Loading model was used to estimate the amount of total nitrogen and total phosphorus loading from the watershed. Based on the analysis presented in the Model Application Report, the SMRNIG discussed potential targets for the SMR Estuary.

As of February 2017, the following targets were being considered for the TMDL Alternative for the SMR Estuary (County of San Diego, 2017a):

- A primary algal biomass target of 57 grams (dry-weight) per cubic meter [g d-wt/m^2];
- A secondary numeric target for algal biomass of 70 g d-wt/m^2;
- A dissolved oxygen target of not less than 5.0 mg/L; and
- If monitoring data confirm that the SMR Estuary is meeting the primary target of algal biomass of 57 g d-wt/m^2, this result indicates that the beneficial uses are protected. If

monitoring data confirm that the SMR Estuary is meeting an algal biomass between 57 and 70 g d-wt/m^2, the Sediment Quality Objective (SQO) tool (http://www.sccwrp.org/Data/DataTools/SedimentQualityAssessment.aspx) for benthic community structure will be used to assess whether beneficial uses are protected. If the dissolved oxygen target is being met and the SQO tool indicates beneficial uses are protected, the SMR Estuary targets are being met regardless of the algal biomass concentrations.

In the TMDL Alternative analysis, year-round dry weather discharges were determined to be primarily responsible for identified impairments in the SMR Estuary. Wet weather loadings were determined to be primarily flushed to the Pacific Ocean, and modeled reductions in wet weather loads did not have an appreciable impact on improving SMR Estuary conditions. As a result, wet weather load reductions are not required by the TMDL Alternative for the SMR Estuary.[12]

The Estuary model was used to evaluate the load reductions in total nitrogen and total phosphorus needed to meet the targets based on the 2008 to 2009 Water Year simulated in the model. Based on the model results, the SMRNIG has developed a proposal for allocations for the TMDL Alternative for the SMR Estuary (County of San Diego, 2017b). The proposed allocations apply a 76% reduction equally to all controllable discharges within the SMR WMA, which are defined for the purposes of the TMDL Alternative as discharges covered by WDRs or NPDES permits. Other discharges are not subject to load reduction goals, as they are either naturally occurring (e.g., open space) or releases necessary to protect other beneficial uses (e.g., Comprehensive Water Rights Management Agreement flows). While the Regional Water Board has provided preliminary positive feedback on the allocation proposal, the TMDL Alternative for the SMR Estuary is still under development and the proposal may be modified before it becomes final~~when it is incorporated into the resolution~~.

Compliance with requirements in applicable Orders is expected to attain and maintain the allowable loadings from controllable discharges in the TMDL Alternative for the SMR Estuary. Non-storm water discharges are generally effectively prohibited by the existing MS4 Permit requirements (Order No. R9-2013-0001, as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100 ~~2015-0100~~) and the agricultural orders (Orders No. R9-2016-0004 and R9-2016-0005). However, several non-controllable discharges exist in the watershed that may cause the SMR Estuary to exceed the proposed receiving water targets. Should a demonstration be made that all controllable discharges have been addressed and are meeting allocations and the SMR Estuary continues to exceed receiving water targets, modifications to the targets may be considered to reflect the impact of natural sources. Under such conditions, t~~T~~he TMDL Alternative for the SMR Estuary will not require additional load reductions from the controllable discharges to meet the receiving water targets in the SMR Estuary.

4.1.3 Numeric Goals and Schedules for the SMR Watershed

The Copermittees used the geographic extent of the eutrophication and nutrient loading, in combination with scientific studies and modeling performed as part of the SMR Estuary TMDL

[12] If wet weather loadings are identified in the future as a source that is required to be addressed by the TMDL Alternative for the SMR Estuary or TMDLs for the other portions of the SMR WMA, the Water Quality Improvement Plan goals and strategies will be updated as required through the adaptive management process.

Alternative and the Rainbow Creek Nutrient TMDL, to develop numeric goals for the watershed. The goals are presented in the following sections.

4.1.3.1 Goals and Schedules to Address Eutrophication and Nutrient Loading in the ~~Upper~~ Middle SMR Subwatershed[13]

The ~~Upper~~ Middle SMR Subwatershed consists of six subareas (**Figure 2-3**). Copermittees have MS4~~storm drain~~ outfalls that discharge to portions of five of the six subareas. The evaluation of MS4~~storm drain~~ outfall data indicates that total nitrogen and total phosphorus discharges from the MS4 during dry conditions, which may occur year-round, ~~from the storm drain~~ have the potential to contribute nutrient loading to the SMR Estuary, Warm Springs, and Redhawk Channel. As a result, the geographic extent of the HPWQC in the ~~Upper~~ Middle SMR Subwatershed include the portions of the Upper Murrieta Creek and tributaries, Warm Springs, Santa Gertrudis Creek, Murrieta Creek and Long Canyon Creek, and Temecula Creek and Redhawk Channel subareas to which MS4~~storm drain~~ outfalls discharge during dry weather. ~~Storm drains do not~~ There are no MS4 outfalls that discharge to other subareas in the ~~Upper~~ Middle SMR Subwatershed.

Interim and final goals and schedules for the ~~Upper~~ Middle SMR Subwatershed are presented in **Table 4-2~~Table 4-2~~~~Table 4-2~~**. A multi-tiered approach to setting goals was used. The compliance pathways for agencies to meet the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ goals are also shown in the table. The compliance pathways are based on six different metrics. Each Copermittee in the ~~Upper~~ Middle SMR Subwatershed will have the option of demonstrating compliance through one of the six pathways. As such, the pathways are presented sequentially, separated by "OR" to indicate that any one of the six pathways may be followed for compliance. Each pathway includes interim goals, with at least one goal per Permit term, to demonstrate progress toward achieving the final goals. The first two pathways support a watershed-based approach as they focus on achievement of goals in receiving waters to demonstrate progress toward meeting ~~TMDL-based~~ load reductions and targets based on the TMDL Alternative. The second two pathways include MS4~~storm drain~~ discharge goals, to demonstrate progress and provide jurisdictional accountability toward meeting the TMDL Alternative-based load reductions and targets. The last two pathways account for natural loading, and provide a BMP-based option throu~~gh Water~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ implementation. The following six pathways are presented in **Table 4-2~~Table 4-2~~~~Table 4-2~~**:

> ***Pathway 1****. Demonstration that the discharger is attaining the load reduction goal of 76% in the ~~Upper~~ Middle SMR Subwatershed in receiving waters.*
>
> ***Pathway 2****. Demonstration that the Santa Margarita River Estuary targets (based on the proposed TMDL Alternative) have been attained.*
>
> ***Pathway 3****. Demonstration that non-stormwater flows that are within agency control have been reduced to meet load reductions.*
>
> ***Pathway 4****. Demonstration that discharger is meeting required load reductions as described in the TMDL Alternative for the SMR Estuary.*
>
> ***Pathway 5****. Demonstration that exceedances of targets are due to sources outside of agency control.*

[13] Cities of Menifee, Murrieta, Temecula, and Wildomar, Riverside County Flood Control and Water Conservation District, and Riverside County.

Pathway 6*. Demonstration that management actions to attain load or flow reductions are being implemented through mechanisms defined in the accepted Water Quality Improvement Plan.*

The final goals were identified based on the proposed wasteload allocations and required load reductions proposed for the TMDL Alternative for the SMR Estuary. The proposed wasteload allocations used to establish goals are annual load reductions in dry weather discharges. As discussed above, dry weather discharges were determined in the TMDL analysis to be primarily responsible for identified impairments in the SMR Estuary. As such, the ~~Upper~~ Middle SMR Subwatershed agency goals are applicable under dry conditions year-round (including both summer dry and winter dry conditions). Weather is considered dry if the preceding 72 hours has been without measurable precipitation (>0.1").

The interim goals were established conservatively, to reflect the anticipated reductions that can be achieved through each step of strategy implementation. The strategy implementation process is described in **Section 4.2**. The final goals and timeframe for achieving the goals is based on the implementation schedule anticipated ~~to be approved in~~ for the final terms of the TMDL Alternative ~~Resolution~~ for the SMR Estuary.[14]

[14] The final goals and schedules are preliminary and will be updated through the adaptive management process when the TMDL Alternative becomes effective.

Table 4-2. Interim and Final Numeric Goals and Schedules, HPWQC – Eutrophication Impacts and Nutrient Loading, Upper and Middle Santa Margarita River Subwatershed Agencies (County of San Diego, 2017a)

Pathway	Interim Goal (2023)	Interim Goal (2028)	Interim Goal (2033)	Final Goal (2038) [6]	Metric
1[1]	10% reduction in dry weather[2] loadings in receiving waters: TN 993 lb/yr TP 99 lb/yr	30% reduction in dry weather loadings in receiving waters: TN 2,980 lb/yr TP 300 lb/yr	50% reduction in dry weather loadings in receiving waters: TN 4,970 lb/yr TP 495 lb/yr	76% reduction in dry weather loadings in receiving waters: TN 7,550 lb/yr TP 752 lb/yr	Assessment of loadings in the Santa Margarita River (receiving water) at the base of the ~~Upper~~ Middle SMR Subwatershed
OR					
2	Numeric interim and final goals to be determined based on outcome of TMDL alternative for the Santa Margarita River Estuary				Assessment of receiving water conditions in the Santa Margarita River Estuary
OR					
3	10% reduction in non-stormwater flows within agency control[3]	30% reduction in non-stormwater flows within agency control[3]	50% reduction in non-stormwater flows within agency control[3]	76% reduction in non-stormwater flows within agency control[3]	Assessment of load reductions from implementation actions (based on outfall monitoring or other assessment metrics)

			OR		
4 [4, 5]	10% reduction in dry weather loadings from Copermittees. As a Total: TN 993 lb/yr TP 99 lb/yr OR by jurisdiction: City of Wildomar: TN 79, TP 8 City of Murrieta: TN 224, TP 22 City of Temecula: TN 395, TP 39 Riverside County: TN 286, TP 28	30% reduction in dry weather loadings from Copermittees: As a Total: TN 2,980 lb/yr TP 300 lb/yr OR by jurisdiction: City of Wildomar: TN 237, TP 24 City of Murrieta: TN 673, TP 67 City of Temecula: TN 1,186, TP 118 Riverside County: TN 858, TP 85	50% reduction in dry weather loadings from Copermittees: As a Total: TN 4,970 lb/yr TP 495 lb/yr OR by jurisdiction: City of Wildomar: TN 396, TP 39 City of Murrieta: TN 1,122, TP 112 City of Temecula: TN 1,977, TP 197 Riverside County: TN 1,430, TP 142	76% reduction in dry weather loadings from Copermittees: As a Total: TN 7,550 lb/yr TP 752 lb/yr OR by jurisdiction: City of Wildomar: TN 601, TP 60 City of Murrieta: TN 1,705, TP 170 City of Temecula: TN 3,005, TP 300 Riverside County: TN 2,174, TP 217	Assessment of load reductions from implementation actions (based on outfall monitoring or other assessment metrics)
			OR		
5	Assess progress toward achieving final goal (using other pathways).			Where final goals have not been met, demonstrate that exceedances of targets are due to source(s) of nutrients outside of the control of the Copermittees and the City of Menifee.	Source investigations

OR					
6	The Copermittees and the City of Menifee develop and implement the jurisdictional strategies as described in the accepted Water Quality Improvement Plan.	The Copermittees and the City of Menifee assess progress towards goals, implement the JRMP or enhanced JRMP strategies as triggered using an iterative approach as described in the accepted Water Quality Improvement Plan.	The Copermittees and the City of Menifee assess progress towards goals, implement the JRMP, enhanced JRMP strategies, or optional jurisdictional strategies, as triggered using an iterative approach as described in the accepted Water Quality Improvement Plan.	The Copermittees and the City of Menifee assess progress towards goals, implement the JRMP, enhanced JRMP strategies, optional jurisdictional strategies, or optional WMA strategies, as triggered through an iterative approach as described in the accepted Water Quality Improvement Plan.	Implementation of JRMP, enhanced JRMP strategies, optional jurisdictional strategies, or optional WMA strategies, as triggered through an iterative, adaptive management approach.

Notes:

1. Load reductions at the base of the ~~Upper~~ Middle SMR Subwatershed will be measured against the baseline loads for Riverside County. Source: Tetra Tech. SMR Estuary MS4 Nutrient Loads for WY 2008. Memorandum to Jo Ann Weber, Kyle Cook, Kyle Gallup, and Stuart McKibbin, January 6, 2017. Baseline loads are 60,796 lb/yr for Total Nitrogen and 6,004 lb/yr for Total Phosphorus.
2. Dry weather conditions are defined as those that occur on non-storm days, with storm days being defined as all days with measured precipitation greater than 0.1 inch and the 72 hours following the measured precipitation, and include both summer and winter dry periods.
3. Within agency control means, consistent with the scope of the Permit, that conditions are within the regulatory authority of the Copermittee or the City of Menifee and can feasibly be addressed or treated at the point of entry, within, or at the outlets from the MS4~~stormwater conveyance system~~. This requires the availability of feasible options for treating the condition. Flows/conditions determined to be uncontrollable would not be included in the calculations related to this goal.
4. Load reductions for the Riverside County Copermittees will be measured based on the baseline loads presented in the Tetra Tech memorandum: 9,933 lb/yr for Total Nitrogen and 990 lb/yr for Total Phosphorus. Jurisdictional load reductions for the jurisdictions provided in the Tetra Tech memo are shown in the table.
5. As described in Section 1, Menifee is participating in the development and implementation of this WQIP as required by the Regional Water Board Designation Letter dated October 26, 2015. Based on Menifee's land area in the Santa Margarita watershed, for the purpose of WQIP development and implementation, Menifee is determined by the San Diego Water Board to be a less than significant contributor of nitrogen, phosphorus and other pollutants within the Santa Margarita River Watershed Management Area. There are currently no numeric nutrient load goals for Menifee since no nutrient load values for the small portion of Menifee within the Santa Margarita watershed were included in the Tetra Tech study or any other currently published study, and any nutrient loading from within the City of Menifee to the Santa Margarita River Watershed is considered to be less than significant. Until the Santa Margarita Estuary TMDL stakeholders and the San Diego Water Board determine the final load allocation regarding Menifee, if such an allocation is needed, Menifee will implement appropriate LIP strategies to address the HPWQC in the WMA and meet the WQIP goals and schedules. Furthermore, while Menifee has limited MS4~~storm drain system~~ conveyance structures in the SMR WMA, there are currently no MS4~~storm drain~~ outfalls located within the portion of Menifee in the Santa Margarita watershed. Therefore, achievement of goals will be demonstrated through pathways other than pathway 4.
6. The final goals and schedules are preliminary and will be updated through the adaptive management process when the TMDL Alternative becomes effective.

4.1.3.2 Goals and Schedules to Address Eutrophication Impacts and Nutrient Loading in the Lower SMR Subwatershed[15]

The first set of goals and strategies developed for the Lower SMR Subwatershed relate to the Estuary. Studies conducted to support development of the TMDL Alternative for the SMR Estuary indicate that eutrophic conditions are caused by excessive nutrient loading, which leads to excessive growth and decomposition of algae, and low dissolved oxygen conditions. Reducing dry weather flows from the San Diego County stormwater outfalls will ultimately reduce the nutrient loading that leads to the eutrophic condition in the SMR Estuary. Numeric goals addressing this HPWQC have been established to measure and demonstrate progress toward eliminating dry weather flows. The goals take two forms, though there are multiple compliance pathways to accomplish these goals. These goals are presented in **Table 4-3**.

Efforts to mitigate dry weather flows and consideration of small-scale structural controls (as needed) will begin during the next MS4 Permit term. The final compliance goal, scheduled for FY 2038, is zero persistent discharges from the County of San Diego's MS4~~storm drain~~ outfalls to receiving waters or a 100% reduction in anthropogenic dry weather flow volume. Compliance pathways for these goals will be demonstrated through the dry weather MS4~~storm drain~~ outfall field screening program, or the TMDL Alternative (final terms~~Resolution~~ expected in 2018)~~ numeric~~ targets for the SMR Estuary.

[15] The County of San Diego is the only Copermittee that has Major Outfalls~~storm drain discharges~~ in the Lower SMR Subwatershed.

Table 4-3. Interim and Final Numeric Goals and Schedules for HPWQC – Eutrophication in the Santa Margarita River Estuary, Lower SMR Subwatershed – San Diego County

	Assessment Period					
Goal[1]	**Baseline**	**FY2018-FY2023**	**1st Permit Term (FY2023)**	**2nd Permit Term (FY2028)**	**3rd Permit Term (FY2033)**	**4th Permit Term (FY 2038)**
Effectively eliminate anthropogenic dry weather discharges from ~~storm drain~~MS4 outfalls to the receiving water	To be established during FY16–17 using dry weather[2] flow measurements	Complete turf replacement in Rainbow Park.	Reduce the baseline aggregate flow volume by 25%.	Reduce the baseline aggregate flow volume by 50%.	Reduce the baseline aggregate flow volume by 75%.	Reduce the baseline aggregate flow volume by 100%.
Comply with TMDL Alternative	**OR**					
	Demonstrate that the Santa Margarita River Estuary targets have been attained.[3]					
	OR					
	Demonstrate that the discharger is attaining the nutrient load reduction goal of 76%.					
	OR					
	Demonstrate that the discharger is attaining the load allocations defined in the TMDL Alternative for the SMR Estuary.					
	OR					
	Demonstrate that exceedances of the targets are due to non-controllable sources.					
	OR					
	Demonstrate that management actions to attain allocations are being implemented through mechanisms defined in each applicable Order.[4]					

Notes:

1. These goals are placeholders and may be updated on the basis of the final implementation requirements for the~~approved~~ Santa Margarita River Estuary TMDL Alternative~~Nutrient Reduction Resolution~~.
2. Dry weather conditions are defined as those that occur on non-storm days, with storm days being defined as all days with measured precipitation greater than 0.1 inch and the 72 hours following the measured precipitation, and include both summer and winter dry periods.
3. Primary and secondary numeric targets for algal biomass are proposed. If monitoring data confirm that the SMR Estuary is meeting the primary target of algal biomass of 57 g d-wt/m2, this result indicates that the beneficial uses are protected. If monitoring data confirm that the SMR Estuary is meeting an algal biomass between 57 and 70 g d-wt/m2, the Sediment Quality Objective (SQO) tool for benthic community structure will be used to assess whether beneficial uses are protected. The watershed load reduction goal to meet the numeric targets is 76%.
4. Mechanisms for implementing management actions include, but are not limited to, Phase I MS4 Water Quality Improvement Plans, Agricultural Discharger Water Quality Restoration Program Plans, Phase II MS4 permit program elements, and Caltrans compliance units, cooperative implementation grants and cooperative implementation agreements.

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4.1.3.3 Goals and Schedules to Address HPWQC - Nutrients in Rainbow Creek

Nutrients (including nitrate, nitrogen, and phosphorus) in Rainbow Creek are identified as a HPWQC in the Lower SMR Subwatershed and goals and schedules have been developed to address that condition as well. The Rainbow Creek Nutrient TMDL (Water Quality Control Plan for the San Diego Basin (Basin Plan) Amendment: Resolution No. R9-2005-0036) was adopted in

2006 to address water quality impairments in Rainbow Creek (San Diego RWQCB, 2006). In 2013, the Rainbow Creek Nutrient TMDL was incorporated into Attachment E.3 of the Permit.

4.1.3.3.1 Geographic Extent of HPWQC-Nutrients in Rainbow Creek

The geographic extent of the HPWQC-Nutrients in Rainbow Creek is the area that drains into stormwater outfalls connected to Rainbow Creek within San Diego County. The Rainbow Creek drainage area encompasses 7,085 acres and approximately 65 percent of the area is undeveloped (Regional Water Board, 2006). The Clean Water Act Section 303(d) list of water quality impaired segments (303(d) list) identifies impairments as a result of excessive nutrient concentrations for an approximately 5-mile stretch of the creek **(Figure 4-2**) (Regional Water Board, 2015).

Rainbow Creek supports a number of beneficial uses. The most sensitive beneficial uses are those designated for protection of aquatic life, as described in the Basin Plan (Regional Water Board, 1994) definition of the warm freshwater habitat (WARM) and cold freshwater habitat (COLD) beneficial uses.

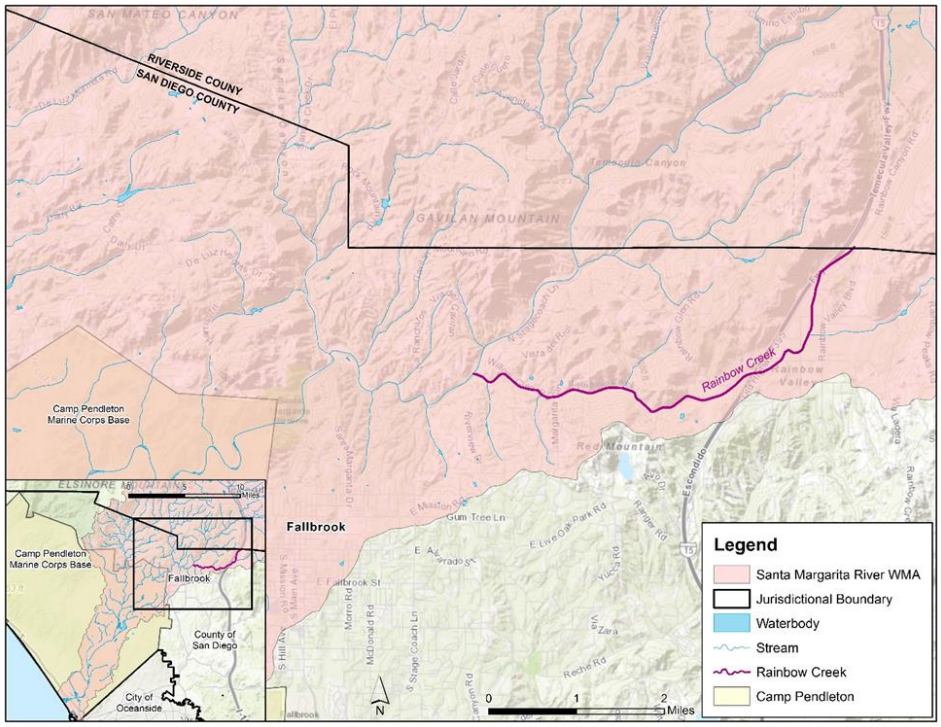

Figure 4-2. 303(d) Listed Segment of Rainbow Creek in the Santa Margarita River WMA

Water quality objectives (WQOs) for biostimulatory substances that are established by the Basin Plan (Regional Water Board, 1994) require that the substances remain below concentrations that promote algal growth to the extent that causes nuisance or adversely affects beneficial uses. The Rainbow Creek Nutrient TMDL is based on the numeric interpretation of the narrative Basin Plan WQOs for biostimulatory substances for the protection of the COLD and WARM beneficial uses: total nitrogen (1.0 milligrams per liter [mg/L] and total phosphorus 0.1 mg/L). The Basin Plan establishes that waters designated with the MUN beneficial use must not contain concentrations of nitrate in excess of the maximum contaminant levels (MCLs) set forth in California Code of Regulations Title 22. The MCL for nitrate (as nitrogen) is 10 mg/L.

4.1.3.3.2 Goals and Schedules for HPWQC Nutrients in Rainbow Creek

To comply with the Nutrient TMDL, the Permit provides multiple compliance pathways either regarding the receiving water or in stormwater discharges. Attachment E.3 of the Permit allows any of these pathways to achieve compliance (i.e., demonstration of progress toward all compliance pathways is not required), so the compliance pathways are independent of each other. The compliance pathways are based on three types of metrics:

(1) Receiving water conditions that are evaluated by comparing measured conditions with WQOs;

(2) Conditions of discharges from the MS4~~storm drain~~ outfalls that are evaluated by comparing measured conditions to WQO load reductions; and,

(3) Implementation of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ (i.e., establishment of goals, implementation of strategies and schedules).

Compliance with the final water quality-based effluent limitations (WQBELs), on or before the final Nutrient TMDL compliance date, may be demonstrated via one of the following methods (Regional Water Board, 2013):

(1) There is no direct or indirect discharge from the Copermittees' ~~storm drain~~MS4s to the receiving water; or

(2) There are no exceedances of the final receiving water limitations under specific Permit Provision 3.b.(2)(a) in the receiving water at, or downstream of the Copermittees' ~~storm drain~~MS4 outfalls; or

(3) There are no exceedances of the final effluent limitations under specific Permit Provision 3.b.(2)(b)(i) at the Copermittees' ~~storm drain~~MS4 outfalls; or

(4) The annual pollutant loads from given land uses discharging to and from the ~~storm drain~~MS4s do not exceed the final effluent limitations under specific Permit Provision 3.b.(2)(b)(ii); or

(5) The Copermittees develop and implement the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~ as follows:

   (i) Incorporate the BMPs required under specific Permit Provision 3.b.(2)(c) as part of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~;

(ii) Include an analysis in the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~, utilizing a watershed model or other watershed analytical tools, to demonstrate that the implementation of the BMPs required under specific Permit Provision 3.b.(2)(c) achieves compliance with specific Permit Provisions 3.b.(3)(a), 3.b.(3)(b), 3.b.(3)(c) and/or 3.b.(3)(d);

(iii) The results of the analysis must be accepted by the Regional Water Board as part of the W~~ater~~ Q~~uality~~ I~~mprovement~~ P~~lan~~;

(iv) The Copermittees continue to implement the BMPs required under specific Permit Provision 3.b.(2)(c); and

(v) The Copermittees continue to perform the specific monitoring and assessments specified in specific Permit Provision 3.d, to demonstrate compliance with specific Permit Provisions 3.b.(3)(a), 3.b.(3)(b), 3.b.(3)(c) and/or 3.b.(3)(d).

The final numeric goals for nutrients in Rainbow Creek, developed based on final effluent limitations for receiving waters and ~~storm drain~~MS4 discharges outlined in Attachment E.3 of the Permit, are presented in **Table 4-4**.

Table 4-4. Numeric Goals and Schedules for HPWQC – Nutrients in Rainbow Creek, San Diego County[16]

Compliance Pathway			Numeric Goal (December 31, 2021)
Water Quality Improvement Plan Implement Accepted Water Quality Improvement Plan			Implementation of a Water Quality Improvement Plan that incorporates the required BMPs; includes an analysis utilizing a watershed model or other watershed analytical tool to demonstrate that the implementation of the required BMPs achieves compliance; the results of the analysis are accepted by the Regional Water Board as part of the Water Quality Improvement Plan; the responsible Copermittees continue to implement the required BMPs; and the responsible Copermittees continue to perform the specific monitoring and assessments to demonstrate compliance.
OR			
Receiving Water Meet Receiving Water Limitations	Nitrate (as N) Total Nitrogen Total Phosphorus		10 mg/L 1.0 mg/L 0.1 mg/L
OR			
MS4~~Storm Drain~~ Discharges Meet Final Effluent Limitations expressed as concentrations in the storm drain discharge	Nitrate (as N) Total Nitrogen Total Phosphorus		10 mg/L 1.0 mg/L 0.1 mg/L
OR			
MS4~~Storm Drain~~ Discharges No Direct or Indirect Storm Drain Discharges to Receiving Water	Discharges		A 100% reduction in anthropogenic discharges from storm drain outfalls to Rainbow Creek.
OR			
MS4~~Storm Drain~~ Discharges Final Effluent Limitations Expressed as Annual Allowable Loads	Total Nitrogen	Commercial Nurseries Parks Residential Areas Urban Areas	116 kilograms per year [kg/yr] 3 kg/yr 149 kg/yr 27 kg/yr
	Total Phosphorus	Commercial Nurseries Parks Residential Areas Urban Areas	3 kg/yr 0.10 kg/yr 12 kg/yr 6 kg/yr

[16] See Order R9-2013-0001, as amended, Attachment E.3 – Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed.

4.2 STRATEGIES AND SCHEDULES

By building on the potential strategies developed consistent with Permit Provision B.2.e (**Appendix 3B**), each Copermittee and the City of Menifee has identified a group of strategies, consistent with Permit Provision B.3.b, that will be implemented within their jurisdiction and identified optional watershed management strategies for consideration to address eutrophication in the SMR watershed. Strategies to address eutrophication focus on reducing the discharges of nutrients, but also include strategies that change the physical factors in the receiving water to reduce the growth of algae and/or improve dissolved oxygen conditions (e.g. restoration of stream channels).

Strategies[17] to meet final goals were selected on the basis of their ability to achieve the following specific objectives:

- Effectively prohibit non-storm water discharges from the ~~storm drain~~MS4~~ system~~ to receiving waters;
- Reduce pollutants in storm water discharges from the ~~storm drain~~MS4~~ system~~ to the maximum extent practicable (MEP); and
- Implement programmatic or institutional BMPs.

The implementation of the ~~Water Quality Improvement Plan~~WQIP will prioritize non-structural BMPs initially, with an emphasis on those that most directly address sources of nutrients. Source control measures will be implemented early on to address flows during dry weather by eliminating prohibited non-storm water discharges. Wet weather load reductions will be achieved through an iterative adaptive management process. Both non-structural and structural BMPs will be implemented as necessary, as applicable approvals are granted and funds are secured.

Within this larger framework, priorities for strategy selection include:

- BMP effectiveness, particularly for targeting nutrients, with consideration for priority water quality conditions;
- Provision of multiple benefits, including but not limited to, habitat, recreation, economic, and water resources benefits; and,
- The degree to which the strategy is sustainable, implementable, and cost-effective.

Given the varied sources within each jurisdiction, sets of strategies were developed specific to each Copermittee and the City of Menifee for each HPWQC, and are presented in the following subsections. Strategies include jurisdictional, optional jurisdictional and optional WMA strategies for each agency. Each Copermittee will implement JRMP (jurisdictional) strategies (to meet Permit Provisions E.2 through E.7), and the City of Menifee will implement its jurisdictional LIP

[17] Water quality improvement strategies selected for this Water Quality Improvement Plan may be categorized as either non-structural or structural BMPs (including both distributed and regional BMPs). Non-structural BMPs are management actions or programs designed to reduce or eliminate pollutant loading at the source. Non-structural BMPs can be municipal programmatic or regulatory measures, public education and outreach, financial incentives, or other source management programs designed to affect behavioral changes. Structural BMPs are treatment or volume mitigation BMPs implemented at the neighborhood (i.e., regional), parcel, or site scale (i.e., distributed) and include features such as green streets, rainwater harvesting, and Low Impact Development (LID)-type solutions. Funding sources for the implementation of structural BMPs have not been identified.

strategies. Additionally, each Copermittee and the City of Menifee will implement additional strategies (optional jurisdictional and optional WMA strategies), as described in Permit Provisions B.3.b(1)(a)(i)-(vi). WMA strategies may be implemented by multiple agencies.

4.2.1 Strategies to Address Eutrophication in the ~~Upper~~ Upper and Middle SMR Subwatershed

This section describes the overall approach to strategy selection, prioritization, and implementation, the selected strategies, and a schedule for strategy implementation. The goals are developed to demonstrate progress towards addressing the HPWQC, but the strategies were developed to address the HPWQC, as well as other priority water quality conditions identified in **Chapter 2**. There are many strategies that will be implemented throughout the ~~Upper~~ Middle SMR Subwatershed. In addition, Copermittees will select "targeted areas" for implementation of specific, focused strategies, to address the HPWQC (eutrophication impacts in the SMR Estuary, Warm Springs, and Redhawk Channel and nutrient loadings to the SMR Estuary from Upper Murrieta Creek and Tributaries, Warm Springs, Santa Gertrudis, Murrieta Creek and Long Canyon, Temecula Creek and Redhawk Channel). Strategies have been developed at jurisdictional (jurisdictional and optional jurisdictional strategies) and watershed scales (optional WMA strategies).

4.2.1.1 Approach to Strategy Selection and Implementation

The Copermittees and the City of Menifee have developed an adaptive approach for addressing the HPWQC which consists of a process for selecting, evaluating and implementing jurisdictional, optional jurisdictional, and optional WMA strategies based on program effectiveness assessments and data gathered through the monitoring program and special studies. The strategies will address the eutrophication and the effects of nutrient loading for the watershed.

Strategies were developed to target specific sources of nutrient loading to the ~~storm drain~~MS4 ~~system~~, particularly during dry weather conditions, consistent with the HPWQC. As described in **Chapter 3**, each agency has prioritized potential sources of nutrients within its jurisdiction. Based on this analysis, the top sources of nutrient loading to the ~~storm drain~~MS4 ~~system~~ within the ~~Upper~~ Middle SMR Subwatershed include residential areas; commercial facilities; orchards, vineyards, and nurseries; and horse ranches. Strategies were developed to address these specific sources, as appropriate, in each jurisdiction.

The approach to the initial strategy selection and implementation is shown in **Figure 4-9**, and consists of the following steps:

- **Each Copermittee and the City of Menifee Will Implement JRMP/LIP Programs Throughout Their Jurisdiction –** Each Copermittee and the City of Menifee will develop and implement a JRMP or LIP (City of Menifee only) that contains strategies to address the requirements in Provisions E.2 through E.7 of the Permit. Jurisdictional programs, strategies, and minimum BMPs established per each agency's JRMP or LIP (City of Menifee only) will be implemented across all areas within the respective jurisdiction within 90 days of the Regional Water Board's acceptance of the ~~Water Quality Improvement Plan~~WQIP. During JRMP and LIP revisions, proceeding concurrently with development of the ~~Water Quality Improvement Plan~~WQIP, the JRMPs and LIPs will incorporate ~~Water Quality Improvement Plan~~WQIP strategies designed to address nutrient loading to the ~~storm drain~~MS4 ~~system~~. Where practical, the JRMPs/LIPs will incorporate

strategies that are designed to provide multiple benefits; that is, they will address eutrophication impacts and nutrients but will often also address one or more of the PWQCs (e.g., bacteria). JRMPs for each Copermittee in the ~~Upper~~ Middle SMR Subwatershed are available at the following web link: www.rcflood.org/npdes/SantaMargaritaWS.aspx#SMdocs. The City of Menifee will implement strategies described in its LIP, developed under their governing MS4 Permit in the Santa Ana Region (Order No. R8-2010-0033, NPDES Permit No. CAS618033).

- **Identify Target Areas to Implement Strategies to Address Specific Sources of the HPWQC –** In addition to the JRMP/LIP strategies to be implemented throughout each jurisdiction, additional strategies will be implemented to address sources of the HPWQC as required by Permit Provision B.3.b.(1)(a)(i)-(vi) (collectively referred to as enhanced JRMP/LIP strategies). In order to best address the priority sources identified in **Chapter 3**, the Copermittees identified target areas for implementation to focus on known and suspected sources of nutrients. Target areas within the SMR watershed were identified using several factors that are expected to correlate with nutrient loading discharged through the ~~storm drain~~MS4~~ system~~. Factors used in target area selection are illustrated in **Figure 4-3**.

1. Based on models developed as part of the TMDL Alternative.
2. Information related to overwatering is supported by water usage data where available through coordination with local water districts.
3. Based on available data as discussed in Chapter 2.

Figure 4-3. Factors Considered When Selecting Target Areas

Copermittees in the ~~Upper~~ Middle SMR Subwatershed selected five target areas to focus implementation. Due to their small land area and lack of ~~storm drain~~MS4 outfalls, the City of Menifee did not select specific target areas. RCFCWCD also did not select target areas, as they do not have land use authority in many of the areas draining to their ~~storm drain~~MS4~~ system~~. The

selected target areas are illustrated for each Copermittee in **Figure 4-4** through **Figure 4-8**, with a figure for RCFCWCD illustrating the drainage areas contributing to their dry weather outfall monitoring locations. Consistent with an adaptive management approach, as more information becomes available, target areas may be modified to focus strategy implementation as appropriate. A diagram of the strategy implementation process for the upcoming permit term is illustrated in **Figure 4-9**.

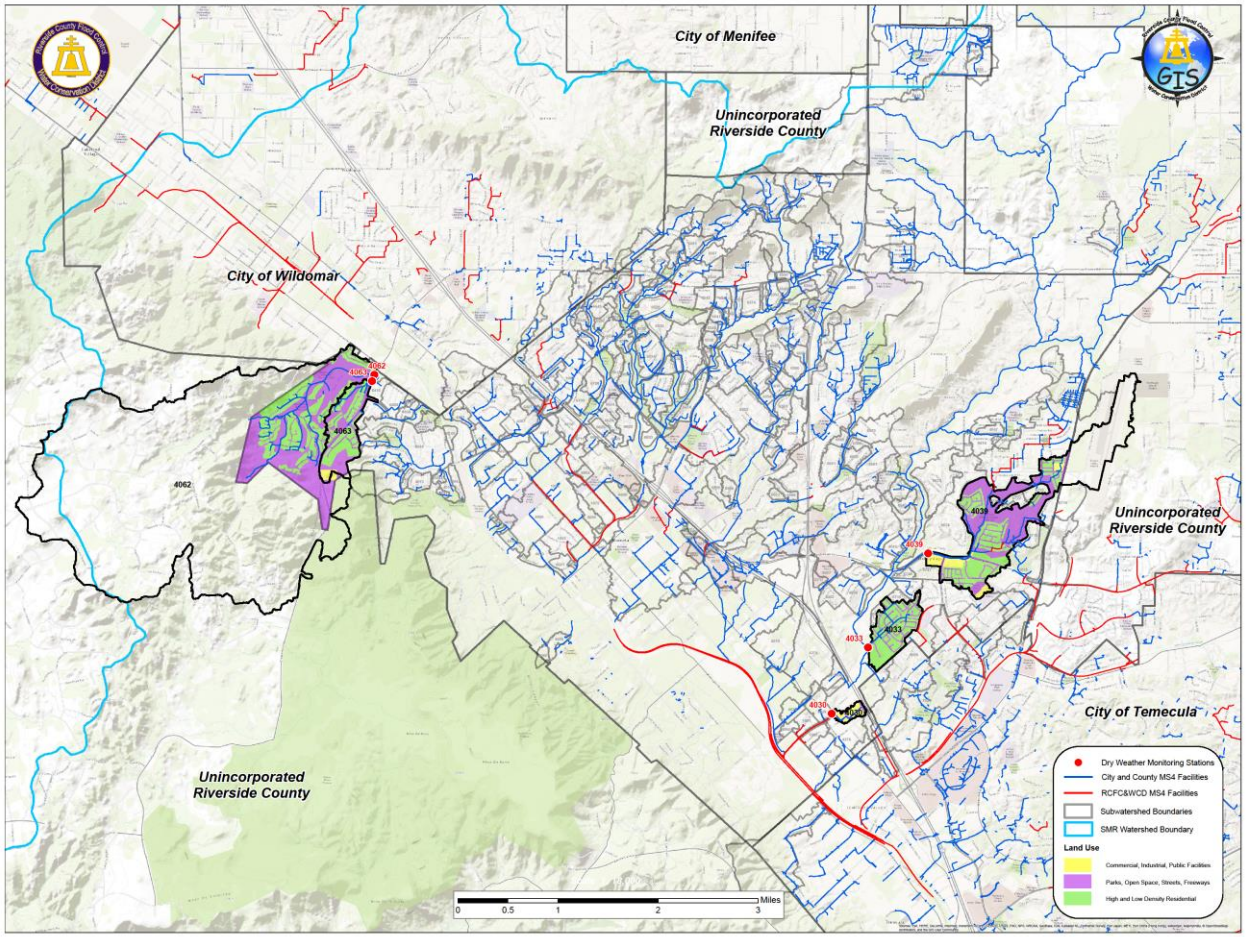

Figure 4-4. City of Murrieta Target Areas

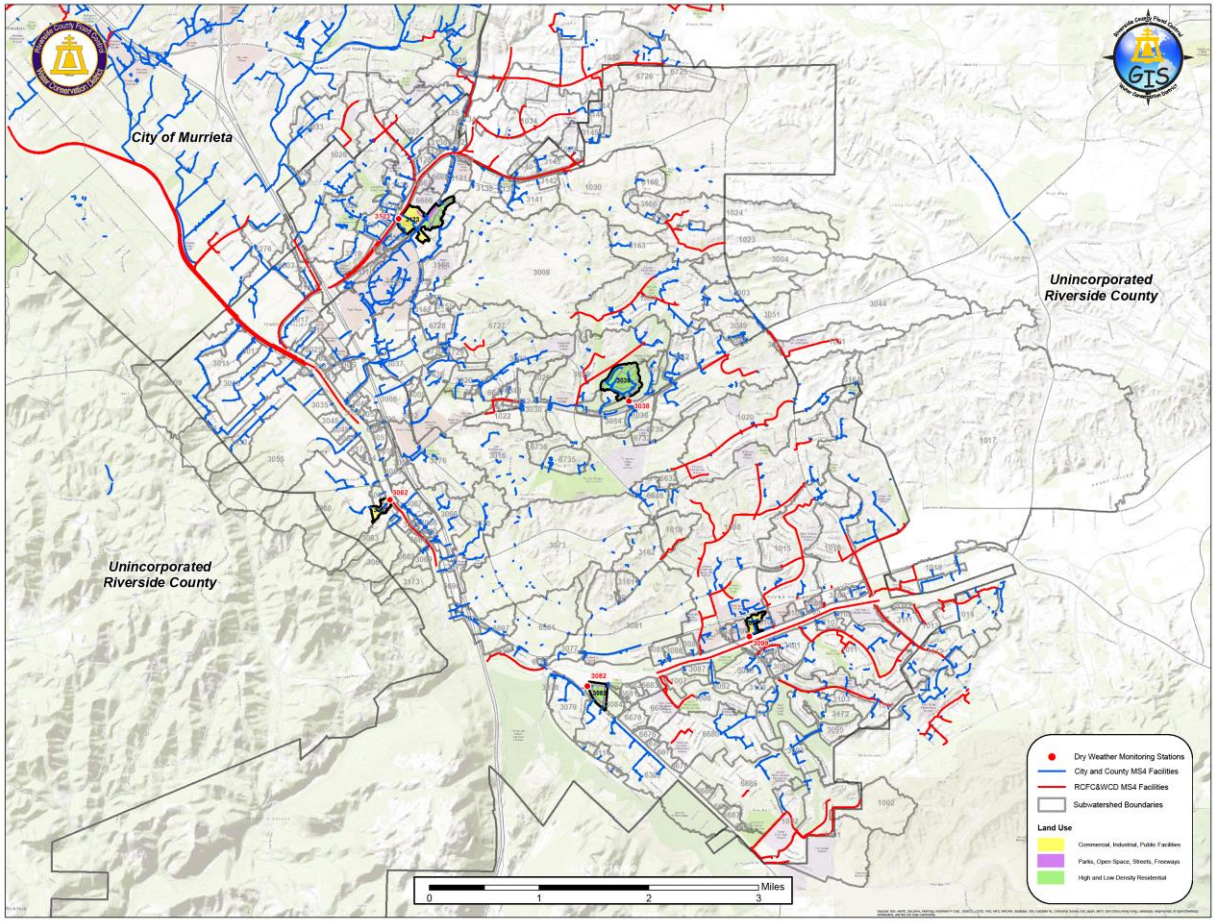

Figure 4-5. City of Temecula Target Areas

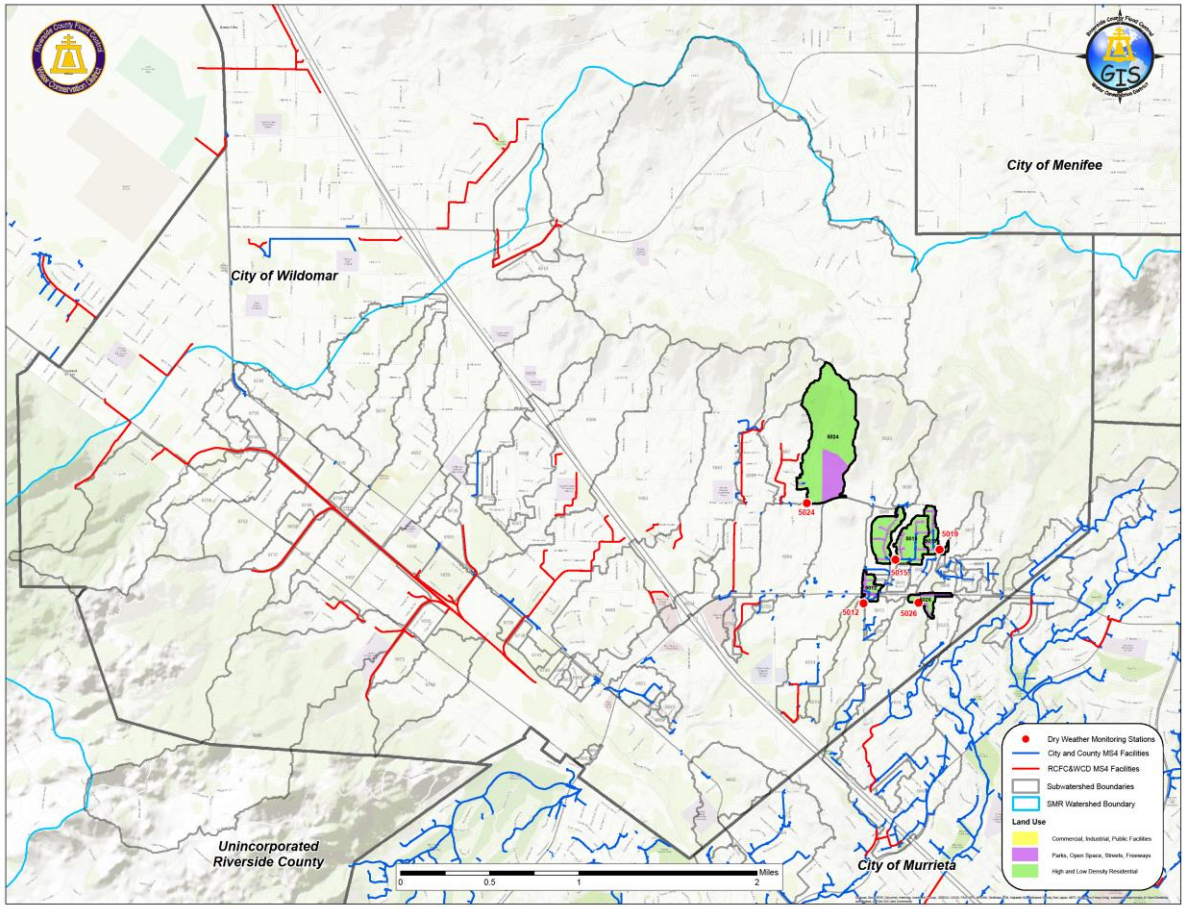

Figure 4-6. City of Wildomar Target Areas

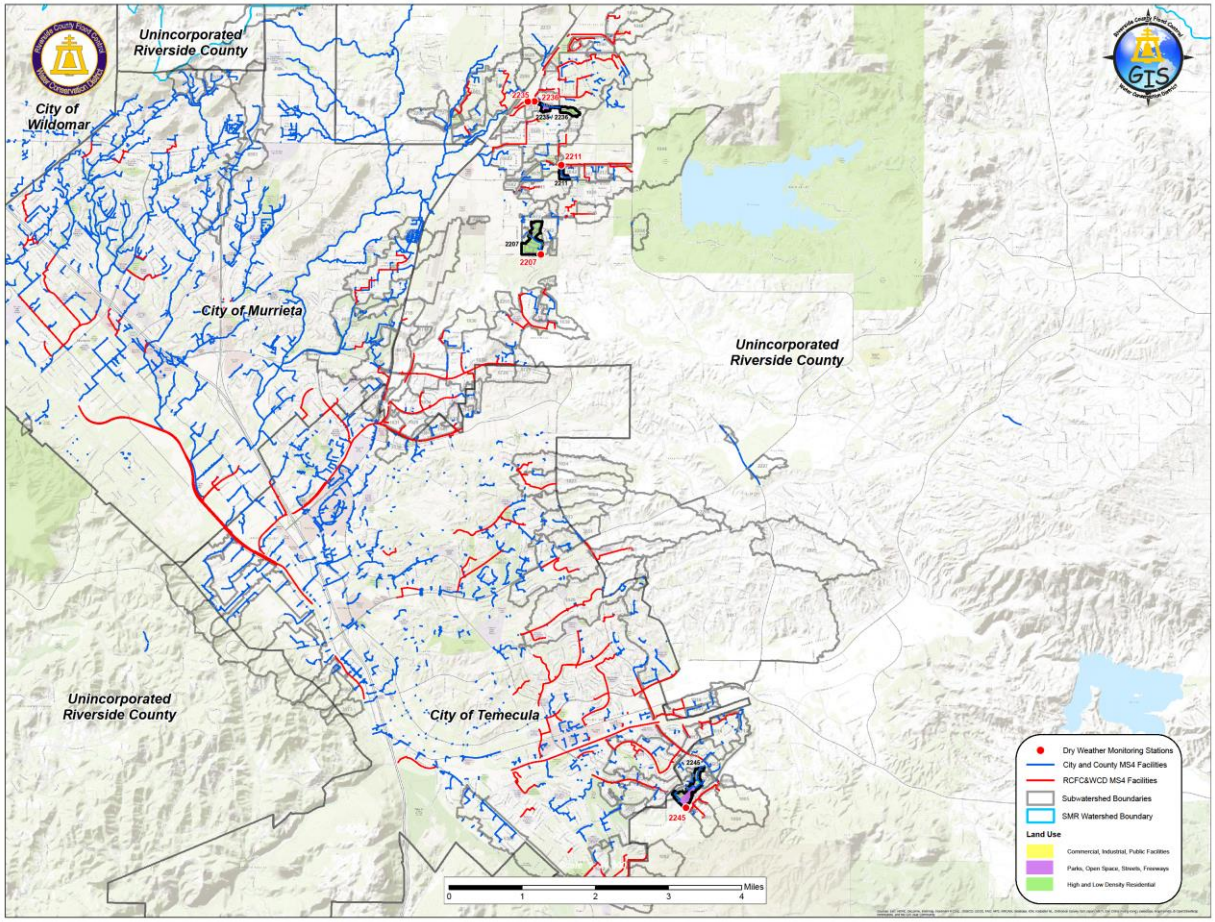
Unincorporated Riverside County
City of Wildomar
City of Murrieta
Unincorporated Riverside County
Unincorporated Riverside County
City of Temecula
2235
2236
2235/ 2236
2211
2211
2207
2207
2246
2245
Dry Weather Monitoring Stations
City and County MS4 Facilities
RCFC&WCD MS4 Facilities
Subwatershed Boundaries
SMR Watershed Boundary
Land Use
Commercial, Industrial, Public Facilities
Parks, Open Space, Streets, Freeways
High and Low Density Residential
Miles
0
1
2
3
4

Figure 4-7. County of Riverside Target Areas

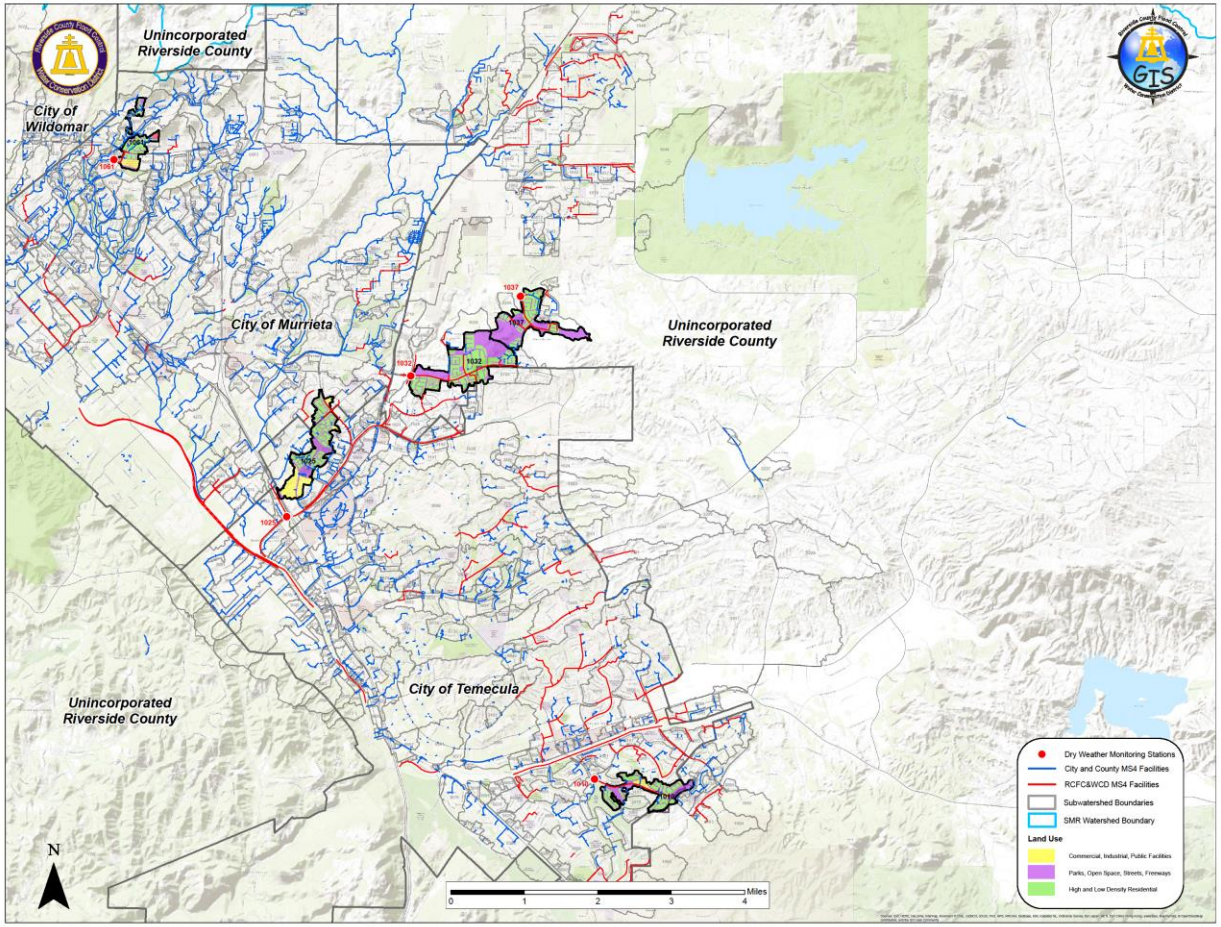

Figure 4-8. Riverside County Flood Control and Water Conservation District Dry Weather Outfall Monitoring Locations

- **Implement Enhanced JRMP/LIP Strategies in Target Areas –** Strategy implementation will include enhanced JRMP strategies that address Permit Provision B.3.b.(1)(a)(i)-(vi). Enhanced strategies are specific, locally appropriate strategies, focused in target areas where there are potential sources of nutrients contributing flows to the ~~storm drain~~MS4~~ system~~.
    - Each Copermittee will implement enhanced JRMP/LIP strategies within their target areas. Each Copermittee has identified an initial set of enhanced strategies within applicable JRMP programs that focus on the nutrient sources within their jurisdiction, summarized in **Table 4-6** through **Table 4-11**.
    - Details of the enhanced JRMP strategies selected by each Copermittee are included in their jurisdictional strategies tables.
- **Implement Optional Jurisdictional/Optional WMA if triggered –** The Copermittees will employ an adaptive approach to implement and evaluate strategies. The Copermittees have developed optional watershed strategies that, if triggered and resourced, would be implemented through coordination amongst the Copermittees. At the time of each update of the ~~Water Quality Improvement Plan~~WQIP (not less than every five years), assessments will be made regarding the degree of implementation of identified strategies versus the measured progress toward interim and final goals. If the percent of implementation is significantly higher than the percentage of the final goal achieved, jurisdictional strategies may be modified, additional enhanced strategies may be selected, or optional strategies (jurisdictional or WMA) may be triggered.

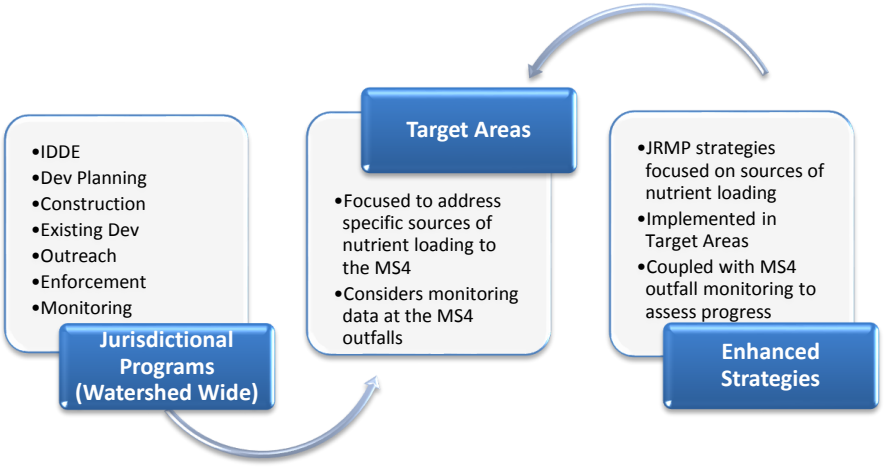

Figure 4-9. Initial Strategy Selection and Implementation, 2018 - 2023

In summary, the strategies can be categorized into three types:

1. Strategies building on the required JRMP elements in Provision E of the Permit. These include the JRMP requirements, as well as modifications and enhancements within existing programs to provide a more focused approach to specifically address sources contributing to nutrient loading and eutrophication;
2. Optional jurisdictional strategies designed to address nutrient loading and eutrophication that may be necessary to achieve goals; and
3. Optional WMA strategies involving cooperation amongst two or more Copermittees or the City of Menifee working together to address nutrient loading and eutrophication.

The strategies include suites of programmatic (i.e., non-structural) and structural BMPs that are expected to improve conditions within the watershed. The Copermittees and the City of Menifee have placed an emphasis on selecting strategies that achieve multiple-pollutant reductions, and, thus, are effective at addressing other priority water quality conditions in addition to nutrients. An overview of the adaptive management options are illustrated in **Figure 4-10**.

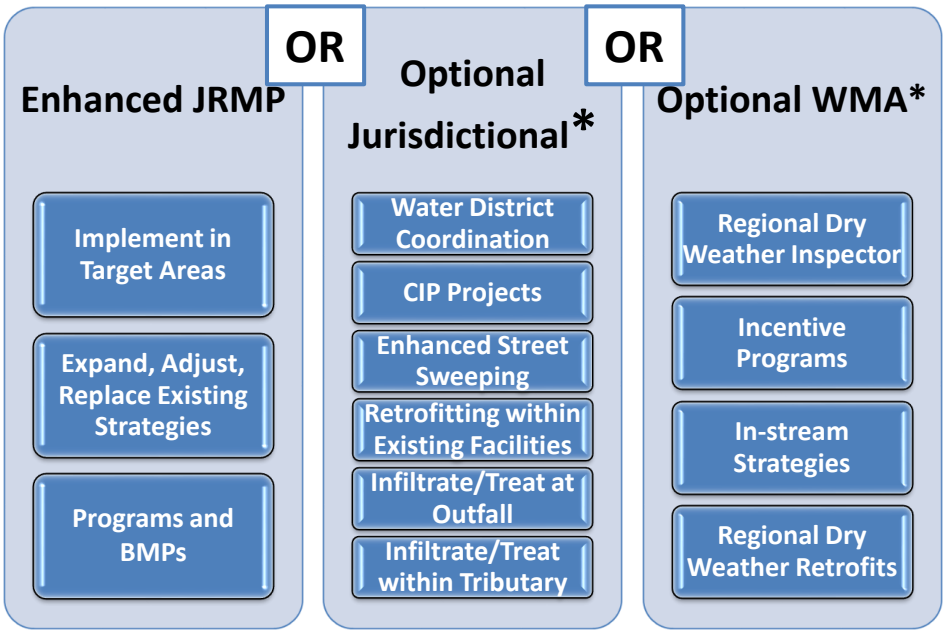

Figure 4-10. Adaptive Management Options (*as triggered and resourced)
[*see Optional Strategies Table and Jurisdictional Tables for Complete List*]

4.2.1.2 Jurisdictional Strategies

The Copermittees and the City of Menifee have identified jurisdictional strategies that will be implemented as part of their JRMP that are designed to effectively prohibit non-storm water discharges to the ~~stormwater conveyance~~MS4~~ system~~, reduce pollutants in stormwater, and protect beneficial uses of receiving waters. Implementation of JRMP strategies and their success will ultimately be measured against the interim and final numeric goals as discussed in **Section 4.1**.

When selecting enhanced JRMP strategies, the most effective BMPs for each program will depend on characteristics of each jurisdiction (e.g., jurisdiction size, types of activities, land uses, sources); therefore, all jurisdictions will not necessarily implement the same strategies nor implement strategies on the same scale. For example, it is expected that all Copermittees and the City of Menifee will have enhanced strategies to focus on residential areas, since that is one of the highest priority sources for all; however, commercial nurseries are only present in some jurisdictions, so only those would have enhanced strategies focused on these sources. From a geographic perspective, enhanced strategies will be focused on areas where they are likely to be most effective. These enhanced strategies will be based on existing JRMP programs and permit requirements and, through the ~~Water Quality Improvement Plan~~WQIP, will be tailored to the conditions within the jurisdiction that may contribute to nutrient loading and eutrophication impacts. As an example, existing development programs implemented under Permit Provision E.5 may be tailored to target specific sources identified as priorities within a jurisdiction, such as residential areas, commercial nurseries, or horse ranches. As discussed in **Chapter 3**, the Copermittees and the City of Menifee identified and prioritized suspected sources that contribute to nutrient loading. The Copermittees and the City of Menifee used that information when developing their jurisdictional programs to focus on the sources that could potentially contribute nutrients through the agencies' ~~storm drain system~~MS4s.

Enhanced strategies are specific, locally appropriate strategies, focused in target areas where there are sources contributing to eutrophication or nutrient loading to the storm drain system.

The Copermittees' jurisdictional programs, per Permit Provisions E2 – E7, and how they address sources of nutrients and eutrophication impacts are described below.

4.2.1.2.1 Illicit Discharge Detection and Elimination [Permit Provision E.2]

The Permit requires the effective prohibition of non-stormwater discharges through implementation of programs under Provision E.2, illicit discharge detection and elimination (IDDE). The IDDE program is intended to minimize the impacts of illicit discharge and connections to receiving waters through investigations, water quality monitoring at ~~storm drain~~MS4 outfalls, and follow-up activities to abate sources of illicit discharges. This program is fundamental in effectively prohibiting non-stormwater discharges. Programs required under this provision are currently being implemented by the Copermittees and will continue. The programs can be enhanced to focus municipal training programs that target key staff regarding the effects of nutrient discharges on receiving waters in the watershed and on identifying sources of illicit discharges (e.g., residential areas, commercial nurseries) that potentially contribute nutrients. The enhanced training efforts will focus on identifying and eliminating non-stormwater flows, since that will reduce nutrient loading and address persistent dry weather flows in outfalls.

While the focus is on nutrients, IDDE programs and enhanced strategies will address multiple pollutant sources and constituents through reduction and elimination of non-stormwater flow. The Copermittees maintain inventories of commercial, industrial, residential, and municipal facilities, all of which can contribute to illicit discharges and nutrient loads. Specifically, Copermittees will focus on inventoried facilities likely to have non-stormwater discharges resulting from over-irrigation, such as commercial facilities, residential areas, and municipal parks. The Copermittees will focus on land uses that meet the following criteria: 1) the land use is likely to be over-irrigated, and 2) areas tributary to a ~~storm drain~~MS4 facility.

Inspections are performed on an as-needed basis as part of the IDDE program, most often in response to complaints from municipal staff or residents, or as a result of field investigations. Inspections will continue to be performed on an as-needed basis, but may be performed on a more frequent basis in response to outfall screening results and assessments in targeted areas aimed at eliminating non-stormwater flows.

4.2.1.2.2 Development Planning [Permit Provision E.3]

The previous municipal stormwater permit in 2010 (Order No. R9-2010-0016) designated specific types of new development and redevelopment projects as "priority development projects" or PDPs, requiring specific site design, source control, and structural treatment control BMPs to be implemented for qualifying projects. The 2010 Permit also required certain PDPs to implement controls to mitigate increases in peak flow and volumes of stormwater. With the 2015 Permit, these requirements were further intensified with the new requirement for full on-site retention of the 24-hour, 85th percentile storm volume. With limited exceptions, new development and redevelopment projects are required to retain or treat and detain stormwater and its associated pollutants (including nutrients) on-site, to reduce the impacts on receiving waters during storm events. In most cases, the post-construction BMPs are also designed to intercept and infiltrate dry weather flows, providing significant pollutant reduction, and often full elimination under ambient conditions. The implementation of baseline Permit requirements for new development and redevelopment projects will mitigate pollutants (including nutrients and other PWQCs) and ensure that these projects do not cause degraded water quality conditions downstream of the project site.

In addition to the baseline requirements, the Copermittees may implement enhanced strategies as part of the Development Planning program that will focus efforts on mitigating sources of nutrients. The enhancements could include modified LID requirements, smart irrigation conditions of approval, and/or revised post-construction guidelines to eliminate dry weather discharges from new development and redevelopment. In addition, development standards and guidelines could be developed or updated to eliminate dry weather discharges; promote swale grading and reduce the use of private area drains directly connected to the curb; and/or require BMPs or catch basins at all site entrances and exits which are sloped towards public right-of-way to ensure that any dry weather run-off is routed to an on-site treatment system. Copermittee BMP design manuals could be amended to address priority sources (e.g., over-irrigation in residential areas) supplemented by internal staff training on updated BMP design manual or other enhancements that target nutrients.

The Copermittees maintain inventories and perform inspections of treatment control BMPs to verify that the required BMPs are constructed properly, maintained appropriately, and operating as designed. Copermittees will continue to inventory and inspect treatment control BMPs as required under Permit Provision E.3. Through this program, it is anticipated that non-stormwater flows (and, therefore, any nutrients in the non-stormwater flows) will be reduced or eliminated

from new development and redevelopment and that nutrients in stormwater will be reduced through biofiltration, retention, or other BMPs. As new development and redevelopment continues, increased amounts of the existing landscape will have treatment control BMPs and contribute less to nutrient loads and other PWQCs identified in **Chapter 2**.

4.2.1.2.3 Construction Management [Permit Provision E.4]

Construction sites have the potential to contribute to nutrient loading primarily through ineffective erosion control that can lead to phosphorous-borne sediment entering the receiving waters. The Copermittees have been implementing construction stormwater programs for several NPDES permit terms. Over this time, agency staff and the construction community have become well trained in construction stormwater management. Additional oversight is required per the State Construction General Permit (Order 2009-0009-DWQ) for sites greater than one acre. With this amount of focus, the limited sources of nutrients related to construction are well addressed via the existing Permit requirements. For this reason, the Copermittees will focus on the baseline programs as required under the 2013 Permit. These requirements include a set of minimum BMPs for construction sites, articulated in each Copermittees' JRMP, and routine inspections of construction sites to ensure that BMPs are implemented as required. Where necessary, enforcement measures may be used to gain compliance.

4.2.1.2.4 Existing Development Management [Permit Provision E.5]

The Existing Development Management program requires comprehensive inventories, periodic inspections, and enforcement for existing development (i.e., commercial, industrial, municipal, and residential) to ensure that BMPs are implemented to reduce water quality pollutants and runoff. This program also includes municipal operations and maintenance practices, such as storm drain cleaning and street sweeping. The source prioritization in **Chapter 3** will be used in conjunction with Copermittee inventories to identify and target specific sources potentially contributing to the eutrophication impacts and nutrient loading. Existing development programs will be implemented per Permit Provision E.5 and may also include enhanced strategies (e.g., increased inspection frequencies for facilities, with the potential to contribute nutrients, included in the inventories). Select strategies within the Existing Development Management Program that the Copermittees identified for addressing nutrients, and other priority water quality conditions, are described below.

4.2.1.2.4.1 Street Sweeping

Street and median sweeping is a common practice for reducing street sediment and vegetative and anthropogenic debris, and, therefore, urban runoff pollutant loads from transportation land uses. High-efficiency street sweeping equipment, such as regenerative air sweepers or vacuum assisted sweepers can significantly increase the amount of sediment removed from roadways. Street and median sweeping within the watershed may be an effective program for managing the sediment transport of pollutants (e.g. nutrients, metals, oil and grease, bacteria) into the ~~storm drain system~~MS4. Street sweeping BMPs provide water quality benefits for multiple pollutants of concern through transportation-related source load mitigation and the removal of multiple associated pollutants. Street sweeping is currently implemented per each Copermittee's JRMP, but may also be selected as an enhanced strategy and implemented at higher frequencies within targeted areas. Street sweeping addresses improved areas of existing development (e.g., residential, commercial, industrial, municipal areas with curb and gutter).

4.2.1.2.4.2 Existing Development Inspections

The source evaluation and prioritization in **Chapter 3** included inventories of potential sources contributing to eutrophication impacts and/or nutrient loading. Specific potential sources include industrial and commercial facilities, especially those with irrigation systems, residential areas, municipal facilities, such as parks and recreation areas, onsite wastewater treatment systems, sanitary sewer systems, streets, and landfills. The Copermittees could choose to enhance their inspection programs to focus on sources that potentially contribute to nutrient loading within the selected target areas as part of their enhanced JRMP Programs. The enhancements may include increasing inspection frequencies at facilities identified to be potential sources of nutrients within the target areas, beyond the minimum requirements in the Permit of once every five years.

In addition, the focus of both residential and commercial/industrial programs will be targeted toward identifying and eliminating over-irrigation to better address nutrient loading from irrigation runoff. Areas identified as sources will be targeted through tailored and enhanced inspections. Through inspections, the Copermittees can conduct outreach to home and business-owners about smart irrigation controllers and/or other financial incentive programs that decrease watering volume. Effective methods to reduce irrigation runoff from residential, commercial, and agriculture may include development of targeted outreach materials, increased inspections surveys, punitive measures for overwatering, tiered water rates, or distribution of smart irrigation controllers and/or other financial incentive programs that decrease watering volume. Irrigation runoff reduction programs can also be integrated with BMPs that encourage landscaping and smart gardening practices that reduce the load of fertilizers and chemicals that enter stormwater, such as integrated pest management, reducing fertilizer and pesticide use, xeriscaping, and turf conversion. To facilitate the use of these source control approaches, ordinances, education and outreach, and financial incentives may be implemented. Increased irrigation runoff controls and incentives in commercial and residential land uses could result in pollutant load reductions at the ~~storm drain~~MS4 outfalls.

Additionally, areas of existing development where erosion is identified as a potential problem will be evaluated and addressed as appropriate since nutrient loads can increase as a function of sediment transport during wet weather events.

4.2.1.2.4.3 Inspection of Onsite Wastewater Treatment Systems (OWTS)

Leaking or failing septic systems may contribute to nutrient loads and other PWQCs (e.g., bacteria) during dry and wet weather conditions. Approximately 1,500 acres of land within the watershed are known to contain septic systems. In selected targeted areas, the Copermittees could enhance their residential programs to add a focus on failing septic systems (e.g., focused internal training for field staff). An effective septic survey and enforcement program addresses nutrients and other PWQCs by preventing the transport of nutrients, sediment, and bacteria from failing OWTS to ~~storm drain~~MS4s and surface waters.

4.2.1.2.5 Enforcement Response Plans [Permit Provision E.6]

The use of enforcement actions to correct violations will support existing programs and enhanced strategies across all JRMP programs and has been shown to increase their effectiveness. Enforcement activities, such as inspections or escalating enforcement responses to compel compliance with statutes, ordinances, permits, orders, and other requirements, could significantly increase the success of other BMP programs (e.g., IDDE, existing development). Escalating

enforcement actions will be implemented in accordance with each Copermittee's enforcement response plan, developed per Permit Provision E.6 and included in their JRMP.

4.2.1.2.6 Public Education and Participation [Permit Provision E.7]

The Public Education and Participation programs are an integral part of program implementation, targeting key internal (i.e., Copermittee staff) and external (i.e., public) audiences that may contribute to nutrient loading or other PWQCs identified within the watershed. Public education and participation is an important approach to heighten watershed stewardship and mindfulness of water quality. The Copermittees develop and distribute outreach materials; perform outreach presentations at public events; provide outreach to large residential properties and mobile landscaping businesses; and provide educational workshops. More recently, some Copermittees are beginning to use social media as an outreach mechanism. The enhanced strategies related to education and participation will focus on sources of nutrients (e.g., nurseries, homeowners' associations, septic systems), but will provide a multi-pollutant benefit in promoting general water quality awareness. Examples of outreach strategies that Copermittees may implement to address nutrient loading and potential sources include:

- Incentive programs (e.g., for irrigation runoff reduction in coordination with water districts);
- Encouraging BMPs that include landscaping and smart gardening practices that reduce the load of fertilizers and chemicals that enter stormwater; and
- Promoting integrated pest management by reducing fertilizer and pesticide use, increasing xeriscaping, and implementing turf conversion.

Programmatic approaches, primarily non-structural BMP implementation, through the JRMP programs and enhanced ~~Water Quality Improvement Plan~~WQIP strategies, form the basis for anticipated improvements in the watershed. These programs are focused on the key sources identified in **Chapter 3**. The key sources for each Copermittee and the relative loading of nutrients from those sources to the Copermittee's ~~storm drain~~MS4s provide the foundation for strategy selection. The priority sources and relative nutrient loading are summarized for each Copermittee in **Table 4-5**.

Overall, the identified strategies for the SMR watershed include robust jurisdictional programs that include baseline programs and enhanced strategies to minimize, to the maximum extent practicable, the effects of nutrients discharged through ~~storm drain~~MS4 conveyance~~ system~~s to receiving waters. Copermittees will continue to implement their baseline JRMPs per Permit Provisions E.1 – E.8. Due to their different programs under the Santa Ana MS4 Permit, the City of Menifee will implement strategies based on their LIP. Within target areas, ~~Upper~~ Middle SMR Subwatershed Copermittees have selected enhanced strategies. Copermittee strategies are summarized in **Table 4-6** through **Table 4-11**.

Table 4-5. Summary of Key Sources of Nutrients by Agency

Copermittee	Key Sources	Total Nitrogen[1]	Total Phosphorus[1]
City of Menifee	Residential Areas/Activities Horse Ranches (Residential) Commercial Facilities	N/A[2]	N/A[2]
City of Murrieta	Residential Areas/Activities	66.20%	64.20%
	Commercial Facilities	10.00%	9.70%
	Orchards, Vineyards, Nurseries	5.90%	5.80%
City of Temecula	Residential Areas/Activities	71.70%	70.50%
	Commercial Facilities	13.20%	13.00%
	Industrial Facilities	7.50%	7.40%
City of Wildomar	Residential Areas/Activities	67.40%	61.00%
	Horse Ranches	3.70%	3.40%
	Commercial Facilities	3.60%	3.30%
County of Riverside	Residential Areas/Activities	35.60%	33.60%
	Orchards, Vineyards, Nurseries	27.60%	26.30%
	Horse Ranches	10.60%	10.00%
RCFCWCD	Residential Areas/Activities Commercial Facilities Orchards, Vineyards, Nurseries	N/A[3]	N/A[3]

1. As a percentage of the total loading to the Copermittee's ~~storm drain system~~MS4.
2. Under the Regional Water Board Designation Letter dated October 26, 2015 Menifee is required to participate in the development and implementation of the SMR WQIP and the implementation of any applicable TMDL. However, no specific load allocations have been assigned to Menifee. Menifee was not included in the modeling efforts. Because Menifee only has a small jurisdictional area in the WMA (less than 2 square miles), Menifee will participate in the overall load reduction by implementing its WQIP and LIP strategies.~~Based on land area and potential sources of nutrients, for the purposes of the Water Quality Improvement Plan development, Menifee is considered to be a less than significant contributor to nitrogen and phosphorus loading. If determined necessary by the SMRNIG, loading estimates may be developed in the future, at which time, they will be included within the Water Quality Improvement Plan through the adaptive management process.~~
2. ~~3.~~ Nitrogen and phosphorus loads for the RCFCWCD were not calculated or included in the SMRNIG model. Therefore, for the purposes of the W Q I P development, RCFCWCD is considered to be a less than significant contributor to nitrogen and phosphorus loading. Nonetheless, the RCFCWCD will implement their JRMP, including the strategies identified in Table 4-11 to address the HPWQCs and PWQCs. If determined necessary by the SMRNIG, loading estimates may be developed in the future, at which time, they will be included within the WQIP through the adaptive management process.

~~Based on land area and potential sources of nutrients, for the purposes of the Water Quality Improvement Plan development, RCFCWCD is considered to be a less than significant contributor to nitrogen and phosphorus loading. If determined necessary by the SMRNIG, loading estimates may be developed in the future, at which time, they will be included within the Water Quality Improvement Plan through the adaptive management process.~~

As programs and progress towards goals are assessed, Copermittees and the City of Menifee will implement an iterative process of implementing additional enhanced strategies, followed by optional jurisdictional and optional WMA strategies as necessary to achieve their goals. Structural solutions are included as optional jurisdictional and optional WMA strategies and will be considered through the adaptive management process as triggered.

Table 4-6. Jurisdictional Strategies Selected to Address Eutrophication Impacts in the ~~Upper~~ Middle SMR Subwatershed – City of Menifee

(Note: Only a small portion of the City of Menifee totaling less than 1.3 square miles is located in the Santa Margarita River Watershed Management Area. This area consists primarily of residential area, the majority of which is rural residential properties larger than 2 acres.)

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Illicit Discharge, Detection, and Elimination (IDDE) Program (Prov E.2)															
IDDE-1	Entire Jurisdiction	Illicit Discharges, mainly residential (e.g. discharges related to equestrian and livestock activities) and commercial (e.g. nursery activities) for the SMR WMA	Implement an Illicit Connection and Illegal Discharge (IC/ID) Program. LIP requirements include: maintaining an MS4 map, using municipal personnel and contractors to identify and report illicit discharges, maintaining a hotline for public reporting of illicit discharges, monitoring MS4 outfalls, and investigating and addressing any illicit discharges.	Both	X	X		X	X	X	X	X	X	Continuous	The City of Menifee conducts outfall monitoring per the Santa Ana MS4 Permit requirements. City staff receive storm water complaints directly by phone and email, and from the regional reporting hotline. City and contract staff work to immediately address and eliminate illegal discharges. Refer to LIP Section 4.
Development Planning (Prov E.3)															
DEV-1	Entire Jurisdiction	New and redevelopment of all land uses	For all development projects, administer a program to ensure implementation of source control BMPs to minimize pollutant generation at each project and implement LID BMPs to maintain or restore hydrology of the area, where applicable and feasible.	Both	X	X	X	X	X	X	X	X	X	Continuous	All development projects are required to implement minimum BMPs. The City of Menifee follows the development requirements outlined in the Santa Ana MS4 Permit. Refer to Local Implementation Plan (LIP) Section 6.
DEV-2	Entire Jurisdiction	New and redevelopment of all land uses	For Priority Development Projects, administer a program requiring implementation of structural BMPs to control pollutants and manage hydromodification. Includes confirmation of design, construction, and maintenance of structural BMPs.	Both	X	X	X	X	X	X	X	X	X	Continuous	All Priority Development Projects are required to implement and maintain post construction BMPs. The City of Menifee follows the development requirements outlined in the Santa Ana MS4 Permit. Priority Development Projects that require a Water Quality Management Plan (WQMP) must follow the guidance of the Santa Ana Watershed WQMP. Refer to LIP Section 6.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Construction Management (Prov E.4)															
CON-1	Entire Jurisdiction	Construction waste management	Administer a program to oversee implementation of BMPs during the construction phase of land development. Includes inspections at an appropriate frequency and enforcement of requirements. Menifee does not have any known agricultural land in the SMR WMA. Therefore, it is not anticipated that any construction projects will involve conversion of agricultural land.	Both		X		X	X			X	X	Continuous	All construction sites are required to implement minimum BMPs. Inspections are tracked to ensure that they meet the minimum inspection frequencies required by the Santa Ana MS4 Permit. **Frequencies:** High priority sites are inspected at least once monthly during the rainy season. Medium priority sites are inspected at least twice during the rainy season. Low priority sites are inspected at least once during the rainy season. All sites are inspected as-needed during the dry season. Refer to LIP Section 7.
Existing Development Management (Prov E.5)															
EXIST DEV-1	Entire Jurisdiction	Commercial - general, Commercial - nurseries, Industrial	Administer a program to require implementation of minimum BMPs for industrial and commercial development that are specific to the facility, area types, and pollutants generated, as appropriate. Includes inspection of existing development at appropriate frequencies.	Both	X	X		X	X	X	X	X	X	Continuous	All industrial and commercial facilities are required to implement minimum BMPs. Inspections are tracked to ensure that they meet the minimum inspection frequencies required by the Santa Ana MS4 Permit. **Frequencies:** High priority facilities are inspected at least once per year. Medium priority sites are inspected at least once every other year. Low priority sites are inspected at least once every five years (during a Permit term). Refer to LIP Section 8. Menifee does not have any known agricultural land within the Santa Margarita Watershed. However, if inspectors identify any facilities engaged in agricultural or livestock activities that are required to file for coverage under an agricultural conditional waiver program, these facilities will be reported to Regional Board staff.
EXIST DEV-2	Entire Jurisdiction	Industrial	Notify Regional Board of industrial businesses subject to the Industrial General Permit so that the businesses may obtain coverage as required.	Both	X	X		X	X	X	X	X	X	Continuous	The City of Menifee will share inspection results with Regional Board staff and notify of non-filers or potential noncompliance with other IGP requirements, especially requirements specifically related to discharges of nutrients. Refer to LIP Section 8

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
EXIST DEV-3	Entire Jurisdiction	Municipal	Administer a program to require implementation of minimum BMPs at municipal facilities. Includes inspection of facilities at appropriate frequencies.	Both	X	X		X	X	X	X	X	X	Continuous	All municipal facilities are required to implement minimum BMPs. Inspections are tracked to ensure that they meet the minimum inspection frequencies required by the Santa Ana MS4 Permit. **Frequency:** All fixed municipal facilities and field operations identified in Table 5-3 of the Drainage Area Management Plan (DAMP) are required to be inspected annually. The City also inspects its public parks annually to ensure that the parks are not a contributor to storm water pollution. Refer to LIP Section 5.
EXIST DEV-4	Entire JurisdictionCollaboration with RCFCWCD	Residential	Promote and encourage implementation of minimum BMPs at residential areas.	Both	X	X		X	X	X	X	X	X	Continuous	The City of Menifee participates in regional activities to facilitate the proper collection and management of used oil, toxic and hazardous materials, and other household wastes. The City also promotes the Riverside County Watershed Protection Program, which provides educational materials for landscaping and gardening and pet owners, among others. Refer to LIP Section 9.
EXIST DEV-5	Entire Jurisdiction	Residential - (Specifically Equestrian and Livestock Activities)	Require proper management of animal waste by residents to prevent transport of wastes and wash water offsite.	Both	X	X						X	X	Continuous	The City of Menifee has adopted a Manure Management and Disposal Ordinance (Order 2013-131U) to address the threat to water quality posed by the accumulation of manure on properties. The ordinance outlines best management practices and establishes regulations for the proper handling, temporary storage, collection, and disposal of manure in the City of Menifee. Refer to LIP Section 3.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
EXIST DEV-6	Entire Jurisdiction Collaboration with RWQCB	Streets within all land uses	Implement operation and maintenance activities (inspection and cleaning) for MS4 and related structures (catch basins, storm drain inlets, open channels, detention basins, etc.) for water quality improvement.	Both	X	X			X			X	X	Continuous	The City of Menifee inspects catch basins annually before the rainy season and cleans basins when accumulated materials are present. Large storm drain pipes, as well as open channels and detention basins in the City are owned and maintained by the Riverside County Flood Control and Water Conservation District. Refer to LIP Section 5.
EXIST DEV-7	Entire Jurisdiction Collaboration with County of Riverside Transportation Dept.	Streets within all land uses	Implement operation and maintenance activities for streets.	Both	X			X	X	X	X	X	X	Continuous	Street sweeping is done on selected routes twice per month by the County of Riverside. Refer to LIP Section 5.
Enforcement Response Plans (Prov E.6)															
ENF-1	Entire Jurisdiction	Illicit Discharges, Development, Construction, Industrial, Commercial, Municipal, Residential	Implement escalating enforcement responses to compel compliance with ordinances, permits, contracts, orders, and other requirements for ICID, development planning, construction management, industrial/commercial, municipal, and residential development (including residential equestrian and livestock activities)	Both	X	X		X	X	X	X	X	X	Continuous	The City has established the legal authority to require BMP implementation, including preventing illegal discharges, through the Stormwater Ordinance (Chapter 15.01 of the Municipal Code). When noncompliance is noted, the City initiates an enforcement process to bring about correction. Refer to LIP Section 3.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Public Education and Participation (Prov E.7)															
PUB ED-1	Entire Jurisdiction Collaboration with RCFCWCD	Industrial, Commercial, Municipal, and Residential	Implement a public education and participation program to promote and encourage development of programs, management practices, and behaviors that reduce the discharge of pollutants in storm water prioritized by high-risk behaviors, pollutants of concern, and target audiences.	Both	X	X		X	X	X	X	X	X	Continuous	Direct education is provided through interaction with the public during inspections, complaint response investigations, and plan review comments. The City educates businesses and residents about sources of pollutants, including waste management, erosion prevention (sediment), proper fertilizer use (nutrients), and discharge prevention, during inspections and complaint response investigations. Educational materials on a variety of storm water topics are available on the Riverside County Watershed Protection program website. This includes information related to residential gardening and overwatering prevention tips that can be shared with residents in the Santa Margarita Watershed. Refer to LIP Section 10 and DAMP Section 10 for details on the regional public outreach program.
PUB ED-2	Entire Jurisdiction Collaboration with RCFCWCD	Industrial, Commercial, Municipal, Residential, Illicit Discharges, Development, Construction.	Provide municipal staff training.	Both	X	X		X	X	X	X	X	X	Continuous	Staff are trained on BMP requirements and implementation. Target audiences include Engineering, Public Works, construction inspectors and plan reviewers. Training may be internal or provided by Riverside County Flood Control and Water Conservation District. Refer to LIP Section 11.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Optional Jurisdictional Strategies															
OPT-1	Target Area(s)	Residential	Develop and implement a residential inspections program. Areas covered would include mainly rural residential and some urban residential.	Both	X	X		X	X	X	X		X	FY18/19-Continuous	**Triggers:** The City plans to implement this strategy upon approval of the WQIP and will continue annual implementation provided the following trigger is met: 1) staff resources are identified and secured. **Approach:** The Santa Ana MS4 Permit does not require residential storm water inspections. However, since the majority of the City's 1.3 square miles within the Santa Margarita Watershed is rural residential, the City will develop and implement an annual residential drive-by inspection program to identify illicit connections, illegal discharges, and other potential pollutant discharges within residential areas in the Santa Margarita River Watershed. Inspectors will also look for evidence of improper BMP implementation related to manure management (see Strategy EXIST DEV-5) in rural residential areas with equestrian and livestock activities. The City will establish Standard Operating Procedures and develop an inspection checklist as part of the residential inspection program. **Funding:** Funding and resources have been secured for FY18. Funding for future fiscal years is contingent on annual budget approval by City Council. Funds anticipated to come out the general fund.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
OPT-2	Target Area(s)	Residential	Enhance public education and outreach for residents.	Both	X	X		X	X	X	X			Once triggered, as resources allow	**Triggers:** This strategy may be implemented at the City's discretion if the following triggers are met: 1) significant storm water deficiencies are observed during residential inspections in a given year, 2) it has been determined by City of Menifee staff through adaptive management that implementation is necessary, and 3) staff resources are identified and secured. **Approach:** Develop and implement a targeted outreach and education program for residents in the Santa Margarita Watershed based on the results of annual residential inspections. Educational topics will be based on issues identified during inspection (e.g. If equestrian washing were noted as an issue during inspection, educational materials targeting proper washing BMPs could be developed). Distribution methods and media type (i.e. online vs. print) to be determined based available resources and inspection staff input. **Funding:** Funding for future fiscal years is contingent on annual budget approval by City Council. Potential funding sources anticipated to be general fund and/or grant sources.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
OPT-3	Target Area(s)	Commercial - nurseries and animal facilities	Increase inspection frequency for highest nutrient pollutant potential businesses within the Santa Margarita Watershed.	Both	X	X		X	X	X	X			Once triggered, within 1 year (contingent upon timing of annual inventory prioritization)	**Triggers:** This strategy may be implemented at the City's discretion if the following triggers are met: 1) An interim goal has not been met, 2) it has been determined by City of Menifee staff through adaptive management that implementation is necessary, and 3) staff resources are identified and secured. **Approach:** Commercial non-agricultural animal facilities and commercial nurseries are generally assigned a medium priority, which translates to a stormwater inspection at least every other year. Under this strategy, if these businesses are identified as having high potential for contributing nutrients to the Santa Margarita Watershed, they would be elevated to high priority, increasing the minimum inspection frequency to once per year. **Funding:** Funding for future fiscal years is contingent on annual budget approval by City Council. Anticipated source would be the general fund.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
OPT-4	Target Area(s)Collaboration with County of Riverside Transportation Dept.	Open Space/Stream Restoration	Coordinate with Riverside County Transportation during review of an encroachment permit to support an integrated mitigation project.	Wet	X	X	X	X	X	X	X			Once triggered. Overall implementation timeline dependent on project schedule as determined by County of Riverside Transportation	**Triggers:** This strategy will be implemented if the following trigger is met: 1) Riverside County Transportation submits project application for encroachment permit to the City of Menifee. **Approach:** Riverside County Transportation is planning an integrated mitigation project which would result in the creation of over 1,500 linear feet of new intermittent channel and seasonal wetlands. The 75-acre site is located south of Scott Road and west of Briggs road in the County of Riverside. The project will preserve, restore and enhance the existing un-named creek (which is tributary to Warm Springs Creek), ephemeral drainages, and associated wetland habitats. The area is immediately outside of the City jurisdiction; however, the project will require infrastructure in the City of Menifee. Because of that, the City will work closely with Riverside County Transportation to facilitate the approval of an encroachment permit. **Funding:** Project funding to be secured by County of Riverside. Per County, the project is partially funded with CFD funds, with the remainder yet to be determined.

Table 4-7. Jurisdictional Strategies Selected to Address Eutrophication Impacts in the ~~Upper~~ Middle SMR Subwatershed – City of Murrieta

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Illicit Discharge, Detection, and Elimination (IDDE) Program (Prov E.2)															
IDDE-1	Entire Jurisdiction	Residential, commercial, nurseries, industrial, parks and recreation, open space	Enhanced municipal training programs and curriculum targeting key field staff. Programs will focus on the water quality improvement plan, HPWQC, NNE requirements as related to illicit discharges and elimination of dry weather flows.	Dry Weather	X	X		X	X	X	X		X	Upon WQIP acceptance, FY 18-19	Public Works, CSD field staff and Code Enforcement will be provided enhanced municipal training. This training would also include training on the system used to record/track illicit discharges. GIS map to be developed and updated with illicit discharges database.
IDDE-3	Entire Jurisdiction	Residential, commercial, nurseries, industrial, parks and recreation, open space	Plot IDDE incidents in GIS to identify clusters where community outreach and workshops would be effective in eliminating dry weather flows.	Dry Weather	X	X		X	X	X	X		X	Upon WQIP acceptance, FY 19-20	Coordinate with GIS to create a layer that show IC/ID incidents based on information from reporting/tracking system.
Development Planning (Prov E.3)															
DEV-1	Entire Jurisdiction	Residential, commercial	Smart irrigation conditions of approval	Dry Weather	X	X		X		X	X	X	X	Ongoing	Condition PDPs to demonstrate that the irrigation controller and heads are set so irrigation runoff does not enter the street or ~~storm drain system~~MS4s.
DEV-2	Entire Jurisdiction	Residential, commercial	BMP Design Manual Training	Wet Weather	X	X		X		X	X		X	Upon WQIP acceptance, FY 17-18	Provide BMP Design Manual training to all applicable staff.
Construction Management (Prov E.4)															
CON-1	Entire Jurisdiction	Residential, commercial	Provide internal staff training related to construction storm water management	Dry and Wet Weather	X	X		X		X	X		X	Upon WQIP acceptance, FY 17-18	Internal staff to attend construction storm water management trainings.
Existing Development Management (Prov E.5)															
ED-6	Entire Jurisdiction	Residential, commercial, nurseries, industrial, parks and recreation, open space	Enhanced municipal training programs and curriculum targeting inspections staff. Programs will focus on the water quality improvement plan, HPWQC, NNE requirements as related to the inspections programs and specific nutrient issues.	Dry Weather	X	X		X	X	X	X		X	Upon WQIP acceptance, FY 18-19	Inspections staff will be provided enhanced municipal training. This training would also include training on the system used to record/track illicit discharges. GIS map to be developed and updated with illicit discharges database.
ED-3	Focus Areas Only	Commercial, industrial, parks and recreation, open space	Enhance commercial / industrial / municipal inspections programs to focus on irrigation systems.	Dry Weather	X	X		X		X	X			Upon WQIP acceptance, FY 20-21	Identify target areas through field screenings and annual inspections. Increase inspection frequencies as necessary.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
ED-4	Focus Areas Only	Residential	Enhance residential inspections programs to focus on over-irrigation.	Dry Weather	X	X		X		X	X			Upon WQIP acceptance, FY 20-21	Identify target areas through field screenings and annual inspections. Increase inspection frequencies as necessary.
ED-2	Focus Areas Only	Residential, commercial, nurseries	Increase inspection frequencies at facilities identified on Copermittee inventories to be sources of nutrients	Dry Weather	X	X		X	X	X	X			Upon WQIP acceptance, FY 21-22	Identify target areas through field screening and annual inspections. Increase inspection frequencies as necessary. If any sources of nutrients are identified, i.e. nurseries, inspections would be appropriately conducted.
ED-7	Focus Areas Only	Residential, commercial, nurseries	Enhanced enforcement program targeting identified, problematic, sources of nutrients	Dry Weather	X	X		X	X	X	X			Upon WQIP acceptance, FY 21-22	Identify problematic areas through field screening and annual inspections. Increase follow up efforts as necessary.
Enforcement Response Plans (Prov E.6)															
ERP-1	Entire Jurisdiction	Residential, commercial, industrial, nurseries	Implement escalating enforcement responses to compel compliance with statutes, ordinances, permits, contracts, orders, and other requirements for IDDE, development planning, construction management, and existing development in the Enforcement Response Plan.	Dry Weather	X	X		X		X	X	X	X	Ongoing	Escalating enforcement strategies will initially start with a Notice of Violation, written or verbal, a follow up, and if violator is not working towards compliance, the Administrative Citation process will begin increasing fines for non-compliance.
Public Education and Participation (Prov E.7)															
PubEd-2	Focus Areas Only	Residential	Enhanced outreach programs targeting homeowner's associations/residential communities.	Dry Weather	X	X		X	X	X	X			Upon WQIP acceptance, FY 22-23	Identify target areas amongst homeowner's associations/residential communities. Distribute targeted informational brochures/pamphlets.
Optional Jurisdictional															
OPT-1	Focus Areas Only	Residential	Water District Coordination - Coordination with Water Districts to pinpoint problem sources of dry weather flows.	Dry Weather	X	X		X		X	X			Upon WQIP acceptance and if triggered	This optional strategy may be triggered if 1) an interim dry weather goal has not been met; 2) it is determined by the City that this strategy would effectively address dry weather flows; and 3) available grant funding. Implementation of strategy would occur the following fiscal year after obtaining necessary approvals and procurement of funding.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
OPT-2	Focus Areas Only	Residential	Water District Coordination - Coordination with Water Districts on inspection and enforcement efforts.	Dry Weather	X	X		X		X	X			Upon WQIP acceptance and if triggered	This optional strategy may be triggered if 1) an interim dry weather goal has not been met; 2) it is determined by the City that this strategy would effectively address dry weather flows; and 3) available grant funding. Implementation of strategy would occur the following fiscal year after obtaining necessary approvals and procurement of funding.
OPT-3	Entire Jurisdiction	Municipal, parks and recreation	Establish semiannual meetings among Engineering and Community Services District to evaluate opportunities for improving water quality at MS4s, streets, parking lots, parks and other landscaped areas.	Dry and Wet Weather	X	X		X	X	X	X			Upon WQIP acceptance and if triggered	This optional strategy may be triggered if 1) an interim dry weather goal has not been met; and 2) it is determined by the City that this strategy would effectively address dry weather flows. Implementation of strategy would occur 6 months after it has been determined that an interim dry weather goal has not been met.
OPT-4	Entire Jurisdiction	Residential, commercial, nurseries, industrial, parks and recreation, open space	Establish semiannual meetings to discuss potential ordinance changes.	Dry and Wet Weather	X	X	X	X	X	X	X			Upon WQIP acceptance and if triggered	This optional strategy may be triggered if 1) an interim dry weather goal has not been met; and 2) it is determined by the City that this strategy would effectively address dry weather flows. Implementation of strategy would occur 6 months after it has been determined that an interim dry weather goal has not been met.
OPT-5	Entire Jurisdiction	Municipal	Establish semiannual meetings among CIP staff to identify opportunities to rehabilitate channels or habitats.	Wet Weather	X	X	X	X						Upon WQIP acceptance and if triggered	This optional strategy may be triggered if 1) an interim dry weather goal has not been met; and 2) it is determined by the City that this strategy would effectively address dry weather flows. Implementation of strategy would occur 6 months after it has been determined that an interim dry weather goal has not been met.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Optional WMA Strategies															
OPT-6	Entire Jurisdiction	Residential	Partner with Water Districts to implement incentive program.	Dry Weather	X	X	X	X		X	X			Upon WQIP acceptance and if triggered	Optional WMA strategy may be triggered if: 1) an interim dry weather goal is not met; 2) it is determined by the City that this strategy would effectively address dry weather flows; and 3) available grant funding. Implementation of strategy would occur the following fiscal year after obtaining necessary approvals and receipt of grant funding.
OPT-7	Entire Jurisdiction	Residential	Regional inspector to inspect areas watershed-wide for anthropogenic sources of dry weather flows.	Dry Weather	X	X		X		X	X			Upon WQIP acceptance and if triggered	Optional WMA strategy may be triggered if: 1) an interim dry weather goal is not met; 2) it is determined by the City that this strategy would effectively address dry weather flows; and 3) available grant funding. Implementation of strategy would occur the following fiscal year after obtaining necessary approvals and receipt of grant funding.

Table 4-8. Jurisdictional Strategies Selected to Address Eutrophication Impacts in the ~~Upper~~ Middle SMR Subwatershed – City of Temecula

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Illicit Discharge, Detection, and Elimination (IDDE) Program (Prov E.2)															
IDDE-1	City of Temecula - Entire Jurisdiction	Commercial - general, Commercial - nurseries, Industrial, Residential (including OWTS), Municipal, Sanitary Sewer, Parks and recreation, Streets, Orchards/Vineyards and other agriculture discharging to the MS4.	Update ordinances to reflect current illicit discharge and connections requirements and strategies to reduce non-stormwater discharges to the MS4 during dry and wet weather.	Both	X	X	X	X	X	X	X	X	X	Once a Permit Term	This strategy will provide the city legal authority to enforce discharge prohibitions as required in the permit. The City of Temecula will have the resources in place to eliminate illicit discharges and improper disposal into the MS4, or otherwise require the discharger to apply for and obtain a separate NPDES permit. IDDE inspection frequencies will be concurrent with construction, business, existing development and other inspections and as reported by public and City staff.
IDDE-2	City of Temecula - Target Area(s)	Commercial - general, Commercial - nurseries, Industrial, Residential (including OWTS), Municipal, Sanitary Sewer, Parks, Streets, Landfills, Orchards/Vineyards and other agriculture discharging to the MS4.	Post signage adjacent to open channels providing information to report any observed illicit discharges. Signage will focus on sources of non-stormwater discharges such as illegal dumping and over-irrigation.	Both	X	X	X	X	X	X	X			FY 19-20, one time only	This strategy is expected to increase the number of illicit discharge and connections reported. The City of Temecula will have the resources in place to eliminate illicit discharges and improper disposal into the MS4, or otherwise require the discharger to apply for and obtain a separate NPDES permit. Signage will be inspected as part of existing development inspections.
IDDE-3	City of Temecula - Entire Jurisdiction, Receiving water; collaboration with the Police Department, resource agencies, Flood Control, Environmental Community	Homeless encampments are known to be located in areas such as Parks and recreation, Streets, Open Space, and Multiple Species Habitat Conservation Program areas.	Responsible Compassion for the Homeless Program will be implemented to address homeless problems throughout the City, thereby reducing their impacts on water quality through trash, illegal dumping, and direct discharge of human waste.	Both	X	X	X	X	X	X	X	X	X	Continuous	The City of Temecula directs homeless individuals to resources to seek housing which reduces the likelihood that homeless individuals will contribute to the loading of pollutants associated with the HPWQC and PWQCs. These areas are monitored continuously by 4 full time dedicated deputy sheriff assigned to support homeless outreach efforts.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Development Planning (Prov E.3)															
DEV-1	City of Temecula - Entire Jurisdiction	Commercial - general, Commercial - nurseries, Industrial, Residential, Municipal, Parks and Recreation, Streets, Orchards/Vineyards and other agriculture that is permitted through the City.	Modified Low Impact Development requirements for new and redevelopment to specifically address nutrients during dry and wet weather through increased use of disconnected impervious surfaces, on-site retention of dry weather flows, and treatment of stormwater prior to discharge.	Both	X	X	X	X		X	X			FY 18-19	The City of Temecula will review its Low Impact Development requirements for new and redevelopment and modify the requirements to promote attainment of the goals identified within this WQIP as part of its adaptive management program.
DEV-2	City of Temecula - Entire Jurisdiction	Commercial - general, Commercial - nurseries, Industrial, Residential, Municipal, Parks and Recreation, Streets, Orchards/Vineyards and other agriculture that is permitted through the City.	Amend BMP design manuals to address sources of HPWQCs and PWQCs on new and redevelopment projects (e.g., irrigation design standards, LID implementation) and conduct internal staff training on updated BMP design manual	Both	X	X	X	X	X	X	X			FY 19-20	The City of Temecula will review the BMP design manuals and amend the manuals as necessary to promote attainment of the goals identified within this WQIP. Staff will be trained annually to ensure proficiency with the elements of the amended BMP design manuals
Construction Management (Prov E.4)															
CON-1	City of Temecula - Entire Jurisdiction	Active construction sites.	Require implementation of BMPs that reduce the potential of HPWQC and PWQC loading, that are site specific and appropriate to the construction phase, year round.	Both	X	X	X	X	X	X	X	X	X	On-going	Implement as part of the JRMP Construction Management Program; ensure that sources of HPWQC/PWQCs have BMPs implemented year round (e.g., erosion/sediment control, materials storage, trash management).
CON-2	City of Temecula - Entire Jurisdiction, former agricultural lands	Active construction on parcels previously used for agriculture.	Where former agricultural lands are issued grading permits for development/ redevelopment, the sites will be deemed high priority for BMP implementation and inspection in accordance with the City's JRMP.	Both	X			X					X	On-going, As Applicable	Modify grading approval and construction site inspections process to ensure that former agricultural lands are deemed high priority, regardless of other factors (e.g., size, slope, proximity) and inspected accordingly. High priority sites are inspected twice per month from Oct 1 - Apr 30 and at least once in August or September each year.
CON-3	City of Temecula - Entire Jurisdiction	Active and inactive construction sites	Impose legal authority to ensure inventoried construction projects are in compliance with all requirements.	Both	X	X	X	X	X	X	X	X	X	On-going	Enforce stormwater, grading, and erosion control ordinances in accordance with the City's Enforcement Response Plan on all active and inactive construction sites through inspections and follow-up. Frequencies for both active and inactive construction site inspections vary based upon the assessed priority of the site as discussed in the City of Temecula JRMP.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Existing Development Management (Prov E.5)															
ED-1	City of Temecula - Entire Jurisdiction	Commercial, Industrial, Residential, OWTS, Municipal, Sanitary Sewer, Parks, Streets, Landfills	Enhanced municipal training programs and curriculum targeting inspections staff. Programs will focus on specific nutrient related activities that inspectors might encounter in the field such as non-stormwater flows and their sources (e.g., over-irrigation, illegal washing/dumping) and materials storage BMPs (e.g., coverage and containment) within existing development.	Dry	X			X		X				FY18-19	The City of Temecula will develop a curriculum that educates its inspection staff regarding the HPWQC and particular sources and areas of focus so as to reduce the potential loading from properties being inspected. Training will be conducted on an annual basis.
ED-2	City of Temecula - Target Area(s); collaboration with Rancho California Water District	Commercial, Industrial, Residential, Municipal, Parks	Install weather based irrigation controllers in municipal parks and promote incentive programs elsewhere (as available) to address sources of over-watering and irrigation runoff within existing development.	Dry	X	X	X	X		X	X		X	On-going for New Parks	The City of Temecula will install weather based irrigation controllers to reduce the potential for runoff and contact Rancho California Water District to discuss opportunities to provide incentives for their use elsewhere.
ED-3	City of Temecula - Entire Jurisdiction; collaboration with CR&R	Residential, Streets	Weekly street sweeping in residential areas to reduce pollutant buildup (e.g., organic debris, trash, metals) on streets and curb/gutter areas, thereby reducing transport of pollutants to the storm drain system via non-stormwater and stormwater flows.	Both	X	X		X	X	X		X	X	On-going	All residential streets are swept by the City's contractor the day following the trash service day. If trash service is provided on Friday, the streets are swept on Monday. Signs are posted asking residents to please refrain from parking on the residential streets on both trash collection and street sweeping days in order allow the City's contractor to provide efficient trash collection and street sweeping services.
ED-4	City of Temecula - Entire Jurisdiction	Agricultural	Modify City JRMP to include any Agricultural business operation as a high priority business inspection similar to industrial business. Report any Non-filing businesses to the Regional Board.	Both	X	X	X	X	X	X	X		X	Annual	This strategy will be incorporated into the City Business inspection component.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Enforcement Response Plans (Prov E.6)															
ERP-1	City of Temecula - Entire Jurisdiction	Construction Sites, New Development Projects, Redevelopment Projects, Existing Development Sites (Residential, Industrial, Commercial, Nurseries, Parks and Recreation, Orchards, Vineyards, Nurseries, horse ranches/ equestrian, other agriculture draining to the City's MS4)	Implement escalating enforcement responses to compel compliance with statutes, ordinances, permits, contracts, orders, and other requirements for IDDE, development planning, construction management, and existing development in the Enforcement Response Plan.	Both	X	X	X	X	X	X	X	X	X	On-going, As Needed	The City will enforce all applicable ordinances using a progressive enforcement approach as described in the City's Enforcement Response Plan
Public Education and Participation (Prov E.7)															
PUB-1	City of Temecula - Target Area(s)	Residential areas with Homeowners Associations (HOAs).	Enhanced outreach programs targeting homeowners associations to educate homeowners and HOAs about outdoor water usage, the effects of over-irrigation, and specific BMPs they can implement to reduce runoff from over-irrigation.	Both	X	X		X	X	X	X			FY18-19, Annual	The City of Temecula will review the literature and develop an enhanced outreach program for homeowners associations that utilizes the strategies that have been identified as most successful for this target audience on an annual basis.
PUB-2	City of Temecula - Target Area(s)	Commercial - general, Commercial - nurseries, Industrial, Residential, Municipal, Parks and recreation, Streets, Orchards/Vineyards and other agriculture discharging to the MS4.	Enhanced outreach materials focused on sources of nutrients (e.g., door hangers, pamphlets, other media). Outreach materials will focus on non-stormwater discharges to the storm drain system (e.g., septic system maintenance, equestrian facility BMPs, outdoor water usage, the effects of over-irrigation, and specific BMPs they can implement to reduce runoff from over-irrigation).	Dry	X			X		X				FY18-19, Annual	The City of Temecula will review the literature and develop enhanced outreach materials focused on sources of nutrients during dry weather that utilize the strategies that have been identified as most successful for this condition on an annual basis.
PUB-3	City of Temecula - Entire Jurisdiction	Agricultural	Notify agricultural business license holders within City Jurisdiction of requirement to enroll in the Regional Water Board Agricultural Order.	Both	X	X	X	X	X	X	X		X	Annual	This strategy will be incorporated into the City Business inspection component.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Optional Strategies (Prov B.3.b.(1)(b))															
Opt-1	At project site as further detailed within the project description and City of Temecula Capital Improvement Plan.	Municipal, Parks	Implement Parks Improvement Program that will provide landscaping, irrigation, and on-site drainage improvements that will reduce the potential for pollutant discharges (e.g., irrigation runoff, fertilizer) from municipal parks.	Both	X	X		X		X	X			Upon being triggered and all funds and/or resources being secured (approximately two years from determination that trigger has been met); One Time	This project would facilitate rehabilitation and improvement projects at various City parks. The rehabilitation and improvement projects could include, but are not limited to, landscaping and irrigation system efficiency upgrades and on-site drainage improvements to reduce the loading of nutrients and other pollutants contributing to PWQCs associated with irrigation and stormwater runoff. [1][2]
Opt-2	At project site as further detailed within the project description and City of Temecula Capital Improvement Plan; Coordination with Riverside County Flood Control and Water Conservation District	Municipal, Parks	Flood control channel repair and rehabilitation to prevent erosion and the transport of sediment-bound pollutants.	Both	X		X	X						Upon being triggered and all funds and/or resources being secured (approximately two years from determination that trigger has been met); One Time	This project repairs and reinforces the earth and berms between specific park sites and flood control channels and rehabilitates the banks to support vegetation and prevent further erosion into the park sites and the transport of sediment-bound nutrients and other pollutants contributing to PWQCs. [1][2]

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Opt-3	To be determined based on information obtained from the Monitoring and Assessment Program; Coordination with Eastern Municipal	Commercial - general, Commercial - nurseries, Industrial, Residential, Municipal, Parks and recreation, Streets, Orchards/Vineyards and other agriculture discharging to the MS4.	Implement dry weather infiltration, diversion to sanitary sewer, to eliminate non-stormwater discharges to the MS4.	Dry	X	X	X	X	X	X	X			Upon being triggered and all funds and/or resources being secured (approximately two to five years from determination that trigger has been met); One Time	This strategy would address persistent dry weather flow in outfalls due to over-irrigation. Outfalls which are persistently flowing due to over-irrigation and which contribute significantly high nutrient loads would be evaluated for potential dry weather infiltration or diversion to sanitary sewer. [1][3]

[1] Implementation of these strategies may be triggered at the City of Temecula's discretion or if (1) persistent dry weather flows are identified; and (2) an interim goal has not been met; or it is determined that implementation is necessary to meet future goals; and (3) the project would help to reduce nutrient loading to receiving waters under dry or wet conditions; and (4) all necessary resources and permits have been secured for the project. Once triggered, it is estimated that it would take approximately two years to procure resources, proceed with engineering, landscape design, and construction to implement the strategy. Because implementation would be within City parks, environmental permitting would not be necessary.

[2] The funding-sources that must be secured to implement this optional strategy are: capital dollars identified in the approved CIP budget (funded through parks and/or drainage fees); staff time for project management and construction (funded through the general fund and/or development fees); budget for operations and maintenance of constructed BMPs (funded through the drainage fees and/or general fund). Once triggered, it is estimated that it would take approximately two years to procure resources, proceed with engineering/design, secure environmental permits, and proceed with construction necessary to implement the strategy.

[3] Funds and/or resources that must be secured to implement this optional strategy are the following: 1) In-field evaluation of suitable sites for infiltration, diversion to sanitary sewer, or treatment BMPs (funded through drainage fees and/or general fund); 2) Evaluation of feasibility (funded through drainage fees and/or general fund); 3) Engineering design plans (funded through drainage fees and/or general fund); 4) Capital Improvement Program funding secured to support 5 - 7 (through drainage fees or another fee supported funding mechanism); 5) Land acquisition and/or private-public partnership agreements (as necessary); 5) Construction contract bid/award; 6) Project construction; 7) Adequate resources for facility operation and maintenance. Once triggered, it is estimated that it would take two - five years to procure resources, proceed with engineering and design work, secure necessary environmental permits, and proceed with construction. Timing will depend on location, scope of the project, and environmental impacts.

The City of Temecula has included a summary of its land uses in chapter 3 table 3-1. Please note the City does not have any land uses zoned for agricultural. However agricultural operations are allowed on all residentially zoned land uses. All commercially operated agricultural operations within the city require a business license and the city uniquely identifies these in its business license inventory. There are currently no commercially operated vineyards or orchards within City limits. "Temecula Wine Country" is located outside Temecula City Limits.

Table 4-9. Jurisdictional Strategies Selected to Address Eutrophication Impacts in the ~~Upper~~ Middle SMR Subwatershed – City of Wildomar

(Background: The City of Wildomar covers an area of approximately 24 square miles. The City is primarily located within the Santa Margarita River Watershed. About 33% of the City extends into the Santa Ana River Watershed. Low Density and Medium Density residential land uses predominantly characterize the City of Wildomar's current landscape. Many of the roads within the City are unimproved (i.e. dirt roads), partially improved (i.e. developed on one side), or are paved but do not have curb or gutter. More recently developed areas within the City do have full street improvements and drainage conveyance systems. As of 2015, the City's population was estimated to be 45% of the total expected population.).

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2017	FY2018	Future Fiscal Years	
Illicit Discharge, Detection, and Elimination (IDDE) Program (Prov E.2)															
IDDE-1	City of Wildomar: - Entire Jurisdiction	Residential Commercial Industrial Parks and Recreation Horse Ranches/Equestrian Nurseries Other Agricultural	Assess IDDE incidents to identify clusters, if any, where targeted efforts may be effective in eliminating dry weather flows.	Dry	X	X	X	X	X	X			X	Continuous	Assess clusters to determine if there are target areas which require special attention, education, enforcement, or any additional/specific resources or targeted follow-up.
IDDE-2	City of Wildomar: - Entire Jurisdiction	Residential Commercial Industrial Parks and Recreation Horse Ranches/Equestrian Nurseries Other Agricultural	Update ordinances to reflect current illicit discharge and connections requirements and strategies.	Dry	X	X	X	X	X	X			X	Each Permit Term	
IDDE-3	City of Wildomar: - Entire Jurisdiction	Residential Commercial Industrial Parks and Recreation Horse Ranches/Equestrian Nurseries Other Agricultural	Utilize service request forms to improve internal and external reporting of IDDE incidents, to help staff more efficiently identify, report, and respond to IDDE incidents.	Dry	X	X	X	X	X	X			X	Continuous	
Development Planning (Prov E.3)															
DEV-1	City of Wildomar: - Entire Jurisdiction	Residential Commercial	Smart Irrigation Conditions of Approval	Dry	X	X	X	X	X	X		X	X	Ongoing	City Council has adopted the WATER EFFICIENT/CONSERVATION LANDSCAPE STANDARDS MANUAL. Items required in the manual are verified during development plan review and during inspections for projects which require landscape plans.
DEV-2	City of Wildomar: - Entire Jurisdiction	Residential Commercial	Revised post-construction guidelines to eliminate potential dry weather discharges from new and redevelopment	Dry	X	X	X	X	X	X	X		X	Continuous	Update plan review guidelines to require that, where feasible, areas of a site which may contribute to potential dry weather discharges are captured and directed to a treatment BMP to eliminate dry weather flows and potential nutrient loading (and other pollutants) from being transmitted downstream. Condition new projects accordingly and incorporate guidelines into Development Plan Check Guidelines.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2017	FY2018	Future Fiscal Years	
DEV-3	City of Wildomar: - Entire Jurisdiction	Residential Commercial Industrial	Amend BMP design manuals to address priority sources and conduct internal staff training on updated BMP design manual	Both	X	X	X			X			X	Each Permit Term	Complete update through cooperation with other SMR Co-Permittees.
DEV-4	City of Wildomar: - Entire Jurisdiction	Commercial Residential	Require new development projects to develop and submit a Storm Water Quality Training Materials for employees. Require new development projects with CC&Rs to address stormwater pollution prevention practices.	Dry	X	X	X	X	X	X		X	X	Ongoing	Condition commercial development projects to require the development of Storm Water Quality Training Materials for employees to ensure that employees of new businesses are educated regarding stormwater pollution prevention and thereby reduce the potential for non-stormwater discharges. For all development projects requiring CC&Rs, require that the CC&Rs address stormwater pollution prevention requirements and practices. Require documentation (e.g. Employee Training Materials, CC&Rs, etc...) as applicable to each project to be submitted for review and for file, recordation, etc... prior to certificate of occupancy. Comment on documentation, as necessary, to ensure that the materials adequately target the applicable post-development activities. Education may target different sources by helping to reduce or eliminate unpermitted non-stormwater management discharges and the potential for nutrients and other pollutants to be transported through non-stormwater discharges.
DEV-5	City of Wildomar: - Entire Jurisdiction	Construction	Require Delineation of Jurisdictional Areas on Development Plans and Require Enhanced Sediment Control BMPs to be Shown Adjacent to Jurisdictional Areas on Development Plans	Both	X		X		X			X	X	Ongoing	Require all development projects to delineate and label jurisdictional areas on or immediately adjacent to the project site on grading or improvement plans and to add a note to the plans requiring delineation of jurisdictional areas on the project site in the field. Also require the plans to identify enhanced Sediment Control BMPs in locations adjacent to jurisdictional areas. Delineation of jurisdictional areas is intended to help reduce unintended construction impacts within these areas and protect and preserve physical habitats, reduce the amount of construction debris that may be deposited in these areas, and by reducing the potential for soil disturbance reduce the potential for nutrients to be transported downstream by sediment. Additional sediment controls adjacent to jurisdictional areas is also intended to limit the potential for nutrients to be transported downstream by sediment.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2017	FY2018	Future Fiscal Years	
DEV-6	City of Wildomar: - Entire Jurisdiction	Streets Residential	Provide Street Sweeping Services for New Streets	Both	X	X	X	X	X	X		X	X	Ongoing	Require all new private development projects to annex into the Community Facilities District (CFD). CFD services will typically include street sweeping for newly developed streets (where applicable) that will be publicly maintained. Street sweeping can help eliminate sediment and other pollutants which may be transported downstream and which may transport nutrients downstream.
Construction Management (Prov E.4)															
CON-1	City of Wildomar: - Entire Jurisdiction	Construction Nurseries Other Agriculture	Implement, or require the implementation of, enhanced construction BMPs on specific projects.	Both	X	X	X	X	X	X			X	Continuous	Implement, or require the implementation of, enhanced construction BMPs on projects with applicable permit activities that have an historical land use normally associated with higher levels of nutrients than other land uses (e.g. project sites with an historical agricultural land use, project sites with known septic systems currently or previously installed onsite, etc...) to reduce the potential for nutrient rich soils to discharge from the project site during construction either by non-stormwater or stormwater related discharges.
CON-2	City of Wildomar: - Entire Jurisdiction	Construction	Provide enhanced focus on specific items during construction inspections.	Both	X	X	X		X				X	Per JRMP	Provide enhanced focus on landscape material storage BMPs during NPDES construction inspections to reduce the potential for materials with nutrients to leave the project site, either by non-stormwater or stormwater related discharges.
CON-3	City of Wildomar: - Entire Jurisdiction	Construction	Require Delineation of Jurisdictional Areas on Project Sites and Require Enhanced Sediment Control BMPs Adjacent to Jurisdictional Areas	Both	X		X		X			X	X	Ongoing	Require all development projects to have all onsite jurisdictional areas delineated prior to or by the pre-grading meeting. Require the continued delineation of such areas throughout the duration of construction, as applicable to each project. Ensure that jurisdictional areas are clearly identified in the field at pre-grading meetings and during grading inspections. Require development projects to implement enhanced Sediment Control BMPs in locations that are adjacent to jurisdictional areas. Delineation of jurisdictional areas is intended to help reduce unintended construction impacts within these areas and protect and preserve physical habitats, reduce the amount of construction debris that may be deposited in these areas, and by reducing the potential for soil disturbance reduce the potential for nutrients to be transported downstream by sediment. Additional sediment controls adjacent to jurisdictional areas is also intended to limit the potential for nutrients to be transported downstream by sediment.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2017	FY2018	Future Fiscal Years	
Existing Development Management (Prov E.5)															
ED-1	City of Wildomar: - Entire Jurisdiction	Municipal (Parks, Cemetery, Fire Station) Streets Illicit Discharges	Enhanced municipal training programs and curriculum targeting key field staff. Programs will focus on the water quality improvement plan, HPWQCs, NNE requirements as related to illicit discharges and elimination of dry weather flows.	Dry	X	X	X	X	X	X			X	Per JRMP	Complete training through cooperation with SMR Co-Permittees. Conduct additional internal training as necessary.
ED-2	City of Wildomar: - Entire Jurisdiction	Illicit Discharges from Over Irrigation	Install weather based irrigation controllers in public landscaped areas.	Dry	X	X	X	X	X	X		X	X	Ongoing	Public landscaped areas maintained by City maintenance districts have weather based controllers installed which help reduce the potential for over-irrigation and irrigation runoff.
ED-3	City of Wildomar: - Entire Jurisdiction	Illicit Discharges from Failing Septic Systems	Address failed septic systems that are discharging effluent to the ground surface.	Both	X	X	X			X	X	X	X	Ongoing	Coordinate with property owners through various City Departments and potentially coordinate with other agencies to eliminate unpermitted surface discharges from septic systems and to the extent possible, encourage property owners to repair/replace the failing septic system(s).
ED-4	City of Wildomar: - Entire Jurisdiction	Other Agricultural	Report potential Agricultural Permit Non-Filers to the Regional Board.	Both	X	X	X			X			X	Continuous	When the City is made aware of an agricultural operation that appears to require coverage under the Regional Board's Agricultural Order, notify the Regional Board.
ED-5	City of Wildomar: - Entire Jurisdiction	Residential Commercial Industrial Parks and Recreation Streets	Clean out catch basins.	Both	X	X	X	X	X	X		X	X	Continuous	Perform scheduled clean-out activities of publicly maintained catch basins to eliminate accumulated sediment, debris, and trash. Catch basin clean-out activities can help eliminate pollutants which may be transported downstream and which may transport nutrients downstream.
Enforcement Response Plans (Prov E.6)															
ERP-1	City of Wildomar: - Entire Jurisdiction	Residential Commercial	Implement escalating enforcement responses to compel compliance with statutes, ordinances, permits, contracts, orders, and other requirements for IDDE, development planning, construction management, and existing development in the Enforcement Response Plan.	Dry	X	X	X	X	X	X		X	X	Ongoing	Implement the ERP as described in the JRMP.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2017	FY2018	Future Fiscal Years	
Public Education and Participation (Prov E.7)															
PubEd-1	City of Wildomar: - Entire Jurisdiction	Nurseries	Enhanced outreach programs targeting nurseries	Both	X	X	X	X	X	X			X	Annually	Identify nurseries (a potential source of nutrients) located within City limits using City's Business Registration Database. Mail Targeted Public Education Materials to registered nurseries to help reduce the potential for pollutants (including nutrients) to be present in stormwater discharges. Complete Commercial Inspections for registered nurseries. Repeat process annually prior to each rainy season.
PubEd-2	City of Wildomar: - Entire Jurisdiction	Horse Ranches/Equestrian Residential	Enhanced outreach programs targeting animal facilities	Both	X	X	X	X	X	X			X	Continuous	Provide focused educational materials to property owners with livestock/equestrian operations regarding Best Management Practices to reduce the potential for non-stormwater discharges and to reduce the potential for pollutants (including nutrients) to be present in stormwater discharges.
PubEd-3	City of Wildomar: - Entire Jurisdiction	Commercial Residential Industrial Nurseries	Public Education for businesses and residents.	Both	X	X	X	X	X	X			X	Continuous	Provide targeted educational materials for businesses as identified in JRMP. Provide targeted stormwater pollution prevention information to all City based businesses, even if not required in JRMP (e.g. over-irrigation handouts to home-based businesses, septic system maintenance handouts to home-based business with septic systems, landscape maintenance handouts to home-based businesses, etc...) to reduce the potential for non-stormwater discharges which may contain nutrients and to reduce the potential for pollutants (including nutrients) to be present in stormwater discharges. Potentially provide contact information handout to business registration applicants which may include contact information for waste haulers, water districts, City, etc...) as well as general stormwater pollution prevention information. (NOTE: This item may require additional coordination and resources before it is determined that it can be implemented.) Place stormwater pollution prevention educational materials at City Front Counter for residents/developers/contractors/businesses. Include Storm Water related message in applicable Email Signatures.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2017	FY2018	Future Fiscal Years	
Optional Strategies															
OPT-1	City of Wildomar: - Target Areas identified Through Cooperation with the Water Districts	Residential Commercial	Coordination with Water Districts to pinpoint and address problem sources of dry weather flows; potential implementation actions could include rebate/incentive programs, irrigation retrofits, or other programs as appropriate and effective.	Dry	X	X	X	X	X	X				As Triggered: Within six (6) months of trigger, establish coordination meeting with Water Districts to proceed with strategy.	Implemented starting in the following fiscal year after triggered. Implementation of this strategy may be triggered if (1) persistent dry weather flows are identified; and (2) an interim dry weather goal has not been met; or it is determined that implementation is necessary to meet future goals; and (3) it is determined that coordination with a water district would be an effective strategy to address the source(s) of the identified dry weather flow. Grant Funding for either the City or the Water District(s) would likely need to be secured for incentive programs.
OPT-2	City of Wildomar: - SMR Region	Open Space Residential Commercial Industrial Parks and Recreation Horse Ranches/Equestrian Nurseries Other Agricultural	Consider and Prioritize, where possible, Multi-Benefit Master Drainage Plan Projects that have both Flood Control and Channel or Habitat Rehabilitation Benefits	Both	X		X		X					As Triggered: Within six (6) months of trigger, establish internal coordination meeting with Public Works Staff to discuss re-prioritization process for Master Drainage Plan Projects.	Implemented starting in the following fiscal year after triggered. Implementation of this strategy may be triggered if (1) persistent dry weather flows are identified; and (2) an interim dry weather goal has not been met; or it is determined that implementation is necessary to meet future goals; and (3) it is determined that prioritizing such multi-benefit projects would be an effective strategy to address the High Priority Water Quality Condition. If determined to be an effective strategy, funding for planning of such projects would be contingent on Area Drainage Plan Funding, Master Drainage Plan Funding, and any additional funds needed in excess of these two sources.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy		HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
				Dry Weather/ Wet Weather/ Both	Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2017	FY2018	Future Fiscal Years	
OPT-3	City of Wildomar: - Entire Jurisdiction	Streets	Enhancements and/or adjustments to street sweeping practices, frequencies, and routes, as determined by jurisdiction.	Both	X	X	X	X	X	X				As Triggered: Within six (6) months of trigger, establish coordination meeting to discuss enhancement and adjustment of street sweeping and procedure to move forward.	Enhance existing street sweeping by assessing deficiencies on existing routes and making applicable modifications. Work with waste haulers to increase street sweeping to include City Arterial Streets and to provide litter pass services in areas with known trash accumulation to reduce pollutants which may be transported downstream by non-stormwater or stormwater discharges. Implemented starting in the following fiscal year after triggered. Implementation of this strategy may be triggered if (1) persistent dry weather flows are identified; and (2) an interim dry weather goal has not been met; or it is determined that implementation is necessary to meet future goals; and (3) it is determined that enhancements or adjustments to street sweeping would be an effective strategy to address the High Priority Water Quality Condition; and (4) implementation of this strategy is supported by cooperation with City waste haulers and legislative approval. Funding for enhancements and adjustments to street sweeping may involve increased waste hauling fees and City Council approval. Other enhancements may involve funding from the General Fund.
Optional WMAA Strategies															
The City of Wildomar will implement Optional WMA Strategies through cooperative agreements with the Santa Margarita River copermittees. The Optional WMA Strategies that will be implemented are identified in the Riverside County Flood Control and Water Conservation District (RCFCWCD) WQIP Strategy Table. Please refer to the RCFCWCD WQIP "Optional WMA Strategies and Schedules" in Table 4-11 (Section 4.2) of the WQIP for details.															

Definitions:

Ongoing	- A strategy that the City currently implements (entirely or to some extent) and will continue to implement throughout WQIP implementation. Implementation will occur as triggered and is not limited to a specific frequency. See Specific Strategy Descriptions for events triggering implementation of this type of strategy.
Continuous	- A strategy that the City will begin implementing upon WQIP acceptance and will continue to implement throughout WQIP implementation. Strategy implementation will occur as required or triggered and is not limited to a specific frequency. See Specific Strategy Descriptions for events triggering implementation of this type of strategy.
Per JRMP	- A strategy that will be implemented based on a schedule or frequency that is identified in the City's Jurisdictional Runoff Management Plan.
Each Permit Term	- A strategy that will be implemented once per permit term, at a minimum.
Annually	- A strategy that will be implemented once per year, at a minimum.

Table 4-10. Jurisdictional Strategies Selected to Address Eutrophication Impacts in the ~~Upper~~ Middle SMR Subwatershed – Riverside County

(Note: The following is the County of Riverside's WQIP strategies table. Specific focus is given to Nutrient source Target Areas (i.e. Agriculture (nurseries, equestrian and other livestock operations) and Residential Uses), then source areas of the other Priority Water Quality Pollutants. As part of the iterative adaptive management process, these strategies will be reviewed as part of the WQIP annual reporting analysis. If interim goals are not met, the strategies may change. Implementation of new strategies would be subject to funding, consistency with the General Plan and/or other regulatory requirements, and securing the necessary resources (e.g., staffing, partnerships, etc.).

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
Illicit Discharge, Detection, and Elimination (IDDE) Program (Prov E.2)												
1	County of Riverside	Illicit Discharge and Illegal Connections County-wide	Utilize municipal personnel and contractors to identify and report Illicit Connections and Discharges (with emphasis on over-irrigation).	✓	✓	✓	✓	✓	✓	✓	Continuous*	Utilize MS4 GIS mapping to focus these efforts for Nutrient Loading Land Uses including Residential and Agricultural as well as providing focused training to field staff/contractors. Identify areas through GIS analysis that need particular attention such as increased surveying and public education.
2	County of Riverside	Illicit Discharge and Illegal Connections County-wide	Develop a reporting mechanism for incidental observations of IC/ID by County staff field personnel.	✓	✓	✓	✓	✓	✓	✓	Continuous	Provide County field staff with IC/ID field forms with emphasis in locating sources of dry weather flows from Residential and Agricultural land uses. These forms are to be submitted to the County NPDES Administrator to initiate investigations, tracking and resolution. Follow up training will provide updates on the success of this Program and help identify additional strategies that could be incorporated.
3	County of Riverside	Illicit Discharge and Illegal Connections County-wide	Develop a procedure to map IC/ID cases in GIS to assist in ongoing identification of IC/ID target areas.	✓	✓	✓	✓	✓	✓	✓	Upon WQIP Approval	Field forms, as described above, shall be submitted to Transportation GIS to map specific IC/ID locations involving PWQP's, with emphasis on Nutrient sources. Scheduling inspections of IC/ID observations in Nutrient Loading Land Use Sources will be given priority.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
4	County of Riverside	Illicit Discharge and Illegal Connections County-wide	Conduct IC/ID - IDDE focused training for County Department field staff.	✓	✓	✓	✓	✓	✓	✓	Annually	Can be expedited through a "Train the Trainer Program" to disseminate training to County employees who work in the field. Emphasis will be given to identification and resolution of Nutrient and other PWQP land use sources and activities that are known to cause erosion and dry weather flows (such as agricultural activities).
5	County of Riverside	Illicit Discharge from Septic System Failures	Respond, educate and require mitigation on septic system failures where observed. Coordinate investigations with Environmental Health (County Regulatory Agency for Septic Systems). Focus on elimination of nutrient loading from phosphorus sources and bacteria loading to MS4 from septic failure. Educate property owners on proper septic maintenance and the importance of eliminating discharges to the MS4.	✓	✓	✓	✓	✓	✓	✓	Continuous	
6	County of Riverside	Illicit Discharge Detection and Elimination	Implement practices and procedures to address accidental spills (with emphasis on identifying Nutrient and other PWQP sources) with the potential to enter the storm drain system. Implement employee spill notification/reporting focused training County-wide.	✓	✓	✓	✓		✓	✓	Continuous	Can be expedited through a "Train the Trainer Program" to disseminate training to County field staff. Training shall focus on importance on identifying and resolving the sources of Nutrient and other PWQP loading to our Receiving Waters.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
New Development and Redevelopment Planning (Prov E.3)												
1	County of Riverside	New and Redevelopment of all Land Uses	Update BMP Design Manual procedures to specify storm water requirements applicable to development and redevelopment projects, identify and design appropriate BMPs, establish maintenance criteria, and establish alternative compliance options. Specific consideration to BMP implementation will be given to reducing/eliminating Nutrient and other PWQP loading to the MS4 and receiving waters.	✓	✓	✓	✓	✓		✓	Each Permit Term or as deemed necessary	
2	County of Riverside	New and Redevelopment of all Land Uses	Conduct training on the updated BMP Manual.	✓	✓	✓	✓	✓		✓	Continuous. Continue to require Annual Training to appropriate staff identified in the JRMP.	Training shall incorporate BMP implementation emphasis for Residential and Agricultural land uses to reduce/eliminate erosion and Nutrient and other PWQP loading to MS4 and receiving waters.
3	County of Riverside	New and Redevelopment of all Land Uses	Prepare drought tolerant Guidelines and Standards for new development and BMP retrofits (e.g. water smart irrigation controllers, turf replacements programs, residential landscape evaluation program).	✓	✓	✓	✓		✓	✓	Continuous or as deemed necessary	Landscape Ordinance and Educational Brochures provide guidelines that describe the importance of eliminating over irrigation, specifically for Residential and Agricultural land uses. Additional new guidelines will be developed to describe why these land uses are of particular concern (i.e., Nutrient and other PWQP loading to MS4 and receiving waters).
4	County of Riverside	County Capital Improvement Projects	Develop a NPDES DATA FORM for Design Teams to identify project-related NPDES data to facilitate: identification of HPWQC and PWQP sources, analyze HPWQC and PWQP source reduction in CEQA/NEPA document, and design of post-construction BMPs to address HPWQC and PWQPs loading reduction and hydromodification.	✓	✓	✓	✓	✓		✓	Upon WQIP Approval	Update form template as needed. Form shall provide footnote describing types of land uses (e.g., Residential and Agricultural) and activities (i.e., on-going grading, tilling, excavation, fertilizer use, etc.) that require particular attention to post-construction BMP implementation.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
5	County of Riverside	New and Redevelopment of all Land Uses	Update County codes, ordinances, and landscape design standards consistent with the permit, including but not limited to prohibition of over irrigation; and the updated BMP Manual.	✓	✓	✓	✓	✓	✓	✓	Upon WQIP Approval	Implement upon obtaining internal and Board of Supervisors' approvals.
Construction Management (Prov E.4)												
1	County of Riverside	Construction Erosion and Sediment Controls; and Waste Management	Require implementation of enhanced BMPs that reduce the potential of HPWQC and PWQP loading, and that are specific to the grading phase, year round.	✓	✓	✓	✓	✓		✓	Continuous	Could potentially be achieved through liquidated damages provisions in Capital Improvement Projects construction contracts
2	County of Riverside	Construction Erosion and Sediment Controls; and Waste Management	Make updates to County ordinances related to construction; reference to existing grading ordinance and requirement to implement enhanced BMPs to mitigate erosion and dry weather flows to MS4 and receiving waters in the SMR.	✓	✓	✓	✓	✓	✓	✓	As deemed necessary	
3	County of Riverside	Construction Erosion and Sediment Controls; and Waste Management	Ensure grading activities are classified as HIGH priority if land is surrounded by or was previously used for agricultural operations.	✓	✓	✓	✓	✓	✓	✓	Upon WQIP Approval, then Continuous	This Strategy is to prevent discharge of sediment with high levels of Nutrients and other PWQP's.
Existing Development (Prov E.5)												
1	County of Riverside	Existing and New Businesses	Enhance the Business Registration Program by educating owners on Nutrient and other PWQP source reduction.	✓	✓	✓	✓	✓	✓	✓	Continuous	Handout appropriate educational brochures to business owners.
2	County of Riverside	MS4 Sources	Implement a prioritized schedule of operation and maintenance activities for the storm water conveyance system draining Nutrient and PWQP source land uses (e.g. Residential and Agricultural).	✓	✓	✓	✓	✓	✓	✓	Continuous	

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
3	County of Riverside	Commercial, Industrial Residential, Agricultural and Municipal Land Uses	Require implementation of BMPs to address application, storage, and disposal of pesticides, herbicides, and fertilizers on commercial, industrial, agricultural (e.g., large commercial nurseries), residential, and municipal properties. Includes education, verifying permits and certifications.		✓	✓		✓		✓	Continuous	
4	County of Riverside	Commercial, Industrial Residential, Agricultural and Municipal Land Uses	Conduct inspections of inventoried existing development (including residential and agricultural land uses) to ensure BMPs are being implemented to reduce the potential of HPWQC and PWQP loading.	✓	✓	✓	✓		✓	✓	Continuous	
Enforcement (Prov E.6)												
1	County of Riverside	Existing Development	Enforce escalating legal authority established for all inventoried existing development, including residential and agricultural, to conserve water and eliminate dry weather flows. Verbal warnings shall be tracked along with written escalating enforcement.	✓	✓	✓	✓	✓	✓	✓	Continuous	
2	County of Riverside	New and Redevelopment of all Land Uses	Impose legal authority to ensure all development and redevelopment projects (with emphasis on residential, park and agricultural projects) are in compliance with all post construction requirements specifically as they pertain to erosion and dry weather flow prohibitions.	✓	✓	✓	✓	✓	✓	✓	Continuous	
3	County of Riverside	Illicit Discharge Detection and Elimination	Implement escalating enforcement responses to compel compliance with statutes, ordinances, permits, contracts, orders, and other requirements for IDDE, development planning, construction management, and existing development in the Enforcement Response Plan. Escalating enforcement strategies will initially start with education and verbal warnings and escalate to cease and	✓	✓	✓	✓	✓	✓	✓	Upon WQIP approval	Evaluate current escalating enforcement strategies and refine to specifically address the elimination of nutrient discharges and priority water quality pollutants (i.e., bacteria, metals, sediment and trash).

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
			desist orders to taking legal actions as necessary. All enforcement actions shall be tracked in a database.									
4	County of Riverside	Unpermitted Agricultural Operations	Report suspected agriculture operation "non-filers" to the Regional Board promptly. Maintain database of reported "non-filers".	✓	✓	✓	✓	✓	✓	✓	Continuous	Observations by field staff should report incidents to Code Enforcement for tracking purposes and the County NPDES Administrator for reporting to the Regional Board.
Public Education (Prov E.7)												
1	County of Riverside	Municipal Parks	Implement pet waste management outreach in County Parks for resident pet owners.	✓	✓		✓	✓		✓	Continuous	
2	County of Riverside	Residential/ Commercial/ Municipal	Implement a public education and participation program to promote and encourage development of programs, management practices and behaviors that reduce the discharge of HPWQC and other PWQPs (specifically for Residential and Agricultural land uses).	✓	✓	✓	✓	✓	✓	✓	Continuous	Coordinate efforts with RCFC&WCD, County Departments and partnering agencies such as Water and School Districts.
3	County of Riverside	Residential/ Commercial/ Municipal	Stock public County counters at Riverside County offices with Pollution Prevention Public Education brochures. Brochures should highlight the importance of proper fertilizer use/application and over irrigation. Other brochures should include emphasis on proper septic maintenance and other good practices to prevent nutrient and other PWQP loading to the MS4 and receiving waters, Provide brochures to other agencies for their public counters as well (e.g., School Administration Buildings).	✓	✓	✓	✓	✓	✓	✓	Continuous	

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
4	County of Riverside	Residential/ Commercial/ Municipal	Facilitate public reporting, through outreach and public education, of Illicit Connections and Illicit Discharges, including over-irrigation.	✓	✓	✓	✓	✓	✓	✓	Continuous	Evaluate current reporting mechanisms including social media, hotlines, and websites with this strategy. Implement additional outreach efforts in Target Areas if current Jurisdictional Strategies under perform. Measure effectiveness through Outfall discharge monitoring results. Coordinate public education outreach efforts with the Riverside County Flood Control and Water Conservation District (RCFC&WCD) Public Education Unit for support. Funding is provided through the Implementation Agreement between the County and RCFC&WCD. Implementation schedule will coincide with RCFC& WCD outreach efforts for the current fiscal year.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
Optional Jurisdictional Strategies												
												Triggers:
1	Warm Springs Creek/ County of Riverside	Rural Residential/Agricultural Land Uses	Construct and manage the Integrated Mitigated Project This project will result in the creation of over 1,500 linear feet of new intermittent channel and seasonal wetlands. The 75-acre site is located south of Scott Road and west of Briggs road in the County of Riverside. The project will preserve, restore and enhance the existing un-named creek (which is tributary to Warm Springs Creek), ephemeral drainages, and associated wetland habitats. This project provided the required 2.3 acres mitigation for 3 capital projects, but is planned to have approximately 71.6 acres of surplus mitigation in the form of Habitat Enhancement, Created Habitat, Preserved Habitat or Restored Habitat for this un-named creek. In total the project is planned to install approximately 2,800 plants, including Oak trees, Sycamore riparian, Southern Willow Scrub, existing channel, and wetland species. Storm water run-on containing Nutrients and other PWQPs would be treated through infiltration and biofiltration.	✓	✓	✓	✓	✓		✓	Construction to begin in FY18/19 if all funding is secured	Construction contingent on: (1) Completing utility installation (currently in progress) (2) when all of the necessary financial resources have been secured. This strategies is placed as optional mostly due to funding. The project is partially funded with CFD funds, with the remainder is yet to be determined. The overall project budget is approximately $2M. At the time of the B.3 submittal, the plan is to bid the project by 2018. If the jurisdictional strategies fail, the excess mitigation may be used in an overall strategy to add to meet targets and goals.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
2	County of Riverside	Residential/ Commercial	Promote Incentive Partnership Programs: Live Turf Replacement & Outdoor Water Efficiency. Promote Incentive Programs with Water Agencies for BMP Retrofits.	✓	✓	✓	✓		✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) it is determined that there would be an adequate demand for such a program with surveys or other methods; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured.
3	County of Riverside and other Copermittees	Septic Systems	Implement a Partnering Rebate Program for septic system maintenance, with a focus in Target Areas.	✓	✓	✓	✓		✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) other optional strategies are not be implemented or being assessed; and (4) all of the necessary resources have been secured. Gas tax can be used for work in the road right of way for public regulatory compliance. However, other funding (not general funds) will need to be secured specifically for this strategy. At this time no funding source currently exist, and enforcement procedures are used to address failing septic systems.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
4	County of Riverside	Sewer Infrastructure	Implement a Partnering Program with Sewering Agencies (note: County of Riverside does not provide sewer system services) to identify where sewer and storm water infrastructure are in close proximity and subsequently, confirm the absence of flow at nearby major outfall during dry weather for high risk areas.	✓	✓		✓		✓	✓		Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) obtain full cooperation and continued coordination from the applicable sewering agency; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured.
5	County of Riverside	Onsite Wastewater Treatment System/ Sanitary Sewer Overflow	Implement a program for on-site wastewater treatment (septic) systems. May include mapping and risk assessment, inspection, or maintenance practices.	✓	✓				✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; and (3) septic systems have been determined to be a pollutant sources to the MS4; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured, including obtaining non-Gas Tax or General Fund revenue sources.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
6	County of Riverside	Existing Development	Provide outreach presentations to elementary, middle, and high school students.	✓	✓	✓	✓	✓	✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; and (3) septic systems have been determined to be a pollutant sources to the MS4; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured, including scheduling with the school district, obtaining targeted educational material from Principal Permittee for younger audiences, and obtaining the appropriate revenue sources.
7	County of Riverside/ Development Community	New and Redevelopment of all Land Uses	Hold external land development workshops targeting the development community (developers and their engineers).	✓	✓	✓	✓	✓	✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) obtaining positive interest from the targeted audience; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured, including obtaining the appropriate revenue sources.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
8	County of Riverside (Rural Areas)	Agricultural/ Equestrian/Livestock Land Uses	Implement outreach program for land owners of equestrian/livestock, and other agricultural operations.	✓	✓		✓	✓		✓		Triggers:
											If Nutrient Reduction Goals are not met within a Permit Term, implement this strategy within 1 year of subsequent Permit Term. See Implementation Notes for additional Triggers.	Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) obtaining positive interest from the targeted audience; (4) other optional strategies are not being implemented or being assessed; and (5) all of the necessary resources have been secured, including obtaining the appropriate revenue sources.
9	County of Riverside	Commercial, Industrial and Residential Tracts with WQMPs, Municipal	Develop inspection data tracking through GIS applications.	✓	✓	✓	✓	✓		✓		Triggers:
											See Implementation Notes	Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) all of the necessary resources have been secured, including obtaining the appropriate revenue sources.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
10	County of Riverside and Water Agencies/Districts	Commercial, Industrial and Residential	Promote/Partner incentive programs for BMP retrofits (e.g. water smart irrigation controllers, turf replacements programs, residential landscape evaluation program).	✓	✓	✓	✓	✓	✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) obtaining positive interest from the targeted audience; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured, including obtaining the appropriate revenue sources.
11	County of Riverside	Municipal Park Areas	Implement a turf replacement program in County Parks.		✓		✓	✓	✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) obtaining positive interest from the targeted audience; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured, including obtaining the appropriate revenue sources.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
12	County of Riverside /Water Districts/NGOs	Residential	Collaborate with partner agencies and groups to promote non-County sponsored incentive programs for BMP retrofits, for example, smart controllers, soil sensors, turf replacement, etc.	✓	✓	✓	✓	✓	✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) obtaining positive interest from the targeted audience; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured, including obtaining the appropriate revenue sources.
13	County of Riverside	Residential/ Commercial/ Industrial/Municipal	Outreach to large mobile landscaping service providers/vendors.	✓	✓	✓	✓	✓	✓	✓	See Implementation Notes	Triggers: Implementation of this strategy will be triggered if (1) failure to meet any goal pathways and (2) it has been determined by the County of Riverside through adaptive management that implementation is necessary; (3) obtaining positive interest from the targeted audience; (4) other optional strategies are not be implemented or being assessed; and (5) all of the necessary resources have been secured, including obtaining the appropriate revenue sources.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
WMA Strategies												
1	County of Riverside and Regional Jurisdictions	N/A	Coordinate with Integrated Regional Water Management (IRWM) regional water quality managers to identify and apply for grants related to water quality improvement projects (retrofits, stream rehabilitation, or other projects).	✓	✓	✓	✓	✓		✓	Continuous	Triggers: Interim goals are not met; progress towards numeric goals is not adequate; staff resources are identified and secured; adaptive management informs the RA's to implement. Resources required to implement strategy: Participation as a stakeholder in the IRWM Program as appropriate; Council approval of an IRWM proposed project; staffing necessary to implement any identified project.
2	County of Riverside and Regional Jurisdictions	N/A	Participate in Santa Margarita River Watershed Nutrient Initiative - Stakeholder Group to exchange information on successes on strategies. Implement or refine existing strategies to utilize other jurisdiction's strategical successes.		✓				✓	✓	Continuous	Triggers: Implementation may be triggered if (1) it has been determined by the County of Riverside through adaptive management that implementation is necessary; and (2) all of the necessary resources have been secured.
3		N/A										Triggers:

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Targeted Source Categories	Strategy	Priority Water Quality Pollutants (PWQP) Addressed						Implementation Frequency Schedule		Implementation Notes
				Bacteria	Eutrophic/ Nutrients (HPWQC) Dry Weather Flows	Metals	Sediment	Trash	Dry Weather Flows	FY 2018	Future Fiscal Year(s)	
	County of Riverside and Regional Jurisdictions		Partner/Implement Sustainable Landscapes Program with Water Agencies and Special Districts (e.g., Valley-Wide Recreation and Park Districts) to encourage landscape retrofits.	✓	✓		✓		✓	✓	Continuous	Implementation may be triggered if (1) it has been determined by the County of Riverside through adaptive management that implementation is necessary; and (2) all of the necessary resources have been secured.
4	County of Riverside and Regional Jurisdictions	N/A	Contingent on Regional Board approval of an implementable process, facilitate alternative compliance projects, for new development that are focused on restoring or creating beneficial uses.	✓	✓	✓	✓	✓	✓	✓		Triggers:
											Upon Regional Board Approval	Implementation may be triggered if (1) it has been determined by the County of Riverside through adaptive management that implementation is necessary; and (2) all of the necessary resources have been secured.
5	County of Riverside, Copermittees, Water Agencies/Districts	Residential, Commercial, Agricultural, and Industrial	Collaborate with watershed partners to develop consistent messaging to targeted audiences, such as residential, agricultural, commercial/industrial/residential land uses to conserve water and eliminate dry weather flows.	✓	✓	✓	✓	✓	✓	✓	Upon WQIP Approval	Review existing program and update as necessary to focus on Priority Water Quality Conditions (i.e., Eutrophication).

*NOTES: "Continuous" refers to a strategy that is already being implemented and will continue throughout Future Years.

Table 4-11. Jurisdictional Strategies Selected to Address Eutrophication Impacts in the ~~Upper~~ Middle SMR Subwatershed – Riverside County Flood Control and Water Conservation District

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule		Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2018	Future Fiscal Years	
Illicit Discharge, Detection, and Elimination (IDDE) Program (Prov E.2)														
IDDE-1	Riverside County Flood Control and Water Conservation District	New Development, Residential, Commercial, Industrial	Promote a public reporting mechanism for incidental observations of IC/IDs.	Dry	X	X		X	X	X	X	X	Ongoing	**The District, as a Principal Permittee,** will continue operating a County-wide 1-800 hotline number to enable the public to report illegal dumping (including discharges from Industrial facilities, Commercial sites, and Construction projects), excess irrigation runoff, clogged storm drains, and faded or missing catch basin stencils. The hotline provides schedules for HHW and antifreeze, batteries, oil and paint clean-up locations and is capable of receiving reports in English and Spanish, 24 hours per day, seven days per week. IDDE is included in the JRMP template as part of each Copermittee's SOPs. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees. T**he District, as a Copermittee,** will have a dedicated e-mail address/reporting link, located at http://rcflood.org/npdes/PollutionReporting.aspx, where the public can report any concerns, damage, or illegal dumping to storm drains, dams, basins, levees and/or channels. The District will fund this program through the Santa Margarita Benefit Assessment Fund.
IDDE-2	Riverside County Flood Control and Water Conservation District	Industrial, Residential, Commercial (incl. nurseries)	Train municipal field staff to identify and report ICIDs.	Dry	X	X		X		X	X	X	Ongoing	**The District, as a Principal Permittee,** will continue to provide Copermittees with annual training that focuses on IC/ID identification and reporting. These training courses have become routine SOPs in the JRMP and will be funded through the cooperative Implementation Agreement with the SMR Copermittees. T**he District, as a Copermittee,** will require its field inspection staff to attend this training. The District will fund this program through the District General Zone Fund.
IDDE-3	Riverside County Flood Control and Water Conservation District	Industrial, Residential, Commercial	Implement a District right-of-way inspection program to identify and report Illicit Connections and Discharges.	Dry	X	X		X		X	X	X	Ongoing	**The District, as a Copermittee,** will ensure that its field crews and field contractors are trained to identify, report and initiate elimination of ICIDs within District right-of-ways. The District will fund this program through the District General Zone Fund.
IDDE-4	Riverside County Flood Control and Water Conservation District	Open Spaces	Develop response procedures for homeless issue complaints to prevent or reduce trash and debris from entering receiving waters.	Dry	X	X	X	X	X	X	X	X	Ongoing	**The District, as a Principal Permittee,** will develop response procedures for homeless issue complaints to prevent or reduce trash and debris from entering receiving waters. These procedures will include coordination with the Sheriff's Department and other agencies for further investigation and clean-up. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees. **The District, as a Copermittee,** will implement these procedures to remove the trash and debris associated with

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule		Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2018	Future Fiscal Years	
														homeless camps from waterways. The District will fund this program through the District General Zone Fund.
IDDE-5	Riverside County Flood Control and Water Conservation District	Existing Development	Identify areas with excessive water use	Dry	X	X		X	X	X	X	X	As needed	**The District, as a Copermittee,** will collaborate with water suppliers to evaluate water usage data to identify areas with excessive water use; such areas are expected to produce proportionately greater non-stormwater runoff so would be targeted for IDDE inspection. The District will fund this program through the Santa Margarita Benefits Assessment fund with in-kind services from water supply agencies.
IDDE-6	Riverside County Flood Control and Water Conservation District	Other Point and Non-Point Sources	Assessment of Permitted flows	Dry	X	X				X		X	Complete by 2023	**The District, as a Principal Permittee**, will conduct a study to evaluate the source contributions of dry weather flow and nutrient loading from natural and permitted flows. The project will include: permitted discharge & purple pipe inventory; natural sources inventory (rising groundwater, springs, etc.); assessment of flows covered by de-minimis permits; and flow characterization. The products will include flow and load estimates, a map of these sources, and recommendations for management approaches. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees and seek assistance and in-kind services from water agencies and other SMR stakeholders.
Development Planning (Prov E.3)														
DEV-1	Riverside County Flood Control and Water Conservation District	New Development, Redevelopment, Residential	Implement Updated BMP Design Manual.	Both	X	X	X	X	X	X	X	X	Ongoing	**The District as a Copermittee** will review WQMPs for conformance with the BMP Design Manual as requested by County of Riverside staff, where there is flood plain encroachment and for projects requiring an encroachment permit from the District. In addition, the District as Copermittee will evaluate its capital improvement projects to determine Priority Development Project (PDP) criteria applicability and will prepare Project Water Quality Management Plans in conformance with the BMP Design Manual for projects meeting PDP criteria. The District will fund this program through pan check review fees and through the District General Zone Fund.
DEV-2	Riverside County Flood Control and Water Conservation District	New Development, Redevelopment, Residential	Update the BMP specifications (Soil mix, plant types, configuration) in the BMP Design Manual to enhance retention of nutrients.	Both	X							X	Ongoing	**The District, as Principal Permittee,** is using its LID Testing and Demonstration Facility to monitor and study the most recent approaches and techniques for biofiltration systems. These efforts include evaluating different soil media, plant palettes, and system configurations to optimize nutrient retention. This research will inform development of improved designs for biofiltration systems for nutrient retention and the District will ensure that the BMP Design Manual is revised to incorporate recommendations arising from this research. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule		Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2018	Future Fiscal Years	
DEV-3	Riverside County Flood Control and Water Conservation District	New Development, Redevelopment, Residential	Update the BMP Design Manual with landscape design and maintenance guidance	Both	X	X		X	X	X	X	X	Ongoing	**The District, as Principal Permittee**, will develop improved guidance for the design, implementation, and maintenance of landscaping for development projects. The guidance will focus on reducing the use of fertilizers, selection of plants, and outline maintenance procedures to prevent non-stormwater flows and improve management and containment of landscape clippings. The BMP Design Manual will be updated with this guidance.
DEV-4	Riverside County Flood Control and Water Conservation District	New Development, Redevelopment, Residential	Train staff on Updated BMP Design Manual.	Both	X	X	X	X	X	X	X	X	Annually	**The District, as a Principal Permittee,** will revise its training module to include the updates to the BMP Design Manual and deliver the module to the Copermittees. **The District, as Copermittee**, will ensure that its staff attends this training. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees.
Construction Management (Prov E.4)														
CON-1	Riverside County Flood Control and Water Conservation District	New Development, Residential, Commercial, Industrial	Train staff on implementation of BMPs that reduce the potential of HPWQC and PWQP loading, and are site specific and seasonally appropriate to the construction phase, year round.	Both	X	X		X	X	X	X	X	Annually	**The District, as a Principal Permittee**, will continue providing annual training to enable Copermittees to effect proper implementation of year-round site-specific/phase-specific construction BMPs, CGP requirements, and SWPPPs at municipal construction sites. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees. **The District, as a Copermittee,** will ensure that its staff attend and apply this training to the preparation and oversight of SWPPPs prepared for District projects. The District will fund this program through the District General Zone Fund.
CON-2	Riverside County Flood Control and Water Conservation District	New Development, Residential, Commercial, Industrial	Require preparation and implementation of SWPPPs	Both	X	X	X	X	X	X	X	X	Annually	**The District, as Copermittee,** will review SWPPPs and inspect its construction sites for conformance with the Stormwater and Non-Stormwater Pollution Control provisions of its standard specifications and contract documents.
Existing Development Management (Prov E.5)														
ED-1	Riverside County Flood Control and Water Conservation District	Municipal Facilities	Inspect and maintain flood control facilities.	Both	X	X	X		X	X	X	X	Ongoing	**The District, as a Copermittee**, will continue maintaining its facilities by removing debris and excess sediment, repairing eroded areas, tracking slopes, maintaining vegetated areas, rehabilitating and/or replacing structural rip-rap, repairing grout, removing and replacing concrete channel linings, repairing washouts, etc. The District will fund this program through the District General Zone Fund.
ED-2	Riverside County Flood Control and Water Conservation District	Existing Development, parks and recreation, orchards/vineyards/nurseries, horse ranches/equestrian, other agriculture, open space	Inspect District outfalls and coordinate abatement activities with affected jurisdictions.	Both	X	X		X					Annually	**The District, as a Copermittee,** will inspect all of its outfalls twice per year and work with affected jurisdictions to provide outreach materials to the general public to abate dry weather flows. The District will fund this program through the Santa Margarita Benefit Assessment Fund.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule		Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2018	Future Fiscal Years	
ED-3	Riverside County Flood Control and Water Conservation District	Existing Development	Provide funding for Riverside County Fire Department HAZMAT Response Program.	Both	X	X	X	X		X	X	X	Annually	**The District, as a Principal Permittee**, will provide funding ($1,825,000 over period FY17/18 to FY21/22) to Riverside County Fire Department for watershed-wide hazardous-material incident response and clean-up.
Enforcement Response Plans (Prov E.6)														
ERP-1	Riverside County Flood Control and Water Conservation District	New Development, Residential, Commercial, Industrial, parks and recreation, orchards/vineyards/nurseries, horse ranches/equestrian, other agriculture, open space	Require the implementation of the ERP to ensure proper use of BMPs to prevent or reduce the discharge of pollutants into MS4 networks.	Both	X	X	X	X	X	X	X	X	Ongoing	**The District, as a Principal Permittee,** will provide training to the Copermittees on implementation of the ERP during existing development inspections. Funding will be provided through the cooperative Implementation Agreement with the SMR Copermittees and the use of the District General Zone Fund. **The District, as a Copermittee,** will ensure that its inspection staff attends and applies ERP training to investigations arising from IDIC notifications.
ERP-2	Riverside County Flood Control and Water Conservation District	Construction Activities	Require the implementation of the ERP to ensure that private construction activities comply with the Construction General Permit and Copermittees' Stormwater Ordinances.	Both	X	X	X	X	X	X	X	X	Ongoing	**The District, as a Principal Permittee,** will provide training to the Copermittees on proper implementation of the ERP during construction site inspections. Funding will be provided through the cooperative Implementation Agreement with the SMR Copermittees and the use of the District General Zone Fund. **The District as a Copermittee** will ensure that its inspection staff attends and applies ERP training to oversight of District construction activities. The District will fund this program through the District General Zone Fund.
Public Education and Participation (Prov E.7)														
PUB-1	Riverside County Flood Control and Water Conservation District	Industrial, Commercial, Residential	Collaborate with watershed partners to develop consistent messaging to targeted audiences, such as commercial residents to conserve water and reduce dry weather flows.	Both	X	X	X	X	X	X	X	X	Ongoing	**The District, as a Principal Permittee and a Copermittee,** will collaborate with Copermittees and watershed partners to develop and deliver a comprehensive education and outreach program that will enable consistent messaging to be delivered to targeted audiences and encouraging practices that conserve water and eliminate excess irrigation runoff. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees.
PUB-2	Riverside County Flood Control and Water Conservation District	Existing Development	Develop and provide outreach material to mobile landscape service providers that focuses on runoff and nutrient reduction.	Both	X		X		X	X		X	Ongoing	**The District, as a Principal Permittee and a Copermittee,** will develop and provide educational materials and outreach, incorporating technical content developed under PUB-1, to landscaping service providers. The materials will focus on preventing irrigation runoff, minimizing fertilizer and pesticide use, and proper containment and disposal of material. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule		Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2018	Future Fiscal Years	
PUB-3	Riverside County Flood Control and Water Conservation District	Residential	Provide outreach presentations to elementary, middle, and high school students to ensure that environmental protection is addressed early-on during the academic process.	Both	X	X		X	X	X		X	Ongoing	**The District, as a Principal Permittee and a Copermittee,** will provide educational materials, incorporating informational content developed under PUB-1, to Homeowner Associations. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees.
PUB-4	Riverside County Flood Control and Water Conservation District	Existing Development, parks and recreation, orchards/vineyards/nurseries, horse ranches/equestrian, other agriculture, open space	Enhanced Jurisdictional: Coordinate/develop outreach materials in support of Copermittee enhanced inspection, outreach & enforcement programs	Both	X	X		X	X	X	X	X	Ongoing	**The District, as a Principal Permittee and a Copermittee,** will coordinate the development and distribution of an informational brochure for nurseries, vineyards, and horse ranches that focus on BMPs that reduce nutrients in runoff. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees.
PUB-5	Riverside County Flood Control and Water Conservation District	Existing Development, parks and recreation, orchards/vineyards/nurseries, horse ranches/equestrian, other agriculture, open space	**Enhanced Jurisdictional:** Develop a webpage to ensure Copermittees and the general public have access to the latest NPDES information.	Both	X				X	X	X	X	Ongoing	**The District, as a Principal Permittee and a Copermittee**, will further develop a website intended to encourage community stewardship of the Santa Margarita River. The District will fund this program using NPDES Benefit Assessment funds.
Optional Jurisdictional Strategies and Schedule														
OPT-1	Riverside County Flood Control and Water Conservation District	New Development, Residential, Commercial, Industrial	Perform infiltration-testing at District basins and outfalls to collect data to assess the feasibility of regional recharge facilities or individual infiltration BMPs.	Both	X	X	X					X	Ongoing	**The District, as a Copermittee,** will evaluate District basins to determine opportunities for managing these facilities to optimize infiltration. Enhancing infiltration rates within existing infrastructure may increase wet and dry weather flow capture thereby reducing pollutant loading. Revised basin management practices will be implemented starting in 2021 as determined by need through the adaptive management process to effect additional load reductions. The District will fund this program through the District General Zone Fund.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule		Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2018	Future Fiscal Years	
OPT-2	Riverside County Flood Control and Water Conservation District	New Development, Residential, Commercial, Industrial	Partner with community groups to engage the public in promoting educational programs and community cleanups.	Both	X	X		X	X				Ongoing	**The District, as a Copermittee,** will partner with community groups to further enable the public to participate in channel cleanups. Clean-ups will remove anthropogenic bio-degradable debris that can contribute to nutrient loading. The annual Santa Ana River clean-up event is a model. The District will fund this program through the Santa Margarita Benefit Assessment Fund.
OPT-3	Riverside County Flood Control and Water Conservation District	New Development, Residential, Commercial, Industrial	Evaluate the suitability of regional basins.	Both	X	X						X	Ongoing	**The District, as a Copermittee,** will incorporate water quality features into a planned regional detention basin upstream of Interstate15 within the City of Wildomar. The District will fund this program through the District General Zone Fund.
Optional WMA Strategies and Schedule														
WMA-1	Upper and Middle Watershed Jurisdictions	IDDE	Partner with Water District(s) on pilot projects to abate dry weather flows.		X	X		X					As needed	**The District, as a Principal Permittee,** will screen the watershed's MS4 infrastructure for opportunities to construct dry weather flow diversions to the sanitary sewer for outfalls where persistent dry weather flows are not being abated by non-structural control strategies. The District will fund this program through the Santa Margarita Benefit Assessment Fund.
WMA-2	Upper and Middle Watershed Jurisdictions	IDDE	Coordinate incentive programs for reducing outdoor water use with Water Districts		X	X				X	X		As needed	**The District, as a Principal Permittee,** will partner with Water Districts on grant funding opportunities that encourage low water landscaping, use of rain barrels, etc. The District will fund this program through the cooperative Implementation Agreement with the SMR Copermittees.
WMA-3	Upper and Middle Watershed Jurisdictions	New Development	Update WMAA.		X		X			X	X		As needed	**The District, as a Principal Permittee,** will prepare an updated WMAA projects created with reference Integrated Water Resource Manageme Conservation Plan. The District will fund the WMAA update through the Copermittees unless grant opportunities can be located.
WMA-4	Upper and Middle Watershed Jurisdictions	New Development	Update Water Quality Equivalency Calculations as part of the Alternative Compliance program.		X	X	X	X		X	X		As needed	**The District, as a Principal Permittee,** will update water quality equivalency calculations as part of the regional criteria for alternative compliance. The District will fund this effort through the cooperative Implementation Agreement with the SMR Copermittees.
WMA-5	Upper and Middle Watershed Jurisdictions	New Development	Submit Grant Applications to support the development and/or implementation of the WMAA and Alternative Compliance Program.		X	X	X	X		X	X		As needed	**The District, as a Principal Permittee,** will search for applicable grant opportunities and partnerships with Copermittees, stakeholder groups, State and Federal agencies, non-profit organizations, etc. to develop and/or implement the WMAA and Alternative Compliance program. The District will fund the development of the WMAA through the cooperative Implementation Agreement with the SMR Copermittees.
WMA-6	Upper Watershed Jurisdictions	Various Point and Non-Point Sources	Develop a Stormwater Resources Plan.		X	X	X			X	X		As needed	**The District, as a Principal Permittee,** will seek partnerships with Water Districts to develop a Stormwater Resources Plan that will identify and select, through a systematic process of prioritization, candidate projects for funding consideration. The District will seek grant funding opportunities to assist Water Districts in funding this effort.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule		Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Food Supply	FY2018	Future Fiscal Years	
WMA-7	Upper and Middle Watershed Jurisdictions	Various Point and Non-Point Sources	Coordinate with the SMR Nutrient Initiative Group to share watershed-related information.		X								As needed	**The District, as a Principal Permittee,** will continue providing support for the analysis of eutrophication and nutrient loading in the upper Santa Margarita River and tributaries. The District will fund this support through the cooperative Implementation Agreement with the SMR Copermittees.
WMA-8	Upper and Middle Watershed Jurisdictions	IDDE and Various point and Non-Point Sources	Coordinate with the SMR IRWM group to share watershed-related information.		X	X		X		X	X		As needed	**The District, as a Principal Permittee,** will seek partnerships with Water Districts to manage water resources, turf removal programs, landscape water reduction, use of recycled water, BMP implementation in Ag and equestrian land uses, etc. The District will seek grant funding opportunities to assist Water Districts in funding these programs.
WMA-9	SMR	Various Point and Non-Point Sources	Coordinate with the Consultation committee to provide updates and share watershed-related information.		X	X		X	X	X	X		As needed	**The District, as a Principal Permittee,** will seek partnerships with Water Districts, stakeholder groups, non-profit organizations, etc. to discuss the status of the health of the watershed in efforts to identify projects to address common issues.

4.2.1.3 Optional Jurisdictional

Optional jurisdictional strategies include those that Copermittees and the City of Menifee may implement to achieve interim and final numeric goals. As part of the five-year assessment process, implementation of strategies will be evaluated against progress towards goals. Where interim goals are met and the current strategies and schedules are determined to be adequate to achieve the subsequent interim or final goal, Copermittees and the City of Menifee may adjust current strategies. Where interim goals are not achieved, and/or it is determined that the current strategies, even if implemented on accelerated schedules, would not achieve future interim or final goals, optional jurisdictional strategies may be triggered and implemented as resources allow. Implementation is contingent on the time needed to assemble resources and the availability of funding. The process for identifying optional jurisdictional strategies is summarized in **Figure 4-11**. Optional strategies for each Copermittee and the City of Menifee are detailed in the jurisdictional strategies tables above. The optional jurisdictional strategies include optional programs, retrofits, and stream rehabilitation programs per Permit Provision B.3.b.

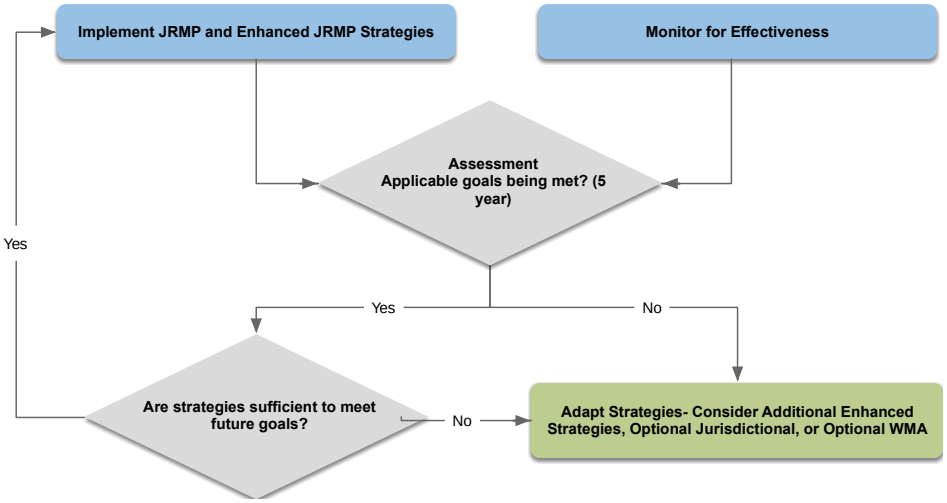

Figure 4-11. Adaptive Management Process to Identify Additional Strategies

4.2.1.3.1 Enhanced Street Sweeping

As described in the Jurisdictional Strategies, street sweeping can be an effective strategy to mediate pollutants that are transported by sediment or leaf debris, including nutrients and other pollutants (e.g. metals, oil and grease, bacteria, and trash), into the ~~storm drain~~MS4s. Street sweeping frequencies and routes could be targeted to more effectively remove debris from problem areas identified by the Copermittees and the City of Menifee.

4.2.1.3.2 Coordination with Water Districts

The Copermittees and the City of Menifee could coordinate with water districts to identify areas with high water usage during dry months, and, thereby, pinpoint and address potential sources of dry weather flows. The coordination could include community surveys and enforcement efforts for over-irrigation, and incentive programs to encourage proper irrigation practices.

4.2.1.3.3 Capital Improvement Program Projects

Capital Improvement Program (CIP) projects could include structural BMPs that treat and/or reduce dry weather and stormwater runoff. These type of BMPs are designed to treat pollutants based on site-specific conditions. Typically, the total cost of structural BMPs tend to be higher than non-structural BMPs, as installation and maintenance is required. Furthermore, extensive studies are needed to select appropriate devices that will treat the desired pollutants at each site. The installation of structural BMPs may be more cost-effective if these are considered in initial planning phases for specific projects. These projects could provide a multi-pollutant benefit in reducing runoff.

4.2.1.3.4 Dry Weather Treatment

Dry weather retrofits (and infiltration or treatment) could be an effective strategy to reduce dry weather flows and reduce multiple pollutants. A dry weather retrofit may include the reconfiguration of the outlets of existing flood control basins to allow more time for evapotranspiration. This could be particularly effective in eliminating non-stormwater discharges to receiving waters. Infiltration BMPs may include infiltration basins, trenches, and galleries, bioretention systems, dry wells, hybrid bioretention/dry wells, or permeable pavements. Infiltration BMPs could be considered in areas with appropriate soils that promote infiltration and where groundwater augmentation is feasible (i.e., stormwater quality would not affect groundwater basin).

The Copermittees and the City of Menifee have reason to question the feasibility of infiltration (independent of a flood control function) in large portions of the ~~Upper~~ Middle SMR Subwatershed that are served by ~~storm drain system~~MS4 facilities. Investigations and discussions with stakeholders during this planning process revealed three concerns:

1. First, the condition of the groundwater below most of the ~~storm drain system~~MS4 facilities is sensitive. There are two aquifers, one on top of the other, separated by a leaky clay layer. The aquifer on top is of poor quality, while the deeper aquifer is of better quality and is the one used for water supply. There is concern that if the surface conditions are changed with infiltration basins, the surface water will enter the top aquifer and force poor quality water from it to enter the deeper aquifer and, thereby, jeopardize drinking water supplies.

2. Second, infiltration rates are often poor to non-existent due to high groundwater conditions. The RCFCWCD discovered this as a result of infiltration tests completed as it investigated the feasibility of potential infiltration basin sites.
3. Third, there is a concern for water rights. Surface water in the SMR WMA has been adjudicated. Camp Pendleton is downstream, and has a claim on surface flows generated in the ~~Upper~~ Middle SMR Subwatershed. If surface flows from the ~~Upper~~ Middle SMR Subwatershed do not exceed certain volumes, they must be replaced, usually with much more expensive Colorado River water. Thus, surface flows diverted to groundwater would have to be replaced, at a high cost, to satisfy the claim.

Taken together, these concerns may be difficult to overcome. They may effectively prohibit the selection of infiltration as an optional strategy in many areas of the ~~Upper~~ Middle SMR Subwatershed.

4.2.2 Strategies to Address Eutrophication Impacts and Nutrients in the Lower SMR Subwatershed

The Permit establishes that ~~Water Quality Improvement Plan~~WQIP strategies should be identified on the basis of their likelihood to "effectively prohibit non-storm water discharges to the ~~storm drain system~~MS4, reduce pollutants in storm water discharges from the ~~storm drain system~~MS4 to the MEP, protect the beneficial uses of receiving water from ~~storm drain~~MS4 discharges, and/or achieve the interim and final numeric goals identified under Provision B.3.a."

Four primary jurisdictional strategy programs are required under the 2013 Permit, each requiring its own inventory of potential pollutant sources. These include:

1. Illicit Discharge Detection and Elimination (~~storm drain~~MS4 outfall inventory);
2. Development Planning (Priority development project [PDP] and BMP inventory);
3. Construction Management (Construction site inventory); and
4. Existing Development Management (Industrial, Commercial, Municipal, and Residential inventories).

San Diego County has developed inventories for each of these categories. Known and suspected sources contributing to nutrient loading are discussed in detail in **Chapter 2**. These known and suspected sources include persistently flowing outfalls and specific land use types. Modeling completed for the SMR identified irrigated agriculture, orchards, vineyards and nurseries, open scrublands and grasslands, and residential land uses as the largest contributors of total nitrogen load. Total phosphorus loading is being contributed by roads, orchards, vineyards and nurseries, open scrublands and grasslands, and residential land uses. Jurisdictional strategies are targeted towards reducing dry weather flow and addressing the types of land use sources that are within the ~~stormwater conveyance~~MS4 ~~system~~ drainage area.

Additional optional strategies have also been identified. These optional strategies are currently being implemented, are planned for implementation, or may be triggered for implementation in the future to address the HPWQC.

Strategies to address nutrients in Rainbow Creek and eutrophic conditions in the SMR Estuary were chosen on the basis of their expected effectiveness in reducing pollutant sources and their suitability and potential to be implemented in order to achieve required goals. Non-structural

strategies represent the first line of defense for management of stormwater pollutants. These institutional programs tend to be the most cost-effective options for water quality improvement because they focus on controlling the sources of pollution throughout the landscape before pollutants can be washed downstream by stormwater runoff. During development of previous ~~Water Quality Improvement Plan~~WQIPs throughout the San Diego Region (San Diego Regional Water Quality Control Board 2016b), maintenance and enhancement of non-structural strategies has been acknowledged by the Regional Water Board to reduce pollutant loads by approximately 10%.

Schedules for strategy implementation reflect the time necessary to fully fund, develop, initiate, and complete the chosen strategies. Strategies with relatively high benefit outcomes and low resource requirements are scheduled for earlier implementation. Strategies planned for later years may have implementation requirements that depend on the outcomes of earlier strategies, or might have significant funding needs.

While the chosen strategies focus on nutrients, these strategies address multiple pollutant sources and constituents as shown in each of the jurisdictional strategy tables above. Optional strategies are also presented in the jurisdictional strategy tables above. Optional strategies may be triggered on the basis of a set of given conditions, such as necessity or as resources are available. The strategies and schedules are subject to change, and are contingent upon programmatic requirements and funding availability. They will be modified through the adaptive management process as needed.

4.2.2.1 Modeling of Structural Strategies for Rainbow Creek

To comply with the Nutrient TMDL in Rainbow Creek as required by Attachment E.3, Table 3.3, of the Permit, the County of San Diego completed a modeling effort to identify the most effective structural strategies for reducing nutrient loading. The purpose of the modeling is to provide reasonable assurance that a specific set of actions will result in sufficient reduction in nutrients to meet compliance with the Final Effluent Limitations assigned to the County of San Diego in Attachment E.3.b.2(b)(ii). To ensure consistency with modeling efforts throughout the watershed, the Rainbow Creek modeling effort built upon modeling completed for the SMRNIG investigation for the SMR Estuary and river (Sutula et al, 2016). That Hydrological Simulation Program FORTRAN (HSPF) watershed model was recently updated and the details can be found in the updated allocation memorandum (Tetra Tech, May 2016) and in Appendix 4A. The updated model improved the representation of land uses within San Diego County and provided additional hydrological refinements to improve the model simulation results for the Rainbow Creek watershed. This updated model was then used to simulate potential structural strategies to reduce nutrients in Rainbow Creek.

The modeling results demonstrated that, given the constraints and conditions of the Rainbow Creek watershed, biofiltration that is designed to provide advanced nutrient treatment is the most appropriate strategy to address wet weather discharges from outfalls to Rainbow Creek. The flat topography in this specific part of the watershed combined with a shallow groundwater level is a constraint for the design of structural BMPs. Wetland channels are recommended and can in some cases be sited in the public right-of-way to intercept stormwater and dry weather runoff. Stream restoration can also be an effective strategy to help restore beneficial uses to degraded creeks and enhance nutrient capture and assimilation. Typical stream restoration projects include reshaping of the channel, installation of features to enhance fluvial processes, and replanting of riparian vegetation.

The County of San Diego proposes to implement structural strategies to address wet weather outfall discharges into Rainbow Creek. Work on the siting and design of these structural BMPs is underway. Funding has been secured through Fiscal Year 19-20 to select sites for structural BMP installation and to move forward with the implementation of BMPs as soon as possible. Currently, the structural BMPs in the Rainbow Creek watershed are being planned to specifically target areas with the highest observed loading of nutrients. The model shows that 6 of the 19 outfalls in the Rainbow Creek subwatershed account for 77% of the total nutrient loading coming from County MS4. Focusing the structural BMPs (nutrient-sensitive biofiltration, wetland channels, or an equivalent approach) to reduce loading at these sites is being analyzed by the engineering and design team. The ongoing work includes conducting a constraints analysis and preparing preliminary engineering designs which will be used to evaluate whether this is the most effective and efficient approach to reducing nutrient loading in the watershed during wet weather. During the design phase, alternate BMPs than the ones listed here may be selected so long as they provide the equivalent level of nutrient load reduction. The level of flow treated for each individual BMP will also be determined and targeted to achieve the appropriate load reductions during the design phase.

The strategies, as determined by reasonable assurance compliance modeling, that are proposed for implementation in order to meet the Rainbow Creek Nutrient TMDL are summarized in **Table 4-12**. Additional details on the modeling techniques and results can be found in Appendix 4A. As required by Permit Provision B.3, this modeling effort provides reasonable assurance that implementation of these proposed structural strategies or equivalent structural strategies will achieve compliance with the Final Effluent Limitations assigned to the County of San Diego.

The County of San Diego's five-year budget forecast identifies the need for funding to continue for the structural strategies in Rainbow Creek watershed and it is expected that funds will be available for this work, since achieving compliance with the Nutrient TMDL is a priority for the County of San Diego. However, it should be noted that the Watershed Protection Program of San Diego County is currently a General Fund program and thus funding must be secured on an annual basis. Progress and status of implementation of the structural BMPs in the Rainbow Creek watershed will be updated annually as part of the Watershed annual reports.

The County of San Diego has already begun the design phase for wetland channels to capture runoff from approximately 200 acres of the southern portion of Rainbow Valley, as shown in Figure 4-12. This includes runoff from several of the large nurseries in the valley and treats the drainage areas associated with HST-01 and SMG-089. The proposed channel wetlands plan to include segments of channel along 5th Street and Huffstatler Street north of 5th Street. The design will reconfigure the existing channels and include a gravel substrate topped by soil media and vegetation creating a subsurface flow wetland which will maximize nutrient reduction through biological uptake, microbial interactions, and anaerobic zone for denitrification. The finalized designs for this structural BMP are scheduled to be completed by June 2019, with a construction bid package awarded in late 2019. The County is working towards installing the remaining structural BMPs in a timely manner so that monitoring results can demonstrate compliance with the Rainbow Creek TMDL prior to the December 31, 2021 deadline.

~~To comply with the Nutrient TMDL in Rainbow Creek as required by Attachment E.3, Table 3.3, of the Permit, San Diego County identified the most effective structural strategies for reducing nutrient loading through a modeling effort. The purpose of the modeling is to provide a reasonable assurance that a specific set of actions will result in sufficient reduction in nutrients to meet compliance. To ensure consistency with modeling efforts throughout the watershed, the modeling effort built upon the modeling completed for the SMRNIG investigation for the SMR Estuary and river (Sutula et al, 2016). That Hydrological Simulation Program FORTRAN (HSPF) watershed model was recently updated and the details can be found in the updated allocation memorandum (Tetra Tech, May 2016) and in **Appendix 4A**. The updated model improved the representation of land uses within San Diego County and provided additional hydrological refinements to improve the model simulations results for the Rainbow Creek watershed. This updated model was then used to simulate potential structural strategies to reduce nutrients in Rainbow Creek.~~

~~The modeling results demonstrated that, given the constraints and conditions of the Rainbow Creek watershed, nutrient-sensitive biofiltration is the most appropriate strategy to address all wet weather discharges from outfalls to Rainbow Creek. Wetland channels are recommended and can be sited in the public right-of-way to intercept stormwater runoff. The modeling showed that stream restoration and near-channel improvements can provide additional nutrient removal. Stream restoration can be an effective strategy to help restore beneficial uses to degraded creeks and enhance nutrient capture and assimilation. Typical restoration projects include reshaping of the channel, installation of features to enhance fluvial processes, and replanting of riparian vegetation.~~

~~Based on the results of the modeling, the County of San Diego proposes to implement structural strategies to address wet weather outfall discharges into Rainbow Creek. This will include nutrient-sensitive biofiltration at six priority outfalls, the construction of wetland channels at these six priority outfalls, and more than 2,000 linear feet of stream restoration and channel improvements (or equivalent approach). The strategies, proposed to meet the Rainbow Creek Nutrient TMDL, are summarized in **Table 4-12**~~**Table 4-12**. ~~Additional details on the modeling techniques and results can be found in **Appendix 4A**. As required by Permit Provision B.3, this modeling effort provides reasonable assurance that implementation of these proposed structural strategies will achieve compliance with the TMDL requirements.~~

Figure 4-12. Proposed Structural BMP Currently in Design Phase in Rainbow Valley

Table 4-12. Proposed Structural Strategies to Meet Compliance with Rainbow Creek Nutrient TMDL

Strategy[1]	Units	Quantity[2]	Scheduled Compliance
Nutrient-Sensitive Biofiltration (Based on six priority outfalls) or equivalent	acres	0.21	12/31/2021
Wetland Channels (Based on six priority outfalls) or equivalent	acres	0.39	12/31/2021
Stream Restoration and Channel Improvements or equivalent (Public-Private Partnerships)	linear feet	2,143 [3]	12/31/2021

1. The County of San Diego has concerns in that there is no long-term funding source(s) identified to fund structural BMPs and their ongoing operation and maintenance.
2. Note that quantities are based on planning-level, desktop analyses. Actual quantities will vary during implementation on the basis of site-specific designs, conditions, and constraints.
3. Sized based on rate of 0.075 lbs/ft/yr removed of TN (Chesapeake Stormwater Network and Center for Watershed Protection, 2014).

4.2.2.2 Jurisdictional Strategies

The Copermittees have identified jurisdictional strategies that will be implemented as part of their JRMPs. Achievement of water quality benefits will ultimately be measured against the interim and final numeric goals as discussed in **Section 3.3.1**. The key sources for the County of San Diego and the relative loading of nutrients from those sources to the County's storm drainMS4s provide the foundation for strategy selection. The priority sources and relative nutrient loading are summarized for the County of San Diego in **Table 4-13**.

Table 4-13. Summary of Key Sources of Nutrients for the County of San Diego

Key Sources	Total Nitrogen[1]	Total Phosphorus[1]
Orchards, Vineyards, Nurseries	56.60%	53.40%
Residential Areas/Activities	20.90%	23.30%
Other Agriculture	5.00%	4.50%

1. As a percentage of the total loading to the Copermittee's storm drain systemMS4.

The jurisdictional strategies can be categorized into three types:

1. Strategies building on the required JRMP elements in Provision E of the Permit. These include the JRMP requirements as well as modifications and enhancements within existing programs to provide a more focused approach, specifically addressing nutrients;
2. Optional jurisdictional strategies that may be implemented to achieve the interim and final goals; and
3. Coordinated strategies involving collaboration amongst multiple agencies within the WMA working towards common goals.

Under the Permit, strategies are required to be identified for the following six components. The required components are:

1. Illicit Discharge Detection and Elimination (~~storm drain~~MS4 outfall inventory) [Provisions D.2 and E.2];
2. Development Planning (PDP and BMP inventory) [Provision E.3];
3. Construction Management (Construction site inventory) [Provision E.4];
4. Existing Development Management (Industrial, Commercial, Municipal, and Residential inventories) [Provision E.5];
5. Enforcement Response Plans [Provision E.6]; and
6. Public Education and Participation [Provision E.7].

Table 4-14 presents the jurisdictional strategies planned for implementation to address nutrients in the Lower SMR Subwatershed.

Table 4-14. Jurisdictional Strategies for the Lower SMR Subwatershed

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Illicit Discharge, Detection, and Elimination (IDDE) Program (Prov E.2)															
IDDE-1	County of San Diego	Industrial, Residential, Commercial	Maintain storm water conveyance system map to facilitate Illicit Discharge, Detection, and Elimination program.	Dry	X	X		X		X	X	X	X	Ongoing	Ongoing updates to mapping as needed.
IDDE-2	County of San Diego	Industrial, Residential, Commercial (incl. nurseries),	Utilize municipal personnel and contractors to identify and report Illicit Connections and Discharges.	Dry	X	X		X		X	X	X	X	Ongoing	Annual stormwater training for municipal personnel and contractors as needed.
IDDE-3	County of San Diego	Industrial, Residential, Commercial	Updated focused training for County field staff.	Dry	X	X		X	X	X	X	X	X	Annually	Training is updated and will be administered as needed.
IDDE-4	County of San Diego	Onsite Wastewater Treatment Systems	Address septic system failures where observed.	Dry	X	X		X	X	X	X	X	X	Ongoing	Per the LAMP policy, DEH will respond to septic system failures as appropriate.
IDDE-5	County of San Diego	Industrial, Residential, Commercial	Facilitate public reporting of Illicit Connections and Illicit Discharges via email.	Dry	X	X		X	X	X	X	X	X	Ongoing	A bilingual hotline, dedicated e-mail address, and multiple online reporting tools will continue to be supported.
IDDE-6	County of San Diego	Industrial, Residential, Commercial	Bilingual hotline (I Love a Clean San Diego) to provide better customer service.	Dry	X	X		X	X	X	X	X	X	Ongoing	The I Love A Clean San Diego hotline will continue to be supported.
IDDE-7	County of San Diego	Industrial, Residential, Commercial	Implement practices and procedures to address spills with the potential to enter the storm drain system.	Dry	X	X		X		X	X	X	X	Ongoing	A NOV will be issued by DEH when appropriate per the LAMP policy. Prompt follow up and mitigation is implemented.
IDDE-8	County of San Diego	Sanitary Sewer Overflow	Coordinate spill response with responsible sanitary sewer agencies.	Dry	X	X		X		X	X	X	X	Ongoing	Implement plan to inform the public of risks associated with sewer spills, conducting sampling, reporting, posting signs, etc.
IDDE-9	County of San Diego	Industrial, Residential, Commercial	Utilize municipal personnel and Contractors to monitor storm water outfalls for discharges of potential Illicit Connections and Illicit Discharges.	Dry	X	X	X	X	X	X	X	X	X	Ongoing	This is part of our IDDE program.
IDDE-10	County of San Diego	Industrial, Residential, Commercial	Develop and implement a strategy for investigating and addressing Illicit Connections and Illicit Discharges.	Dry	X	X		X		X	X	X	X	Ongoing	This is part of our IDDE program
IDDE-11	County of San Diego	Open Spaces	Refer homeless issue complaints to Sheriff or appropriate jurisdictions.	Dry	X	X	X	X		X	X	X	X	Ongoing	This is part of our IDDE program
Development Planning (Prov E.3)															
DEV-1	County of San Diego	New and Redevelopment	Priority Development Projects (PDPs): In addition to requirement for all development projects, implement or require implementation of onsite structural BMPs to control pollutants and manage hydromodification for PDPs.	Both	X	X	X	X		X	X	X	X	Ongoing	The County BMP Design Manual requires all PDPs to implement PC and HMP BMPs. These requirements are captured in the WPO and County's BMP DM.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
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DEV-2	County of San Diego	New and Redevelopment	Update BMP Design Manual procedures to specify storm water requirements applicable to development and redevelopment projects, identify and design appropriate BMPs, establish maintenance criteria, and establish where implemented alternative compliance options.	Both	X	X	X	X	X	X	X	X	X	Ongoing	Updated to reflect the Regional Model BMP DM with additional changes to incorporate County implementation practices.
DEV-3	County of San Diego	New and Redevelopment	Conduct internal (staff) training on the updated BMP Manual.	Both	X	X	X	X		X	X	X	X	Ongoing	Initial training was provided and will be continued as needed.
DEV-4	County of San Diego	New and Redevelopment	Impose legal authority to ensure all development and redevelopment projects are in compliance with all post construction requirements.	Both	X	X	X	X	X	X	X	X	X	Ongoing	The Watershed Protection Ordinance was updated in FY16 to include modifications necessary as the result of the updated permit and the inclusion of applicant-implement offsite alternative compliance.
DEV-5	County of San Diego	New and Redevelopment	Update County codes, ordinances, and storm water design standards consistent with the permit and the updated BMP Manual.	Both	X	X		X		X	X	X	X	One time	The Watershed Protection Ordinance was updated in FY16 to include modifications necessary as the result of the updated permit and the inclusion of applicant-implement offsite alternative compliance.
Construction Management (Prov E.4)															
CON-1	County of San Diego	Construction Waste Management	Require implementation of BMPs that are site specific, seasonally appropriate and appropriate to the construction phase, year round.	Both	X		X	X	X	X	X	X	X	As necessary	Every project requires implementation of site specific construction BMPs, seasonably appropriate and appropriate to the construction phase.
CON-2	County of San Diego	Construction Waste Management	Impose legal authority to ensure inventoried construction projects are in compliance with all requirements.	Both	X	X	X	X	X	X	X	X	X	As necessary	The Watershed Protection Ordinance is the current legal authority to insure inventoried construction projects are in compliance with all requirements.
CON-3	County of San Diego	Construction Waste Management	Provide internal staff training related to construction storm water management.	Both	X	X	X	X	X	X	X	X	X	Annually	Training will be administered as needed.
Existing Development Management (Prov E.5)															
ED-1	County of San Diego	Industrial, Commercial, Municipal, Residential	Maintain and update a watershed-based inventory of existing development (i.e. commercial, industrial, municipal and residential areas).	Both	X	X	X	X		X		X	X	Ongoing	Inventory for these items is tracked in an electronic database.
ED-2	County of San Diego	Industrial, Commercial, Municipal, Residential	Improve the tracking of watershed based inventories via consolidated database.	Both	X	X	X	X	X	X		X	X	Ongoing	Inventory for these items is tracked in an electronic database.
ED-3	County of San Diego	Industrial, Commercial, Municipal, Residential	Designate a minimum set of BMPs required for all existing development inventories, including special event venues. The designated minimum BMPs must be specific to facility or area types and pollutant generating activities, as appropriate.	Both	X	X	X	X	X	X		X	X	Annually	The JRMP establishes minimum BMPs for all land use types.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
ED-4	County of San Diego	Municipal	Pet waste management and outreach in County Parks.	Both	X	X				X		X	X	Ongoing	Determine if pet waste is currently addressed in County Parks in this area and increase outreach if needed.
ED-5	County of San Diego	Municipal	Implement a schedule or operation and maintenance activities for the storm water conveyance system and related structures.	Both	X	X		X		X		X	X	Ongoing	Stormwater conveyance system maintenance is referred to appropriate departments when needed.
ED-6	County of San Diego	Streets	Implement a schedule of operation and maintenance for County paved and unpaved roads.	Both	X	X		X		X		X	X	Ongoing	County Road Crews employ a schedule for maintenance of County Roads.
ED-7	County of San Diego	Residential	Promote and encourage implementation of designated BMPs in residential areas.	Both	X	X				X		X	X	Ongoing	The County will support and promote efforts of partner agencies that provide incentive programs.
ED-8	County of San Diego	Industrial, Commercial, Municipal, Residential	Conduct inspections of inventoried existing development to ensure compliance.	Both	X	X		X		X		X	X	Ongoing	Inspections are completed on an ongoing basis as described in the JRMP and in compliance with the Permit. Twenty percent of the inventory will be inspected per year, all within 5 years.
ED-9	County of San Diego	Residential	Conduct focused residential inspections based on strategic assessments.	Both	X	X		X		X	X	X	X	Ongoing	Residential areas that are identified as contributing to nutrient loading will be selected for additional outreach and/or inspection programs. Twenty percent of the inventory will be inspected per year, all within 5 years.
ED-10	County of San Diego	Residential	Develop a residential inspections tracking program via mobile platform - miles, violations, etc.	Both	X	X		X		X		X	X	Ongoing	Residential inspections are tracking in the electronic database.
ED-11	County of San Diego	Industrial, Commercial, Municipal, Residential	Improve inspections data tracking through mobile phone applications.	Both	X	X		X		X		X	X	Ongoing	Mobile phone applications that synch to the inspections tracking system are currently in development.
ED-12	County of San Diego	Industrial, Commercial, Municipal, Residential	Enforce legal authority established for all inventoried existing development to achieve compliance.	Both	X	X		X	X	X	X	X	X	Ongoing	Legal authority will be enforced as outlined in the JRMP.
ED-13	County of San Diego and Regional Jurisdictions	Residential	Promote incentive program for BMP retrofits (e.g. water smart irrigation controllers, turf replacements programs, residential landscape evaluation program).	Both	X	X		X		X		X	X	Ongoing	The County will collaborate with and promote the efforts of partner agencies incentive programs.
ED-14	County of San Diego	Municipal	Turf replacement in Rainbow Park.	Both	X	X	X	X		X		X	X	Ongoing	The plans for this replacement are complete and work should be starting this Fiscal Year.
ED-15	County of San Diego	Equestrian Land Uses	Promote the implementation of equestrian BMPs and distribute outreach material.	Both	X	X				X	X	X	X	Ongoing	Outreach materials have been developed; identify any areas where they can be distributed.

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
Public Education and Participation (Prov E.7)															
PUB-1	County of San Diego	Industrial, Commercial, Residential	Implement a public education and participation program to promote and encourage development of programs, management practices and behaviors that reduce the discharge of pollutants in storm water prioritized by high risk behaviors, pollutants of concern, and target audiences.	Both	X	X		X	X	X		X	X	Ongoing	The County completes numerous education and public participation programs for a diverse target audiences. See JRMP.
PUB-2	County of San Diego	Residential	Educational Workshops on Integrated Pest Management, manure management and others as needed.	Both	X	X			X	X	X	X	X	Ongoing	The County completes numerous education and public participation programs for diverse target audiences. See JRMP.
PUB-3	County of San Diego	Industrial, Commercial, Residential	Collaborate with watershed partners to develop consistent messaging to targeted audiences, such as commercial residents to conserve water and reduce dry weather flows.	Both	X	X	X	X	X	X	X	X	X	Ongoing	The County completes numerous education and public participation programs for diverse target audiences. See JRMP.
PUB-4	County of San Diego	Residential, Commercial	Outreach to mobile landscaping service providers.	Both	X		X		X	X		X	X	Ongoing	Educational materials and outreach will be distributed to landscaping service providers as needed and appropriate.
PUB-5	County of San Diego	Residential	Give outreach presentations to elementary, middle, and high school students.	Both	X	X		X	X	X		X	X	Ongoing	The County completes numerous education and public participation programs for diverse target audiences. See JRMP.
Optional Jurisdictional Strategies and Schedule															
OPT-1	County of San Diego	Sewer Infrastructure	Divert persistent dry weather flows from storm drains to sewer.	Dry	X	X				X	X			Once triggered, 2-3 years	Triggers: Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (3) permission is granted from sewer agency; and (4) ground water or permitted discharges have been ruled out; and (5) all of the necessary resources have been secured. Resources include: Staff availability, Grant funding or alternative source, Contractor funding, Engineering design, Environmental review, Permits, Ongoing funding for operation/maintenance

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
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OPT-2	County of San Diego and Partners	Residential, Commercial	Promote Incentive Programs: Rain Barrel, Live Turf Replacement & Outdoor Water Efficiency. Promote Incentive Programs for BMP Retrofits.	Both	X	X		X	X	X	X			Continuous, as resources allow	Triggers: Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (3) pilot program success; and (4) all of the necessary resources have been secured. Resources include: Staff availability, Grant funding or alternative source, Incentive items, Establishment of partnerships
OPT-3	County of San Diego	Onsite Wastewater Treatment Systems	Implement a program that provides rebates or incentives for pumping onsite wastewater treatment systems.	Both	X	X				X	X			Once triggered, Pilot program 1 -2 years, as needed thereafter	Triggers: Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (3) pilot programs have demonstrated success; and (4) all of the necessary resources have been secured. Resources include: Staff availability, Grant funding or alternative source, Contractor funding, Partnerships, Incentive items
OPT-4	County of San Diego	Municipal Areas	Implement a Green Streets Retrofits Program.	Both	X	X		X	X	X	X			Once triggered, 3-7 years per project; ongoing operation & maintenance thereafter	Triggers: Implementation of this strategy may be triggered on a project-by-project basis if (1) a specified interim goal has not been met; and (2) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (3) pilot program success; and (4) all of the necessary resources have been secured. Resources include: Staff availability, Grant funding or alternative source, Contractor funding, Engineering or landscaping design, Permits, Environmental review, Right of way acquisition, Ongoing funding for operation/maintenance
OPT-5	County of San Diego	Open Spaces	Flood Control Channel Rehabilitation Projects (e.g., removal of impervious lining in flood control channel and replacement with earthen or vegetated surface).	Both	X		X	X		X	X			Once triggered, 4-7 years per project; ongoing operation & maintenance thereafter	Triggers: Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (3) engineering design, monitoring, and outreach plans are approved; and (4) all of the necessary resources have been secured. Resources include: Staff availability, Grant funding or alternative source, Contractor funding, Partnerships, Engineering design, Permits, Environmental review, Right of way acquisition (if needed), Ongoing funding for operation/maintenance

Strategy Number	Geographic Extent/ Jurisdiction/ Collaboration	Sources Addressed	Strategy	Dry Weather/ Wet Weather/ Both	HPWQC	PWQCs						Implementation Schedule			Implementation Approach/Notes
					Eutrophication/ Nutrients	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	FY2017	FY2018	Future Fiscal Years	
OPT-6	County of San Diego and Regional Partners	Municipal Areas	Identify candidate areas of existing development for stream, channel, and/or habitat rehabilitation projects and facilitate implementation of such projects.	Both	X		X	X		X	X			Once triggered, 4-7 years per project; ongoing operation & maintenance thereafter	Triggers: Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined by the County of San Diego through adaptive management that implementation is necessary; and (3) all of the necessary resources have been secured. Resources include: Staff availability, Grant funding or alternative source, Contractor funding, Partnerships, restoration/rehabilitation designs approved, Environmental permits issued, CEQA/NEPA environmental review, and Ongoing funding for maintenance and monitoring.

The subsections below highlight some of the jurisdictional strategies, listed in **Table 4-14**.

4.2.2.2.1 Illicit Discharge Detection and Elimination [Permit Provisions D.2 and E.2]

4.2.2.2.1.1 Address Impacts of Sewers and Septic Systems

Sanitary sewer overflows (SSOs) are typically episodic events but can contribute to nutrient loads if they are not addressed promptly. Although overflows can happen during wet weather, they typically occur most often during dry weather. SSOs may occur from private sewer laterals and from the publicly owned sanitary system when blockages occur due to roots, grease, or other debris.

In addition to SSOs, faulty septic or Onsite Wastewater Treatment Systems (OWTS) can be a source of nutrients in this watershed area. The Local Agency Management Program (LAMP) describes San Diego County procedures for OWTS requiring corrective action. Within 24 hours of a complaint or other notification of a failing OWTS, the San Diego County Department of Environmental Health (DEH) will complete an investigation to determine the validity of the complaint. The LAMP provides DEH with the authority to require action to repair any OWTS within a reasonable time frame. If corrective action is not completed, enforcement will escalate, which may include condemnation of the structure.

4.2.2.2.1.2 Inspections and Enforcement of Illicit Discharges and Connections

Many types of illegal discharges contribute to nutrient loading in stormwater discharge and receiving waters. Illegal connections that convey these discharges are equally problematic. These challenges are typically associated with dry weather, transient in nature, and have been a focal point for the Copermittees' stormwater programs for many years. Full scale elimination of illegal discharges is challenging and requires a societal change in the way water is managed.

The County of San Diego will implement an active field program to better locate and abate illicit dry weather discharges. Potential dry weather discharges will be evaluated through inspections of ~~storm drain~~MS4 outfalls discharging to receiving waters. Staff will spend time present in unincorporated communities identifying nuisance anthropogenic flows and addressing them through appropriate education and enforcement strategies. County of San Diego staff members have been trained to identify and report illicit discharges and illegal connections during required annual storm water training; this training has been updated to reflect recent Permit changes.

4.2.2.2.2 Development Planning [Permit Provision E.3]

4.2.2.2.2.1 Equine Facility BMPs, Manure Management, and Equine BMP Manual Updates

The Lower SMR Subwatershed contains a significant amount of rural residential land uses, where lots tend to be larger and domestic livestock are more common. Several programs are implemented that address domestic animals as sources of nutrients.

If not applied properly, manure can be a significant source of nutrient loading when used as fertilizer. Manure re-use is addressed through several existing programs, in conjunction with existing development requirements. Examples include:

- Composting areas must be located in a fashion so as to prevent runoff to the ~~stormwater conveyance~~MS4~~ system~~ or receiving waters.

- Existing development inspections programs provide oversight, outreach, and enforcement where necessary to ensure proper storage and re-use of manure.
- IDDE, monitoring, and source tracking programs are in place to detect discharges and identify sources where manure re-use may be contributing to water quality problems related to nutrient loading.

An effective source control program promotes an inventory and frequent inspection of horse ranches, livestock areas, kennels and other pet service areas. Community outreach tools include education materials that stress manure and wash water management, directing drainage away from and/or around exposed stalls, horse health, and WMA awareness. These BMPs address both commercial and private facilities.

The County of San Diego Equine Best Management Practices Manual has been developed as a resource for horse owners and facilities to manage stormwater runoff. This manual contains helpful information for manure management, dirt access roads and trails, arenas and paddocks, stockpiles, horse wash rack drains, vehicle maintenance, housekeeping, site design, exclusionary fencing, pest management, training and education.

4.2.2.2.2.2 BMP Design Manual Updates and Training

The BMP Design Manual requirements apply to residential, commercial, industrial, educational, and transportation land uses. The Manual guides applicants through the design and submittal process to ensure the necessary stormwater features are being implemented. Project designs must show runoff being infiltrated or else treated by structural BMPs, such as bioretention facilities, planter boxes, filters, settling ponds, or constructed wetlands.

The BMP Design Manual for new development and redevelopment was updated in FY16 and training was provided to County of San Diego staff, followed by the development industry. One-time land development workshops were held to educate the development community on updated requirements, particularly as they pertain to priority sources of bacteria, nutrients, and other pollutants, such as residential areas and commercial areas including nurseries and eating/drinking establishments.

4.2.2.2.3 Construction Management [Permit Provision E.4]

Although development in this region of the watershed is limited, construction sites have the potential to contribute to nutrient loading primarily through ineffective erosion control that can lead to phosphorus-borne sediment entering the receiving water.

The agencies have been implementing construction stormwater programs for several Permit terms. Over this time, agency staff and the construction community have become well trained in construction stormwater management. Additional oversight is required per the State Construction General Permit (Order 2009-0009-DWQ) for sites greater than one acre. With this amount of focus, the limited sources of nutrients related to construction are well addressed via the existing Permit requirements. For this reason, the agencies will focus on the baseline programs as required under the Permit.

For active construction areas, the County routine enforcement measures include Administrative

Warnings and Notices of Violation. Public works projects use construction plans, specifications, and Stormwater Pollution Prevention Plans to effectively eliminate or control pollutant discharge

through stormwater. Adherence with contract provisions is confirmed by inspection staff and enforced using standard payment provisions, liquidated damage clauses, and other means.

4.2.2.2.4 Existing Development Management [Permit Provision E.5]

The Existing Development Management Program addresses a variety of sources including

commercial/industrial, residential, and municipal areas and activities. The County of San Diego has an inspection program that addresses each of these sources. Due to the prevalence of rural residential land in this area, jurisdictional strategies will focus on residential inspections to help reduce irrigation runoff and nutrient loading to the receiving water.

4.2.2.2.4.1 Residential Inspections

The "education first" approach is a key component in the County's routine enforcement process within existing residential areas. County staff are also required to inspect structural BMPs and respond to complaints regarding structural BMP performance. Advisory letters, verbal warnings, CARs, and Clean-up and Abatement Notices (through which the County cleans or repairs the structural BMP and then charges the responsible party) are all routinely used as follow up measures, if necessary. As field staff conduct investigations, they maintain records and a database of relevant information for each incident. This information is entered into a database that is used for annual reports submitted to the Regional Water Board.

Educational outreach by the County is developed and implemented based on the following four objectives:

1. Teaching basic awareness;
2. Adapting education to specific target audiences;
3. Clearly describing specific responsibilities under the Watershed Protection Ordinance; and,
4. Providing instruction to successfully implement BMPs, with an emphasis on pollution prevention.

For the residential and general public audiences, the County's educational outreach program, as described in the JRMP, utilizes a multi-media approach. Media types may include print materials, television, radio, websites, billboards, and promotional items. Through joining efforts with the County Water Authority, the County of San Diego has been and continues to work to collaborate on efforts to reduce water use and over-irrigation. Messages and promotional materials have been tailored to promote the use of native or drought-tolerant plants.

Irrigation runoff reduction programs can also be integrated with BMPs that encourage landscaping and gardening practices that reduce the load of fertilizers and chemicals that enter in stormwater, such as integrated pest management, reduction of fertilizer and pesticide use, xeriscaping and turf conversion.

4.2.2.2.4.2 Turf Replacement at Rainbow Park

To reduce irrigation runoff and other dry weather pollutant generating activities from County Parks, the County of San Diego is replacing 95,000 square feet of existing lawn in Rainbow Park with synthetic turf and a sand infill drainage system. This retrofit will begin in 2017, with construction estimated to be completed in 2018.

4.2.2.2.4.3 Rainbow Creek Nutrient Reduction and Management Plan

The Rainbow Creek Nutrient Reduction and Management Plan (NRMP), required by Section B.2 of the Permit, was completed in 2016 and outlines several waste control and cleaning practices for County-responsible sources. Management practices for irrigation, nutrient control, and erosion and runoff are recommended for agricultural operations. The County of San Diego ~~County~~'s Department of Agriculture, Weights, and Measures (AWM) is authorized to inspect commercial nurseries and greenhouse facilities and conduct follow up inspections if deficiencies are found.

AWM's inspection frequencies are prioritized based on the facility's assigned threat to water quality, as determined using the methodologies outlined in the County's JRMP, Section 5.2.4. AWM annually inspects all facilities that have been designated as a high threat to water quality. The goal for each inspection is to ensure compliance with the County's Watershed Protection Ordinance. For locations where non-compliance is observed at the time of the inspection, AWM follows the Enforcement Response Plan as described in the JRMP, Section 9.0 and in Section 4.2.2.2.5 below. Consistent with the education first approach taken across the stormwater program, AWM often provides contact information for various organizations that can provide assistance with BMP implementation at agricultural operations, such as Mission Resource Conservation District, Natural Resource Conservation Service and University of California Cooperative Extension Office.

4.2.2.2.4.4 Sustainable Landscapes Retrofit Program

The Sustainable Landscapes Retrofit Program is designed to encourage landscape retrofits to reduce the amount of potable water applied to urban landscapes and minimize pollutant infiltration to local waterbodies. Through an Integrated Regional Water Management Program (IRWMP) grant awarded using state of California Proposition 84 funds, the County of San Diego in concert with other agency and non-government partners is also developing a Sustainable Landscapes Retrofit Program. The Sustainable Landscapes Retrofit Program consists of an integrated set of landscaping practices, including stormwater capture and use, LID and potable water conservation that will help property owners retrofit their high water-use landscaping for more sustainable ones. The program targets residential-scale urban landscapes, and is a collaborative effort among three public agencies. Multipollutant benefits of the program include reduction in nutrients and bacteria from residential areas, nurseries, and greenhouses. The program leads to benefits to water quality improvement and reduced cost for the Copermittees. Reductions in cost are realized from reductions in water use, green waste, labor, fertilizers, pesticides, and carbon dioxide emissions. Target areas include municipal fixed facilities; industrial and commercial facilities; construction sites; residential; general public; land development and redevelopment; streets and parking facilities.

4.2.2.2.4.5 Designate a Minimum Set of BMPs Required for Existing Development Inventories

The County of San Diego has established a set of minimum BMPs to support their jurisdictional strategy implementation. These BMPs are presented in **Table 4-15**.

4.2.2.2.5 Enforcement Response Plans [Permit Provision E.6]

As described in the County of San Diego's Enforcement Response Plan (ERP), a wide range of enforcement 'tools' can be implemented to abate illicit discharges and facilitate compliance.

The primary objective of the ERP is to promote voluntary compliance with applicable ordinances and the NPDES permit provisions. In cases of non-compliance, the ERP provides County staff with several enforcement tools to ensure a return to compliance in a timely manner while following due process. While emphasizing education as the primary means of achieving compliance, the County also has the necessary authority and procedures in place to investigate and enforce in cases of continued non-compliance. In the event that a violation or potential violation may endanger health or the environment, the County may forego the "education first" approach and proceed immediately to more stringent enforcement measures.

4.2.2.2.6 Public Education and Participation [Permit Provision E.7]

Education and outreach programs are implemented to provide the public with resources and incentives to accomplish projects and practices that protect and improve water quality throughout the WMA. The County of San Diego provides manuals for landscaping and BMP design that, if implemented, reduce dry weather flows to the ~~stormwater conveyance~~MS4~~ system~~ and ultimately to receiving waters. These manuals include the LID Handbook, the Standard Urban Stormwater Mitigation Plan (SUSMP) (County of San Diego, 2012), the Hydromodification Management Plan (HMP) (County of San Diego, 2011), and the BMP Design Manual (County of San Diego, 2016).

Materials for education and outreach have been developed to focus on prevention of discharges to the ~~stormwater conveyance~~MS4~~ system~~ and reduction of pollutants reaching receiving waters. Specific handouts have been created related to over-irrigation that may be distributed to property owners in the WMA. Additionally, promotional items are often distributed and may include pens, pencils, magnets, and rulers, as well as more behavior-specific items including packages of California poppy seeds to promote the use of native or low maintenance plants. All items contain stormwater messages and the County of San Diego Stormwater Hotline and Project Clean Water website. Outreach materials are distributed by County staff during community events, displayed in kiosks at appropriate locations, and supplied to partner organizations to distribute at their facilities.

The County will continue to sponsor workshops for specific target audiences and pollutants of concern, including some that address nutrients such as manure management and composting for horse owners and animal facilities; integrated pest management and gardening workshops for residents interested in gardening and more sustainable landscape practices; and rain water harvesting classes to encourage rainfall capture from roofs for landscape use.

Table 4-15. Minimum BMPs Supporting Jurisdictional Strategy Implementation for the Lower SMR Subwatershed

Best Management Practice Watershed	Pollutant Sources								HPWQC
	Residential	Commercial	Industrial	Parks and Recreation	Orchards, Vineyards, Nurseries	Horse Ranches	Other Agriculture	Open Space	Nutrients
1. Eliminate illicit connections to the municipal separate storm sewer system (MS4); ~~Hereafter, "storm drain system")~~.	●	●	●	●	●	●	●		●
2. Eliminate illicit non-storm water discharges.	●	●	●	●	●	●	●	●	●
3. Properly dispose of process and wash water.	●	●	●	●	●	●	●		●
4. Properly dispose of vehicle and equipment wash water/eliminate the discharge of vehicle and equipment was water.	●	●	●	●	●	●	●		
5. Properly dispose of water from fire sprinkler maintenance activities	●	●	●	●	●	●	●		
6. Eliminate pumped groundwater, foundation and footing drain discharges.	●	●	●	●	●	●	●		●
7. Minimize rising groundwater, diverted stream flows, uncontaminated groundwater infiltration, springs, riparian habitat/wetland flows, potable water sources, and foundation/ footing drain discharges.	●	●	●	●	●	●	●	●	●
8. Protect unpaved areas, including landscaping, from erosion using vegetation or physical stabilization.	●	●	●	●	●	●	●	●	●
9. Regularly clean parking lots.	●	●	●	●	●	●	●		
10. Implement good housekeeping to keep site free of trash and debris.	●	●	●	●	●	●	●	●	●
11. Provide and maintain secondary containment to catch spills when storing potential liquid pollutants in outdoor areas.	●	●	●	●	●	●	●		●
12. Properly store and dispose of hazardous substances.	●	●	●	●	●	●	●		●
13. Cover, contain, and/or elevate materials stored outside that may become a source of pollutants in storm water or non-storm water.	●	●	●	●	●	●	●		●
14. Label containers to prevent mishandling of hazardous materials and other potential pollutants.	●	●	●	●	●	●	●		●

Best Management Practice Watershed	Pollutant Sources								HPWQC
	Residential	Commercial	Industrial	Parks and Recreation	Orchards, Vineyards, Nurseries	Horse Ranches	Other Agriculture	Open Space	Nutrients
15. Develop a written plan that identifies appropriate BMPs, including spill response, and includes procedures for proper implementation.	●	●	●	●	●	●	●		●
16. Prevent or capture liquid leaks from vehicles and equipment.	●	●	●	●	●	●	●		
17. Maintain a readily accessible spill cleanup kit that is appropriate for the type of material stored.	●	●	●	●	●	●	●		●
18. Immediately clean up spills.	●	●	●	●	●	●	●		●
19. Temporarily protect ~~storm drain~~MS4s from non-storm water discharges while conducting activities that have the potential to result in a discharge.	●	●	●	●	●	●	●	●	●
20. Implement a pollution prevention system for uncovered outdoor sources of pollutants.	●	●	●	●	●	●	●	●	●
21. Train appropriate employees on storm water pollution prevention.	●	●	●	●	●	●	●	●	●
22. Keep trash/waste storage areas free of exposed trash, sediment, and debris.	●	●	●	●	●	●	●	●	●
23. Protect waste storage areas from contact with storm water and non- storm water flows on to the property.		●	●	●	●	●	●	●	●
24. Eliminate irrigation runoff.	●	●	●	●	●	●	●		●
25. Eliminate nursery irrigation discharges.	●	●	●		●				●
26. Properly dispose of discharges from swimming pools, spas, fountains, reflective pools, ponds, and filter backwash.	●	●	●	●					●
27. Control air conditioning condensation discharges.	●	●	●	●	●	●			●
28. Eliminate floor mat cleaning discharges.	●	●	●	●					●
29. Regularly clean and maintain structural BMPs and LID installations to ensure proper performance.	●	●	●	●	●	●	●		●

Best Management Practice Watershed	Pollutant Sources								HPWQC
	Residential	Commercial	Industrial	Parks and Recreation	Orchards, Vineyards, Nurseries	Horse Ranches	Other Agriculture	Open Space	Nutrients
30. Keep storm drain inlets and under drains free of sediment, trash, and debris.	●	●	●	●	●	●	●		●
31. Properly manage pesticides and fertilizers.	●	●	●	●	●	●	●		●
32. Implement controls to prevent pollution from exposed outdoor work areas.	●	●	●	●	●	●	●		●
33. Drain fluids from inoperable vehicles and store or dispose of appropriately.	●	●	●	●	●	●	●		
34. Provide pollution prevention signage for storm drains.	●	●	●	●	●	●	●		●
35. Properly store and dispose of green waste.	●	●	●	●	●	●	●		●
36. Manage animal waste and animal washing in a manner that prevents transport of wastes and wash water off-site.	●	●	●	●	●		●		●

4.2.2.3 Optional Strategies

Optional jurisdictional strategies include those that the Copermittees may implement if necessary to achieve interim and final numeric goals. Implementation of the optional strategies will be contingent on circumstances supported by the need for the additional effort, the cost/benefit as compared to other options and strategies, and the availability of funding. Optional jurisdictional strategies for the County of San Diego in the Lower SMR Subwatershed are listed above in **Table 4-14**. The subsections below summarize the optional strategies, or combinations of optional strategies.

4.2.2.3.1 Dry Weather Flow Diversion

Diverting persistent dry weather flows to sanitary sewers reduces nutrient loading to the receiving water. This strategy addresses nuisance dry weather flows from the ~~storm drain system~~MS4 and pollutants from roads, streets, and parking lots. Structural BMPs will also be implemented within the County of San Diego's jurisdiction. The County of San Diego will take into account the locations of existing structural controls when considering future implementation efforts and potential locations for structural controls.

Implementation of this strategy may be triggered if:

1. An interim goal has not been met;

2. It has been determined by the County of San Diego, through adaptive management, that implementation is necessary;
3. Permission is granted from wastewater collection agency;
4. Permitted discharges have been ruled out; and
5. All of the necessary resources have been secured. Resources include staff availability, grant funding or alternative source, contractor funding, engineering design, environmental review, permits, ongoing funding for operation/maintenance.

4.2.2.3.2 Promote Incentive Programs for BMP Retrofits

Another tactic for addressing the source of nutrient loading in this area is the increased promotion and support of incentives targeted to promote water conservation and landscape retrofits through partner agencies (including Metropolitan Water District, local water districts, and the San Diego County Water Authority). Examples of these incentive programs include payments for things such as turf replacement, sprinkler head nozzle replacements, smart irrigation controllers, rain barrels, etc. These incentive programs can be an important tool in creating change at the individual level and could be promoted until resources are depleted. Programs that support landscape retrofits will target sources of wet and dry weather flows that can mobilize nutrients, particularly those associated with residential areas as well as roads, streets, and parking. The Sustainable Landscapes Retrofit Program is also currently being implemented to encourage landscape retrofits at nurseries and greenhouses, as well as residential areas. The Sustainable Landscapes Retrofit Program is discussed in greater detail in **Section 4.2.2.2.4**.

Implementation of this strategy will be triggered if:

1. An interim goal has not been met;
2. It has been determined by the County of San Diego through adaptive management that implementation is necessary;
3. Pilot program success and;
4. All of the necessary resources have been secured. Resources include staff availability, grant funding or alternative funding source, incentive items, and establishment of partnerships.

4.2.2.3.3 Septic System Rebate Programs

Many properties in this area operate onsite wastewater treatment systems. Improperly maintained OWTS can be a source of nutrients. If funding were available, a Septic System Rebate Program could be implemented. This rebate program would be designed to target nutrient loading by promoting frequent inspection and pumping, which can prevent septic system failures. Additional resources to educate property owners of recommended maintenance activities and preventative measures, such as what not to put into the system and how to avoid overloading their residential septic systems, could be developed and made available. Rebates would be available on a first-come, first serve basis as funding allows.

Rebate and inspections programs as an optional jurisdictional strategy would be triggered if:

1. An interim goal has not been met;

2. It has been determined by the County of San Diego through adaptive management that implementation is necessary;
3. Pilot programs have demonstrated success; and
4. All of the necessary resources have been secured. Resources include staff availability, grant funding or alternative source, contractor funding, partnerships, and incentive items.

4.2.2.3.4 Green Streets Retrofit Program

The County of San Diego utilizes LID projects and green street designs to effectively reduce flows during storm events and to reduce nutrient concentrations by retrofitting impervious areas. Green infrastructure aims to incorporate elements found in natural areas into the road right-of-way to provide water quality and community benefits. Green streets, in particular, 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. Green streets also provide the added benefit of treating runoff from both the roadway and contributing parcel.

This strategy would be implemented if:

1. An interim goal has not been met;
2. It has been determined by the County of San Diego, through adaptive management, that implementation is necessary;
3. Pilot program success; and
4. All of the necessary resources have been secured. Resources include staff availability, grant funding or alternative funding source, contractor funding, engineering or landscaping design, permits, environmental review, right of way acquisition, and ongoing funding for operation/maintenance.

4.2.2.3.5 Flood Control Channel Rehabilitation Projects

Examples of potential rehabilitation projects include partial or total removal of impervious lining in the flood control channel and replacement with an earthen or vegetated surface. These projects can result in nutrient and sediment load reductions and restoration of aquatic habitat and vegetation. They may also provide educational opportunities and lead to greater public understanding of water quality protection and improvement actions. Rehabilitation projects are expected to address nutrient loading in receiving waters.

Implementation of this strategy may be triggered if:

1. An interim goal has not been met;
2. It has been determined by the County of San Diego, through adaptive management, that implementation is necessary;
3. Engineering design, monitoring, and outreach plans are approved; and
4. All of the necessary resources have been secured. Resources include staff availability, grant funding or alternative source, contractor funding, partnerships, restoration / right of way acquisition, California Environmental Quality Act (CEQA)/National Environmental Policy

Act (NEPA) environmental review, environmental permits issued, and ongoing funding for maintenance and monitoring.

4.2.2.3.6 Stream Restoration Projects

Increased runoff volumes and velocities from natural wet weather events and increased urban development can result in erosion of stream banks and channels and degrade or alter natural systems. Erosion can result in large quantities of sediment and sediment-bound pollutants such as phosphorus entering the water column and traveling downstream, where it can contribute to nutrient loading in the SMR Estuary. A stream restoration project could be designed to reduce nutrient loading and is expected to have supplemental reductions to bacteria and sediment.

The stream restoration remedy includes the following proposed options, as funds are available and pending approval of environmental documents, obtaining permits, and the feasibility of effectiveness:

- Widening or modifying the impaired creek channel to disperse and slow flow to increase residence time and nutrient uptake.
- Re-sloping streambanks to reduce erosion and Total Suspended Solids (TSS) and nutrient loading downstream.
- Streambank stabilization by revetments, log cribs, groins, or gabions reduce erosion and TSS and nutrient loading downstream.
- Floodplain restoration and reconnection with the stream course to increase retention time and groundwater recharge.
- Restored native basins to temporarily capture and reduce flow and promote nutrient uptake and groundwater recharge.
- Refurbishment of existing basins for desilting and groundwater recharge.
- Replacing invasive vegetation species with native vegetation that has increased nutrient uptake.

Implementation of this strategy may be triggered if:

1. An interim goal has not been met;
2. It has been determined by the County of San Diego, through adaptive management, that implementation is necessary; and
3. All of the necessary resources have been secured. Resources include staff availability, grant funding or alternative source, contractor funding, partnerships, approved restoration/rehabilitation designs, CEQA/NEPA environmental review, environmental permits issued, and ongoing funding for maintenance and monitoring.

4.2.3 Optional WMA Strategies

The Copermittees and the City of Menifee have identified multiple coordinated efforts (i.e., optional regional or multijurisdictional WMA strategies) to be implemented to address eutrophication impacts and nutrient loading within the SMR watershed. The optional WMA strategies differ from the optional jurisdictional strategies in that they are a coordinated effort

amongst two or more jurisdictions working collaboratively, at a regional, WMA, or multi-jurisdictional level within the SMR WMA towards common goals within the watershed. Collaboration potentially increases efficiency and effectiveness in addressing sources through economies of scale (e.g., watershed-wide outreach approaches or incentive programs to address over-irrigation, in-stream rehabilitation to reduce eutrophication within waterbodies). The coordinated efforts are summarized in **Table 4-16**.

As part of the five-year assessment process, implementation of strategies will be evaluated against progress to goals. Where interim goals are met and the current implementation approach is determined to be effective enough to achieve the next interim or final goal, Copermittees and the City of Menifee may adjust current strategies, but will likely not implement optional WMA strategies. Where interim goals are not achieved, and/or it is determined to be unlikely that current implementation levels will achieve future interim or final goals, optional WMA strategies may be triggered and implemented as resources allow. Implementation of the optional WMA strategies will be contingent on circumstances supported by the need for the additional effort, the expected efficiency and effectiveness of the strategy as compared to other options and strategies, and the availability of funding. The process to trigger the watershed strategies are specific to the individual WMA strategy, and are largely dependent on necessity and availability of funding. Each of the WMA strategies is included as an option moving forward for all jurisdictions; however, specific projects for implementation may only include a subset of the jurisdictions, depending on the applicability of the WMA strategy to the jurisdiction.

Table 4-16. Collaborative WMA Strategies for the SMR WMA

Optional WMA Strategy	Implementation Timeframe/ Schedule	RCFCWCD	County of Riverside	County of San Diego	City of Menifee	City of Murrieta	City of Temecula	City of Wildomar	Triggers	Resources	Pollutant Sources	HPWQC	Priority Water Quality Conditions						
												Eutrophication utrients)	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	Industry
Incentive programs to reduce non-stormwater and stormwater runoff (e.g., drought tolerant landscaping, rain barrel program, turf replacement).	Implemented starting in the following fiscal year after triggered.	●	●	●	●	●	●	●	Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined through adaptive management that implementation is necessary and that this approach would help to address sources of nutrient loading; and (3) all the necessary resources have been secured.	(1) Willing partners (e.g., Water Districts, other municipalities); (2) funding necessary to contribute to a program; (3) if resources are unavailable, implementation would be contingent on receipt of grant funding	Sources within upstream catchment area (to be determined)	●	●	●	●	●	●	●	●
Regional dry weather inspector(s): Inspect areas watershed-wide for anthropogenic sources of dry weather flow, gather Permit-required information, conduct outfall screening, follow a developed SOP, and alert responsible Copermittee when issues are observed.	Implemented within two fiscal years after triggered.	●	●			●	●		Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined through adaptive management that implementation is necessary and that this approach would help to address sources of nutrient loading; and (3) all the necessary resources have been secured.	(1) Funding for one full time position within an agency in the watershed or contract supported by other Copermittees within the watershed (2) Each Copermittee would need available staff resources to respond to identified problems and proceed with enforcement as necessary	Dry weather flows from targeted areas	●	●	●	●	●	●	●	●
In-stream strategies, including watercourse rehabilitation to provide natural uptake of nutrients, increase shading, or modify physical factors to reduce algal growth.	Allow 2-5 years for design, permit, and construction once triggered.	●	●	●	●		●		Implementation of this strategy may be triggered if (1) an opportunity for a project is identified that would effectively address problems within the watershed; and (2) an interim goal has not been met; and (3) Copermittees with jurisdiction are willing participants in the project; and (4) all necessary resources and permits have been secured.	A stream restoration project would require the following resources: 1) Studies to identify suitable sites; 2) Evaluation of feasibility; 3) Engineering design plans; 4) Capital Improvement Program funding secured; 5) Land acquisition and/or private-public partnership agreements (as necessary); 5) Construction contract bid/award; 6) Project construction; 7) Adequate resources for operation and maintenance	Sources within upstream catchment area (to be determined)	●	●	●	●	●	●	●	●
Regional dry weather retrofits or incentives for retrofits for existing development to reduce/eliminate dry weather flows.	Allow 2-5 years for design, permit, and construction once triggered.	●	●				●		Implementation of this strategy may be triggered if (1) an interim goal has not been met; and (2) it has been determined through adaptive management that implementation is necessary; and (3) all the necessary resources have been secured.	Retrofit program would require the following resources: 1) In-field evaluation of suitable sites for infiltration or diversion to sanitary sewer; 2) Evaluation of feasibility; 3) Engineering design plans; 4) Capital Improvement Program funding secured; 5) Land acquisition and/or private-public partnership agreements (as necessary); 5) Construction contract bid/award; 6) Project construction; 7) Adequate resources for facility operation and maintenance	Dry weather flows from targeted areas	●	●	●	●	●	●	●	●

Optional WMA Strategy	Implementation Timeframe/ Schedule	RCFCWCD	County of Riverside	County of San Diego	City of Menifee	City of Murrieta	City of Temecula	City of Wildomar	Triggers	Resources	Pollutant Sources	HPWQC	Priority Water Quality Conditions						
												Eutrophication (Nutrients)	Recreation	Physical Habitat	Toxicity	Nuisance (Trash)	Water Supply	Agricultural Supply	Industry
Coordinate with Integrated Regional Water Management (IRWM) regional water managers to plan for and implement water quality improvement projects (retrofits, stream rehabilitation, or other projects) that will address nutrients and/or dry weather flows.	As triggered	●		●					Participation as stakeholder in IRWM program will occur, as needed and if funded, to promote applicable project adoption in the SMR WMA.	Individual projects and further participation in grant funding offered through IRWM assessed on case-by-case basis.	Sources within upstream catchment area (to be determined)	●	●	●	●	●	●	●	●
Participate in Santa Margarita River Watershed Nutrient Initiative - Stakeholder Group as a collaborative effort to reduce nutrients and dry weather flows.	Ongoing	●	●	●		●	●	●	Ongoing participation. This work is a follow-on effort to the 2006 San Diego Lagoons Investigative Order (R9-2006-0076; Lagoon Order) and subsequent work plan developed jointly by the Regional Water Board and WMA stakeholders.	Funding for staff support within an agency or contract supported by other Copermittees within the watershed	Sources within upstream catchment area (to be determined)	●							

The subsections below summarize the WMA strategies, or combinations of collaborative WMA strategies, listed in **Table 4-16**.

4.2.3.1 Santa Margarita River WMA Nutrient Initiative Group

Copermittees will continue to participate in the SMRNIG efforts so long as that group is active. The SMRNIG is further described in **Chapter 2**. SMRNIG efforts include evaluation of implementation scenarios, conducting studies, and providing a forum for development of collaborative watershed strategies with other stakeholders.

4.2.3.2 Permitted Flow Assessment

The Copermittees will also implement additional strategies designed to gather data and improve their understanding of conditions in the watershed. Assessments and evaluations of permitted non-stormwater discharges and a watershed management area analysis are currently planned for implementation and are described below. Permitted flow assessments are anticipated to begin upon acceptance of the ~~Water Quality Improvement Plan~~WQIP.

To address ~~storm drain~~MS4s with anthropogenic dry-weather flow, the Copermittees will conduct an assessment of flows from ~~storm drain~~MS4 outfalls to determine which flows should be addressed by the Copermittee, and which flows are permitted, or required to be permitted by others, or those flows originating from lands outside the Copermittees' jurisdiction (e.g., Tribal Lands). The assessment will include the following components:

- Work with the Regional Water Board to conduct an inventory of permitted discharge and recycled water conveyances (purple pipes);
- Complete an inventory of natural sources (rising groundwater, springs, etc.); and
- Conduct a flow and load characterization.

As a component of the assessment, a monitoring plan to identify permitted discharges will be developed within the Monitoring and Assessment Program (Permit Provision D). The permitted flow assessment will be initiated during FY 2017/2018, and completed during FY 2020/2021.

4.3 WATERSHED MANAGEMENT AREA ANALYSIS

The Copermittees within the ~~Upper~~ Middle and Lower SMR Subwatersheds have developed a Watershed Management Area Analysis (WMAA), which is an optional task for the purpose of developing watershed-specific requirements for structural BMP implementation. The WMAA is a watershed-scale analysis that identifies important characteristics, such as hydrologic process categories and stream descriptions. The final output of the analysis includes geographic information system (GIS) layers that Copermittees may use to identify candidate projects as offsite alternative compliance options. The WMAA also develops analyses and information to support exemptions from the on-site hydromodification management BMP requirements. Per Permit Provision B.3.b.(4)(a), the WMAA includes the following:

(i) A description of dominant hydrologic processes, such as areas where infiltration or overland flow likely dominates;

(ii) A description of existing streams in the watershed, including bed material and composition, and if they are perennial or ephemeral;

(iii) Current and anticipated future land uses;

(iv) Potential coarse sediment yield areas; and

(v) Locations of existing flood control structures and channel structures, such as stream armoring, constrictions, grade control structures, and hydromodification or flood management basins.

The WMAA also includes a list of candidate projects that could be used as alternative compliance options for Priority Development Projects (PDPs). The WMAA is included as **Appendix 4B** and will be incorporated into the ~~Water Quality Improvement Plan~~WQIP as part of the adaptive management process.

The Permit allows Copermittees to develop a program as part of their overall JRMP that potentially allows development projects to participate in offsite alternative compliance projects that yield greater overall water quality benefit to the WMA. The Copermittees may use the data generated from the characterization analyses indicated above for two purposes:

(1) To identify candidate projects that could potentially be used as offsite alternative compliance options in lieu of satisfying full onsite retention, biofiltration, and hydromodification management control requirements as is required for PDPs.

(2) To identify and/or prioritize areas where it is appropriate to allow certain exemptions from onsite hydromodification management BMPs.

The updated WMAA builds upon work completed in the 2015 San Diego County Regional Watershed Management Analysis. (http://www.projectcleanwater.org/watershed-management-area-analysis-wmaa) The San Diego analysis developed the tools and mapping for the Lower SMR Subwatershed. This analysis extends into the ~~Upper~~ Middle SMR Subwatershed, and studies hydromodification susceptibility of the SMR to the Pacific Ocean. The WMAA will develop WMA-specific requirements for structural BMPs and identify candidate projects related to hydromodification, stream restoration, or structural BMPs. The elements of the analysis are specific to all Copermittees within the SMR Region, which includes County of Riverside, RCFCWCD, City of Wildomar, City of Murrieta, City of Temecula, and County of San Diego.

5 Monitoring and Assessment Program

Chapter 5 outlines procedures to support assessment of progress toward numeric goals and schedules, progress addressing eutrophication impacts and nutrient loading, and each Copermittee's overall efforts to implement the ~~Water Quality Improvement Plan~~WQIP. In conducting previous NPDES MS4 Permit required monitoring and by participating in various regional monitoring efforts over the past 20 years, the Copermittees have established water quality monitoring stations throughout the SMR WMA. A select number of existing monitoring stations will continue to be monitored. In addition, new monitoring stations to fulfill requirements not contained in previous versions of the Permit have been identified. The quantity and required characteristics of these new monitoring stations are described under the applicable program component in the sections below. The reporting year for the Monitoring and Assessment Program (MAP) extends from October 1st to September 30th of the following year.

5.1 SMR WMA MAP DESCRIPTION

The SMR WMA MAP includes the Receiving Water Monitoring Program, the MS4 Outfall Discharge Monitoring Program, Special Studies, and Assessment Program. The SMR WMA MAP is designed to determine the following:

- The long-term receiving water trends and whether conditions in receiving waters are improving;
- If urban runoff is contributing to exceedances of WQOs and impacting beneficial uses of receiving waters;
- Pollutant sources and/or stressors;
- The effectiveness of the Copermittees' JRMP toward effectively prohibiting non-storm water discharges into the ~~storm drain system~~MS4 and reducing pollutants in stormwater discharges from their ~~storm drain~~MS4s to the MEP; and
- Progress of the water quality improvement strategies implemented as part of this ~~Water Quality Improvement Plan~~WQIP toward achieving numeric goals and schedules, addressing the HPWQC, and achieving compliance with the discharge prohibitions of the Permit.

5.2 SMR WMA MAP MONITORING QUESTIONS

The SMR WMA MAP is designed to evaluate and address current and/or potential water quality issues in the SMR WMA that may be impacted by discharges of urban runoff from the ~~storm drain system~~MS4. The data collected under the MAP will be used to assess the effectiveness of strategies and progress to numeric goals for the WMA. The SMR WMA MAP is designed with the overall goal of answering the following monitoring questions in support of the numeric goals for the WMA presented in **Chapter 4**:

- How much has total nitrogen and total phosphorus loading been reduced in the SMR watershed?
- How much has non-storm water flow been reduced at Copermittee outfalls?

- How much has total nitrogen and total phosphorus loading been reduced at Copermittee outfalls?
- Are there sources of pollutants outside of Copermittee control causing exceedances of targets?

5.3 GENERAL SCOPE OF MONITORING

The monitoring component of the SMR WMA MAP includes the following programs:

1. **Receiving Water Monitoring**
   - Wet Weather Receiving Water Monitoring Program
     - Field Observations and Monitoring, Analytical, and Toxicity
   - Dry Weather Receiving Water Monitoring Program
     - Field Observations and Monitoring, Analytical, Toxicity, Bioassessment, and Hydromodification
   - Regional Monitoring Programs
     - Storm Water Monitoring Coalition (SMC) Regional Monitoring
     - Southern California Bight (Bight) Regional Monitoring
   - Sediment Quality Monitoring Program
   - TMDL Monitoring
2. **MS4 Outfall Monitoring**
   - Wet Weather ~~Storm Drain~~MS4 Outfall Discharge Monitoring Program
     - Field Observations and Monitoring, Analytical
   - Dry Weather ~~Storm Drain~~MS4 Outfall Discharge Monitoring Program
     - ~~Storm Drain~~MS4 Outfall Discharge Field Screening Monitoring
     - Non-Storm Water Persistent Flow ~~Storm Drain~~MS4 Outfall Discharge Monitoring (including field observations and analytical)
3. **Special Studies**
   - WMA Special Study
   - San Diego Region Special Study

Table 5-1 provides a summary of the major monitoring programs. All monitoring activities are intended to be conducted in general conformance with the recommended protocols provided by the SWAMP. Monitoring program elements are described in the sections to follow, and additional program details for individual monitoring programs are discussed in **Appendix 5A**. The SMR WMA MAP will be reviewed annually, as necessary, and any updates will be submitted to the Regional Water Board as part of the ~~Water Quality Improvement Plan~~WQIP Annual Report.

Receiving water monitoring will consist of time-weighted or flow-weighted composite samples collected by automated samplers, in addition to grab samples, field measurements, visual

observations, and bioassessment. Wet weather ~~storm drain~~MS4 outfall monitoring will use time-weighted or flow-weighted composite sampling in wet weather, and grab sampling for appropriate analytes. Dry weather ~~storm drain~~MS4 outfall monitoring will generally use a grab sampling approach. When feasible and required, a regional watershed approach is implemented for elements of the monitoring program to enhance consistency of monitoring data within the San Diego Region. Monitoring of wet weather and dry weather flows is included in this SMR WMA MAP. Available USGS gauging station data may be used for continuous flow measurements as applicable. Monitoring events will be coordinated by the Copermittees, and/or with consultants authorized to monitor on behalf of the Copermittees.

Table 5-1. Summary of Monitoring Programs

SMR WMA MAP Component	# Events	Sample Type	Analyses	Permit Provision
Wet Weather Receiving Water Monitoring Program (**Section 5.3.1.1**)	Three per permit term according to sampling schedule[1]	Field Observations	Location, date, duration of storm event, rainfall estimate of storm event, duration between storm event sampled and the end of previous measurable (> 0.1 inch rainfall) storm event. Flow rate and volume. Station condition. Presence and assessment of trash.	D.1.d.(1)
		Field Monitoring	pH, temperature, specific conductivity, dissolved oxygen, and turbidity.	D.1.d.(2)
		Analytical Monitoring	As outlined in **Appendix 5A**.	D.1.d.(3)
		Toxicity	Freshwater testing (salinity < 1 ppt): *Pimephales promelas* (Fathead Minnow), *Ceriodaphnia dubia* (Daphnid), *Selenastrum capricornutum* (Green Algae). Marine and Estuarine testing (salinity ≥ 1 ppt): *Strongylocentrotus purpuratus* (Purple Sea Urchin).	D.1.d.(4)
Dry Weather Receiving Water Monitoring Program (**Sections 5.3.1.1**, **5.3.1.2**, and **005.3.1.3**)	Three per permit term according to sampling schedule[2]	Field Observations	Station identification and location, presence of flow, or pooled or ponded water, flow estimation and characteristics, pooled or ponded water characteristics (if applicable), and station description. Presence and assessment of trash.	D.1.c.(1)
		Field Monitoring	pH, temperature, specific conductivity, dissolved oxygen, and turbidity.	D.1.c.(2)
		Analytical Monitoring	As outlined in **Appendix 5A**.	D.1.c.(3)
		Toxicity	Freshwater testing (salinity < 1 ppt): *Pimephales promelas* (Fathead Minnow), *Ceriodaphnia dubia* (Daphnid), and *Selenastrum capricornutum* (Green Algae). Marine and Estuarine testing (salinity ≥ 1 ppt): *Strongylocentrotus purpuratus* (Purple Sea Urchin).	D.1.c.(4)

SMR WMA MAP Component	# Events	Sample Type	Analyses	Permit Provision
	Once per Permit term according to sampling schedule	Bioassessment Monitoring	Macroinvertebrate samples, physical habitat characterization, freshwater algae, and Index of Biological Integrity (IBI) or California Stream Condition Index (CSCI) for benthic macroinvertebrates and algae.	D.1.c.(5)
		Hydromodification Monitoring	Channel conditions, location of discharge points, habitat integrity, photo documentation, channel erosion dimensions, causes of erosion/habitat impact.	D.1.c.(6)
Rainbow Creek Nutrient TMDL Monitoring (**Section 5.3.1.6**)	12 per year (monthly)	Field Observations	Presence of flow and flow rate estimation. Visual observations of odor, color, clarity, floatables, deposits, vegetation and biology.	Attachment E.3.d.(1)
		Field Monitoring	pH, temperature, specific conductivity, dissolved oxygen, and turbidity.	Attachment E.3.d.(1)
		Analytical Monitoring	TDS, dissolved iron, sulfates, ammonia, nitrate, nitrite, organic nitrogen, TKN, total phosphorus, and dissolved ortho-phosphate.	Attachment E.3.d.(1)
Regional Monitoring Programs (**Section 5.3.1.4**)	Annually	SMC Regional Monitoring	Bioassessment monitoring, flow, conventional parameters, nutrients, flow regime, vertebrate occurrence, hydromodification screening and channel engineering checklist (at trend sites).	D.1.e.(1)(a)
Regional Monitoring Programs (**Section 5.3.1.4**)	Every five years	Bight Regional Monitoring	Sediment chemistry, toxicity, and benthic macroinvertebrate community sampling per SQO requirements.	D.1.e.(1)(b)

SMR WMA MAP Component	# Events	Sample Type	Analyses	Permit Provision
Sediment Quality Monitoring Program (**Section 5.3.1.5**)	One event every five years (follow-up sampling as needed)	Sediment Quality Monitoring (may be fulfilled by Bight Monitoring)	Sediment chemistry, toxicity, and benthic macroinvertebrate community sampling per SQO requirements and in accordance with Sediment Monitoring Plan and QAPP (Weston 2014).	D.1.e.(2)
Wet Weather MS4 Outfall Discharge Monitoring Program (**Section 5.3.2.1**)	Once per year at each Copermittee wet weather representative outfall monitoring station	Field Observations	Location, date, duration of storm event, rainfall estimate of storm event, duration between storm event sampled and the end of previous measurable (> 0.1 inch rainfall) storm event. Flow rate and volume.	D.2.c.(3)
		Field Monitoring	pH, temperature, specific conductivity, dissolved oxygen, and turbidity.	D.2.c.(4)
		Analytical Monitoring	As outlined in **Appendix 5A**.	D.2.c.(5)
Dry Weather MS4 Outfall Discharge Monitoring Program (**Sections 5.3.2.2** and **5.3.2.3**)	Two per year at 80% of Copermittee major outfalls	Field Screening Monitoring	Station ID and location, flow (presence, estimation, characteristics, sources) pooled/ponded water (characteristics, sources), station condition, presence and assessment of trash, and evidence of illicit connection or illegal dumping.	D.2.b.(1)
	Two per year at each Copermittee highest priority persistent flow monitoring station	Field Observations	Location, date, duration of storm event, rainfall estimate of storm event, duration between storm event sampled and the end of previous measurable (> 0.1 inch rainfall) storm event. Flow rate and volume.	D.2.b.(2).(c)
		Field Monitoring	pH, temperature, specific conductivity, dissolved oxygen, and turbidity.	D.2.b.(2).(d)
		Analytical Monitoring	As outlined in **Appendix 5A**.	D.2.b.(2).(e)
Rainbow Creek	At least four times per year	Field Observations	Presence of flow and flow rate estimation. Visual observations of odor, color, clarity, floatables, deposits, vegetation and biology.	Not required

SMR WMA MAP Component	# Events	Sample Type	Analyses	Permit Provision
Progress to Goals Outfall Monitoring (**Section 5.3.2.4**)		~~Field Monitoring~~	~~pH, temperature, specific conductivity, dissolved oxygen, and turbidity.~~	~~Not required~~
		~~Analytical Monitoring~~	~~TDS, dissolved iron, sulfates, ammonia, nitrate, nitrite, organic nitrogen, TKN, total phosphorus, and dissolved ortho phosphate.~~	~~Not required~~
WMA Special Study (**Section 5.3.3**)	On-going	SMRNIG Study	Algal bioassessment, dissolved oxygen, pH, temperature, conductivity, nutrients, water level, velocity, and discharge.	D.3.a.(1)
~~San Diego Region Special Study (**Section 5.3.3**)~~	~~On-going~~	~~San Diego Regional Stream Reference Study~~	~~Indicator bacteria, nutrients, metals, and toxicity.~~	~~D.3.a.(2)~~
San Diego Region Special Study (**Section 5.3.3**)	On-going	SMC CLEAN (In-kind) Analytical and Field Monitoring	Nutrients, Indicator bacteria, metals, pH, temperature, specific conductivity, dissolved oxygen, and turbidity.	D.3.a.(2)

1. At least one wet weather monitoring event will be conducted during the first storm of wet season (October 1 – April 30) that meets mobilization criteria, and at least one wet weather monitoring event that occurs after February 1st.
2. At least one monitoring event will be conducted during the dry season (May 1 – September 30) and at least one monitoring event will be conducted during a dry weather period (i.e., antecedent dry period of at least 72 hours following a storm event producing measurable rainfall of greater than 0.1 inch) after the first measurable storm of the wet season (October 1 – April 30).

5.3.1 Receiving Water Monitoring

The Receiving Water Monitoring Program is designed to monitor the condition of the receiving waters in the SMR WMA during dry weather and wet weather conditions. Long-term receiving water monitoring will be conducted to assess the long-term trends and to evaluate attainment of numeric goals established in **Chapter 4**, as applicable and as further described in **Section 5.4.1**. The Permit requires receiving water monitoring at one long-term receiving water monitoring station from among the existing mass loading stations, temporary watershed assessment stations, bioassessment stations, and stream assessment stations previously established by the Copermittees to be representative of the receiving water quality in the SMR WMA; however, two long-term receiving water monitoring stations will be monitored within the WMA to ensure that differences in receiving water quality between the ~~Upper~~ Middle and Lower SMR Subwatersheds are adequately characterized. The two long-term receiving water monitoring stations will allow the Copermittees to assess the long-term trends and determine if conditions in receiving waters are improving. Given their location at the base of the Copermittees' jurisdiction within each subwatershed, the long-term receiving water monitoring stations are located downstream of all diversions and all sites were selected to be representative of land uses and sources within each subwatershed.

In addition, the long-term receiving water monitoring stations will provide data that is representative of the overall health of the upstream waterbodies. For example, the median total nitrogen and total phosphorus results observed at the long-term receiving water monitoring station at the base of the ~~Upper~~ Middle SMR S~~s~~ubwatershed are 0.70 mg/L and 0.12 mg/L, respectively. These median values fall within the range of the median values observed at the receiving water sites historically monitored within the ~~Upper~~ Middle SMR ~~s~~Subwatershed.[18]

The District, on behalf of the Permittees has initiated reconnaissance for selection of a new monitoring station representative of the Upper SMR. It is anticipated that the District will coordinate with the Rancho California Water District, County Transportation, or possibly a private property owner, to access a monitoring location (**Figure 5-2**). Wilson Creek appears to be a promising monitoring option as the creek, being tributary to lake Vail, has one of the longest linear extents in this subwatershed. The area identified for further reconnaissance resides between 33°29'15.13"N/116°55'10.14"W to 33°29'5.55"N/116°54'22.07"W, approximately 0.7 mile along Wilson Creek on the west side of Sage Road to approximately 0.3 mile along Wilson Creek on the east side of Sage Road. In the event that an alternative station is needed, such as due to access or safety constraints, additional reconnaissance will be conducted along Temecula Creek above Vail Lake. The area identified for potential further reconnaissance reside between 33°28'23.20"N/ 116°56'26.12"W to 33°27'38.31"N/ 116°55'5.85"W, approximately 0.6 mile along Temecula Creek on the north side of Highway 79 to approximately 1.16 mile along Temecula Creek on the south side of Highway 79.

Monitoring is required during three wet weather events and three dry weather events per permit term. Both composite and grab sampling regimes will be used for sample collection during dry

[18] The ranges of median total nitrogen and total phosphorus results for all receiving water sites located within the ~~Upper~~ Middle SMR subwatershed with a minimum sample size of four are 0.60 mg/L to 2.4 mg/L and 0.09 mg/L to 0.78 mg/L, respectively.

and wet weather events. Field observations and collection of field monitoring data will be conducted at the stations during all dry and wet weather events.

5.3.1.1 Receiving Water Wet Weather Monitoring and Dry Weather Monitoring

~~Two~~ Three receiving water monitoring stations will be monitored. The locations are summarized ~~and mapped~~ in **Table 5-2** and mapped in **Figure 5-1** and **Figure 5-2**, respectively. The receiving water monitoring stations were determined by a selection process considering, but not limited to, representativeness, accessibility, safety, and hydrologic considerations.

Table 5-2. Long-Term Receiving Water Monitoring Station Locations

Station Name	Station ID	Latitude	Longitude
Upper Santa Margarita River, d/s confluence	902USM828	33.4740[1]	-117.1423[1]
Upper SMR - Wilson Creek (TBD)/ Temecula Creek (TBD)	TBD	TBD	TBD
Lower Santa Margarita River, u/s Camp Pendleton	SMR-MLS-2	33.3981[1]	-117.2627[1]

1. Latitudinal and longitudinal coordinates are approximate. Actual sampling location(s) may be adjusted accordingly based on monitoring and assessment criteria.

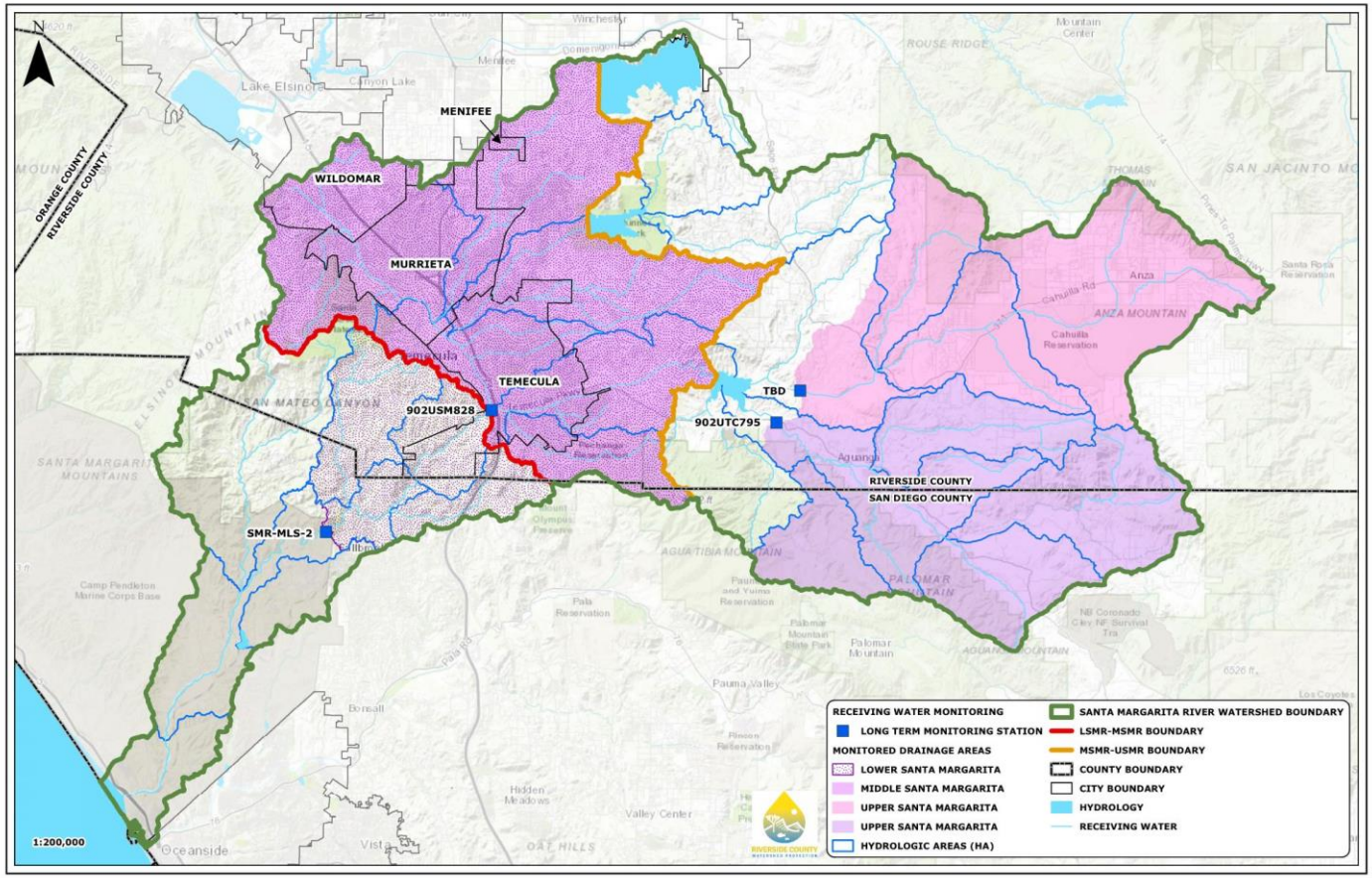

Figure 5-1. Long-Term Receiving Water Monitoring Station Locations for Upper, Middle, and Lower SMR Subwatersheds

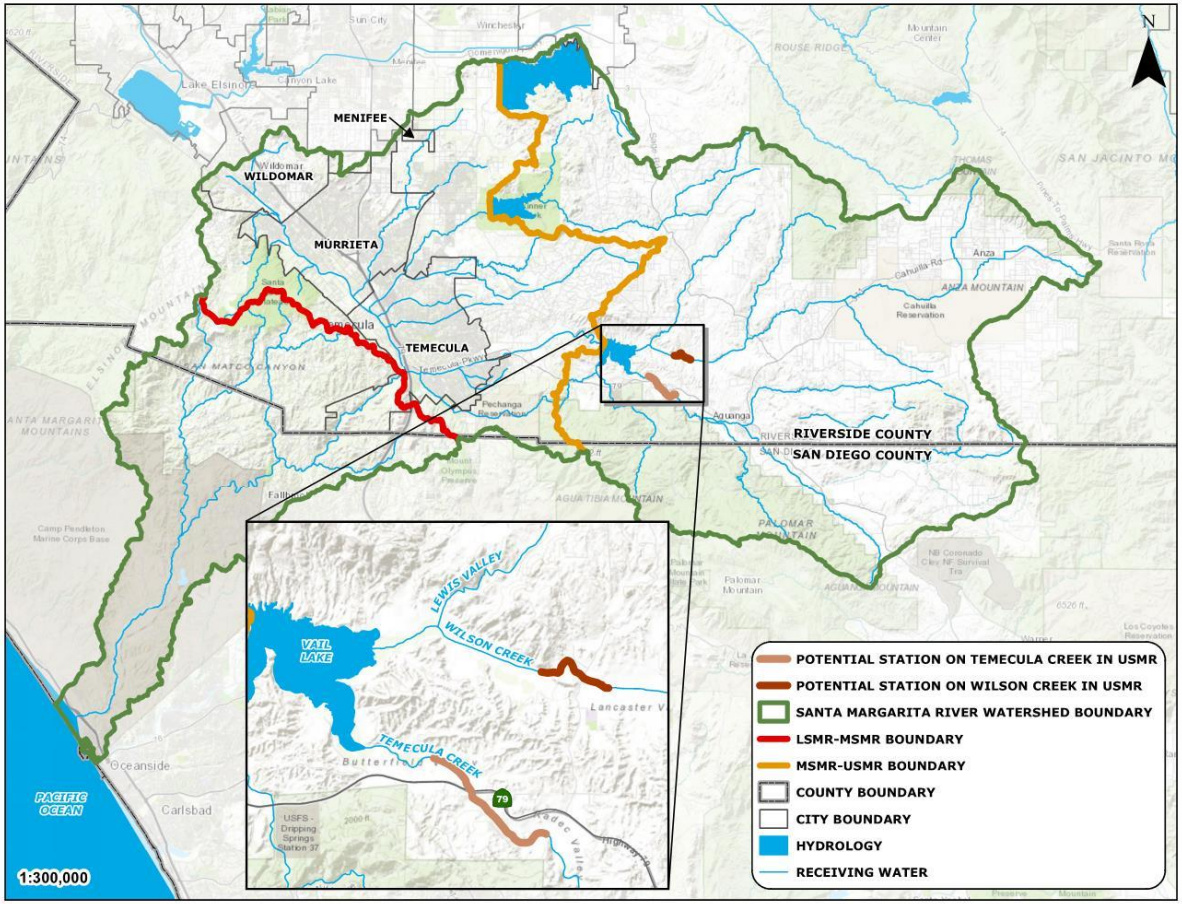

Figure 5-2. Potential Receiving Water Sites for Upper SMR Subwatershed

Bioassessment monitoring and hydromodification monitoring will be conducted at the receiving water stations during at least one dry weather monitoring event during the permit term. Sediment quality monitoring will also be conducted in the SMR Estuary. Details regarding the analysis for each type of monitoring are provided in **Appendix 5A**. **Table 5-3** outlines a tentative schedule for performing each element of the receiving water monitoring program. Monitoring events are tentatively scheduled to support required assessments per Permit Provision D.4.

Table 5-3. Tentative Receiving Water Monitoring Program Schedule[1]

~~Receiving Water Monitoring Program Element~~	~~Reporting Year (# of Events)[2]~~				
	~~18/19~~	~~19/20~~	~~20/21~~	~~21/22~~	~~22/23~~
~~Wet Weather Monitoring~~					
~~Upper and Lower SMR Subwatersheds~~		~~3[3]~~			
~~Dry Weather Monitoring~~					
~~Upper SMR Subwatershed~~			~~3[4]~~		
~~Lower SMR Subwatershed~~		~~3[4]~~			
~~Bioassessment Monitoring~~					
~~Upper SMR Subwatershed~~			~~1~~		
~~Lower SMR Subwatershed~~		~~1~~			
~~Hydromodification Monitoring~~					
~~Upper SMR Subwatershed~~			~~1~~		
~~Lower SMR Subwatershed~~		~~1~~			
Receiving Water Monitoring Program Element	**Reporting Year (# of Events)[2]**				
	18/19	**19/20**	**20/21**	**21/22**	**22/23**
Wet Weather Monitoring					
Upper SMR Subwatershed		3[3]			
Middle SMR Subwatershed		3[3]			
Lower SMR Subwatershed		3[3]			
Dry Weather Monitoring					
Upper SMR Subwatershed			3[4]		
Middle SMR Subwatershed			3[4]		
Lower SMR Subwatershed		3[4]			
Bioassessment Monitoring					
Upper SMR Subwatershed			1		
Middle SMR Subwatershed			1		
Lower SMR Subwatershed		1			
Hydromodification Monitoring					
Upper Subwatershed			1		
Middle SMR Subwatershed			1		
Lower SMR Subwatershed		1			

1. While the total number of events identified for each receiving water monitoring program element will not change, the reporting years during which monitoring is conducted may change if deemed necessary by the Copermittees.
2. The reporting year for the Monitoring and Assessment Program extends from October 1st to September 30th of the following year.
3. At least one wet weather monitoring event will be conducted during the first storm of the wet season (October 1 – April 30) that meets mobilization criteria, and at least one wet weather monitoring event will be conducted after February 1st. The reporting year during which these events take place will be determined based on rainfall intensity and resource availability.
4. At least one monitoring event will be conducted during the dry season (May 1 – September 30) and at least one monitoring event will be conducted during a dry weather period (i.e., antecedent dry period of at least 72 hours following a storm event producing measurable rainfall of greater than 0.1 inch) after the first measurable storm of the wet season (October 1 – April 30). The reporting year during which these events take place will be determined based on resource availability.

5.3.1.2 Receiving Water Bioassessment Monitoring

The Permit requires bioassessment monitoring for each LTMS for one dry weather event per permit term. Bioassessment monitoring at the receiving water monitoring stations will be conducted simultaneously with a receiving water monitoring station dry weather monitoring event. The bioassessment monitoring will be comprised of collecting macroinvertebrate samples, physical habitat characterization measurements, and freshwater algae samples. Bioassessment monitoring is designed to be SWAMP compatible and samples are used to calculate an Index of biotic integrity (IBI) and/or California Stream Condition Index (CSCI) for macroinvertebrates and algae. Bioassessment monitoring may be conducted in accordance with the "Triad" assessment approach that includes the collection of water chemistry and toxicity data as well (Stormwater Monitoring Coalition, 2004). Detailed proposed monitoring methods and procedures are presented in **Appendix 5A**.

~~Receiving Water Hydromodification Monitoring~~

5.3.1.3 Hydromodification Monitoring

The Permit requires hydromodification monitoring to be conducted as part of the Copermittees' approved Hydromodification Management Plans[19] in **Appendix 5B** (Section III; Appendix K) and **Appendix 5C** (Section 8) as well as hydromodification monitoring at each receiving water monitoring station for one dry weather event per permit term.

Hydromodification monitoring was initiated as specified in the April 2016 revision to Appendix K of the Riverside County SMR Hydromodification Management Plan (HMP Monitoring). HMP Monitoring will be conducted annually at two stations, Warm Springs Creek and Meadowview Stream (**Table 5-4** and **Figure 5-2**) through spring of 2019[20]. Hydromodification monitoring as specified in the 2011 Regional HMP for the County of San Diego did not include any monitoring sites in the SMR WMA.

Dry Weather Receiving Water Hydromodification Monitoring in the Middle SMR Subwatershed will occur in conjunction with receiving water dry weather monitoring, and may be conducted in coordination with special studies and regional monitoring programs, such as the SMC Regional Monitoring Program, when feasible. The monitoring conducted in the Lower SMR subwatershed

[19] Refers to Hydromodification Management Plans as approved under the prior Permit for Riverside County Co-Permittees within the Santa Margarita Watershed (Order No. R9-2010-0016) and under the prior Permit for the County of San Diego within the Santa Margarita Watershed (Order No. R9-2007-0001).

[20] All analytical data and a final report, as described in the April 2016 revision to Appendix K of the Riverside County SMR HMP, will be submitted to the San Diego Water Board by October 31, 2019.

will coincide with the spring receiving water dry weather monitoring event in May or June and the dry weather receiving water bioassessment monitoring.

Table 5-4. Hydromodification Monitoring Sites (HMP Monitoring)

	Station Name	Station ID	Latitude	Longitude
HMP Monitoring	Warm Springs Creek	901HDM001	33˚32'54.02" N	117˚10'14.24" W
	Meadowview Stream	902HDM002	33˚31'22.66" N	117˚07'51.46" W
Long Term Receiving Water Hydromodification Monitoring	See Table 5-2			

Observations and measurements will be collected in accordance with each County specific HMP. Detailed proposed monitoring methods and procedures are presented in **Appendix 5A Section 2.7**.

~~In addition to the hydromodification monitoring conducted as part of the Copermittees' Hydromodification Management Plans (**Appendices 5B** and **5C**), the Permit requires hydromodification monitoring for each receiving water monitoring station for one dry weather event per permit term. Hydromodification monitoring at the receiving water monitoring stations will be conducted simultaneously with a receiving water monitoring station dry weather monitoring event. Observations and measurements will be collected in accordance with each County specific HMP. Detailed proposed monitoring methods and procedures are presented in **Appendix 5A**.~~

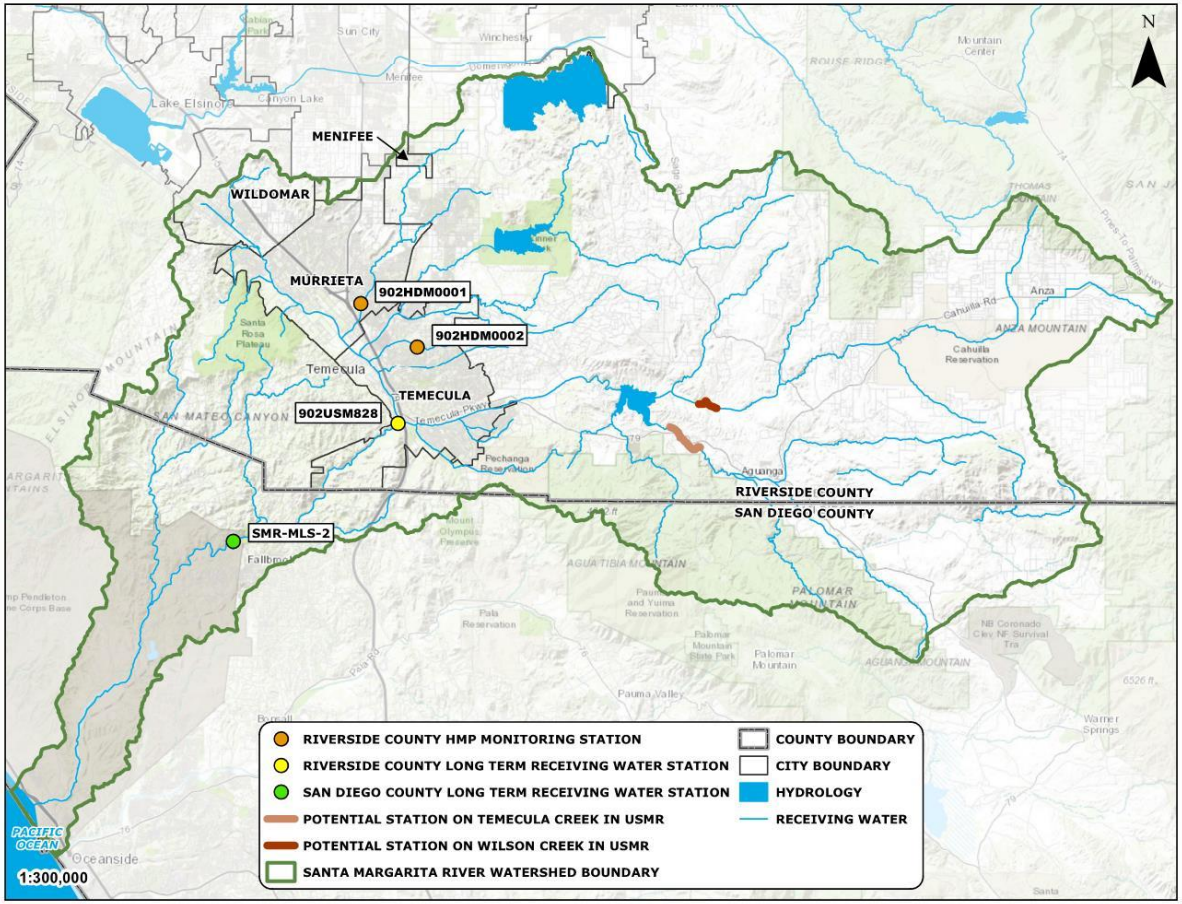

Figure 5-3. Hydromodification Monitoring Station Locations

~~5.3.1.3~~5.3.1.4 Regional Monitoring Programs

Regional Monitoring Programs have been developed with the purpose of increasing the effectiveness of existing NPDES monitoring programs by integrating the efforts of Copermittees to achieve a large-scale assessment of the watershed condition. Certain monitoring efforts have been incorporated into these regional programs for the purpose of establishing a holistic and coordinated approach, the details of which are available in the applicable regional monitoring plans. Copermittees will participate in these regional programs to meet the requirements of Permit Provision D.1.e (1). These programs are summarized below.

~~5.3.1.3.1~~5.3.1.4.1 *Southern California Stormwater Monitoring Coalition*

Since 2001, the Copermittees have partnered with regulated stormwater municipalities in Southern California, the RWQCBs of Southern California and the Southern California Coastal Water Research Project (SCCWRP) to form the SMC. The Copermittees are continuing to participate in the SMC Regional Freshwater Stream Bioassessment Monitoring Program. In 2015, a new five-year SMC program began that extended the initial survey to answer key management questions about the impacts of stormwater on stream conditions. Several modifications were made to the previous surveys to emphasize detection of trends and to address data gaps. Specifically, monitoring of high-priority stressors (i.e., habitat, nutrients, and ionic composition) was continued, whereas monitoring of low-priority stressors (i.e., water column metals, pyrethroids, and toxicity) was discontinued. Flow regime (hydrologic state checklist derived from Gallart et al. [2010] and water level loggers), vertebrate occurrence, and new stressors of interest (i.e., sediment pyrethroids and toxicity) were added to the list of monitored parameters. Sediment sampling was deferred by the SMC Executive Committee until the 2017 monitoring year.

In addition, the physical habitat assessment has been enhanced with hydromodification screening (modified from Bledsoe et al., 2010) at unarmored or partially armored "condition" sites (i.e., sites selected in a probabilistic way to represent the typical condition of streams in the region) and a channel engineering checklist at all condition sites. The hydromodification screening and channel engineering checklist will be conducted at "trend" sites (i.e., sites that are revisited) at least once during the five-year study. The trend sites were selected from previously sampled sites under earlier probabilistic surveys in order to estimate changes in regional conditions over time, and the condition sites were selected from a new probabilistic sample draw in order to estimate current regional conditions.

~~5.3.1.3.2~~5.3.1.4.2 *Southern California Bight Regional Monitoring*

Provision D.1.e.(1)(b) of the Permit also requires the Copermittees to participate in the Bight Regional Monitoring Program, an integrated assessment of the Southern California Bight, that occurs every five years and consists of a partnership of multiple local, state, and federal agencies overseen by SCCWRP. The Bight Regional Monitoring Program assesses the ecological health of nearshore and offshore marine habitats as well as coastal embayments by measuring indicators of environmental condition (e.g., habitat quality, sediment contamination, toxicity, infaunal communities, and fish communities). Participation in the Bight Regional Monitoring Program may be used to fulfill the sediment quality monitoring requirements of Permit Provision D.1.e.(2).

~~5.3.1.4~~5.3.1.5 Sediment Quality Monitoring

The Copermittees are required either individually, in association with multiple Copermittees, or through participation in a waterbody monitoring coalition to perform sediment quality monitoring to assess compliance with the sediment quality receiving water limits applicable to ~~storm drain~~MS4 discharges to enclosed bays and estuaries. Provision D.1.e.(2) of the Permit requires the Copermittees to conduct sediment monitoring which satisfies the requirements of the *Water Quality Control Plan for Enclosed Bays and Estuaries of California – Part I Sediment Quality* (Sediment Control Plan) (State Water Board and California Environmental Protection Agency [CA EPA], 2009). Data are assessed using sediment quality objectives (SQOs) which are based on a multiple lines of evidence (MLOE) approach. The lines of evidence (LOE) are sediment toxicity, sediment chemistry, and benthic community condition. The MLOE results are integrated through the evaluation of the severity of biological effects and the potential for chemically-mediated effects to provide a final site level assessment. The integration of all three measurements help to provide a comprehensive assessment of the sediment condition of lagoons in San Diego County using the most up-to-date protocols.

~~5.3.1.5~~5.3.1.6 TMDL Monitoring

The SMR WMA has one existing TMDL, established in 2006, which is the *Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed* (Nutrient TMDL). The goal of the Nutrient TMDL is to achieve the pollutant load reductions necessary to restore and protect the designated aquatic life beneficial uses in the Rainbow Creek sub-watershed. The monitoring program provides data on baseline conditions and trends for nutrients in the Rainbow Creek Subwatershed. The resulting data may be used in evaluating BMP effectiveness to reduce nutrient loading to the creek, and tracking changes in water quality and the trajectory to attain the TMDL goals in Rainbow Creek and its tributaries over time. Monitoring in compliance with the Nutrient TMDL addresses the following questions:

- How do the mean concentrations of total nitrogen and total phosphorous vary among the sampling sites in the Rainbow Creek mainstem and tributaries~~, instantaneous loading, and instantaneous flux of total nitrogen and total phosphorus vary among the sampling sites in the Rainbow Creek main stem and tributaries~~?
- Are there any significant trends in total nitrogen and total phosphorus concentrations in the Rainbow Creek main stem and tributaries over time?

In situ monitoring for field parameters and grab sampling for nutrients, TDS, iron and sulfate are conducted at 14 locations in the Rainbow Creek Subwatershed. Monitoring events are conducted during dry weather (i.e., not within 72 hours of a rain event totaling 0.1 inch or greater) at approximately 30-day intervals from October to September of each monitoring year. The flow rate at each site is estimated using channel cross-section dimensions and either a hand-held flow meter or the floating object technique to measure current velocity.

Monitoring methods are further described in **Appendix 5A**. Compliance with the Nutrient TMDL is evaluated by comparing monitoring results with final receiving water limitations (i.e., 1 mg/L for total nitrogen, 0.1 mg/L for total phosphorus, and 10 mg/L for nitrate as N).

Table 5-~~5~~54. Rainbow Creek Nutrient TMDL Monitoring Station Locations

Station ID	Site Description	Latitude	Longitude
	Main Stem		
RBC01	Rainbow Creek @ Eastern edge of Hines Nursery	33.42042	-117.13571
RBC02	Rainbow Creek @ Huffstatler Road	33.41544	-117.15199
RBC04	Rainbow Creek @ Old Highway 395	33.41272	-117.15853
RBC06[1]	Rainbow Creek @ 2219 Willow Glen Road	33.40881	-117.20539
RBC10	Rainbow Creek @ MWD Crossing	33.40696	-117.18344
SMG05	Rainbow Creek @ Willow Glen Road	33.40788	-117.20104
SMG06	Rainbow Creek @ Stage Coach Lane	33.41056	-117.21477
	Tributary		
RVT02	Chica Tributary @ 1st Street	33.42126	-117.14983
HST01	Brow Ditch to Rainbow Creek @ Huffstatler Road	33.41526	-117.15204
HST02	~~Pipe from a nursery along~~ Huffstatler Road ~~(down~~upstream of HST01~~)~~	33.41174	-117.15196
MGT01	Margarita Glen Tributary to Rainbow Creek	33.40847	-117.19877
RGT01	Rainbow Glen Tributary to Rainbow Creek	33.41107	-117.18569
WGT01	Willow Glen Tributary @ Willow Glen Road	33.40784	-117.20309
VMT01	Via Milpas Tributary to Rainbow Creek	33.40957	-117.21373

[1] Due to a change in private ownership, as of November 2018, the County of San Diego no longer has access to RBC06 and will no longer monitor this site.

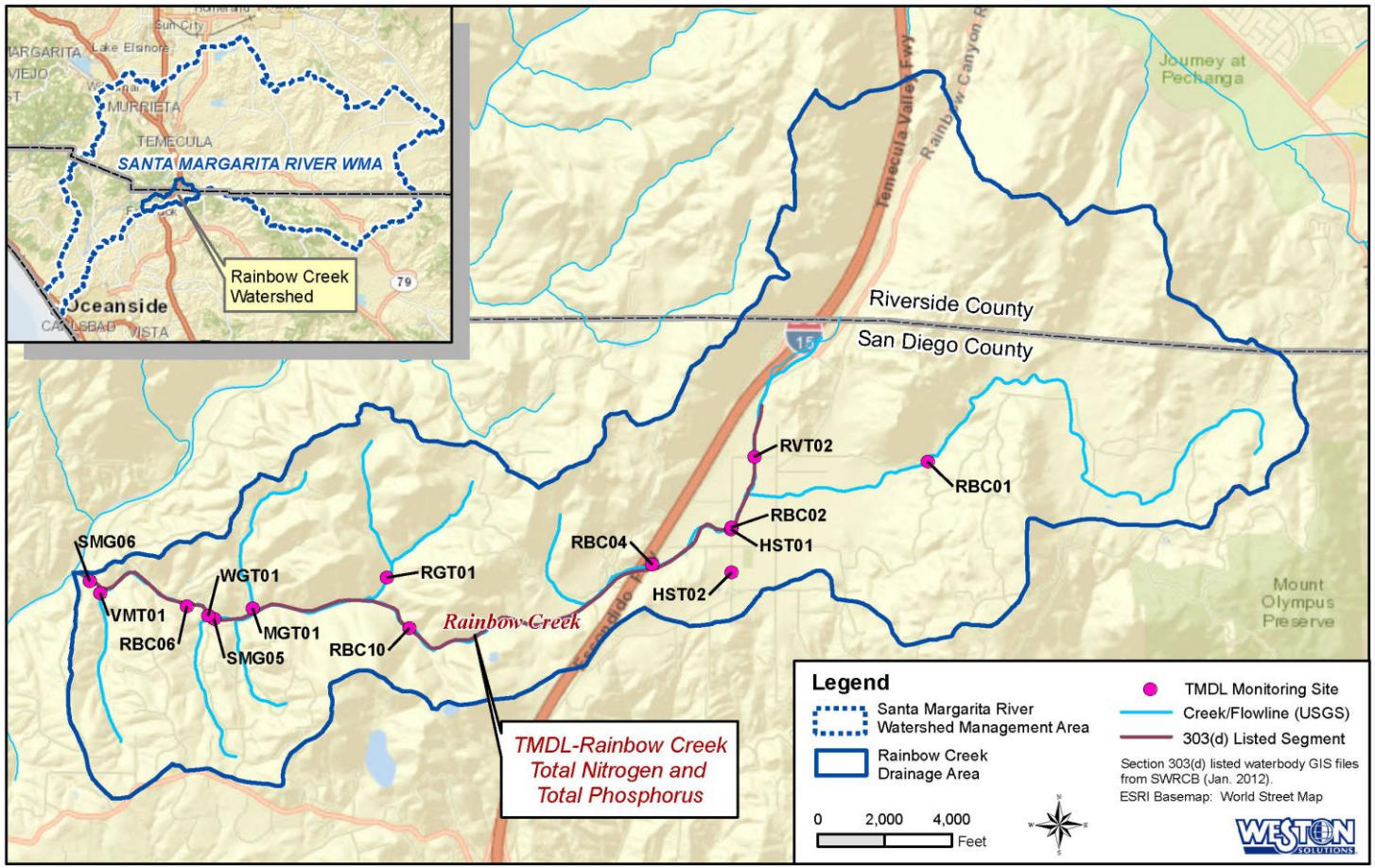

Figure 5-~~44~~42. Rainbow Creek Nutrient TMDL Monitoring Station Locations

5.3.2 MS4 Outfall Monitoring

The MS4 Outfall Monitoring Program is designed to assess the effectiveness of Copermittees JRMPs and ~~Water Quality Improvement Plan~~WQIP strategies at prohibiting non-storm water discharges into the ~~storm drain system~~MS4 and reducing pollutants in stormwater discharges from their ~~storm drain~~MS4s to the maximum extent practicable (MEP). ~~Storm drain~~MS4 outfall monitoring may also be used to evaluate attainment of numeric goals established in **Chapter 4**, as applicable and as further described in **Section 5.4.1**. The MS4 Outfall Program consists of wet weather sampling of discharges from the representative major outfalls, as well as field screening monitoring and non-storm water persistent flow ~~storm drain~~MS4 outfall discharge monitoring during dry weather. In addition, the County of San Diego conducts further ~~storm drain~~MS4 outfall monitoring associated with the HPWQC in the Rainbow Creek Subwatershed in a voluntary monitoring program that provides data to assess progress to goals.

5.3.2.1 MS4 Outfall Wet Weather Monitoring

Each Copermittee with ~~storm drain~~MS4 outfalls within the WMA has identified one major outfall station within their jurisdiction for wet weather MS4 outfall discharge monitoring as shown in **Table 5-6~~Table 5-6~~~~Table 5-5~~** and **Figure 5-5~~Figure 5-5~~~~Figure 5-3~~**. These six representative major outfall stations (or alternative stations identified during adaptive management) will be monitored in the SMR WMA to meet Permit requirements.

Table 5-66~~5~~. MS4 Outfall Wet Weather Monitoring Station Locations

Station Number	Receiving Water	Permittee[1] Assigned	Site Description	Latitude	Longitude
902MS41 033	Tucalota Creek	RCFCWCD	Outlet to W side of Tucalota Creek south of M.H.S. Rd.	33.5521	-117.1364
902MS42 240	Temecula Creek	County of Riverside	Outlet to Temecula Creek @ South of Breeze Way Pl and Summit View	33.4866	-117.0636
902MS44 034	Warm Springs Creek	Murrieta	RCP Outlet to Warm Springs Creek d/s of M.H.S. Rd.	33.5475	-117.1719
902MS43 015	Murrieta Creek	Temecula	Outlet to Murrieta Creek @ Diaz Rd. behind RCWD pump station	33.5165	-117.1723
902MS45 031	Wildomar Channel	Wildomar	Outlet to NW side of Wildomar Channel @ Gruwell St.	33.6037	-117.2787
HST01	Rainbow Creek	County of San Diego	Brow Ditch to Rainbow Creek @ Huffstatler Street	33.4151	-117.1520

1. The City of Menifee does not have a ~~storm drain~~MS4 outfall.

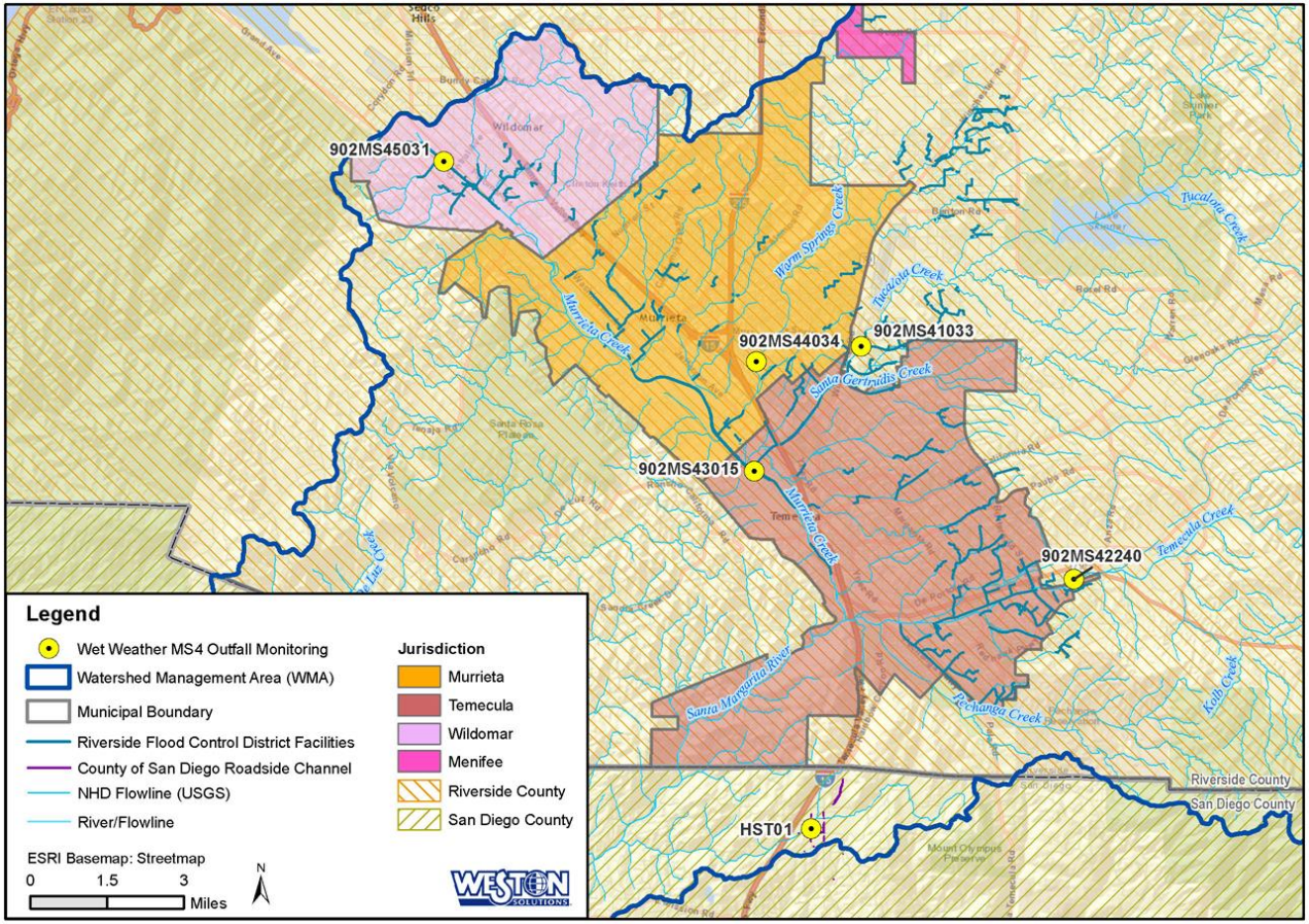

Figure 5-~~5~~53. MS4 Outfall Wet Weather Monitoring Station Locations

The six representative major outfalls will be monitored once per year during wet weather events. The outfalls will continue to be monitored unless new information becomes available which warrants consideration of new stations. If new information becomes available which warrants consideration of new stations, the Copermittees will re-evaluate the stations and potentially recommend new stations via the adaptive management process. Modifications to monitoring locations will be reported in the ~~Water Quality Improvement Plan~~WQIP Annual Report. Detailed proposed monitoring methods and procedures are presented in **Appendix 5A**.

5.3.2.2 Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Dry weather MS4 outfall discharge field screening monitoring consists of collecting visual observations at Copermittee major outfalls. The Permit identifies the required frequency for dry weather ~~storm drain~~MS4 outfall discharge field screening monitoring based on the number of major outfalls within a Copermittee's jurisdiction. As shown in **Table 5-7~~Table 5-7~~~~Table 5-6~~**, each Copermittee has less than 125 major ~~storm drain~~MS4 outfalls within the SMR WMA. The initial requirement for each Copermittee is to visually inspect at least 80 percent of the outfalls twice per year during dry weather conditions. The Permit also allows the Copermittees to adjust the field screening monitoring frequencies and locations for the ~~storm drain~~MS4 outfalls in its inventory, as needed, to identify and eliminate sources of persistent flow non-storm water discharges in accordance with the HPWQC identified in the ~~Water Quality Improvement Plan~~WQIP, provided the number of visual inspections performed is equivalent to the number of visual inspections initially required. The Copermittees will, at a minimum, conduct the total number of visual inspections identified within **Table 5-7~~Table 5-7~~~~Table 5-6~~** each year and the frequencies and locations for the ~~storm drain~~MS4 outfalls which are inspected may be adjusted in accordance with the flexibility allowed in the Permit, as needed. Detailed proposed monitoring methods and procedures are presented in **Appendix 5A**.

Table 5-7~~6~~. Dry Weather MS4 Outfall Discharge Field Screening Monitoring Frequency

Copermittee	Total Number of Major Outfalls in SMR WMA	80% of Major Outfalls	Number of Visual Inspections Required Per Year
RCFCWCD	84	68	136
County of Riverside	7	6	12
Menifee	0	0	0
Murrieta	31	25	50
Temecula	119	96	192
Wildomar	11	9	18
County of San Diego	11	9	18

5.3.2.3 Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring

Based upon the dry weather ~~storm drain~~MS4 outfall discharge field screening monitoring records available upon the submittal of the ~~Water Quality Improvement Plan~~WQIP and other pertinent factors (e.g., safety conditions, site accessibility, flow vs. ponded observations, tributary influences), each Copermittee identified and prioritized the ~~storm drain~~MS4 outfalls observed to

have persistent flow. This information was then used by the Copermittees to prioritize the ~~storm drain~~MS4 outfalls based on their potential to contribute to the HPWQC identified in **Chapter 2**. Target areas within the SMR WMA were identified using several factors (detailed in **Chapter 4**) which are expected to significantly correlate with the nutrient loading being discharged through the ~~storm drain system~~MS4. Persistently flowing outfalls are shown in **Figure 5-6~~Figure 5-6Figure 5-4~~**. Copermittees prioritized persistently flowing outfalls; however, where less than five persistently flowing outfalls were identified, the next highest priority transient outfall was selected. **Figure 5-7~~Figure 5-7Figure 5-5~~** illustrates the thirty preliminary highest priority ~~storm drain~~MS4 outfall discharge monitoring stations that will be monitored in the SMR WMA during implementation of the SMR ~~Water Quality Improvement Plan~~WQIP. Each Copermittee has selected five ~~storm drain~~MS4 outfall discharge monitoring stations within the WMA, except for the City of Menifee, which does not have a ~~storm drain~~MS4 outfall.

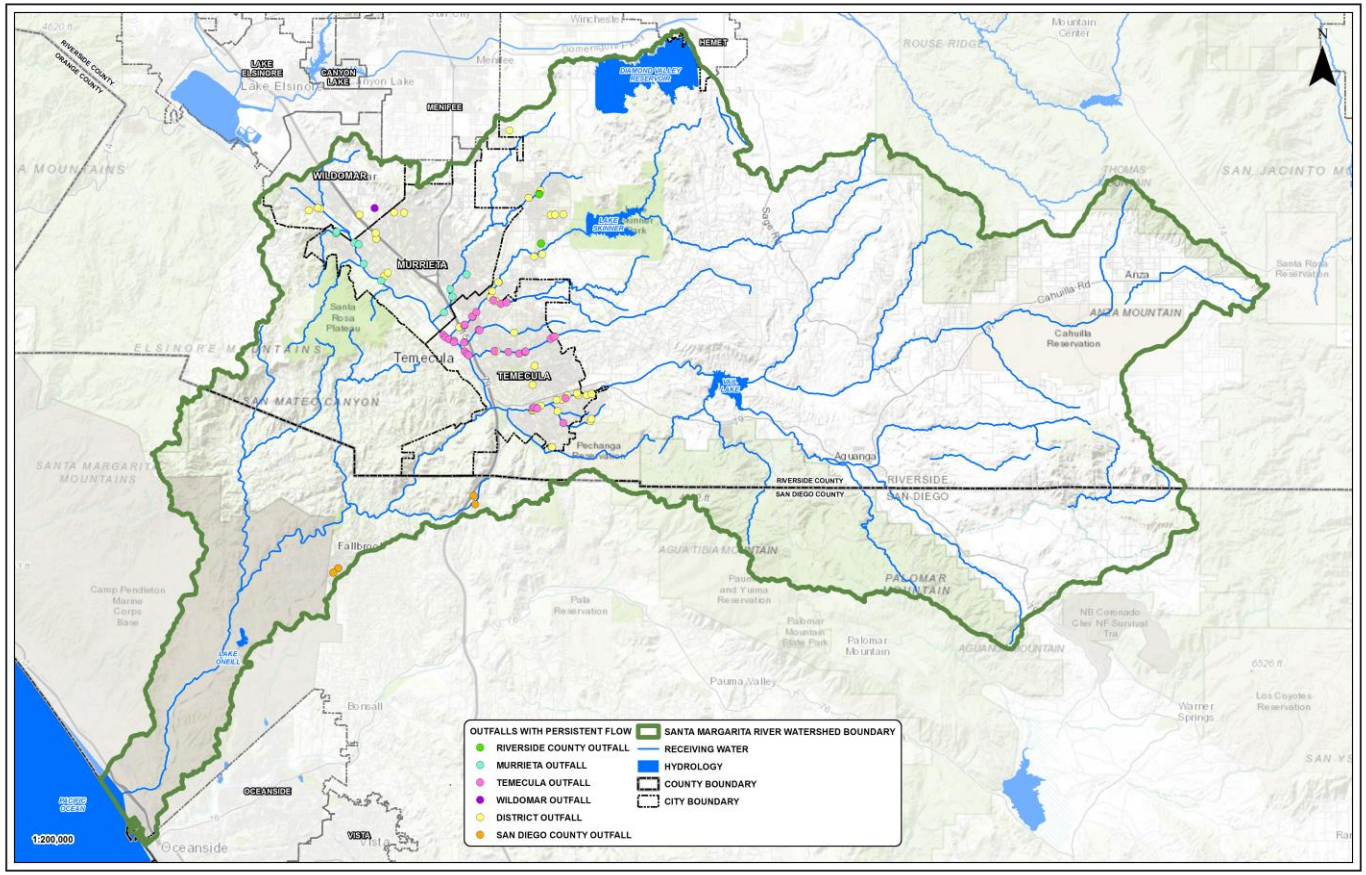

Figure 5-~~6~~64. Persistently Flowing Outfalls Identified within the SMR WMA

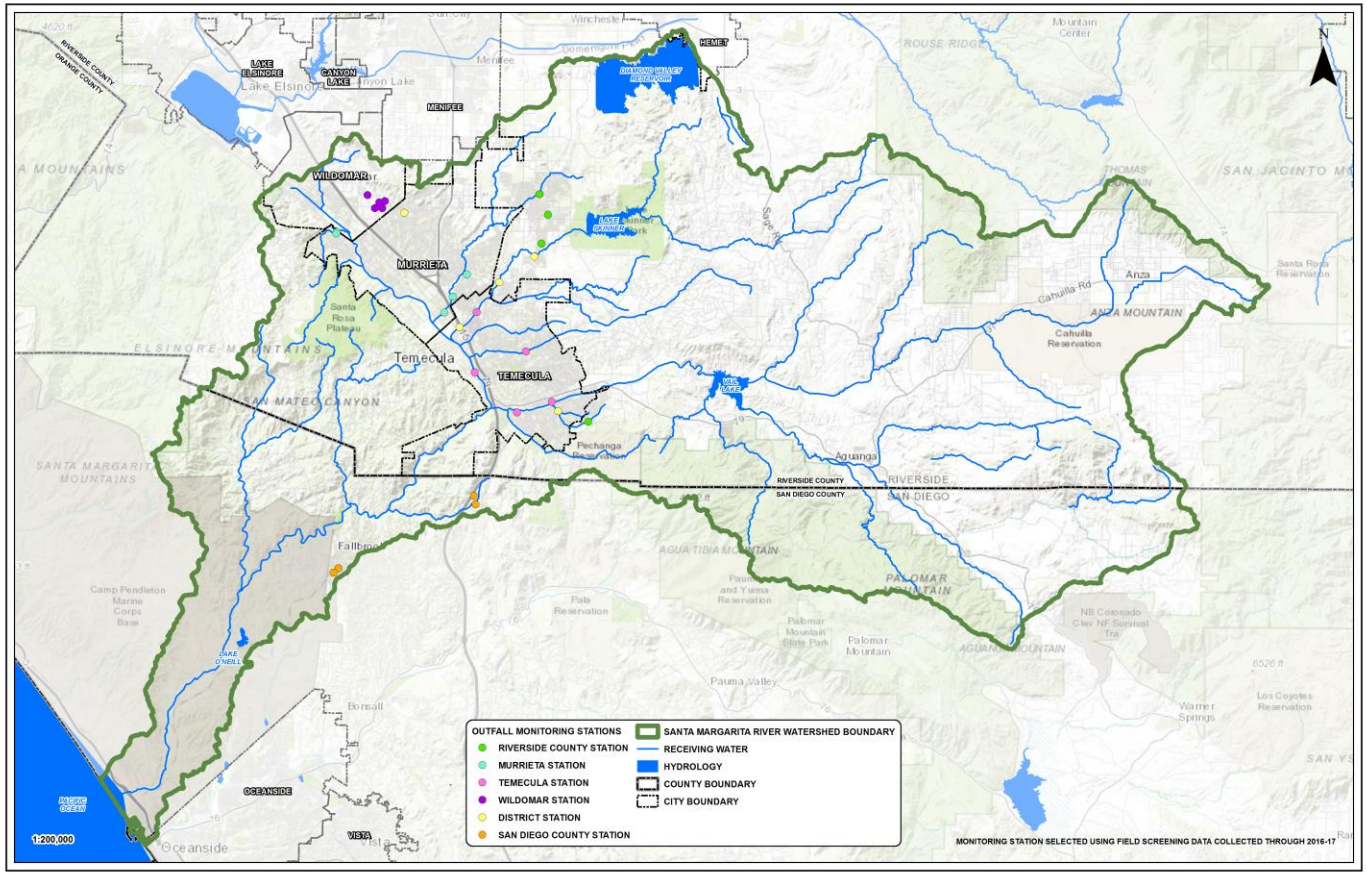

Figure 5-~~7~~75. Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Station Locations

Table 5-8887. Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Station Locations

Station Number	Permittee Assigned	Latitude	Longitude
902MS41010	RCFCWCD	33.4728	-117.0920
902MS41025	RCFCWCD	33.5241	-117.1651
902MS41032	RCFCWCD	33.5521	-117.1361
902MS41037	RCFCWCD	33.5680	-117.1104
902MS41061	RCFCWCD	33.5943	-117.2066
902MS42207	County of Riverside	33.5761	-117.1051
902MS42211	County of Riverside	33.5939	-117.1005
902MS42235	County of Riverside	33.6065	-117.1070
902MS42236	County of Riverside	33.6065	-117.1070
902MS42245	County of Riverside	33.4664	-117.0697
902MS44030	Murrieta	33.5331	-117.1764
902MS44033	Murrieta	33.5428	-117.1702
902MS44039	Murrieta	33.5567	-117.1600
902MS44062	Murrieta	33.5822	-117.2562
902MS44063	Murrieta	33.5812	-117.2566
902MS43038	Temecula	33.5096	-117.1159
902MS43062	Temecula	33.4962	-117.1535
902MS43082	Temecula	33.4718	-117.1221
902MS43099	Temecula	33.4785	-117.0967
902MS43123	Temecula	33.5335	-117.1525
902MS45012	Wildomar	33.5970	-117.2282
902MS45015	Wildomar	33.6006	-117.2251
902MS45019	Wildomar	33.6014	-117.2208
902MS45024	Wildomar	33.6051	-117.2338
902MS45026	Wildomar	33.5971	-117.2228
MS4-SMG-015	County of San Diego	33.3748	-117.2526
MS4-SMG-021	County of San Diego	33.3748	-117.2526
MS4-SMG-057	County of San Diego	33.4203	-117.1532
MS4-SMG-024	County of San Diego	33.3720	-117.2560
HST01	County of San Diego	33.4151	-117.1520

Each of the highest priority non-storm water persistent flow ~~storm drain~~MS4 outfall monitoring stations identified in **Table 5-8~~Table 5-8~~~~Table 5-8~~~~Table 5-7~~** and **Figure 5-7~~Figure 5-7~~~~Figure~~**

~~5-5~~ will be monitored under dry weather conditions at least semi-annually until one of the following criteria occur:

- The non-storm water discharges have been effectively eliminated (i.e. no flowing, pooled, or ponded water) for three consecutive dry weather monitoring events, OR
- The source(s) of the persistent flows has been identified as a category of non-storm water discharges that does not require a NPDES permit and does not have to be addressed as an illicit discharge because it was not identified as a source of pollutants (i.e. constituents in non-storm water discharge do not exceed Non-Storm Water Action Levels [NALs] identified in Permit Provision C.1 [inclusive of any future iterations]), and the persistent flow can be re-prioritized to a lower priority, OR
- The constituents in the persistent flow non-storm water discharge do not exceed NALs, and the persistent flow can be re-prioritized to a lower priority, OR
- The source(s) of the persistent flows has been identified as a non-storm water discharge authorized by a separate NPDES permit.

If one of the criterion for discontinuing monitoring is met, or the threat to water quality has been reduced (per Permit Provision D.2.b.(2)(b)(iii)), a Copermittee can replace the persistent flow MS4 outfall monitoring station with their next highest prioritized outfall within the WMA, unless there are no remaining qualifying major ~~storm drain~~MS4 outfalls within their jurisdiction within the WMA. Copermittees are not required to sample ponded water, as the requirements of Permit Provision D.2.b.(2)(e) specify collection during monitoring events "in which measurable flow is present…". Ponded or pooled water may have conditions not found in flowing water and may not reach receiving waters. Sites visited during semi-annual monitoring events that do not have measurable flow may result in an analytical data gap. Therefore, Copermittees may elect to replace highest priority outfalls that become transient, and a reduced threat to water quality can be demonstrated, with persistently flowing outfalls. **Table 5-8~~Table 5-8Table 5-7~~** and **Figure 5-7~~Figure 5-7Figure 5-5~~** will be updated accordingly as stations are rotated and any updates will be presented in the ~~Water Quality Improvement Plan~~WQIP Annual Report. Detailed proposed monitoring methods and procedures are presented in **Appendix 5A**.

5.3.2.4 Rainbow Creek Progress Towards Goals Outfall Monitoring

The County of San Diego will continue to conduct monitoring in the Rainbow Creek Subwatershed to assess the contribution of urban runoff to ~~the nutrient concentration in~~ Rainbow Creek. This non-storm water monitoring effort currently includes at least quarterly visits to 21 outfalls in this subwatershed during dry weather (i.e., no daily precipitation greater than 0.1 inches within 72 hours prior to the visit). ~~When water is present at a storm drain location, grab samples are collected for analysis of nutrients, TDS, iron, and sulfate. Field parameters are measured in-situ, including pH, temperature, conductivity, turbidity and dissolved oxygen.~~ A hand-held flow meter or the floating object technique is used to measure current velocity. **Appendix 5A** provides additional details regarding this monitoring effort including monitoring locations~~, parameter list and analytical methods~~.

5.3.3 Special Studies

Special Studies as required under the Regional Permit are intended to address data gaps and/or to facilitate the development of information necessary to more effectively address the pollutants

and/or stressors as relevant to the HPWQC in the WMA, as well as impacts to the receiving waters in the region. A description of these special studies are included in Sections 5.3.3.1 and 5.3.3.2. The Co-Permittees also participate in additional special studies for the benefit of their local and regional program efforts. A description of other special efforts are included in Section 5.3.3.3. Special Studies have their own separate stand-along workplans. Updates to Special Studies' Workplans and progress of Special Studies efforts will be included in the Annual Monitoring and Assessment reports.~~Special studies for the SMR WMA include the Nutrient Initiative Study and the San Diego Regional Reference Streams Study.~~

5.3.3.1.1 WMA Special Study - SMRNIG Study

The SMRNIG, formed in 2011, is a collaboration of stakeholders from within the watershed for the purpose of monitoring and assessing water quality in order to evaluate and address impairments due to biostimulatory substances in the estuary and river. The SMR Stakeholder Group is funded largely through the Integrated Regional Water Management (IRWM) process and is currently receiving a Proposition 84 grant from the State of California with matching funding and in-kind services provided by the County of San Diego, District, Southern California Coastal Water Research Project (SCCWRP), United States Marine Corps (USMC) Base Camp Pendleton, and the Regional Board. A Technical Advisory Committee led by SCCWRP coordinates the technical studies at the bequest of the SMR Stakeholder Group.

Current nitrogen and phosphorus water quality objectives are problematic, in part, because they do not consider site-specific factors. The Nutrient Numeric Endpoint (NNE) framework, an alternative regulatory approach advocated by SWRCB staff and United States Environmental Protection Agency (USEPA) Region 9, is currently in development. As a result, the methods for protecting beneficial uses from biostimulatory substances are aimed at addressing the cause of potential impairments rather than focusing on controlling nutrient concentrations in of themselves. This framework can be used to develop scientifically-sound nutrient water quality goals for the Estuary and river that are protective of their beneficial uses.

In support of the development of the NNE framework the Copermittees targeted sites for in-kind sampling to provide the study with additional nutrient data, selected in coordination with SCCRWP. Samples collected included analysis of ammonium, orthophosphate, TDN, TDP, particulate organic carbon, particulate organic nitrogen, particulate phosphorus, phytoplankton chlorophyll a, algal CN content, and algal phosphorus content. During WQIP implementation Copermittees will continue to support the study effort by including in-kind monitoring of additional NNE relevant parameters at the long-term receiving water station during a dry weather monitoring event. The Copermittees will continue to support future phases of the NNE development efforts.

Currently, the Regional Water Board is preparing a draft resolution and staff report that will support water quality goals for the Estuary that was developed with the consideration of stakeholder input. The resolution is scheduled to be released for public comment in spring 2018 and is based on technical studies supported by the SMR Stakeholder Group (Sutula et al., 2016). The next stage of the project will develop proposed water quality goals for the Santa Margarita River downstream of the confluence with De Luz Creek. By May 2018, the Technical Advisory Committee will develop a preliminary report that evaluated potential goals for this section of the river that is based on scientific studies and model simulations. Additional discussions of the SMR stakeholder Group will ensue that use the results of this preliminary technical report to inform the

Stakeholder Group in developing recommended goals for this section of the river for the Regional Water Board's consideration. Final goals developed for the River will be considered as part of the integrated assessment of the WQIP.

~~*5.3.3.1.2 San Diego Regional Reference Streams Study*~~

~~The San Diego Regional Reference Stream Study serves as the regional special study for the Santa Margarita WMA. The study was conceived by the San Diego, Orange County and Riverside Permittees, funded by San Diego and Orange County, and fulfills the regional special study requirement in Permit Provision D.3.(a). The goal of this project was to collect the data necessary to derive reasonable and accurate numeric targets for bacteria, nutrients, and heavy metals by referencing natural, local conditions. The study develops levels that account for natural sources to establish the concentrations or loads from streams in a minimally disturbed or reference condition. The study considers the size, geology and wet or dry conditions of the catchment. This study provides a scientific basis for evaluating compliance levels in TMDLs. The results of this study were used to support the forthcoming reopener of the regionally adopted Bacteria TMDLs and to support numeric targets in future TMDLs for bacteria, nutrients, and metals. For additional details see SCCWRP Technical Report 862: Wet and Dry Weather Natural Background Concentrations of Fecal Indicator Bacteria in San Diego, Orange, and Ventura County, California Streams (Tiefenthaler et al., 2015) (http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/862_StreamFIBs.pdf). The draft report on the measured concentrations of nutrients and metals in streams in minimally disturbed watersheds will be released in the near future for review and comment.~~

~~*5.3.3.1.3*~~*5.3.3.1.2 San Diego Region Special Study - SMC CLEAN Project*

The SMC California LID Evaluation and Analysis Network (SMC CLEAN) will develop a thorough understanding of the effectiveness of LID BMPs in California: in the short term for use in calibration of performance expectations for watershed programs; and in the long term for modification of LID design, construction, and maintenance. This can only be acoomplished with the help of project partners and others performing LID monitoring. The District, on behalf of the Co-Permittees is a cost-sharing project partner and provides in-kind services for this special study. In-kind monitoring services are accomplished by sharing the data resulting from the District's 15-acre LID Integrated Management Plan Testing and Demonstration Facility. The facility is being used to monitor the performance of LID features in the field, illustrate LID features in training workshops, and assist in the development of technical guidance regarding LID features. Flow data and influent and effluent samples are collected in accordance with the District's LID Monitoring Plan and QAPP (Appendix 5G). The District is collaborating with the SMC CLEAN's overarching LID BMP evaluation project. The results of this monitoring study will be used to establish water quality treatment effectiveness and numeric criteria for crediting flow reductions to developments that implement these BMPs. The SMC CLEAN project will be used to:

- Develop specific LID research questions;
- Research existing LID monitoring data;
- Develop a standard methodology for monitoring LID BMPs including coordination with other SMC projects concerned with monitoring methodology;
- Coordinate ongoing LID monitoring;

- Implement LID monitoring through the standard methodology and monitoring protocol developed;
- Compile and analyze LID monitoring data;
- Develop recommendations; and
- Conduct a review and update of the Southern California LID Manual.[21]

The updated LID Manual will provide enhanced guidance for design, construction, and maintenance of various LID BMPs to improve their performance in removing pollutants and reducing hydrologic changes. This is a regional project with many participating agencies including UCSD, Riverside County Flood Control and Water Conservation District, Orange County Public Works, the Council for Watershed Health, Loyola Marymount University and the US South Coast Research and Extension Center. As the project progresses, improvements in technology and understanding of BMPs effectiveness in treating a variety of stormwater pollutants (including nutrient) will be assessed and implemented. This regional effort will provide information filling the data gap on the effectiveness of LID BMPs and to and provide guidance on the performance expectations for watershed programs. Assessment based on findings of this special study will be dependent on the schedule for the updated LID Manual.

~~5.3.3.1.4~~5.3.3.1.3 Additional Special Studies or Related Monitoring Efforts~~Intercalibration~~

San Diego Regional Reference Streams Study

The San Diego Regional Reference Stream Study serves as the regional special study for the Santa Margarita WMA. The study was conceived by the San Diego, Orange County and Riverside Permittees, funded by San Diego and Orange County, and fulfills the regional special study requirement in Permit Provision D.3.(a). The goal of this project was to collect the data necessary to derive reasonable and accurate numeric targets for bacteria, nutrients, and heavy metals by referencing natural, local conditions. The study develops levels that account for natural sources to establish the concentrations or loads from streams in a minimally disturbed or reference condition. The study considers the size, geology and wet or dry conditions of the catchment. This study provides a scientific basis for evaluating compliance levels in TMDLs. The results of this study were used to support the forthcoming reopener of the regionally adopted Bacteria TMDLs and to support numeric targets in future TMDLs for bacteria, nutrients, and metals. For additional details see SCCWRP Technical Report 862: Wet and Dry Weather Natural Background Concentrations of Fecal Indicator Bacteria in San Diego, Orange, and Ventura County, California Streams (Tiefenthaler et al., 2015) (http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/862_StreamFIBs.pdf). The draft report on the measured concentrations of nutrients and metals in streams in minimally disturbed watersheds will be released in the near future for review and comment.

Laboratory Intercalibration

Beginning in 2003, and continuing in 2006 and 2009, the SMC implemented a series of intercalibration studies to promote comparability of water chemistry measurements. The 2003 intercalibration study established common reporting levels and target analytes, and utilized iterative round robin exercises to minimize interlaboratory variation. During this permit term the SMC commissioned an intercalibration study to quantify stormwater-sample testing comparability

[21] https://www.casqa.org/sites/default/files/downloads/socallid-manual-final-040910.pdf

among laboratories for toxicity methods. This study aimed at assessing variability among laboratories, identifying potential quality improvements, and improving comparability and consistency in toxicity measurements. This regional Intercalibration effort is expected to be useful in addressing data gaps necessary to more effectively address the stressors that are impacting receiving waters on a regional basis in the San Diego, and specifically toxicity is one of the priority water quality conditions of concern in this WMA. The successes and benefits derived from the chemistry laboratory intercalibration, the toxicity testing intercalibration study provides an important first step towards improving toxicity testing data quality and comparability on a regional basis.

A round robin exercise was conducted to characterize and ultimately minimize inter-laboratory variability for testing marine and freshwater species, and developed a manual to provide guidelines for testing precision and sensitivity. The SMC has conducted similar studies with its chemical testing program to address comparability issues. These studies have provided a platform to quantify the range of variability and a vehicle to improve the variability among testing laboratories.

A Laboratory Working Group composed of expert laboratory managers from the participating institutions selected the toxicity methods, species, and endpoints for the round robin exercise. In addition, the group is developing pass/fail comparability evaluation criteria for data generated by participating laboratories. Iterative sample testing with freshwater and marine species was conducted. The species and endpoints selected for testing freshwater samples were the 7-day chronic survival and reproduction test for *Ceriodaphnia* and the 96-hour acute survival test for *Hyalella*. For marine or estuarine receiving environments, the species and endpoints selected are the larval development test with purple sea urchin (72 hours) and larval mussel survival and development (48 hours). These species were selected by the group because they are the most commonly tested permit organisms; they also are sensitive, easy to conduct the test with, readily available, representative of local species, and have relatively high variability of test method.

This SMC intercalibration study identified poor comparability in *Ceriodaphnia dubia* reproduction results among laboratories, as well as between samples within individual laboratories. This variability raised concerns regarding the ramifications of assessment errors in toxicity test results which can include incorrect status of waterbodies on the Clean Water Act 303(d) listing or the initiation of unnecessary toxicity reduction evaluations. This data was then used to assess real world scenarios of listed waterbodies. Even when assuming the low end of the variability scenarios, more than 50% of the test results could be overturned in either direction. The final recommendations of this study are to either discontinue use of *C. dubia* to be replaced by an alternate species approved by the EPA, or to consider conducting additional interlaboratory intercalibration studies to improve the variability.

As a result of this effort a Guidance Manual was developed based on the lessons learned. The Copermittees will only contract laboratories that have participated in the intercalibration efforts for the purpose of improving and standardizing analytical methods. The Copermittees will continue to participate in future SMC intercalibration studies, as needed, in the next permit term. There is no monitoring plan associated with this activity; however the resulting guidance will be of benefit to future monitoring in the region. The Co-Permittes will only contract laboratories that have participated in this effort.

Field Procedure Intercalibration

Prior to the spring bioassessment activities the SMC Regional Bioassessment Subcommittee Technical Subcommittee conducts a follow-up meeting on an annual basis to reflect upon the previous year's field efforts and coordination as well as review the procedures used under the 5-year workplan. This provides an opportunity to share lessons learned and initiate the preparations for the next year's efforts which are kicked-off by a field Intercalibration exercise. The Co-Permittee's contracted bioassessment services consultants participate in this effort. The observations from the past Intercalibration efforts have identified areas of the regional survey that need streamlining for efficient data collection. In general the observations have shown that the participating agencies' field crews are collecting data in a comparable manner and in general conformance with the available SWAMP protocols and program components outlined in the Regional Bioassessment Workplan. The Co-Permittees' fielded crews will continue to participate in this activity on an annual basis in the next permit term. Detailed proposed monitoring methods and procedures are presented in **Appendix 5A**.

5.4 PROJECT ORGANIZATION AND RESPONSIBILITIES

The Copermittees are collectively responsible for implementing the SMR WMA MAP. The RCFCWCD, as the Principal watershed Copermittee within the SMR WMA, is the lead agency responsible for overseeing implementation of the ~~Upper~~ Middle SMR Subwatershed Monitoring Program. The County of San Diego is the lead agency responsible for overseeing implementation of the Lower SMR Subwatershed Monitoring Program.

5.4.1 Monitoring to Assess Progress Toward Achieving Goals and Schedules

This section summarizes monitoring to assess progress toward achieving goals related to the HPWQC (the dry weather condition of eutrophication impacts for the SMR Estuary and the year-round conditions of nutrient enrichment for Rainbow Creek). As outlined in **Section 4.2**, strategies to be implemented to demonstrate progress toward meeting goals to address eutrophication impacts in the SMR Estuary support Copermittees' efforts to reduce non-stormwater flows from Copermittees' ~~storm drain~~MS4 outfalls.

5.4.1.1 Monitoring to Assess Progress Toward Achieving Goals and Schedules in the ~~Upper~~ Middle SMR Subwatershed

A multi-tiered approach to setting goals was used for the ~~Upper~~ Middle SMR Subwatershed. The six compliance pathways for Copermittees to meet the ~~Water Quality Improvement Plan~~WQIP goals are detailed in **Section 4.1.3**. Each Copermittee in the ~~Upper~~ Middle SMR Subwatershed will have the option of demonstrating compliance through one of the six pathways. The date by which the final goal for the ~~Upper~~ Middle SMR Subwatershed must be achieved is preliminarily scheduled for 2038 and will be updated through the adaptive management process when the TMDL Alternative becomes effective. **Table 5-9~~Table 5-9Table 5-8~~** presents the compliance pathways for the ~~Upper~~ Middle SMR Subwatershed goals and the monitoring that may be used to track progress toward achieving these goals

Table 5-~~9~~98 Monitoring Related to HPWQC – Eutrophication Impacts and Nutrient Loading, ~~Upper~~ Middle Santa Margarita River Subwatershed Copermittees

	Compliance Pathway	Final Numeric Goal[1]	Monitoring Elements
1	Demonstration that the discharger is attaining the load reduction goal of 76% in the ~~Upper~~ Middle SMR Subwatershed in receiving waters.	76% reduction in dry weather loadings in receiving waters	*Dry Weather Receiving Water Monitoring* data for total nitrogen and total phosphorus collected in the Santa Margarita River (receiving water) at the base of the ~~Upper Watershed~~Middle SMR Subwatershed.
		OR	
2	Demonstration that the Santa Margarita River Estuary targets (based on the proposed TMDL Alternative) have been attained.	Numeric goals to be determined based on outcome of TMDL Alternative for the Santa Margarita River Estuary	*TMDL Monitoring* in conjunction with other dischargers based on outcome of TMDL Alternative.
		OR	
3	Demonstration that non-stormwater flows that are within Copermittee control have been reduced to meet load reductions.	76% reduction in non-stormwater flows within Copermittee control (i.e., within their regulatory authority)	*Dry Weather Field Screening Monitoring* for flow at Copermittee major outfalls.
		OR	
4	Demonstration that discharger is meeting required load reductions as described in the TMDL Alternative for the SMR Estuary.	76% reduction in dry weather loadings from MS4 Copermittees	Total nitrogen, total phosphorus, and flow data from *Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring*.
		OR	
5	Demonstration that exceedances of targets are due to sources outside of Copermittee control.	Where final goals have not been met, demonstrate that exceedances of targets are due to source of nutrients outside of the control of the Copermittees.	Potential *Special Studies* conducted during future Permit terms.
		OR	
6	Demonstration that management actions to attain load or flow reductions are being implemented through mechanisms defined in the accepted Water Quality Improvement Plan.	The Copermittees assess progress to goals, implement the JRMP, enhanced JRMP strategies, optional jurisdictional strategies, or optional WMA strategies, as triggered through an iterative approach as described in the accepted Water Quality Improvement Plan.	N/A

1. The final goals are preliminary and will be updated through the adaptive management process when the TMDL Alternative becomes effective.

The outfall monitoring data identify if there are direct or indirect discharges from the Copermittees' ~~storm drain~~MS4 outfalls to receiving waters during dry weather. Where discharges are found, analytical data and flow can be assessed to determine if the concentrations of total nitrogen and total phosphorus exceed the effluent limitations. Combined with the flow data, these concentrations can also be used to calculate loading rates and flux per acre, and further extrapolated to calculate annual loading rates for the ~~Upper~~ Middle SMR Subwatershed.

5.4.1.2 Monitoring to Assess Progress Toward Achieving Goals and Schedules in the Lower SMR Subwatershed

Multiple compliance pathways are set forth for the Rainbow Creek Nutrient TMDL in Attachment E.3 of the Permit. Compliance with the TMDL may be demonstrated via one of the compliance pathways identified in the Permit. The final compliance date for the TMDL is December 31, 2021, which will be during the next permit term. **Table 5-10~~Table 5-10~~~~Table 5-9~~** presents the compliance options for the Rainbow Creek Nutrient TMDL goals and the monitoring that may be used to track progress toward achieving these goals.

Table 5-10~~109~~ Monitoring Related to HPWQC – Nutrients in Rainbow Creek, San Diego County[1]

	Compliance Pathway	TMDL Goal	Monitoring Elements
1	No discharge from ~~storm drain~~MS4 outfalls	No direct or indirect discharge from the County of San Diego's ~~storm drain~~MS4 outfalls to the receiving water	At least quarterly visual observation of flow from outfalls to receiving and Dry Weather Field Screening Monitoring.
		OR	
2	Meet final receiving water limitations	No exceedances of the final Receiving Water Limitations	*TMDL Monitoring* data for nitrate, total nitrogen, and total phosphorus collected at Rainbow Creek monitoring locations.
		OR	
3	Meet final effluent limitations	No exceedances of the final effluent limitations at the County of San Diego's ~~storm drain~~MS4 outfalls	Nitrate, total nitrogen, and total phosphorus concentration data collected at outfalls as part of *Outfall Monitoring* and *Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring*.
		OR	
4	Reduce annual pollutant loads	The annual pollutant loads from given land uses discharging to and from ~~storm drain~~MS4 outfalls do not exceed the final effluent limitations	The land uses are intermingled and cannot easily be independently monitored. This pathway is not currently addressed.
		OR	
5	Implement Water Quality Improvement Plan	Implement Water Quality Improvement Plan that incorporates the required BMPs supported by a reasonable assurance as accepted by the San Diego Regional Water Board	*See above for paths 1 through 3.* BMP effectiveness monitoring conducted once BMPs are constructed will demonstrate compliance.

1. See Order R9-2013-0001, as amended, Attachment E.3 – Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in the Rainbow Creek Watershed.

At this time, the County of San Diego plans to leverage current permit-required monitoring programs and augment these programs close to the compliance deadline to demonstrate dry weather compliance for nutrients for both the SMR Estuary and Rainbow Creek. However, efforts will be accelerated in Rainbow Creek to meet the upcoming compliance deadline of December 31, 2021. Currently, the County inspects all ~~storm drain~~MS4 outfalls in Rainbow Creek at least quarterly and conducts 24 –hour continuous monitoring from May through September at a minimum of one outfall location. These efforts will continue and when staff are available, the outfalls will be monitored monthly to demonstrate progress toward meeting the dry weather goal. Dry weather conditions occur in the watershed about 90 percent of the time during the year. The outfall monitoring data identify if there are direct or indirect discharges from the County of San Diego's ~~storm drain~~MS4 outfalls to Rainbow Creek during dry weather. ~~Where discharges are observed, analytical data and flow can be assessed to determine if the concentrations of total phosphorus, total nitrogen, and nitrate (as N) exceed the effluent limitations. Combined with the flow data, these concentrations can also be used to calculate loading rates and flux per acre, and further extrapolated to calculate annual loading rates to the Rainbow Creek Subwatershed.~~

For wet weather compliance monitoring in Rainbow Creek, BMP effectiveness monitoring will be used once the BMPs are constructed to demonstrate that the goal is met. This BMP monitoring will include the collection of water quality samples upstream and downstream of the constructed BMPs to measure the change in concentration or loads of nutrients and total suspended solids. In the meantime, for the Rainbow Creek Nutrient TMDL, at least one additional wet weather outfall monitoring event will be add~~conduct~~ed annually as part of the MS4 Outfall Wet Weather Monitoring (**Section 5.3.2.1**) to provide additional characterization data to inform the design of the remedial measures. This additional wet weather outfall monitoring will be selected during the design phase of the structural BMP and tailored to the needs of the engineers for the design of the BMP~~s~~. The outfall monitoring will be conducted to collect flow-weighted composites, time-weighted composites, or to collect separate aliquots of samples during one part of the storm event, such as during the rising limb of the storm hydrograph. These samples will be analyzed, at a minimum, for nutrients and total suspended solids.

To track progress toward meeting the dry weather goal for the SMR Estuary, the County of San Diego will expand the Dry Weather Field Screening Monitoring (**Section 5.3.2.2**) to major outfalls that discharge to the SMR from semiannually to quarterly to record flow as present, ponded water or no flow. This additional information will further inform the prioritization of outfalls to mitigate potential sources of dry weather flows.

5.5 REPORTING AND ASSESSMENT PROGRAM

The Copermittees will submit a ~~Water Quality Improvement Plan~~WQIP Annual Report for each reporting period no later than January 31st of the following year. The annual reporting period will consist of two different periods: 1) July 1st to June 30th for JRMP and ~~Water Quality Improvement Plan~~WQIP implementation, and 2) October 1st to September 30th for the monitoring and assessment programs. The ~~Water Quality Improvement Plan~~WQIP Annual Reports will be made available to the public via two Regional Clearinghouses (i.e., RCFCWCD and Project Clean Water websites). The following sections detail the information and assessments that will be provided within the ~~Water Quality Improvement Plan~~WQIP Annual Report or the Report of Waste Discharge (ROWD) that the Copermittees will submit 180 days prior to the end of the permit term.

5.5.1 Water Quality Improvement Plan Annual Reporting Requirements

The Permit sets forth annual reporting requirements for the ~~Water Quality Improvement Plan~~WQIP Annual Report. Copermittees will provide the following information within the ~~Water Quality Improvement Plan~~WQIP Annual Report:

- Receiving water and ~~storm drain~~MS4 outfall discharge monitoring data;
- Progress, finding, interpretations, and conclusions of the special studies (or phases of the study), as appropriate;
- Findings, interpretations, and conclusions from the assessments detailed within **Section 5.5.2**;
- Progress of implementing the ~~Water Quality Improvement Plan~~WQIP, including but not limited to, the following:
    - Progress toward achieving the interim and final numeric goals for the HPWQC for the WMA;
    - Water quality improvement strategies that were implemented and/or no longer implemented by each of the Copermittees during the reporting period and previous reporting periods;
    - The water quality improvement strategies planned for implementation during the next reporting period;
    - Proposed modifications to the water quality improvement strategies, the public comments received, and the supporting rationale for the proposed modifications;
    - Previous modifications or updates incorporated into the ~~Water Quality Improvement Plan~~WQIP and/or each Copermittee's JRMP document and implemented by the Copermittees in the WMA; and
    - Proposed modifications or updates to the ~~Water Quality Improvement Plan~~WQIP and/or each Copermittee's JRMP document;
- Completed JRMP Annual Report form for each Copermittee in the WMA;
- Copermittee monitoring data utilized in developing the ~~Water Quality Improvement Plan~~WQIP Annual Report uploaded to the California Environmental Data Exchange Network (CEDEN). Raw data files will not be included within the ~~Water Quality Improvement Plan~~WQIP Annual Report.

5.5.2 Assessment Program

The assessment portion of the MAP will evaluate the data collected under the monitoring programs described in **Section 5.2**, as well as the information collected as part of the JRMPs and implementation of ~~Water Quality Improvement Plan~~WQIP strategies. The data collected from these programs will be used to assess the progress toward achieving the numeric goals and schedules for addressing the HPQWC. **Figure 5-8~~Figure 5-8Figure 5-6~~** depicts how the watershed monitoring activities will support the assessments required by the Permit. Some assessments will be reported annually, as part of the ~~Water Quality Improvement Plan~~WQIP Annual Report, while others will be included in the ROWD. The SMR WMA MAP will be

evaluated and adapted in the context of the ~~Water Quality Improvement Plan~~WQIP Annual Report and the ROWD. The re-evaluation will consider data gaps and the results of all monitoring program elements. In general, short term evaluations will be included in annual reports, with long term assessments included within the ROWD. The assessment process and feedback loop is described in greater detail in **Chapter 6**, Adaptive Management.

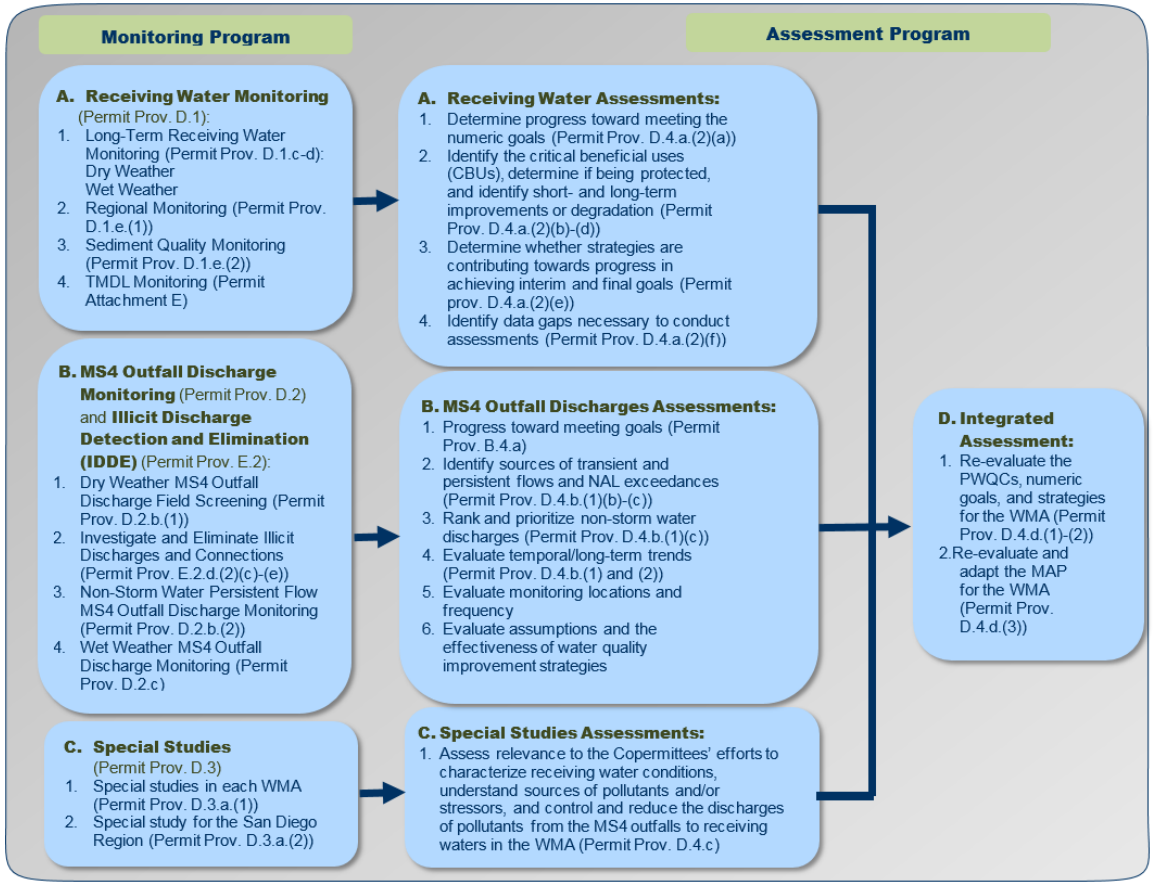

Figure 5-~~8~~86. MAP Components for the SMR WMA

5.5.2.1 RECEIVING WATER ASSESSMENT

The assessment of receiving waters involves evaluating the physical, chemical, and biological conditions of the receiving waters and sediments. The Copermittees must assess the status and trends of receiving water quality conditions in coastal waters, enclosed bays, estuaries, and streams in the watershed. Receiving water data, regional monitoring programs, sediment quality, and TMDL monitoring programs will be used as applicable. The receiving water assessments to be presented in the ~~Water Quality Improvement Plan~~WQIP Annual Report or ROWD will:

- Assess whether or not the conditions of the receiving waters are meeting the applicable numeric goals by calculating the percent reduction in dry weather loading in receiving waters;
- Identify the most critical beneficial uses (e.g., HPWQC) that must be protected to ensure the overall health of the receiving water by following procedures consistent with the evaluations outlined in **Chapter 2**;
- Evaluate whether or not those critical beneficial uses are being protected by comparing data to applicable water quality objectives;
- Identify short-term and/or long-term improvements or degradation of those critical beneficial uses by evaluating trends;
- Consider whether or not the ~~Water Quality Improvement Plan~~WQIP strategies contribute toward progress in achieving the interim and final numeric goals of the ~~Water Quality Improvement Plan~~WQIP; and
- Identify data gaps in the monitoring data needed to assess the provisions above.

5.5.2.2 ~~STORM DRAIN~~MS4 OUTFALL DISCHARGE ASSESSMENTS

The ~~storm drain~~MS4 outfall discharge assessments include evaluating both the dry weather monitoring data associated with the IDDE program collected as part of the JRMP and the wet weather monitoring data collected by the Copermittees. Each Copermittee will assess its dry weather ~~storm drain~~MS4 outfall monitoring programs individually and compile results annually as part of the ~~Water Quality Improvement Plan~~WQIP Annual Report. Each Copermittee must assess and report the progress of its IDDE program (required pursuant to Permit Provision E.2) toward effectively prohibiting non-storm water and illicit discharges into the ~~storm drain system~~MS4s within its jurisdiction. The non-storm water discharge reduction assessments to be presented in the ~~Water Quality Improvement Plan~~WQIP Annual Report or ROWD will:

- Identify known and suspected controllable sources (e.g. facilities, areas, land uses, pollutant generating activities) of transient and persistent flows within the Copermittee's jurisdiction in the WMA by following procedures consistent with the procedures outlined in **Chapter 3**;
- Identify sources of transient and persistent flows within the Copermittee's jurisdiction in the WMA that have been reduced or eliminated by reviewing information collected as part of the IDDE program and Dry Weather MS4 Outfall Discharge Field Screening Monitoring Program;

- Identify necessary modifications through program assessment to identify and eliminate sources of persistent flow;
- Rank the outfalls according to potential threat to receiving water quality and produce a prioritized outfall list;
- For the highest priority outfalls in exceedance of NALs,
    - Identify known and suspected sources that may cause or contribute to NAL exceedances;
- Using a model or other method, calculate/estimate non-storm water volumes and pollutant loads from all major outfalls with persistent flow to assess progress toward meeting flow reduction and load reduction goals identified in **Section 4.1.3**:
    - With an estimate of the percent contribution from each known source for each ~~storm drain~~MS4 outfall; and
    - Each Copermittee must annually identify and quantify sources of non-storm water not subject to the Copermittee's legal authority that are discharged from the Copermittee's major ~~storm drain~~MS4 outfalls to downstream receiving waters;
- Identify reductions and progress in achieving reductions in non-storm water and illicit discharges to the Copermittee's ~~storm drain system~~MS4 in the WMA;
- Assess the effectiveness of water quality improvement strategies (with estimates attributable to the specific strategies if possible) toward addressing ~~storm drain~~MS4 non-storm water discharges by comparing data collected through the Non-Storm Water Persistent Flow MS4 Outfall Discharge Monitoring Program to NALs and assessing additional available information;
- Identify modifications to increase effectiveness of the water quality improvement strategies; and
- Identify data gaps in the monitoring data necessary to assess the provisions above.

The assessments for stormwater pollutant discharge reductions to be presented in the Annual Report will:

- Use a model or other method to calculate/estimate:
    - The average storm water runoff coefficient for each land use within the WMA;
    - The volume of storm water and pollutant loads discharged from monitored outfalls for each storm event with measurable rainfall greater than 0.1 inch;
    - The total flow volume and pollutant loadings discharged from each jurisdiction within the WMA over the course of the wet season (extrapolated from the monitored ~~storm drain~~MS4 outfalls); and
    - The percent contribution of storm water volumes and pollutant loads discharged from each land use type within each hydrologic subarea with a major ~~storm drain~~MS4 outfall to receiving waters or within each major ~~storm drain~~MS4 outfall to receiving waters in the Copermittee's jurisdiction within the WMA for each storm event with measurable rainfall greater than 0.1 inch;

- Evaluate findings against analyses/assumptions from the ~~Water Quality Improvement Plan~~WQIP to determine whether updates are needed;
- Identify reductions in pollutants concentrations or loads from different land uses and/or drainage areas;
- Assess the effectiveness of water quality improvement strategies (with estimates attributable to the specific strategies if possible) toward reducing pollutants in storm water discharges by comparing data collected through the MS4 Outfall Wet Weather Monitoring Program to storm water action levels (SALs) identified in Permit Provision C.2 [inclusive of any future iterations] and assessing additional available information;
- Identify modifications to increase effectiveness of the water quality improvement strategies;
- Identify data gaps in the monitoring data necessary to assess the provisions above; and
- Evaluate all the wet weather ~~storm drain~~MS4 outfall discharge monitoring data, and incorporate new outfall monitoring data into time series plots for each long-term monitoring constituent for the WMA, and perform statistical trends analysis on the cumulative long-term wet weather ~~storm drain~~MS4 outfall discharge water quality dataset.

5.5.2.3 SPECIAL STUDIES ASSESSMENTS

As part of the ~~Water Quality Improvement Plan~~WQIP Annual Report, the Copermittees will evaluate the results and findings from the special studies, as available. Depending on the special study, the results may be included in assessments related to receiving waters, ~~storm drain~~MS4 discharges, source identification, or other evaluations, as appropriate. Where applicable, they will use the resulting data to: (1) assess their relevance to the Copermittees' characterization of receiving water conditions, (2) understand sources of pollutants and/or stressors, and (3) control and reduce the discharges of pollutants from the ~~storm drain~~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~~WQIP.

5.5.2.4 INTEGRATED ASSESSMENT

The Copermittees will integrate the data collected as part of the MAP, along with information collected during the implementation of the JRMP and ~~Water Quality Improvement Plan~~WQIP strategies. The integrated assessment will evaluate the main components of the ~~Water Quality Improvement Plan~~WQIP and will follow the assessment process outlined in the Permit. The integrated assessment will include all four ~~Water Quality Improvement Plan~~WQIP components: (1) Priority Water Quality Conditions, (2) Goals and Schedules, (3) Strategies and Schedules, and (4) MAP. The assessment will be performed during the development of the ROWD and include those assessments specified for "once during the term of the Order". The PWQCs will be reevaluated using the receiving water and ~~storm drain~~MS4 outfall discharge assessments. The goals and schedules in **Chapter 4** will be reviewed based on the results of the receiving water and ~~storm drain~~MS4 outfall discharge assessments, along with data collected as part of the JRMP and ~~Water Quality Improvement Plan~~WQIP strategies. This evaluation will highlight the progress in achieving the compliance goals. Both water quality monitoring data and maintenance/observational data related to BMP effectiveness will be used to assess the strategies implemented by the Copermittees. Strategies will be evaluated in the ~~Water Quality Improvement~~

~~Plan~~WQIP Annual Report based on the data collected as part of the JRMP and ~~Water Quality Improvement Plan~~WQIP strategies and any new relevant BMP effectiveness data collected by the Copermittees. Finally, the Copermittees must re-evaluate and adapt the MAP for the WMA when new information becomes available to improve the MAP. The re-evaluation of the MAP for the WMA will consider the data gaps identified by the assessments described in **Sections 5.5.2.1** and **5.5.2.2** and results of the special studies.

6 Iterative Approach and Adaptive Management Process

Chapter 6 outlines the iterative approach of the adaptive management process that will be used to evaluate and adapt the ~~Water Quality Improvement Plan~~WQIP for the SMR WMA. The adaptive management process is the framework to evaluate progress and make adjustments in implementation approaches and timing to attain goals. It will be used, in conjunction with data collected, as part of the Monitoring and Assessment Program (MAP), to evaluate whether modifications to goals, schedules, and/or strategies are necessary to meet the interim and final goals for eutrophication impacts and nutrient loading in the SMR WMA. Through the implementation of strategies and an iterative, adaptive management approach, it is anticipated that the numeric goals will be achieved and the water quality will be improved. **Figure 6-1** summarizes the framework of the adaptive management process.

The ~~Water Quality Improvement Plan~~WQIP will be adapted in response to triggers identified in Permit Provisions B.5.a-c. Triggers that may warrant program adaptation include exceedances of water quality standards in receiving waters, new information, Regional Water Board recommendations, and input received during the public participation process. The Regional Water Board may require updates to the ~~Water Quality Improvement Plan~~WQIP based on information they receive from outside parties. Additional Permit requirements for adaptive management are summarized in **Table 6-1**. Effectiveness assessments of JRMP or LIP programs and strategies may also trigger adaptations to the ~~Water Quality Improvement Plan~~WQIP. The diagram below outlines the process for the development and implementation of the ~~Water Quality Improvement Plan~~WQIP and includes the iterative approach and adaptive management process steps.

Each trigger calls for specific responses within timeframes specified in the Permit. While the adaptive management process would typically be implemented annually or at the end of the permit term, other adaptations could occur on a different schedule.

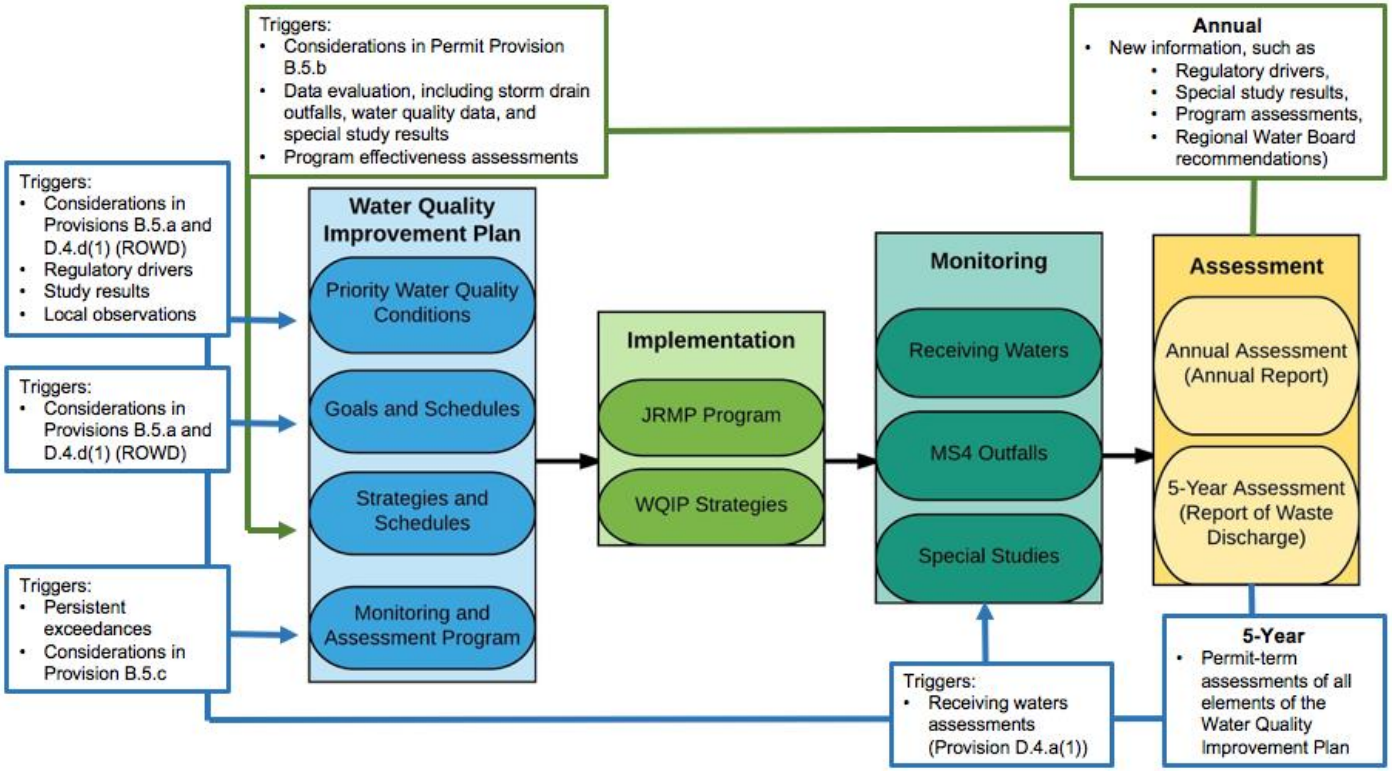

Figure 6-1. Adaptive Management Process Framework

Table 6-1. Permit Requirements for the Adaptive Management Process

Permit Provision	Requirements	Frequency
Provision A.4	The Water Quality Improvement Plan must be designed and adapted to ultimately achieve compliance with the discharge prohibitions (Provisions A.1.a and A.1.c) and receiving water limitations (Provision A.2.a) specified in the Permit.	Report of Waste Discharge
Provision B.5	Specific considerations must be included in the adaptive management process. This includes the re-evaluation of PWQCs; adaptation of goals, strategies, and schedules; and adaptation of the Monitoring and Assessment Program.	Re-evaluation of Water Quality Conditions, Goals/Schedules, and the Monitoring and Assessment Program to be provided in Report of Waste Discharge; Strategies and Schedules to be considered annually.
Provision D.4.d	Contains the processes for the assessments and adaptive management that must occur once during the Permit term.	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.	Copermittees must submit updates to the Water Quality Improvement Plan either in the Annual Report or in the Report of Waste Discharge

6.1 RE-EVALUATION OF PRIORITY WATER QUALITY CONDITIONS

Permit Provision B.5.a describes the process for re-evaluation of the PWQCs. PWQCs may be re-evaluated as needed by the Copermittees during the permit term, and must be re-evaluated in the Report of Waste Discharge. The HPWQC and PWQCs selected during the development of the ~~Water Quality Improvement Plan~~WQIP are intended to remain for the duration of the permit term, but may be adjusted if new, pertinent information becomes available that would directly influence priorities. Provisions B.5.a and D.4.d(1) describe the considerations that would trigger an assessment of the PWQCs and HPWQC. The following additional considerations may trigger an assessment of the PWQCs and HPWQC, including, but not limited to:

- Regulatory drivers, such as revised WQOs issued by the State Water Board, approval of a TMDL Basin Plan Amendment, modifications to the TMDL Alternative, and/or adoption of the TMDL Alternative Resolution;
- Results of special studies conducted within the watershed, and relevant results from outside the watershed related to the PWQCs and HPWQC;
- Additional relevant and appropriately collected data and information related to the Upper SMR Subwatershed, including data to be collected at the new monitoring station described in Section 5.3.1 ~~areas of the watershed above Lake Skinner, Diamond Valley Lake, and/or Vail Lake~~;

- New data and recommendations developed from the Rainbow Creek Nutrient TMDL Monitoring and assessment of progress toward achieving goals and schedules in the Lower SMR Subwatershed; and
- Local observations, such as the number of homeless encampments in creek systems, or local evidence of eutrophication.

Data collected during the permit term will be used to update the analysis of the PWQCs as part of the Report of Waste Discharge**. Table 6-2** lists the considerations that must be included when Copermittees re-evaluate the PWQCs for the watershed.

Table 6-2. Re-evaluation of Priority Water Quality Conditions

Frequency	Trigger[1]	Considerations
5-Years	Report of Waste Discharge (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 ~~storm drain~~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 strategies and actions. • Recommendations from the Regional Water 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 ~~storm drain~~MS4 discharges on receiving waters per the process developed in **Chapter 2**. This includes the identification of beneficial uses in receiving waters that are protected per the Monitoring and Assessment Program. • Re-evaluation of the identification of stormwater conveyance ~~system~~ sources and/or stressors if corresponding to elevation of a new highest priority condition.

1. Following approval of a TMDL with wasteload allocations by the Office of Administrative Law (OAL) and the USEPA, the Copermittees must initiate an update of the ~~Water Quality Improvement Plan~~WQIP within six months – this may impact the PWQCs and HPWQC for the SMR WMA.

6.2 ADAPTATION OF GOALS, STRATEGIES, AND SCHEDULES

The adaptation of goals, strategies, and schedules must occur as part of the Report of Waste Discharge, and may occur on an annual basis under certain conditions. The two conditions that warrant annual adaptation of goals and schedules are: (1) where a new TMDL is approved by the State of California Office of Administrative Law (OAL) and the USEPA or (2) where annual evaluations of receiving water and ~~storm drain~~MS4 outfall monitoring data provide new information impacting the goals. The three conditions that warrant annual adaptation of strategies

and schedules are: (1) where a new TMDL is approved by OAL and USEPA, (2) where annual evaluations of receiving water and ~~storm drain~~MS4 outfall monitoring data provide new information impacting implementation schedules, or (3) where program effectiveness assessments provide information adequate to justify modification.

6.2.1 Adaptation of Goals and Schedules

As part of the preparation of the Report of Waste Discharge, the Copermittees will evaluate the progress toward achieving the watershed goals established in **Chapter 4**. The watershed goals and schedules that will be assessed as part of the Report of Waste Discharge are provided in **Table 4-2** in **Section 4.1**.

Assessment of the watershed goals and compliance pathways will be performed using data collected per the Monitoring and Assessment Program (MAP) and JRMP/LIPs, along with the schedules developed in conjunction with each goal. Depending on the results of the assessment, it may be appropriate to adjust either the numeric goals and/or the schedules associated with each goal. The ability to modify goals and schedules based on the TMDL Alternative for the SMR Estuary will be dependent on the flexibility afforded by the Resolution for the TMDL Alternative, which has yet to be adopted by the Regional Water Board. **Table** 6-3~~**Table** 6-3~~~~**Table** 6-3~~ lists the considerations that will be included in the process of evaluating progress towards defined goals and schedules.

Table 6-3. Adaptation of Goals and Schedules for the HPWQC

Frequency	Trigger [a]	Considerations
5-Years	Report of Waste Discharge (B.5.b, D.4.d.(1))	***Provision B.5.b Iterative Approach and Adaptive Management Considerations*** • Modifications to the PWQCs 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 the stormwater conveyance ~~system~~ to the MEP. • New information resulting from the re-evaluation of impacts from ~~storm drain~~MS4 discharges and/or pollutants and stressors. • Efficiency in implementing the Water Quality Improvement Plan. • Recommendations from the Regional Water 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.

1. Following approval of a TMDL with wasteload allocations by OAL and the USEPA, the Copermittees must initiate an update of the ~~Water Quality Improvement Plan~~WQIP within six months.

6.2.2 Adaptation of Strategies and Schedules

The strategies and implementation schedules developed to address the HPWQC in the watershed will be re-evaluated as part of the Annual Reporting process and the preparation of the Report of Waste Discharge. These re-evaluations may result in modifications to or elimination of strategies as well as the development of new strategies. 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, programmatic data collected over the permit term may be incorporated into the assessment and adaptive process to modify strategies and implementation schedules as appropriate.

6.2.2.1 Water Quality Data Evaluation and Linkage to Strategies

Receiving water data will be assessed as described in **Section 5.5**. The assessment will indicate progress toward longer term goals and protection of beneficial uses. These data may be used to evaluate the collective effectiveness of the strategies. This information will provide a "big picture" assessment of the success of the strategies over the long term. The data evaluation also has the potential to trigger mandatory updates to the ~~Water Quality Improvement Plan~~WQIP per Permit Provision A.4 where exceedances of water quality standards persist in receiving waters. This part of the adaptive management process is described further in **Section 6.5** and detailed in **Figure 6-1.**

~~Storm drain~~MS4 outfall visual observations, water quality data, and special study 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 HPWQC in the watershed. Where appropriate, these assessments will include a comparison of the data with the NALs and SALs as required per Provision C of the Permit. These data will provide the foundation for the ~~storm drain~~MS4 outfall discharge assessments described in **Chapter 5**, which will examine the results of Illicit Discharge Detection and Elimination Programs and ~~Storm Drain~~MS4 Outfall Discharge Monitoring Programs. Where strategies can be linked to measurable or demonstrable reductions of non-storm water discharges or to reductions of pollutants in storm water, appropriate modifications will be made.

6.2.2.2 Program Assessments

Where available, the results of program effectiveness assessments performed at the jurisdictional or watershed scale may also factor into the adaptation of specific strategies. The level of information will vary by jurisdiction and by program, as these types of assessments are not explicitly required by the Permit. However, in many cases, the jurisdictions are performing programmatic assessments to ensure the most effective use of available 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 ~~storm drain~~MS4 outfalls or in receiving waters and 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. Modifications to strategies based on program effectiveness assessment may occur annually or on a permit term.

Table 6-4 lists the considerations that will be evaluated when adapting strategies and schedules, whether on an annual timeframe within the Annual Report or on a 5-year permit term timeframe (i.e., Report of Waste Discharge).

Table 6-4. Adaptation of Water Quality Strategies and Schedules

Frequency	Trigger[1]	Considerations
Annual	New Information (B.5.b)	***Permit Provision B.5.b Iterative Approach and Adaptive Management Considerations*** • Modifications to the priority water quality conditions. • 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 the stormwater conveyance ~~system~~ to the maximum extent practicable (MEP). • New information resulting from the re-evaluation of impacts from ~~storm drain~~MS4 discharges and/or pollutants and stressors. • Efficiency in implementing the Water Quality Improvement Plan. • Recommendations from the Regional Water Board. • Recommendations received through a public participation process.
5-Years	Report of Waste Discharge (D.4.d.(2))	***Permit Provision D.4.d(2) Integrated Assessment Considerations*** • Identification of the non-storm water and storm water pollutant loads from the ~~storm drain~~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.
5-Years	Persistent Exceedances Not Addressed (A.4.a.(2))	***Permit Provision A.4.a(2) Integrated Assessment Considerations [2]*** • Water quality standard exceedances for pollutants that are addressed by the Water Quality Improvement Plan; implementation of the accepted plan continues and is updated as necessary. • If ~~storm drain~~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, the Water Quality Improvement Plan will be updated as part of the Annual Report (unless directed to update it earlier by the Regional Water Board). Following Regional Water Board approval of modifications to the Water Quality Improvement Plan, the Copermittees must update their JRMP accordingly.

1. Following approval of a TMDL with wasteload allocations by the OAL and the USEPA, the Copermittees must initiate an update of the ~~Water Quality Improvement Plan~~WQIP within six months.
2. The procedure need not be repeated for continuing or recurring exceedances of the same water quality standard(s) once scheduled strategies are implemented unless directed to do so by the Regional Water Board.

6.3 ADAPTATION OF MONITORING AND ASSESSMENT PROGRAM

As part of the Report of Waste Discharge, the Copermittees will consider modifications to the Monitoring and Assessment Program (MAP), consistent with the requirements in Permit Provision D.4.d.(3). During the permit term, modifications must be consistent with the requirements of Permit Provisions D.1, D.2, and D.3 (receiving water, ~~storm drain~~MS4 outfall, and special study monitoring requirements, respectively), which limit the amount of adaptation that is possible. However, recommendations within the Report of Waste Discharge provide an opportunity to make more meaningful modifications to the Monitoring and Assessment Program. Examples of modifications to the Monitoring and Assessment Program include the following adjustments:

- Determine whether discharges from the ~~storm drain~~MS4 outfalls are linked to exceedances in the receiving water;
- Address data gaps via re-assessment of monitoring locations and frequencies; and/or
- Address results of special studies.

Table 6-5 lists considerations that will be evaluated when adapting the Monitoring and Assessment Program.

Table 6-5. Adaptation of Monitoring and Assessment Program

Frequency	Trigger [1]	Considerations
Annual	New Information (B.5.c)	***Permit 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, including new regulations. • Must include information gained from Permit required monitoring.
5-Years	Persistent Exceedances Not Addressed (A.4.a.(2))	***Permit Provision A.4.a(2) Integrated Assessment Considerations [2]*** May include modifying the monitoring program to fill data gaps. Modifications could include moving monitoring locations, adding additional sample collection, or changing type of sample collected.
5-Years	Report of Waste Discharge (B.5.c)	***Permit Provision B.5.c Iterative Approach and Adaptive Management Considerations*** • Review of Program based on the requirements in Provision D. • Adjustment of the monitoring program to determine whether discharges from the stormwater conveyance ~~system~~ 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 monitoring program to address results of special studies.

1. Following approval of a TMDL with wasteload allocations by the OAL and the USEPA, the Copermittees must initiate an update of the ~~Water Quality Improvement Plan~~WQIP within six months.
2. The procedure need not be repeated for continuing or recurring exceedances of the same water quality standard(s) once scheduled strategies are implemented unless directed to do so by the Regional Water Board.

6.4 TIMING OF ADAPTIVE MANAGEMENT REQUIREMENTS

Adaptive management via the iterative process, based on the Permit-required evaluations described previously, will be integral to the success of the ~~Water Quality Improvement Plan~~WQIP. However, the Copermittees will adapt different components of the ~~Water Quality Improvement Plan~~WQIP at different rates, depending on a variety of factors. In most cases, annual modifications will consist of updates to strategies or timelines, reflective of information gained through implementation. Significant updates to the ~~Water Quality Improvement Plan~~WQIP may be required as part of the Report of Waste Discharge, performed once per permit term. For parts of the ~~Water Quality Improvement Plan~~WQIP (e.g., PWQCs, goals) a longer timeline is appropriate for evaluation, as accurate and more robust information is necessary to change the course of the ~~Water Quality Improvement Plan~~WQIP. The following sections provide more insight and details related to the timing of the adaptive management process and the impacts on revisions to the ~~Water Quality Improvement Plan~~WQIP.

6.4.1 Annual Assessments and Adaptive Management

The Permit indicates that new information should be considered on an annual basis for adaptations to the ~~Water Quality Improvement Plan~~WQIP. Modifications may be appropriate for the water quality goals, strategies, schedules, and/or Monitoring and Assessment Program. The PWQCs and Monitoring and Assessment Program may be modified as needed during the permit term, but would likely be modified only as a result of assessments conducted for the Report of Waste Discharge.

6.4.1.1 Annual Evaluation of New Information

The adaptive management process may be triggered as new information becomes available as discussed in the following subsections. Where appropriate, modifications may be made to goals, strategies, schedules, and/or the Monitoring and Assessment Program and reported in the Annual Report.

6.4.1.1.1 Regulatory Drivers

Where new regulations or policies are adopted that impact watershed planning and implementation processes in the near term, modifications to the goals, strategies, schedules, and/or Monitoring and Assessment Program may be warranted, and, in some cases, required. For example, an update will be initiated no later than six months following approval of a TMDL Basin Plan Amendment by the OAL and the USEPA, or adoption of the TMDL Alternative Resolution. The trigger applies to TMDLs containing wasteload allocations assigned to Copermittees within the watershed during the term of the Order (Provision F.2.c.(2)). Similarly, modifications to the TMDL Alternative, in development during preparation of the ~~Water Quality Improvement Plan~~WQIP, may also necessitate adaptations. The ~~Water Quality Improvement Plan~~WQIP is based on the best available information related to the TMDL Alternative at the time of development, but modifications to the TMDL Alternative during the adoption process may necessitate modifications to the ~~Water Quality Improvement Plan~~WQIP.

Other examples of regulatory drivers that may trigger modifications include new state policies or plans (e.g., biostimulatory substances amendments, biological objectives) and changes resulting from modifications to existing Permit requirements (e.g., as a result of revising a TMDL).

6.4.1.1.2 Special Study Results

As part of the Monitoring and Assessment Program, Copermittees have performed special studies related to the HPWQC for the watershed. As further described in **Chapter 5** of this ~~Water Quality Improvement Plan~~WQIP, the Copermittees supported a WMA special study which consisted of providing in-kind monitoring support for Phase II of the SMRNIG Characterization Studies. In addition, the Copermittees participated in the San Diego Regional Stream Reference Study, which included the collection and reporting of nutrient data. Future special studies will be designed to provide information related to sources of the HPWQC within the watershed, will be implemented during the 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~~WQIP may be modified. The study results may impact the goals, strategies, schedules, and the Monitoring and Assessment Program. Additionally, lessons learned and study results from outside the watershed, especially those related to the HPWQC, may also be incorporated into the ~~Water Quality Improvement Plan~~WQIP.

6.4.1.1.3 Program Assessments

~~Water Quality Improvement Plan~~WQIP strategies will be incorporated into individual Copermittees' JRMPs. The Copermittees will implement program refinements to increase focus on the particular water quality issues identified in the ~~Water Quality Improvement Plan~~WQIP, and utilize various assessment methods to determine which program refinements are effective and which are not. The program effectiveness assessment results would provide useful information that may lead to adaptation of goals, strategies, schedules, and the Monitoring and Assessment Program. For example, as various water conservations strategies are implemented in coordination with water districts in target areas, the water conservation strategies that are found to be effective at reducing flow may be expanded, while those that are ineffective may be modified, reduced, or eliminated.

6.4.1.1.4 Regional Water Board Recommendations

Adaptation of the ~~Water Quality Improvement Plan~~WQIP may also be required based on recommendations from the Regional Water Board. The Regional Water Board may require updates to the ~~Water Quality Improvement Plan~~WQIP based on information they receive from outside parties. The Regional Water Board's recommendations could be a result of the public participation process, Consultation Committee input, review of submitted reports, or other Regional Water Board interests.

6.4.2 Permit Term Assessments and Adaptive Management

The Permit also contains specific assessments to be performed during preparation of the Report of Waste Discharge. These assessments are longer term in nature, occurring only once during the permit cycle. During Report of Waste Discharge preparation, all elements of the ~~Water Quality Improvement Plan~~WQIP are eligible for modifications through the required adaptive management processes. Elements that could be evaluated include the water quality conditions (i.e., priorities), goals and accompanying schedules, strategies and accompanying schedules, and the Monitoring and Assessment Program.

6.4.2.1 Receiving Waters Assessments

Evaluation of receiving water and ~~storm drain~~MS4 outfall discharge data will be performed annually as part of the Annual Report and is described in **Chapter 5**. More comprehensive evaluations of receiving water data will be performed for the Report of Waste Discharge (Permit Provision D.4.a.(1)). These evaluations will summarize receiving water data collected within the watershed and provide information with the potential to trigger the adaptive management process to achieve compliance with Permit discharge prohibitions and receiving water limitations as required in Provision A.

Provision A.4 describes adaptive management procedures that the Copermittees must implement "if exceedance(s) of water quality standards persist in receiving waters." If the adaptive management process is triggered under this provision, the process will include the following assessments:

- Whether the ~~storm drain~~MS4 outfall is a source of pollutants causing the exceedances to persist in the receiving waters, and
- Whether or not the exceedances are addressed by the ~~Water Quality Improvement Plan~~WQIP.

If the receiving water exceedances are addressed under the ~~Water Quality Improvement Plan~~WQIP, the Copermittees will continue implementation. If the receiving water exceedances are not addressed, the Copermittees will update the ~~Water Quality Improvement Plan~~WQIP to address the exceedances as described in Provision A.4.a.(2) and submit the updates with the Report of Waste Discharge. 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, and
- Updates to the Monitoring and Assessment Program to track progress toward achieving compliance with Provisions A.1.a, A.1.c, and A.2.a.

The adaptive management process as required under Provision A.4 is illustrated in **Figure 6-2**.

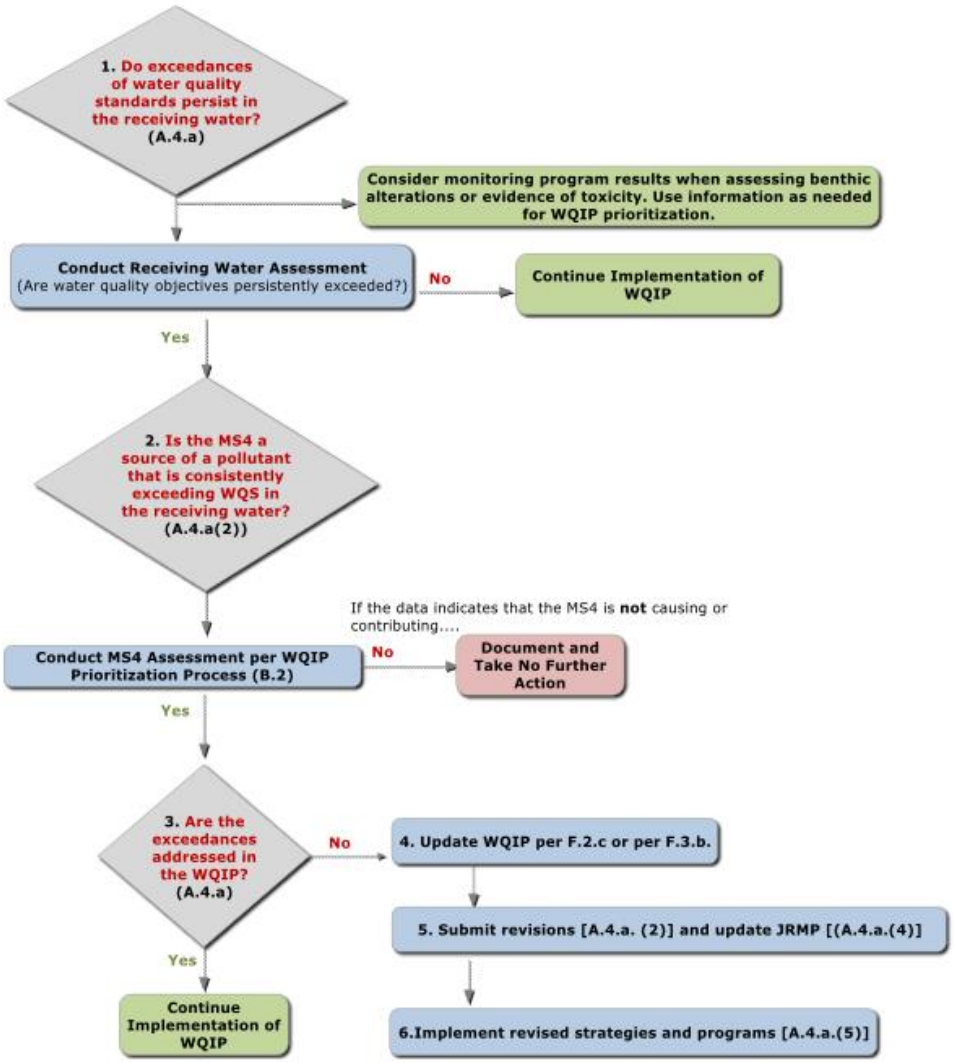

Figure 6-2. Receiving Waters Water Quality Standards Exceedance Process

6.5 WATER QUALITY IMPROVEMENT PLAN UPDATES AND REPORTING

Updates to the ~~Water Quality Improvement Plan~~WQIP will include a public participation process as required by Provision F of the Permit. Annual updates will likely include a more abbreviated public process unless substantial modifications are identified. A full public process will be implemented as part of updates associated with the Report of Waste Discharge. Updates will include a process to obtain data from the public, participation by the Consultation Committee, and submittal for approval. As applicable, updates to the ~~Water Quality Improvement Plan~~WQIP will be initiated within six months following OAL and USEPA approval of any TMDLs with Waste Load Allocations (WLAs) assigned to the Copermittees. Updates will be deemed appropriate for inclusion in the ~~Water Quality Improvement Plan~~WQIP 90 days following submission to the Regional Water Board unless otherwise directed by the Regional Water Board Executive Officer. Updates to the ~~Water Quality Improvement Plan~~WQIP will also be made available to the public via two Regional Clearinghouses (i.e., RCFCWCD and Project Clean Water websites) following acceptance by the Regional Water Board. **Table 6-6** provides a tentative timeline for ~~Water Quality Improvement Plan~~WQIP implementation and the adaptive management process.

Table 6-6. Water Quality Improvement Plan Implementation and Adaptive Management Process, as required by Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100

Milestone	Target Date	Adaptive Management Triggered
Report of Waste Discharge	December 2017	
~~Water Quality Improvement Plan~~WQIP Submittal	January 2018	
Anticipated ~~Water Quality Improvement Plan~~WQIP Acceptance	Spring 2018	
~~Water Quality Improvement Plan~~WQIP Implementation	90 Days following Acceptance by Regional Water Board	
Annual Reporting	January (2019)	Strategies and schedules
Anticipated Permit Adoption	February 2019	
Effective date for Permit	50 days after Adoption	
Annual Reporting	January of each year (2020, 2021, 2022, 2023)	Strategies and schedules
Report of Waste Discharge	180 days prior to Permit Expiration	• Priority water quality conditions • Goals and schedules • Monitoring and assessment program

7 Glossary of Terms

Agencies – Copermittees and the City of Menifee

Controllable – (or "within agency control") consistent with the scope of the Permit, conditions that are within the regulatory authority of the agency and can feasibly be addressed or treated at the point of entry, within, or at the ~~storm drain~~MS4 outlets are controllable. This requires the availability of feasible options for treating the condition. (See accepted San Luis Rey WMA ~~Water Quality Improvement Plan~~WQIP, Section 2.3.1)

Copermittee – A permittee to a NPDES permit that is only responsible for permit conditions related to the discharge for which it is operator [40 CFR 122.26(b)(1)]. For the purposes of the MS4 Permit, a Copermittee is one of the individual permittees identified in Tables 1a – 1c of the Permit. (See Permit Attachment C)

Dry Season – May 1 to September 30. (See Permit Attachment C)

Dry Weather – Weather is considered dry if the preceding 72 hours has been without measurable precipitation (>0.1 inch). (See Permit Attachment C)

Existing Development – Any area that has been developed and exists for municipal, commercial, industrial, or residential purposes, uses, or activities. May include areas that are not actively used for its originally developed purpose, but may be re-purposed or redeveloped for another use or activity. (See Permit Attachment C)

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26. (See Permit Attachment C)

Open Space – Undeveloped areas of the watershed that are do not contain areas of existing development (e.g., commercial, residential, industrial, municipal facilities) and are not under construction. (See Permit Fact Sheet, Provision E.5)

Storm Drain – [need new definition] ~~Synonymous with Municipal Separate Storm Sewer System (MS4); see definition above. "Storm drain" is used to improve readability throughout the Water Quality Improvement Plan.~~

Wet Season (aka Rainy or Storm Season) – October 1 to April 30. (See Permit Attachment C)

Wet Weather – Weather is considered wet up to 72 hours after a storm event of 0.1 inches and greater, unless otherwise defined by another regulatory mechanism (e.g., a TMDL). (See Permit Attachment C)

8 References

Aziz, Julia J., et al. 2003. "MAROS: A decision support system for optimizing monitoring plans." Ground Water 41.3 (2003). Pages 355-367. 200~~1~~3.

California Code of Regulations. Title 22. Division 4.5.

California Regional Water Quality Control Board, San Diego Region. 1994. Water Quality Control Plan for the San Diego Basin. September 8, 1994. Amended May 17, 2016.

California Regional Water Quality Control Board, San Diego Region. Basin Plan Amendment: Resolution No. R9-2005-0036. Effective 2006.

California Regional Water Quality Control Board, San Diego Region. 2007. Resolution No. R9-2007-0104, Amendment to the Water Quality Control Plan for the San Diego Basin to Incorporate the Revised Conditional Waivers of Waste Discharge Requirements for Specific Types of Discharge Within the San Diego Region. Adopted October 10, 2007.

California Regional Water Quality Control Board, San Diego Region. 2008. General Waste Discharge Requirements for Discharges From Groundwater Extraction and Similar Discharges to Surface Waters Within the San Diego Region Except for San Diego Bay. Order No. R9-2008-0002. NPDES No. CAG919002. 2008.

California Regional Water Quality Control Board, San Diego Region. 2013. *National Pollutant Discharge Elimination System Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems Draining the Watersheds Within the San Diego Region*. NPDES Permit No. CAS0109266. Order No. R9-2013-0001. Adopted May 8, 2013. Amended by Order No. R9-2015-0001 and Order No. R9-2015-0100.

California Regional Water Quality Control Board, San Diego Region. 2016. Order No. R9-2016-0004 General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers that are Members of a Third-Party Group. 2016.

California Regional Water Quality Control Board, San Diego Region. 2016. Order No. R9-2016-0005 General Waste Discharge Requirements for Discharges from Commercial Agricultural Operations for Dischargers that are not Participating in a Third-Party Group. 2016.

Regional Water Quality Control Board. 2017a. Letter Addressed to Mr. Stuart Eyler, Stormwater Section Head. Subject: Modification to Marine Corps Base Camp Pendleton Phase II General Permit Storm Water Management Plan to Address Unauthorized Discharges from Stuart Mesa East and West Agricultural Field. August 28, 2017.

California Regional Water Quality Control Board, San Diego Region. 2017b. Second Interim Deliverable for Santa Margarita River Watershed Management Area Water Quality Improvement Plan, Provision B.2 (Revised) Priority Water Quality Conditions and Provision B.3 Strategies, Numeric Goals, and Schedules comment letter, October 10, 2017, comment 2.b. 2017.

California Regional Water Quality Control Board, Santa Ana Region. 2010. National Pollutant Discharge Elimination System Permit and Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside, and the

Incorporated Cities of Riverside County Within the Santa Ana Region. Order No. R8-2010-0033. NPDES No. CAS 618033. Adopted January 29, 2010. Effective January 29, 2010.

California State Water Resources Control Board. 1988. Resolution No. 88-63. Adoption of Policy Entitled "Sources of Drinking Water." Adopted May 19, 1988.

California State Water Resources Control Board. 2004. Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List Appendix A. September 30, 2004.

California State Water Resources Control Board. 2006. Statewide General Waste Discharge Requirements for Sanitary Sewer Systems. Order No. 2006-0003-DWQ.

California State Water Resources Control Board. 2010. 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report).

California State Water Resources Control Board. 2012a. National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. Order 2012-0006-DWQ. NPDES NO. CAS000002. Effective July 17, 2012.

California State Water Resources Control Board. 2012b. Order 2012-0011-DWQ. Amended by Order WQ 2014-0006-EXEC, Order WQ 2014-0077-DWQ, and Order WQ 2015-0036-EXEC. NPDES No. CAS000003. National Pollutant Discharge Elimination System Statewide Storm Water Permit Waste Discharge Requirements for State of California Department of Transportation. Effective July 1, 2013.

California State Water Resources Control Board. 2012c. Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems, June 19, 2012.

California State Water Resources Control Board. 2013. Water Quality Order No. 2013-0001-DWQ NPDES General Permit No. CAS000004. Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems. Adopted February 5, 2013.

California State Water Resources Control Board. 2014. National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activities. Order 2014-0057-DWQ. NPDES NO. CAS000001. Adopted April 1, 2014. Effective July 1, 2015.

California State Water Resources Control Board. 2015. Amendment to the Water Quality Control Plan for Ocean Waters of California to Control Trash, and Part I Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California. 2015

County of San Diego. 2005. Santa Margarita River Watershed Management Plan.

County of San Diego. 2016. Transitional Monitoring and Assessment Report for the Santa Margarita River Watershed Management Area (2014-2015). Prepared by Weston Solutions. January 2016.

County of San Diego. 2017a. "*Updated Proposal for Load Allocations and Reductions Approach and Staff Report Language for Santa Margarita River Nutrient Alternative TMDL*

Resolution." Letter to CA Regional Water Quality Control Board, San Diego Region, February 10, 2017.

County of San Diego. 2017b. Revised Proposal for Load Allocations and Reductions Approach and Staff Report Language for Santa Margarita River Nutrient Alternative TMDL Resolution Based on Updated Model Output. Letter to CA Regional Water Quality Control Board, San Diego Region, May 11, 2017.

Helsel, D.R., and R.M. Hirsch. Hydrologic Analysis and Interpretation: Chapter A3 Statistical Methods in Water Resources, by, U.S. Geological Survey, September 2002.

Ode, P.R., A.C. Rehn, and J.T. *A quantitative tool for assessing the integrity of Southern Coastal California Streams.* Environmental Management, 35 (1): 1-13. May. 2005.

Philip Williams and Associates, Ltd. (PWA) 1998. Santa Margarita Watershed Study: Hydrologic and Watershed Processes. October 26, 1998. Page 20.

Rancho California Water District, Riverside County Flood Control and Water Conservation District, County of Riverside, Stakeholder Advisory Committee. 2014. *Upper Santa Margarita Watershed Integrated Regional Water Management Plan Update, Final.* April 2014.

San Diego Stormwater Copermittees Urban Runoff Management Programs. 2011. 2011 Long-Term Effectiveness Assessment Final Report. Prepared for: San Diego County Copermittees. June 2011.

Stetson Engineers Inc. and San Diego State University. 2010. Final Report: Hydrological and Biological Support to the Lower Santa Margarita Watershed Monitoring Program Water Years 2008-2009. February 21, 2010.

Stormwater Monitoring Coalition Model Monitoring Technical Committee. 2004. Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California. Technical Report #419. August 2004.

Sutula, M., J. Butcher, C. Boschen, M. Molina. 2016. Application of watershed loading and estuary water quality models to inform nutrient management in the Santa Margarita River Watershed. Southern California Coastal Water Research Project (SCCWRP) Technical Report 933. (Model Application Report).

Tetra Tech, prepared for USEPA Region IX. *Technical Approach to Develop Nutrient Numeric Endpoints for California*. July 2006.

Tetra Tech, 2017. Rainbow Creek Watershed Modeling and Compliance Analysis, December 2017.

United States Environmental Protection Agency (USEPA). *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document.* EPA 833-R-10-003. Office of Wastewater Management. June 2010.

U.S. Geological Survey. Helsel, D.R. and R.M. Hirsch. 2002. Hydrologic Analysis and Interpretation: Chapter A3 Statistical Methods in Water Resources. September 2002.

Weston Solutions, Inc. 2014. Agricultural, Federal, Tribal, and State Input Special Study. Annual Progress Report. Prepared for: Riverside County Municipal Copermittees (San Diego Region). www.projectcleanwater.org