JASON E. UHLEY
General Manager-Chief Engineer

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RIVERSIDE, CA 92501
951.955.1200
FAX 951.788.9965
www.rcflood.org

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

January 31, 2020

Via Electronic Submittal to: SanDiego@waterboards.ca.gov

Mr. David Gibson, Executive Officer
Northern Watershed Unit
CRWQCB-San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108

Dear Mr. Gibson:

Re: 2018-19 WQIP Annual Report for the Santa Margarita River Watershed Management Area: Order No. R9-2013-0001 (as amended);
ERyan: SMR WMA PIN 794828

Please find attached a USB Flash Drive with an electronic copy of the 2018-19 Water Quality Improvement Plan (WQIP) Annual Report (Report) for the Santa Margarita River Watershed Management Area (SMR WMA), submitted as required by the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System Permit: Board Order No. R9-2013-0001, as amended by R9-2015-0001 and R9-2015-0100. The Report is submitted on behalf of the SMR WMA Copermittees: the Cities of Murrieta, Temecula, and Wildomar, the Counties of Riverside and San Diego, and the Riverside County Flood Control and Water Conservation District. The Copermittees have provided certification statements for the Report pursuant to 40 C.F.R Section 122.41(k), below this transmittal letter. PINs for each Copermittee are listed below in the cc section of this letter.

Appendix 2 of the Report includes the following Copermittee-specific Jurisdictional Runoff Management Program (JRMP) information as applicable:

- Completed JRMP Annual Report Forms pursuant to Provision F.3.b.(3)(e);
- Fiscal Analysis pursuant to Provision E.8.c;
- Certified statement of full legal authority pursuant to Provision E.1.b;
- Response to the Audit of Discharge Prohibition;
- Proposed modifications or updates to the Copermittee's JRMP document pursuant to Provision F.2.a.(3);
- Updates to the WQMP (BMP Design Manual) pursuant to Provision F.2.b.(2);
- Proposed administrative updates to the Water Quality Improvement Plan;

In addition to the content specified in Provision F.3.b.(3), the Report also includes responses, as applicable, to letters that were sent to the Copermittees by the San Diego Water Board, including:

- November 27, 2018: WQIP Acceptance Letter;
- July 16, 2019: 2017-2018 WQIP Annual Report Review for the SMR WMA;
- September 4, 2019: Compliance Pathway for Rainbow Creek TMDL.

The Report will also be uploaded to the SMR WMA Regional Clearinghouse at: http://rcflood.org/npdes/SMRWMA.aspx.

If you have any questions regarding this report, please feel free to call Matt Yeager at 951.955.0843 or me at 951.955.1273.

Very truly yours,

RICHARD J. BOON
Chief of Watershed Protection Division

Attachment:
USB Flash Drive Attachment: 2018-19 WQIP Annual Report for the SMR WMA

cc: via email
Erica Ryan, San Diego Water Board
Matt Yeager, Riverside County Flood Control and Watershed Conservation District; PIN 252906
Rania Odenbaugh, County of Riverside; PIN 252901
Jan Bulinski, Riverside County Transportation Department
Brianna Martin, County of San Diego; 255223
Mai Son, City of Murrieta; PIN 214653
Stuart Kuhn, City of Temecula; PIN 214666
Jason Farag, City of Wildomar; PIN 762396

MY:mc
P8/229447

CERTIFICATION

SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA
2018-19 WATER QUALITY IMPROVEMENT PLAN ANNUAL REPORT

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

MATT YEAGER, D. Env
Senior Flood Control Planner
Riverside County Flood Control
and Water Conservation District

1-22-20
DATE

P8/229275

COUNTY OF RIVERSIDE
EXECUTIVE OFFICE

GEORGE A. JOHNSON
COUNTY EXECUTIVE OFFICER

LISA BRANDL
CHIEF OPERATING OFFICER

DON KENT
ASSISTANT COUNTY EXECUTIVE OFFICER
COUNTY FINANCE OFFICER

CERTIFICATION

SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA
2018-19 WATER QUALITY IMPROVEMENT PLAN ANNUAL REPORT

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Lisa Brandl

Lisa Brandl, County Chief Operating Officer

Jan 14, 2020

Date

County of San Diego

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

LAND USE AND ENVIRONMENT GROUP
1600 PACIFIC HIGHWAY, ROOM 212, SAN DIEGO, CA 92101
(619) 531-6256 • Fax (619) 531-5476
www.sdcounty.ca.gov/lueg

STATEMENT OF CERTIFICATION

SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA, WATER QUALITY IMPROVEMENT PLAN FISCAL YEAR 2018-2019 ANNUAL REPORT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations [40 CFR 122.22(d)].

Sarah Aghassi

SARAH E. AGHASSI
Deputy Chief Administrative Officer
Land Use and Environmental Group
County of San Diego

Date 12/20/19

CITY OF MURRIETA

CERTIFICATION

SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA
2018-19 WATER QUALITY IMPROVEMENT PLAN ANNUAL REPORT

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

Robert K. Moehling, P.E.
Public Works Director / City Engineer

1/24/2020
Date

City of Temecula
41000 Main Street • Temecula, California 92590
Phone (951) 694-6411 • temeculaca.gov

SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA
2018-19 WATER QUALITY IMPROVEMENT PLAN ANNUAL REPORT

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

Patrick Thomas
Director of Public Works/City Engineer

1/22/20
Date

23873 Clinton Keith Rd, Ste 201
Wildomar, CA 92595
951.677.7751 Phone
951.698.1463 Fax
www.CityofWildomar.org

CERTIFICATION

SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA
2018-19 WATER QUALITY IMPROVEMENT PLAN ANNUAL REPORT

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

Daniel A. York, Assistant City Manager
Public Works Director/City Engineer

Jan 21, 2020
Date


Upper Santa Margarita River

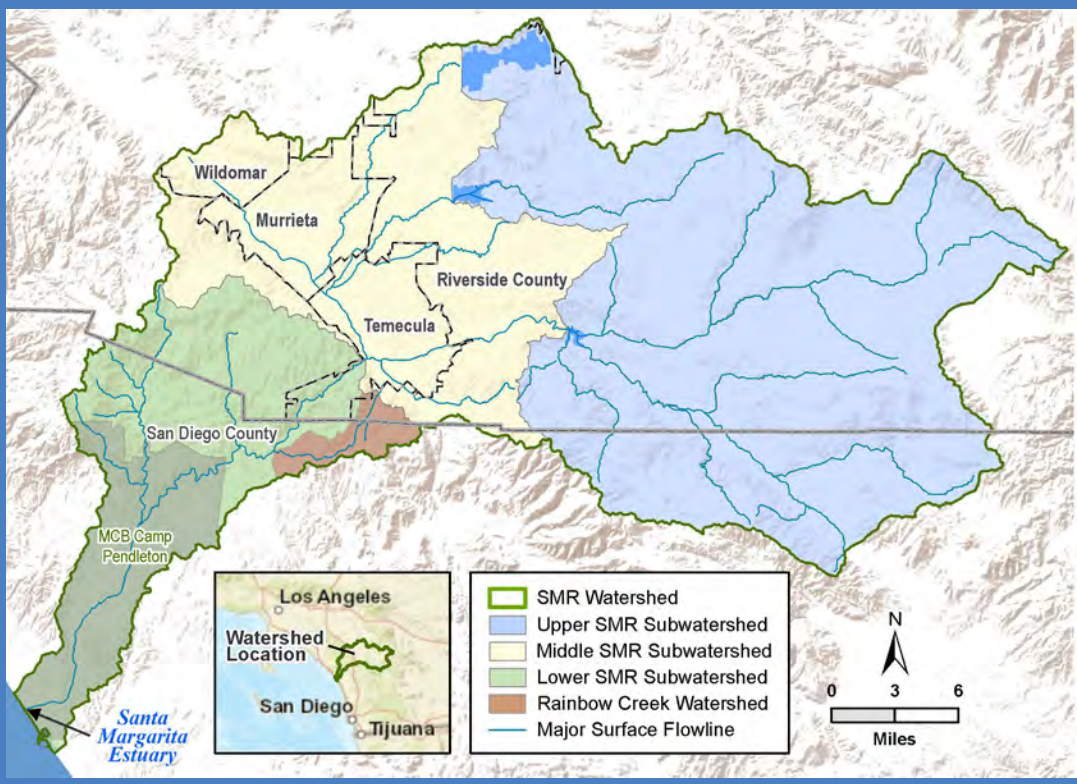
SANTA MARGARITA RIVER
Watershed Management Area

2018-2019 Water Quality Improvement Plan Annual Report

Executive Summary

The Santa Margarita River (SMR) Watershed Management Area (WMA) encompasses over 740 square miles in southern Riverside County and northern San Diego County. To protect, preserve, and restore surface water quality and designated beneficial uses of water bodies in the WMA, Copermittees implement strategies through a watershed-based Water Quality Improvement Plan (WQIP) and individual Jurisdictional Runoff Management Programs. These plans were developed to meet the requirements of the San Diego Region Municipal Separate Storm Sewer System (MS4) permit (Permit) issued by the San Diego Regional Water Quality Control Board (San Diego Water Board).

The WQIP identifies eutrophication and nutrient loading as highest priority water quality conditions (HPWQCs). Goals, strategies, and schedules for addressing HPWQCs have been developed by Subwatershed area and are applicable to Copermittees within those areas. For the 2018-2019 reporting year, this executive summary highlights WQIP implementation progress and strategies, monitoring, and adaptive management. The full report provides details on this first year of WQIP implementation.



COPERMITTEES

Progress To Goals and Strategy Implementation

The Copermittees are implementing a variety of strategies to improve conditions identified as impacted by eutrophication and nutrient loading. Progress is measured against interim and final goals that have been established for the following Subwatershed areas in the WMA:

◆ *Middle SMR Subwatershed* ◆ *Lower SMR Subwatershed* ◆ *Rainbow Creek*

Each of these areas has several compliance pathway options. Middle and Lower SMR Subwatershed pathways include WQIP goals designed to measure progress toward dry weather numeric targets for a Total Maximum Daily Load (TMDL) Alternative for the SMR Estuary. For Rainbow Creek, the goals are intended to demonstrate compliance with the existing Nutrient TMDL.

Progress toward goals based on implementation of strategies is shown by Subwatershed area in the following three tables. No goals were due to be achieved in the 2018-2019 reporting year.

Compliance Pathways by Watershed Geographic Area: Middle SMR Subwatershed (Riverside County Copermittees)

Compliance Pathways		2023 Goal	2018-2019 Status
Receiving Water Reduction in Dry Weather Nutrient Loading	Assess dry weather loading in the Santa Margarita River at the base of the Middle SMR Subwatershed	10% Reduction in Total N & P	Pathway under evaluation
Or			
Receiving Water Attainment of Estuary Targets	Assess receiving water conditions in the Estuary	Not yet determined	Pathway under evaluation
Or			
MS4 Discharges Reduction in Non-Stormwater Flows	Assess reductions in non-stormwater flows	10% Reduction	Pathway under evaluation
Or			
MS4 Discharges Reduction in Dry Weather Nutrient Loading	Assess load reductions in dry weather	10% Reduction in Total N & P	Pathway under evaluation
Or			
Achieve Final Goal Demonstrate Exceedances are due Sources Outside of Agency Control	Source investigations	Not yet determined	Pathway under evaluation
Or			
WQIP Implementation Implement the Accepted WQIP	Assess implementation of WQIP strategies		Met for FY 2019: Strategies proposed in the WQIP were implemented. See Section 2.2 and Appendix 2 for additional details.

Lower SMR Subwatershed (San Diego County)

Compliance Pathways		2023 Goal	2018-2019 Status
MS4 Discharges Eliminate Anthropogenic Dry Weather Discharge from MS4 Outfalls	Rainbow Park project completion	Turf replacement	Met: Project completed
	Percent reduction in aggregate flow volume	25% baseline flow reduction	In progress
Or			
Alternative TMDL Compliance Pathways		**2038 Goal**	**2018-2019 Status**
Receiving Water Achieve Santa Margarita River Estuary Targets	Algal biomass level in SMR Estuary	Primary numeric target	Compliance pathway not used
	Or		
	Algal biomass level in SMR Estuary AND SQO benthic community structure	Secondary numeric target	Compliance pathway not used
Or			
TMDL Alternative Pathway Reduction in Nutrient Load	Percent nutrient load reduction	76% Reduction	Compliance pathway not used
Or			
TMDL Alternative Pathway Attainment of Load Allocations	Nutrient loading in the SMR Estuary	Not yet determined	Compliance pathway not used
Or			
Achieve Final Goal Demonstrate Exceedances are from Non-Controllable Sources	Documentation that exceedances of the targets are due to non-controllable sources		Compliance pathway not used
Or			
Order Implementation Implement Applicable Orders to Attain Allocations	Demonstrate that proposed management actions are implemented through mechanisms defined in applicable Orders (Phase I MS4 WQIPs, Agricultural Discharger Water Quality Restoration Program, etc.)		Compliance pathway not used

Photo: Performing stream rating at Santa Margarita River at De Luz Road

Rainbow Creek (San Diego County)

Compliance Pathways			2021 Goal	2018-2019 Status
WQIP Implementation Implement the Accepted WQIP	Implementation of a WQIP that incorporates the required BMPs and performing specific monitoring and assessments to demonstrate compliance			Compliance pathway not used
Or				
Receiving Water Meet Receiving Water Nutrient Limitations	Nitrate (as N)		10 mg/L	Compliance pathway not used
	Total Nitrogen		1 mg/L	
	Total Phosphorus		0.1 mg/L	
Or				
MS4 Discharges Meet Final Effluent Limitations as Concentrations in Storm Drain	Nitrate (as N)		10 mg/L	Compliance pathway not used
	Total Nitrogen		1 mg/L	
	Total Phosphorus		0.1 mg/L	
Or				
MS4 Discharges Eliminate Storm Drain Discharges	Reduction in anthropogenic discharges from storm drain outfalls to Rainbow Creek		100% Reduction	Compliance pathway not used
Or				
MS4 Discharges Meet Final Effluent Limitations Expressed as Annual Allowable Loads	Total Nitrogen	Commercial Nurseries	9.5 kg/yr	In progress: See Section 2.4 for additional details and proposed modifications to the allowable loads.
		Parks	0.8 kg/yr	
		Residential Areas	13.9 kg/yr	
		Urban Areas	9.8 kg/yr	
	Total Phosphorus	Commercial Nurseries	0.9 kg/yr	
		Parks	0.08 kg/yr	
		Residential Areas	1.4 kg/yr	
		Urban Areas	1.0 kg/yr	

Photo: Tributary to Rainbow Creek

Strategy Highlights

During fiscal year (FY) 2018-2019, strategy focus areas included:

- Eliminating illicit discharges and illegal connections (ICID) to effectively prevent non-stormwater discharges from entering the MS4.
- Creating a monitoring plan and quality assurance plan in response to the 2019 Investigative Order (R9-2019-0007) for the SMR Estuary to demonstrate progress in reducing eutrophication resulting from excessive nutrients.
- Planning structural best management practice (BMP) projects to reduce flows and pollutants.
- Participating in the Santa Margarita River Nutrient Initiative Group (SMRNIG), addressing nutrient issues in the SMR Watershed. The SMRNIG is piloting alternative approaches to establish biostimulatory targets based on recent science. During FY 2018-2019, the SMRNIG held quarterly meetings and initiated Phase III of the technical work. Phases I and II provided key information used by the San Diego Water Board in developing the 2019 Investigative Order. The Riverside County Flood Control and Water Conservation District took over administering, coordinating, and providing a facilitator for the SMRNIG meetings.

1,500
Linear feet of new intermittent channel and seasonal wetlands designed for completion in FY 2020

211
Inspections of commercial nurseries and greenhouse operations were completed resulting in 45 enforcement actions

5,631
Residents were reached in the education and outreach program for proper residential composting techniques

2,821
Acres will have runoff treated by the Regional Detention Basin and four BMP retrofits

154
Non-stormwater discharges investigated; 101 sources of illicit discharges or connections identified and 87 eliminated

For more information on the Copermittees' Strategies and Accomplishments during the 2018-2019 reporting year see Report Section 2 and Appendix 2.

Middle SMR Subwatershed Strategies

Public Education and Outreach

The Riverside County Watershed Protection Program and Copermittees developed and began implementing a Five-Year Strategic Plan for Public Education and Outreach. Goals of the plan include complying with the educational requirements of the Permit, engaging with the community to foster a commitment to improve water quality, implementing measures to further modify residential behavior toward dry-weather flows, and engaging residents in litter-reduction campaigns. During FY 2018-2019, education and outreach to schools included 19 presentations at six schools in the watershed, reaching 685 students in grades K-8.

Upper Santa Margarita River Watershed Storm Water Resource Plan (USMRW SWRP)

The 2019 USMRW SWRP is an integrated plan that focuses on regional watershed-based stormwater priorities and on developing projects with multiple benefits. The purpose of the SWRP is to guide development, facilitate implementation, and improve funding eligibility of stormwater projects that will provide benefits such as improved water quality, augmented water supply, and reduced flood risk. The SWRP also acts as a vehicle for agency collaboration for development of regional stormwater and dry weather runoff solutions.The SWRP is closely tied to the WQIP and the Integrated Regional Water Management Plan.

Illicit Discharge Detection and Elimination (IDDE) and Major MS4 Outfall Monitoring

All Copermittees implemented programs to identify and eliminate prohibited discharges to help meet TMDL Alternative goals. The Copermittees also monitored major MS4 outfalls during dry weather and conducted IDDE investigations as needed to help identify sources of prohibited discharges. The Riverside Copermittees received letters this year describing findings from a San Diego Water Board program audit related to non-stormwater flow prohibitions with a focus on irrigation runoff. Dry weather major MS4 outfall monitoring from 2018-2019 shows that fewer than 20 of almost 200 outfalls had measurable flow in 2018-2019. The Copermittees will continue to implement improvements in response to the letter comments regarding the prohibition of irrigation runoff, including website updates, educational materials, and ordinance updates.

Lower SMR Subwatershed and Rainbow Creek Strategies

Agricultural Strategies

The County of San Diego's Department of Agriculture, Weights, and Measures (AWM) inspects commercial nurseries and greenhouse facilities applicable to the MS4 discharges within the County of San Diego's unincorporated area. This focuses on facilities that are designated as a high threat to water quality. AWM inspections often include outreach on stormwater ordinance requirements and information on Agricultural Orders, as well as opportunities for water conservation rebates and incentives offered by other agencies.

The County is enhancing specific strategies to help achieve water quality improvement goals in the Rainbow Creek Watershed such as increasing inspection frequencies of commercial agricultural facilities, focused investigative efforts on source identification, and raising awareness and outreach of nutrient issues and applicable BMPs.

In collaboration with AWM, the County Watershed Protection Program designed a Rainbow Creek Nutrient Reduction BMP flyer during the reporting period. The flyer uses community based social marketing principles to convey BMP information to help agricultural businesses reduce nutrient contributions to Rainbow Creek.

Rainbow Park Turf Replacement Project

To reduce nutrient loads from park land use, the County of San Diego completed a 1.7-acre turf conversion project of grass on a multi-use sports field to artificial turf with an underdrainage system. This project reduces total nitrogen loads by 0.27 kilograms per year and total phosphorus loads by 0.01 kilograms per year, supporting the required Rainbow Creek Nutrient TMDL load reduction from park uses. This project also allows for year-round use of the field and eliminates water use and associated costs for the multi-use sports field.

BMP Retrofits and Stream Restoration

To achieve compliance with the Nutrient TMDL and to meet the final WQIP goals by December 31, 2021, the County continues to construct water quality improvement projects and to investigate additional opportunities to construct projects that will reduce nutrient loads to Rainbow Creek. Preliminary design was completed and funding was secured for four BMP retrofits consisting of lined, subsurface wetland channels and bioretention swales within segments of the County's road drainage system (example shown to right). These four BMP retrofits are designed to treat runoff from approximately 511 acres and 68% of the total MS4 outfall drainage area within the Rainbow Creek Watershed. Public-private partnerships are also being actively pursued to add 100-foot riparian buffers, creek restoration, or re-vegetation activities near Rainbow Creek.

Example Rendered Subsurface Wetland Channel During Wet Weather

MONITORING AND ASSESSMENT

Rainbow Creek Nutrient Monitoring

Rainbow Creek Nutrient TMDL Compliance Monitoring

Nutrient TMDL compliance monitoring was conducted at 12 receiving water locations and two other compliance sites in the Rainbow Creek Watershed, which is located within the Lower SMR Subwatershed. Measured concentrations in 112 samples of total nitrogen and total phosphorus were above the respective receiving water limitations with the exception of one nitrogen sample and two phosphorus samples during dry weather sampling.

Dry Weather MS4 Outfall Monitoring

Dry weather MS4 monitoring data were collected at outfalls within the County of San Diego jurisdiction that have a potential to discharge to Rainbow Creek. This monitoring is not required by the Permit or the TMDL, but is performed to determine whether progress is being made toward MS4 compliance pathway options of the Nutrient TMDL. During 2018-2019, nearly half of the 21 monitoring sites were dry, and the majority of the samples were collected at only three locations due to lack of flow. Nutrient concentrations were above TMDL effluent limitations for total nitrogen in 25 of 31 samples and for total phosphorus in 28 of 31 samples.

Special Studies

Special studies are conducted to provide insight to effectively address pollutants and/or stressors that cause or contribute to HPWQCs. The Copermittees use data from special studies to investigate and understand sources, target jurisdictional strategies, and ultimately to facilitate achieving compliance with the numeric goals outlined in the WQIP.

Santa Margarita River Nutrient Initiative Group

SMR Copermittees will continue to support the study effort under the SMRNIG by including in-kind monitoring at long-term receiving water stations during a dry weather monitoring event to collect additional parameters relevant to the Nutrient Numeric Endpoint framework, an alternative regulatory approach advocated by State Water Board staff and USEPA Region 9. During the 2018-2019 monitoring year, no work was planned for this special study. Monitoring is scheduled for WQIP year 3 (2020-2021) as described in the schedule of the WQIP Monitoring and Assessment Program. Future monitoring is intended to coincide with a dry weather monitoring event at the long-term receiving water stations.

Rainbow Creek Watershed Microbial Source Tracking - Dry Weather

The study which began in 2019 includes collection of dry weather samples from outfalls and receiving waters in the Rainbow Creek Watershed for analysis of fecal indicator bacteria and human-associated fecal marker HF183. This study supports the Rainbow Creek Nutrient TMDL, which identified septic systems as contributors of total nitrogen loading. Once the monitoring program has been completed, the results will be used to determine whether human sources of fecal contamination are present and their spatio-temporal patterns, and if patterns exist, to potentially identify areas with suspected septic system influence on dry weather flows and associated nutrient loading. At one outfall, a follow-up study was conducted to investigate sources of HF183 detections.

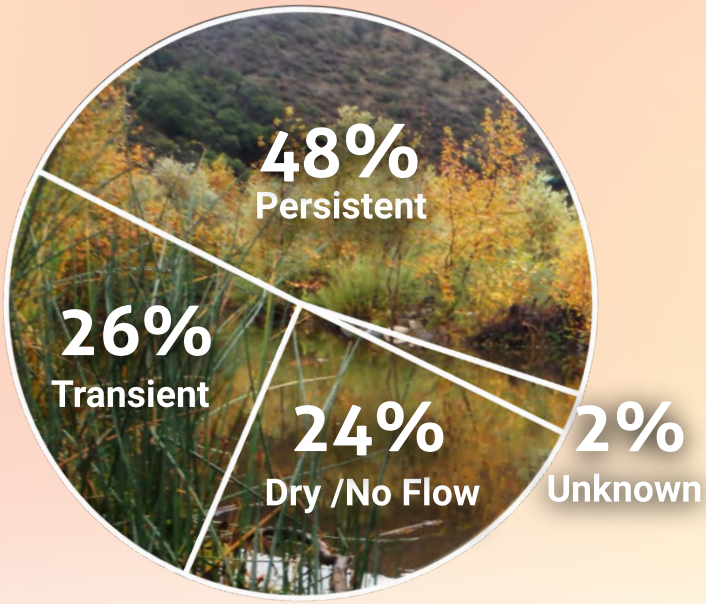
2019 Post-Fire Stormwater Monitoring - Tenaja Fire

Monitoring of stormwater discharges was initiated for the area affected by the 2019 Tenaja Fire that burned approximately 1,939 acres in the Middle and Lower SMR Subwatersheds. The study was designed to assess contaminant concentration and flux by sampling stormwater runoff from the terminal end of burned catchments and compare the data to reference sites, as well as assess the potential post-fire water quality impacts with a focus on the HPWQCs in the WMA.

MONITORING AND ASSESSMENT

Storm Drain Outfall Monitoring

Dry Weather



519 Outfall Field Screenings

30 outfalls visited twice for highest priority persistent flow discharge monitoring to better understand and target sources of persistent dry weather flow.

Dry weather field screening includes visual observations at MS4 outfalls regarding flowing or ponded water, or dry conditions; flow rate estimation; and identification of potential sources. During the 2018-2019 monitoring year, 24% of the outfalls visited were determined to be dry and 48% were flowing or had ponded water during the last three consecutive visits. For those outfalls with observed flow, 67% of the flows were estimated at less than one gallon per minute (trickle flow).

This monitoring year was the first year of MS4 outfall dry weather analytical sampling under the WQIP. Many outfalls had no flow or lacked sampleable flow. Of 10 outfalls that were sampled twice, both total phosphorus and total nitrogen concentrations exceeded non-stormwater action levels (NALs) two times at all stations. One outfall, which was sampled once due to ponded conditions at the second event, exceeded the NAL for total phosphorus.

Wet Weather

Photos: Wet weather monitoring equipment installed at outfalls.

During the 2018-2019 monitoring year, wet weather MS4 outfall discharge monitoring was conducted once at five locations in the Middle SMR Subwatershed and one location in the Lower SMR Subwatershed (i.e., one outfall per Copermittee). This was the third year of monitoring at all six locations. Composite samples were analyzed for constituents contributing to the HPWQC, 2014/2016 303(d) List impairments, and constituents with stormwater action levels (SALs) Flow was monitored to estimate pollutant loads.

The outfall located in Rainbow Creek Watershed (HST01) exceeded nutrient SALs and Rainbow Creek Nutrient TMDL final effluent limitations. No other outfalls exceeded SALs for nutrients.

For more information on the Monitoring and Assessment Program see Report Section 3 and Appendix 4.

Water Quality Improvement Plan Adaptive Management

Santa Margarita Estuary at mouth

The SMR WMA Copermittees use an adaptive management process to evaluate and make adjustments to their WQIP as needed to improve strategies that reduce pollutants from MS4 outfalls. Triggers for adaptive management include Monitoring and Assessment Program data, new regulatory actions, requests or recommendations from the San Diego Water Board, public input, and progress to goals assessment results. Of these triggers, adaptive management following this first year of WQIP implementation is largely driven by new regulatory considerations and requests, rather than assessments of programmatic and monitoring results. During the 2018-2019 reporting year, the Copermittees received several comment letters from the San Diego Water Board, which are addressed in this 2018-2019 WQIP Annual Report as follows:

- Updates to WQIP elements based on requests in the 2017-2018 WQIP Annual Report review letter dated July 19, 2019 are generally not required until January 31, 2021 or later. However, several items were identified to be addressed in this Annual Report. These items, detailed in Appendix 5, include submittal of the Final HMP Effectiveness Assessment and HMP data for the Middle SMR Subwatershed, submittal of this WQIP Annual Report, submittal of program changes to address inspection and enforcement deficiencies for agricultural facilities as a result of Rainbow Creek Nutrient TMDL monitoring trends, and requests for additional information (i.e., outfall prioritization processes used by the Copermittees, tabulation of structural BMP information, and a monitoring completeness check). In addition, the letter specifies that the WQIP will be updated to incorporate the requirements of the 2019 Investigative Order, including the Monitoring and Assessment Workplan, by January 31, 2021.
- In response to the Compliance Pathway for Rainbow Creek TMDL letter dated September 4, 2019, updates to goals associated with Rainbow Creek Compliance Pathway 5 are proposed by the County of San Diego and enhancements to agriculture focused strategies have been identified.
- In response to the Program Audit letters regarding irrigation runoff (received in early 2019), website updates, educational materials, and ordinance updates are underway as needed. Responses to the audits are provided by Copermittee in Appendix 2.

Additional regulatory actions that may require updates to the Monitoring and Assessment Program include the Statewide Bacteria Provisions and Trash Amendments. For details, see Section 4 and Appendix 5.

Bioassessment Monitoring

SANTA MARGARITA RIVER
WATERSHED MANAGEMENT AREA
2018-2019
WATER QUALITY IMPROVEMENT PLAN
ANNUAL REPORT

FINAL REPORT

Prepared for the following Santa Margarita River WMA Copermittees:

County of Riverside
County of San Diego
Riverside County Flood Control and Water Conservation District
City of Murrieta
City of Temecula
City of Wildomar

Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100

Prepared by:

Weston Solutions, Inc.
5817 Dryden Place, Suite 101
Carlsbad, California 92008

D-Max Engineering, Inc.
7220 Trade Street, Suite 119
San Diego, CA 92121

January 2020

P8/229388

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

2007 Permit	San Diego Water Board Order No. R9-2007-0001
2010 Permit	San Diego Water Board Order No. R9-2010-0016
2014 and 2016 303(d) List	Clean Water Act 2014 and 2016 Section 303(d) List/305(b) Integrated Report
2019 Investigative Order	Investigative Order No. R9-2019-0007
AFDM	ash-free dry mass
APHA	American Public Health Association
ASBS	Area of Special Biological Significance
ASCI	algal stream condition index
Basin Plan	Water Quality Control Plan for the San Diego Basin
Bight '18	Southern California Bight 2018 Regional Monitoring Program
BMI	benthic macroinvertebrate
BMP	best management practice
BOD	biological oxygen demand
CA LRM	California Logistic Regression Model
$CaCO_3$	calcium carbonate
CCC	criterion continuous concentration
CASQA	California Stormwater Quality Association
CEDEN	California Environmental Data Exchange Network
CEM	Channel Evolution Model
CMP	Consolidated Monitoring Program
COC	chain-of-custody
CRAM	California Rapid Assessment Method
CSBP	California Stream Bioassessment Procedure
CSCI	California Stream Condition Index
CSI	Chemical Score Index
CWA	Clean Water Act
DEH	Department of Environmental Health
District	Riverside County Flood Control and Water Conservation District
DO	dissolved oxygen
EMC	event mean concentration
EPT	Ephemeroptera, Plecoptera, and Trichoptera
FY	fiscal year
GIS	Geographic Information System
HA	hydrologic area
HSA	hydrologic subarea
HPWQC	highest priority water quality condition
HU	hydrologic unit
IBI	Index of Biotic Integrity
IC/ID	illegal connection and illicit discharge
ID	identification
IDDE	illegal discharge detection and elimination
IRWM	Integrated Regional Water Management
JRMP	Jurisdictional Runoff Management Program

LID	low impact development
LOE	line of evidence
LTMS	long-term monitoring station
MAP	Monitoring and Assessment Program
MBAS	methylene blue active substance
MLS	mass loading station
MRCD	Mission Resource Conservation District
MRP	Monitoring and Reporting Program
MS4	municipal separate storm sewer system
MST	microbial source tracking
MWD	Metropolitan Water District
NA	not applicable
ND	not detected
NPDES	National Pollutant Discharge Elimination System
NS	not sampled
NWS	National Weather Service
O/E	observed to expected ratio
OWTS	onsite wastewater treatment system
PAH	polycyclic aromatic hydrocarbon
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
pH	hydrogen ion concentration
PMAX	maximum probability model
pMMi	predictive multi-metric index
Permit	Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100
PEST	Public Education Strategic Taskforce
PWQC	priority water quality condition
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
HMP Monitoring	Geomorphological and Habitat Assessments required by Appendix K of the Riverside County SMR Hydromodification Management Plan
Rainbow Creek Nutrient TMDL	*Amendment to the Water Quality Control Plan for the San Diego Basin to Incorporate Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus in the Rainbow Creek Watershed*
San Diego Water Board	San Diego Regional Water Quality Control Board
SANGIS	San Diego Geographic Information Source
SCCWRP	Southern California Coastal Water Research Project
SM	Standard Methods
SMC	Southern California Stormwater Monitoring Coalition
SMC CLEAN	SMC California LID Evaluation and Analysis Network
SMC Regional Monitoring Program	SMC Regional Bioassessment and Water Quality Monitoring Program
SMC Workplan	*Bioassessment Survey of the Stormwater Monitoring Coalition. Workplan for Years 2015 through 2019*

SMR	Santa Margarita River
SMRNIG	Santa Margarita River Nutrient Initiative Group
SQO	sediment quality objective
State Water Board	State Water Resources Control Board
SAG	Stakeholder Group
SWAMP	Surface Water Ambient Monitoring Program
TAC	Technical Advisory Committee
TAPE	Technology Acceptance Protocol-Ecology
TDS	total dissolved solids
TIE	toxicity identification evaluation
TKN	total Kjeldahl nitrogen
TMDL	total maximum daily load
TPH	total petroleum hydrocarbons
UAV	Unmanned Aerial Vehicle
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTC	unable to calculate
VNS	Visited Not Sampled
WESTON®	Weston Solutions, Inc.
WMAA	Watershed Management Area Analysis
WMA	Watershed Management Area
WQBEL	water quality based effluent limitation
WQIP	Water Quality Improvement Plan
WQO	water quality objective
WRCOG	Western Riverside Council of Governments

UNITS OF MEASURE

µg/L	micrograms per liter
µS/cm	micro Siemens per centimeter
°C	degrees Celsius
°F	degrees Fahrenheit
cf	cubic feet
cfs	cubic feet per second
cm	centimeter
g/m²	grams per square meter
g d-w/m^2	grams dry weight per square meter
gpm	gallons per minute
mg/m^2	milligrams per square meter
mg/L	milligrams per liter
MPN/100 mL	most probable number per 100 milliliters
NTU	Nephelometric Turbidity Units
ppt	parts per thousand
%	percent
<	less than
>	greater than
≥	greater than or equal to
≤	less than or equal to

1.0 INTRODUCTION

This 2018-2019 Water Quality Improvement Plan (WQIP) Annual Report communicates the implementation status and progress that the Water Quality Improvement Plan (WQIP) (Santa Margarita River [SMR] Watershed Management Area [WMA] Copermittees, 2018) and Jurisdictional Runoff Management Programs (JRMPs) (the Copermittees' local plans) have achieved during the first year of WQIP implementation in accordance with Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100 (Permit).[1] The Permit requires the development of watershed-specific WQIPs through a collaborative effort by the WMA's Copermittees and other key stakeholders. Order No. R9-2015-0100, which enrolled the Riverside County Copermittees in the Permit, was adopted on November 18, 2015 and became effective January 7, 2016. The development of the WQIP for the SMR WMA did not begin until the Riverside County Copermittees were enrolled in the Permit. The WQIP was accepted by the San Diego Regional Water Quality Control Board (San Diego Water Board) on November 27, 2018.

This 2018-2019 WQIP Annual Report covers two different reporting periods. The first is from July 1, 2018 to June 30, 2019 (i.e., fiscal year [FY] 2019) for the JRMPs, and the second is from October 1, 2018 to September 30, 2019, which is the monitoring year for monitoring and assessment programs. Because implementation of the accepted WQIP for the SMR Copermittees began during the 2018-2019 reporting year, progress reporting is based on the period from November 27, 2018 to September 30, 2019.

The Copermittees in the SMR WMA include the Counties of Riverside and San Diego, the Riverside County Flood Control and Water Conservation District (District), and the Cities of Murrieta, Temecula, and Wildomar. A map of the WMA is shown in **Figure 1-1**. The WMA is described in detail in Section 1 of the WQIP.

A portion of the City of Menifee lies within the geographic jurisdictional boundaries of the San Diego Water Board. However, the City of Menifee is largely regulated by the Santa Ana Water Board pursuant to an October 26, 2015 agreement between the Santa Ana Water Board and the San Diego Water Board.[2] Although the City of Menifee is required to actively participate in the development and implementation of the WQIP for the SMR WMA,[3] the City of Menifee is not required to submit an Annual Report to the San Diego Water Board.[4] Therefore, this WQIP Annual Report does not include information from the City of Menifee.

[1] The Permit expired on June 27, 2018; the term of the Permit is automatically extended until the new permit is issued.
[2] Letter from David Gibson, Executive Officer, to Robert K. Moehling, Daniel A. York, and Jonathan G. Smith regarding: Regional Water Board Designation for Regulating Municipal Separate Storm Sewer System Discharges in the Cities of Murrieta, Wildomar, and Menifee in Riverside County, dated October 26, 2015.
[3] See Finding 29.b of the Regional MS4 Permit (Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100).
[4] Condition 12 of the October 26, 2015 letter states: "Annual Reports prepared by each City pursuant to its Phase I MS4 Permit requirements shall be a single report encompassing the entire geographic jurisdictional area of the City, using the format prescribed in the applicable Phase I MS4 Permit. The Annual Reports shall be submitted to the Regional Water Board that issued the applicable Phase I MS4 NPDES Permit.

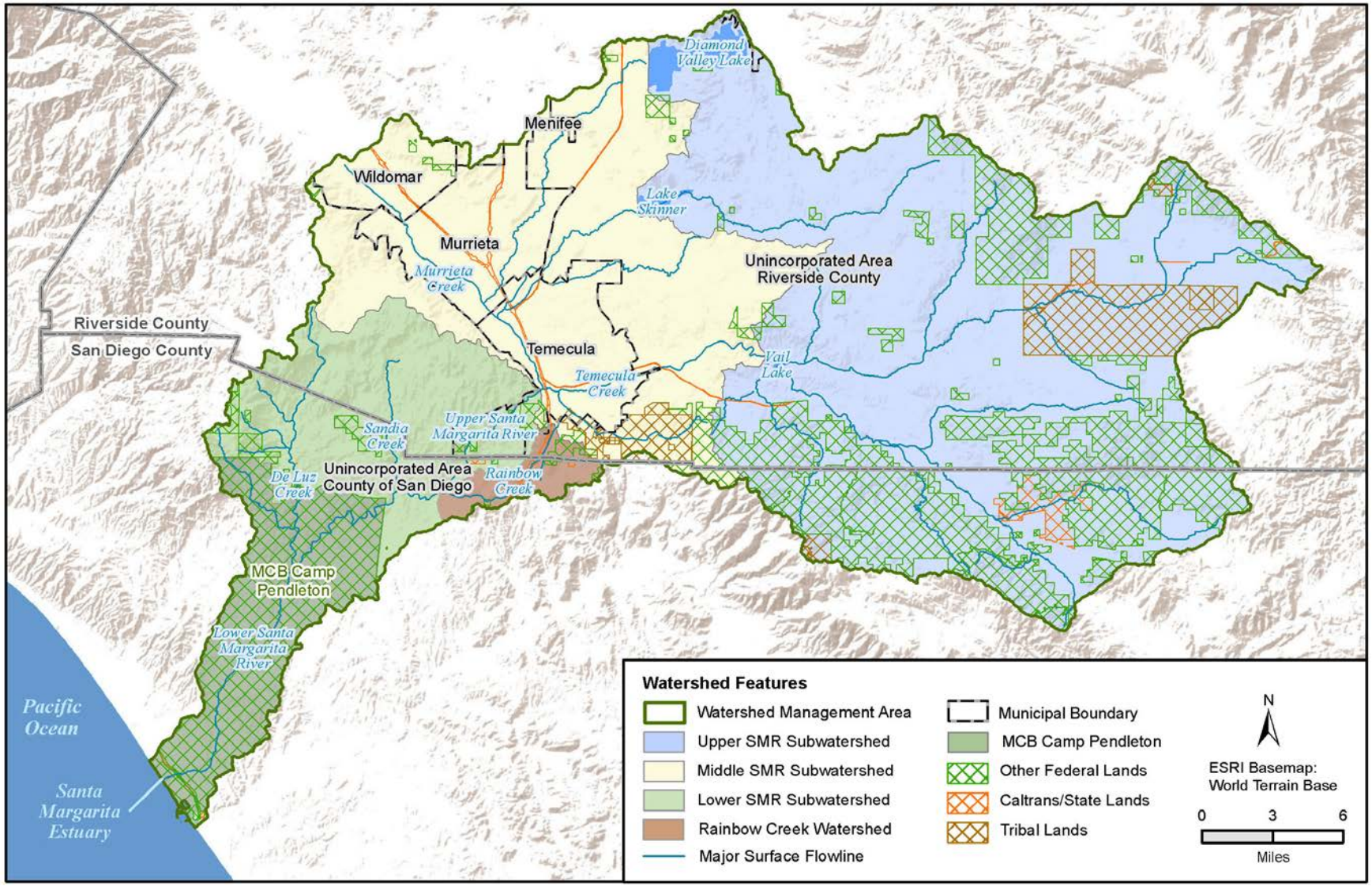


Figure 1-1. Santa Margarita River Watershed Management Area

The WQIP identifies priority water quality conditions (PWQCs), highest priority water quality conditions (HPWQCs), and known and suspected sources of stormwater and non-stormwater pollutants contributing to the HPWQCs. The HPWQCs, as given in Section 2 of the WQIP, are summarized in **Table 1-1**. PWQCs are also given in Section 2 of the WQIP and are summarized in **Appendix 4**. The Copermittees developed numeric goals, schedules, and strategies to address eutrophication and nutrient loading HPWQCs within the WMA.

Table 1-1. HPWQCs in the SMR WMA

Beneficial Use Category	Water Quality Condition	Wet	Dry	Geographic Area
Aquatic Life: Eutrophication	Eutrophication Impacts (elevated algal biomass)		✓	Santa Margarita River Estuary[1], Warm Springs, Redhawk Channel[2]
	Nutrient loading to waterbodies with an adopted TMDL or listed as impaired		✓	All Middle and Lower SMR Subwatershed subareas, except Fallbrook Creek and Sandia Creek[1]
		✓		Rainbow Creek

TMDL – total maximum daily load

[1] MS4 discharges within the following subareas may reach the SMR Estuary during dry weather and contribute to the Eutrophication HPWQC 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 subareas may be added as a result of the TMDL Alternative during adaptive management process.

During the 2018-2019 reporting year, Copermittees received several comment letters from the San Diego Water Board. Requested items requiring a response are listed in **Table 1-2**. For completeness, the table includes items listed in the WQIP acceptance letter. For items with a response due with this WQIP Annual Report, the location of the response is given in **Table 1-2**. These letters include:

- WQIP acceptance letter dated November 27, 2018.
- 2017-2018 WQIP Annual Report review letter dated July 19, 2019. The San Diego Water Board conducted a review of the 2017-2018 WQIP Annual Report for the SMR WMA and their review results are presented in the letter.
- Compliance Pathway for Rainbow Creek Nutrient TMDL[5] letter dated September 4, 2019. The San Diego Water Board notified the County of deficiencies in the reasonable assurance demonstration used to select the implementation of the WQIP as a pathway for compliance with the Rainbow Creek Nutrient TMDL. In response to this letter, the County of San Diego has re-evaluated its approach to meeting compliance with the TMDL.
- Program Audit letters regarding irrigation runoff (early 2019). The Riverside County Copermittees received letters describing the findings from a San Diego Water Board desktop audit related to non-stormwater flow prohibitions, focusing on irrigation runoff. Some Copermittees also received notices of violation related to Permit requirements to establish legal authority to prohibit non-stormwater discharges.

[5] Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus for Rainbow Creek (Rainbow Creek Nutrient TMDL) (San Diego Water Board, 2005).

Table 1-2. SMR Regulatory Letters, Requested Actions, and Locations of Responses in 2018-2019 WQIP Annual Report

Letter	Requested Item	Status	Response Location in 2018-2019 WQIP Annual Report
WQIP Acceptance Letter November 27, 2018	1. Monitoring	Completed	
	a. The Copermittees shall discontinue the transitional monitoring (provision F.3.b(1)).	Transitional monitoring was discontinued. The County of San Diego had completed 2 of 4 events when the WQIP accepted in November 2018 and voluntarily completed the remaining two events after WQIP acceptance to finish the monitoring that had been started.	Section 3.0 Appendix 4
	b. The Copermittees shall implement the Santa Margarita River WMA receiving water and hydromodification monitoring and reporting programs.	Copermittees began implementing the monitoring and reporting on November 27, 2018.	Section 3.2 Appendix 4
	2. Revision of Quality Assurance Project Plan (QAPP) for additional Receiving Water Monitoring location. Submit revised QAPP within 60 days.	The Santa Margarita River Watershed Monitoring Plan and the QAPP were revised as requested and submitted to the San Diego Water Board on January 31, 2019.	Not applicable to 2018-2019 WQIP Annual Report; submitted on January 31, 2019.
	3. Submittal of HMP Effectiveness Assessment Monitoring Data	Completed	
	a. Submit the HMP Effectiveness Assessment monitoring data required under Order No. R9-2010-0016 concurrently with the January 31, 2019, Annual Plan Report. Must be submitted as a separate document.	All HMP effectiveness data collected through September 30, 2018 were previously submitted* with the 2017-2018 WQIP Annual Report.	Not applicable to 2018-2019 WQIP Annual Report; previously submitted* as Appendix M of the 2017-2018 Annual Report.
	b. Submit a Final HMP Effectiveness Assessment Monitoring Report (Final HMP Report) concurrently with the January 31, 2020, Annual Plan Report. Must be submitted as a separate document.	The Final HMP Report is attached to Appendix 4 and has been provided as a separate document	Appendix 4 Attachment 4E & Separate submittal
	c. Submit all HMP monitoring data with the Final HMP Report on January 31, 2020. These data must be submitted as a separate document.	All HMP effectiveness assessment data are attached to Appendix 4 and provided as a separate document.	Appendix 4 Attachment 4E & Separate submittal
	4. Reporting Schedule The Copermittees must submit the following reports:	Completed	
	a. First Water Quality Improvement Plan Annual Report due no later than January 31, 2019; and	The first WQIP Annual Report was previously submitted to the San Diego Water Board.* Attachments too large to email were sent via FedEx.	Not applicable to 2018-2019 WQIP Annual Report; previously submitted.*
	b. First Jurisdictional Runoff Management Program Document (JRMP) Annual Report Form, due no later than January 31, 2019.	The JRMP Annual Report Forms were previously submitted to the San Diego Water Board.*	Not applicable to 2018-2019 WQIP Annual Report; previously submitted.*
	5. Program Authorizations Each Copermittee is authorized to implement the following forthwith:	Completed	
	a. The exemptions to the Hydromodification Management Best Management Practice pursuant to provision E.3.c(2)(d)(iii) of the Order within the Santa Margarita River WMA;	Acknowledged and Copermittees notified for WQMP reviews.	Not applicable
	b. The Alternative Compliance Program for Priority Development Projects pursuant to provision E.3.c(3) of the Order within the Santa Margarita River WMA; and	Acknowledged and Copermittees notified of this optional program.	Not applicable
	c. The strategies described in the Revised Plan according to the specified schedules.	Strategy implementation commenced as scheduled.	Section 2 Appendix 2
	6. Update the WQIP to Include Requirements of Tentative Investigative Order No. R9-2019-0007 (Tentative Investigative Order). The Revised Plan modifications must be submitted to the San Diego Water Board no later than ***September 6, 2019*** and implemented as directed by the Board.	This submittal deadline was revised by the WQIP Annual Report review letter, Item 5. The revised date for update and submittal is January 31, 2021.	Not applicable to 2018-2019 WQIP Annual Report; will be submitted as requested by January 31, 2021.
Over-irrigation Audit Letters via Email February 2019	The [District; the County of Riverside, and the Cities of Murrieta, Temecula, and Wildomar] shall provide an update to the San Diego Water Board in the District's next JRMP annual report.	Riverside Copermittees are providing responses with JRMP sections	Appendix 2

Table 1-2. SMR Regulatory Letters, Requested Actions, and Locations of Responses in 2018-2019 WQIP Annual Report

Letter	Requested Item	Status	Response Location in 2018-2019 WQIP Annual Report
WQIP Annual Report Review Letter July 19, 1019	**1. Acceptance Letter Submittal Requirements** a. Final Certified WQIP b. Revised Quality Assurance Project Plan (QAPP) c. Order R9-2010-0016 Hydromodification Management Plan Effectiveness Assessment Monitoring Data (HMP Data)	The additional specific submittal requirements specified in the Acceptance Letter and due in 2019 have been submitted by the SMR Copermittees.	Not applicable to 2018-2019 Report; previously submitted.*
	2. Monitoring Data Submittals	Completed	
	a. Transitional monitoring reports	All required transitional monitoring reports were submitted by the SMR Copermittees.	Not applicable to the 2018-2019 monitoring year; submitted for previous transitional years.
	b. HMP monitoring reports	1. The County of San Diego, in coordination with the San Diego County Copermittees, submitted the Final Effectiveness Assessment of the San Diego HMP, as required under the Order R9-2007-0001 on November 9, 2016. No further submittals under provision D.1.a (2) are required. 2. The Western Riverside Copermittees submitted HMP Data under Order R9-2010-0016 on February 1, 2019. Additional submittals to comply with provision D.1.a (2) are required. The Final HMP Effectiveness Assessment and HMP Data are due on or before January 31, 2020.	1. Not applicable to 2018-2019 monitoring year; submitted November 9, 2016. 2. Appendix 4 Attachment 4E & Separate submittal
	c. WQIP annual monitoring reports	The first WQIP Annual Report was submitted to the San Diego Water Board January 31, 2019. Attachments too large to email were sent via FedEx on January 31, 2019.	Not applicable to 2018-2019 WQIP Annual Report; previously submitted.*
	3. WQIP Numeric Goals and Schedules The Copermittees will provide a WQIP Annual Report for the 2018-2019 reporting period **on or before January 31, 2020**. The status of the WQIP numeric goals and schedules will be reviewed at the time of the January 31, 2020, WQIP Annual Report submittal.	The Copermittees are submitting this WQIP Annual Report on January 31, 2020. The status of WQIP numeric goals and schedules are included in Section 2.	2018-2019 WQIP Annual Report submittal Status of goals: Section 2
	4. WQIP Adaptive Management General Topics The San Diego Water Board is requiring all WQIP Copermittees to address the Adaptive Management General Topics included in **Attachment 1** to this letter. The Adaptive Management General Topics are to be incorporated into the WQIP and submitted by the WQIP Copermittees **on or before January 31, 2021**.	The adaptive management general topics included in Attachment 1 are summarized in Appendix 5 Table A5-3. In general, adaptive management topics are not applicable to 2018-2019 WQIP Annual Report and are to be addressed by January 31, 2021. Detailed responses for items due by January 31, 2020 are provided in Appendix 5.	
	5. WQIP Update Requirements On May 9, 2019, the Santa Margarita Estuary Investigative Order R9-2019-0007 was signed by the San Diego Water Board Executive Officer. The Acceptance Letter for the Santa Margarita WMA WQIP required a formal update to the WQIP to incorporate the requirements of the Order "…*no later than September 6, 2019*…" However, consistent with the schedules in the final Order, the revised due date for the WQIP Update to incorporate the requirements of the Order is now **on or before January 31, 2021.**	Not applicable to 2018-2019 WQIP Annual Report; will be submitted as requested by January 31, 2021	
	6. Additional Comments on WQIP Annual Report	Completed	
	a. Rainbow Creek Nutrient TMDL – Monitoring Trends The San Diego Water Board finds that the initial assessment in the WQIP for improving trends of nutrients in the Final Accepted WQIP do not appear to continue based on the additional years of data received. The San Diego Water Board has met with the County and expressed concerns regarding meeting the TMDL compliance deadline and the efficacy of the proposed regional BMP to meet the Attachment E requirements. The San Diego Water Board has also identified to the County deficiencies in the inspection and enforcement program for agricultural facilities in coordination with the San Water Board staff implementing the Agricultural Orders. **The County is required to submit program changes with the January 31, 2020, JRMP annual report to address the identified program inspection and enforcement deficiencies.**	The County's Department of Agriculture, Weights, and Measures (AWM) conducts routine and follow up storm water compliance inspections at commercial nurseries and greenhouse facilities. In response to the San Diego Water Board's request, AWM has identified program changes (i.e., enhanced strategies) to help achieve water quality improvement goals in the Rainbow Creek Watershed, which are summarized in Section 2.3, Appendix 2, and Appendix 5 of this WQIP Annual Report. The County will update its JRMP document during FY19-20 to describe its programs to address agricultural water quality.	Section 2.3 Appendix 2 Section 7.3 Appendix 5 Section 5.1.2.1.2

Table 1-2. SMR Regulatory Letters, Requested Actions, and Locations of Responses in 2018-2019 WQIP Annual Report

Letter	Requested Item	Status	Response Location in 2018-2019 WQIP Annual Report
	b. WQIP Annual Report Monitoring – The San Diego Water Board is requiring that the WQIP Copermittees conduct a completeness check and include this with next WQIP Annual Report **due on or before January 31, 2020**.	A monitoring completeness check was conducted; completeness > 90% was achieved for each program component.	Appendix 5 Section 5.1.2.1.3 Appendix 4 Table 4A-2 and QA/QC Reports as attachments to Appendix 4: • 4A-5: 2018-2019 Transitional Monitoring - QA/QC Report • 4B-4B Sediment Chemistry QA/QC report • 4C-1C 2019 Riverside SMC Bioassessment QA Report • 4C-2h San Diego SMC Chemistry QC Report • 4D-1C Rainbow Creek Nutrient TMDL QC • 4D-2B RBC MS4 QC Summary • 4G-2 Riverside Dry Weather MS4 Outfall Data QC Report • 4H-1 Riverside Wet Weather MS4 Outfall Data QC Report • 4H-2 San Diego Wet Weather MS4 Outfall Data QC Report
	c. Outfalls with Noted Exceedances in Dry Weather in the WMA The San Diego Water Board reviewed dry weather data submitted by the Copermittees. The following MS4 outfalls are noted as exceeding WQO objectives at the following locations: • CT-SMG07: Nutrients (TN) • CT-SMG18: FIB and Nutrients (TN) The San Diego Water Board is requiring the WQIP Copermittees to adaptively manage their programs based on these outfall exceedances in accordance with **11.b of Attachment 1**.	CT-SMG07: The County of San Diego has identified this site to be a receiving water location (Figure A5-3). CT-SMG18: This site is located at an MS4 segment that is within the drainage area of one of the County's highest priority major MS4 outfalls with non-storm water persistent flow (MS4-SMG-015) (Figure A5-4). Dry weather flows from this location are being captured and sampled at the downstream outfall (MS4-SMG-015), as required by Permit Provision D.2.b.(2).	Appendix 5 Section 5.1.2.1.4
Attachment 1: Adaptive Management July 19, 2019	Adaptive Management General Topics	All actions requested by January 31, 2020 have been completed. Detailed responses are provided in Appendix 5.	Appendix 5 Table A5-3
Rainbow Creek Nutrient TMDL Compliance Pathways September 4, 2019	The San Diego Water Board is requiring the County to submit documentation with the next **WQIP Annual Report due January 31, 2020.** The documentation must support all of the strategies and BMPs relied upon under provision E.3.b(3)(e) in Attachment E of the Regional MS4 Permit and identified in the watershed model for the Rainbow Creek Nutrient TMDL are being fully implemented by the County to achieve the assumed percent load reductions. The supporting documentation must clearly demonstrate that the strategies and BMPs relied upon to achieve nutrient load reductions to meet the Rainbow Creek Nutrient TMDL are actually being implemented in accordance with the technical requirements in the model demonstration within the geographic areas and land uses identified. In addition, the San Diego Water Board is also requiring the County revise its watershed model to reflect the load reductions for strategies and BMPs which are actually being implemented.	In response to this letter, the County of San Diego has re-evaluated its approach to meeting compliance with the TMDL. The methods and results of this re-evaluation are presented in Section 2.4.1 with supporting documentation provided in Attachment 5B (Technical Memorandum from Tetra Tech) to Appendix 5. In addition, the County has identified additional specific strategies focused on agriculture which are in part due to the comment letter. A summary of the enhanced strategies for Rainbow Creek is provided in Section 2.4.3. The County of San Diego will update its JRMP to describe its programs to address agricultural water quality during the next fiscal year, as described in Section 7.5 of Appendix 2.	Section 2.4.1 Section 4.1 Appendix 5 Section 5.1.2.1.2 and Attachment 5B

* 2017-2018 reports were submitted via Federal Express on January 31, 2019 and were received by the San Diego Water Board on February 1, 2019.

Table 1-3 provides a summary of the report content and organization, and **Table 1-4** provides a list of Permit-required assessments and reporting provisions and identifies the report sections and appendices that address these assessment and reporting requirements. A detailed list of Permit provision descriptions related to WQIP Annual Reporting is included in **Appendix 1.**

Table 1-3. Report Content Overview and Organization

Section	Contents	Associated Appendix and Contents
1. Introduction	Introduces Permit, identifies Copermittees, major waterbodies, HPWQCs, WQIP and Annual Reporting requirements, and report organization.	**Appendix 1. Crosswalk of Permit Requirements and Annual Report References** • Table of all Permit provisions with descriptions and location in report and appendices.
2. Progress to Goals and Strategy Implementation	Provides assessment of progress toward numeric goals, with a focus on next goals to be achieved. The section also provides highlights of the key strategies implemented to meet the numeric goals, the status of implementation, and plans for the coming year. Detailed strategy implementation status tables are provided in **Appendix 2**. The goals and schedules from the WQIP are provided in **Appendix 3**.	**Appendix 2. Jurisdictional Runoff Management Program (JRMP) Information - organized by Copermittee** • Copermittee Legal Authority Certifications • Copermittee JRMP Annual Report Forms (Attachment D of Permit) including Fiscal Analyses • Responses to Over-irrigation Audit Letters • Revised Implementation Agreement • Modifications to JRMPs • Modifications to Riverside County Water Quality Management Plan (WQMP) or San Diego County Best Management Practices (BMP) Design Manual **Appendix 3. Water Quality Improvement Plan Numeric Goals - from WQIP**
3. Monitoring and Assessment	Summarizes the monitoring programs and provides an assessment of the data collected. WQIP Annual Report presents results for monitoring related to HPWQCs. Details provided in **Appendix 4**.	**Appendix 4. Monitoring Results and Assessments** Monitoring results for all programs and required assessments. Includes Attachments, which provide further details, data packages, and additional reports. **Attachments:** • Transitional Receiving Water Monitoring Data • Bight '18 Regional Monitoring Program Data • SMC Regional Monitoring Program Data • Rainbow Creek Nutrient TMDL Monitoring Report and Progress to Goals MS4 Outfall Monitoring Report • HMP Final Report and Data • Dry Weather Field Screening Data • Dry Weather MS4 Outfall Assessment • Wet Weather MS4 Outfall Data • Wet Weather MS4 Outfall Assessment • Wet Weather MS4 Outfall Time-Series Plots • Special Study Reports and Workplans • CEDEN Data Submittals and Receipts • Monitoring Program GIS Files
4. Adaptive Management	Provides a summary of the drivers for adaptive management, WQIP elements for adaptive management, and current or proposed modifications as a result of information gathered or received during the reporting period. Details provided in **Appendix 5**.	**Appendix 5. Adaptive Management Modifications** • Detailed assessment of triggers for adaptive management and resulting adaptive management • Responses to the 2017-2018 WQIP Annual Report Review Letter • Summary regarding Rainbow Creek Nutrient TMDL Compliance Pathway Letter and links to report sections that address the letter • WQIP Updates **Attachments:** 2017-2018 WQIP Annual Review Letter, Tech Memo on Load Reductions for Rainbow Creek (support for Goals Update), WQIP Errata Sheets
5. Conclusions and Recommendations	Provides the conclusions and next steps based on the data collected and assessments conducted during implementation of the WQIP.	N/A
6. References	Includes references for main report and appendices in one master list.	N/A

Table 1-4. Permit WQIP Annual Reporting Provisions and Corresponding Annual Report Sections

Permit Provision	WQIP Annual Report Section					WQIP Annual Report Appendix			
	Section 1 – Introduction	Section 2 – Progress to Goals and Strategy Implementation	Section 3 – Monitoring	Section 4 – Adaptive Mgmt.	Section 5 – Conclusions	Appendix 2 – Jurisdictional Info.	Appendix 3 – Goals	Appendix 4 – Monitoring	Appendix 5 – Adaptive Mgmt.
Provision A									
A.4.a.(2)			✓	✓		✓		✓	✓
Provision B									
B.5.a.				✓				✓	✓
B.5.b.		✓	✓	✓		✓	✓	✓	✓
B.5.c.				✓					✓
Provision D									
D.1.e.(2)(c)			✓					✓	
D.2.b.(2)(iv)			✓					✓	
D.4.b.(1)(a)(ii)			✓					✓	
D.4.b.(1)(b)			✓	✓				✓	✓
D.4.b.(1)(c)			✓	✓				✓	✓
D.4.b.(2)(a)				✓					✓
D.4.b.(2)(b)			✓	✓				✓	✓
D.4.b.(2)(c)			✓	✓				✓	✓
D.4.b.(2)(d)								✓	
D.4.c.			✓					✓	
D.4.d.				✓					✓
D.4.d.(1)				✓					✓
D.4.d.(2)				✓					✓
D.4.d.(3)				✓					✓
Provision E									
E.1.b.						✓			
E.2.d.(4)			✓					✓	
E.8.c.						✓			
Provision F									
F.1.b.(6)				✓					✓
F.2.a.(2)				✓					✓
F.2.a.(3)				✓					✓
F.2.b.(1)				✓		✓			
F.2.b.(2)				✓		✓			
F.2.c.(1)(c)				✓					✓
F.3.b.(3)(a-f)		✓	✓	✓		✓		✓	✓
Attachment E									
Attachment E			✓					✓	

2.0 PROGRESS TO GOALS AND STRATEGY IMPLEMENTATION

The Copermittees implement WQIP strategies to improve water quality and assess specific water quality data and programmatic information in order to gauge progress toward achieving numeric goals for the HPWQCs. These assessments evaluate whether intended outcomes are being realized or adaptations of Copermittees' programs are necessary.

An alternative approach to a traditional TMDL is being developed to address eutrophic conditions in the SMR Estuary. The approach is based on a current State Water Resources Control Board (State Water Board) effort to develop an alternative approach to address biostimulatory substances, which takes into account site-specific factors that water quality objectives (WQOs), such as those outlined in the Water Quality Control Plan for the San Diego Basin (Basin Plan), do not. The final numeric targets of the TMDL Alternative for the SMR Estuary, from the Draft Staff Report[6] are summarized in **Table 2-1.**

Table 2-1. Numeric Targets for SMR Estuary based on TMDL Alternative

Metric	Primary Target	Secondary Target	Season
Surface Water Macroalgal Biomass	< 57 g dry weight/m^2	< 70 g dry weight/m^2	Winter Dry and Summer Dry
Water Column Dissolved Oxygen	Daily minima ≥ 5.0 mg/L	7-day average of daily minimum measurements ≥ 5.0 mg/L, 10 percent allowable exceedance	Winter Dry and Summer Dry
Benthic Community Condition Score	-	≤ 2.0 (Low Disturbance based on Sediment Quality Objectives [SQO] scale)	Winter Dry and Summer Dry

mg/L – milligrams per Liter; g dry weight/m2 – grams dry weight per square meter

In May 2019, the San Diego Water Board issued *California Regional Water Quality Control Board San Diego Region, Investigative Order No. R9-2019-0007, An Order Directing the Cities of Murrieta, Temecula, and Wildomar, the Counties of San Diego and Riverside, the Riverside Flood Control and Water Conservation District, and the United States Marine Corps Base Camp Pendleton to Design and Implement a Water Quality Improvement Monitoring and Assessment Program for Eutrophic Conditions in the Santa Margarita River Estuary and Watershed, California* (2019 Investigative Order) (San Diego Water Board, 2019). The numeric targets of the TMDL Alternative for the SMR Estuary from the Draft Staff Report were incorporated into the 2019 Investigative Order.

Numeric goals established in the WQIP were designed to show progress toward meeting the numeric targets in the Draft Staff Report for the SMR Estuary and the Rainbow Creek Nutrient TMDL as applicable. WQIP goals and schedules may be revised through the adaptive management process,

[6] California Regional Water Quality Control Board San Diego Region. Santa Margarita River Estuary, California Nutrients Total Maximum Daily Load Project Draft Staff Report (San Diego Water Board, 2018).

including updates needed to be consistent with the requirements for implementation of the TMDL Alternative. Numeric goals were set for each of the following Subwatershed areas (**Figure 1-1**):

1. Middle SMR Subwatershed
2. Lower SMR Subwatershed
3. Rainbow Creek

Each of the three Subwatershed areas has multiple pathways to demonstrate progress and/or achievement of goals. Any one of the pathways may be used for assessment purposes, and not all pathways have to be assessed. Pathways evaluated for this report generally depended on implementation of proposed strategies. The SMR WQIP was accepted in November 2018, and none of the goals outlined in the WQIP were due to be achieved during this reporting period. The interim and final numeric goals for the SMR WMA and the pathways that may be used to demonstrate compliance are provided in **Appendix 3.** The timelines to achieve the interim and final WQIP goals are shown in **Figure 2-1** for the Middle SMR Subwatershed, Lower SMR Subwatershed, and Rainbow Creek. The timeline also shows the implementation schedule for the 2019 Investigative Order. WQIP goals were established to be accomplished for each five-year period (shown in green), as required by Permit Provision B.3.a.(1)(b)(iii).

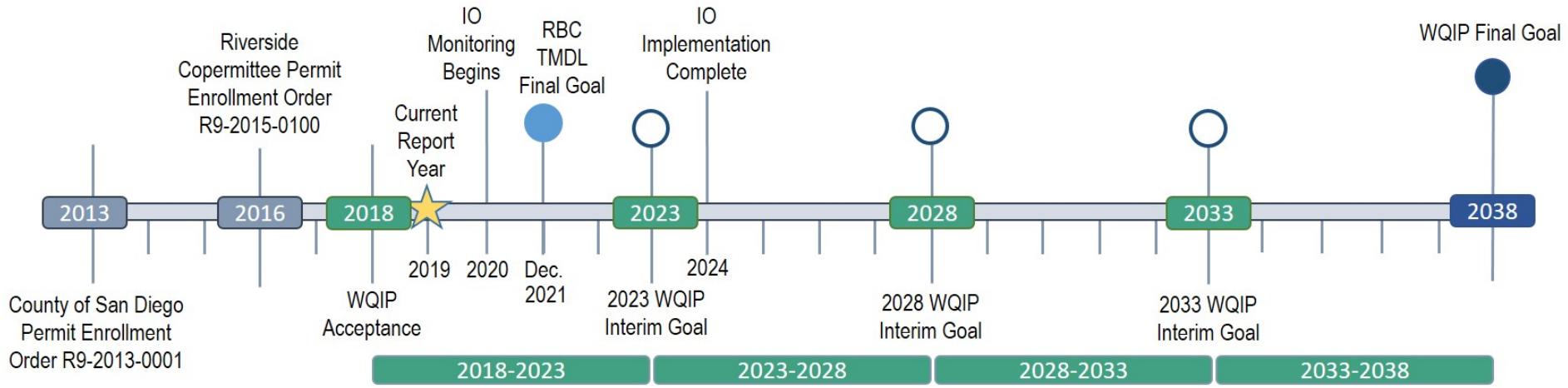


Figure 2-1. Timeline for Achievement of Middle and Lower SMR Subwatershed and Rainbow Creek Watershed Numeric Goals

Progress toward the selected pathways' numeric goals, and jurisdictional strategy implementation highlights are described by Subwatershed area in **Section 2.2** to **Section 2.4** in accordance with Provision F.3.b(3)(d). Tables that detail the implementation status of each strategy listed in the WQIP by Copermittee are provided in **Appendix 2**. Specific water quality data and programmatic information are assessed to gauge progress toward achieving numeric goals and to determine whether intended outcomes are being achieved. The monitoring results used to evaluate progress toward achieving goals for the HPWQCs are provided in **Section 3** and **Appendix 4**.

Copermittees evaluate progress made to determine if adaptations to programs are necessary. WQIP implementation in FY 2019 was limited to the period from November 27, 2018 to June 30, 2019, so data to evaluate progress is relatively limited. As more water quality monitoring data are collected in future years, pathways that are based on monitoring data may also be evaluated.

Progress toward the next goals for each of three Subwatershed areas is summarized in **Table 2-2**. The Middle and Lower SMR Subwatersheds' goals are applicable to dry weather conditions only. Dry weather is defined as non-storm days in both summer and winter; storm days have measured precipitation greater than 0.1 inch and include the 72 hours following the measured precipitation. Goals for the Rainbow Creek Nutrient TMDL include wet and dry conditions ("Annual"). **Table 2-4** through **Table 2-7** in the following sections list all the available pathways to meeting numeric goals, indicate which pathway or pathways are being used, and provide additional information about progress toward the selected pathways.

Table 2-2. Summary of Progress toward Achieving WQIP Goals

Subwatershed or Water Body	Applicable Regulatory Driver	Temporal Extent	Interim or Final Goal	Due Date	Selected Compliance Pathway	Status
Middle SMR Subwatershed[1]	SMR Estuary TMDL Alternative and WQIP	Dry Conditions	Interim	FY 2023	WQIP Implementation through strategies in the JRMPs (Pathway 6); see **Table 2-4.**	**Met - Strategies proposed in the WQIP were implemented.**
Lower SMR Subwatershed[2]	SMR Estuary TMDL Alternative and WQIP	Dry Conditions	Interim	FY 2023	Reduce the baseline aggregate flow volume by 25% (Pathway 1); see **Table 2-5.**	**In progress**
					Turf replacement in Rainbow Park (Pathway 1); see **Table 2-5.**	**Met -** Project completed (1.7 acres of grass replaced with artificial turf)
Rainbow Creek[2]	Rainbow Creek Nutrient TMDL	Year Round	Final	December 31, 2021 (TMDL Final Goal)	Load reduction of total nitrogen and total phosphorus for commercial, nurseries, parks, residential areas, and urban areas (Pathway 5); see **Table 2-7** and **Attachment 5B** to **Appendix 5**.	**In progress**

[1] Copermittees responsible are County of Riverside, Riverside County Flood Control and Water Conservation District, City of Murrieta, City of Temecula, and City of Wildomar.

[2] Copermittee responsible is County of San Diego.

The strategies being implemented by the Copermittees generate improvements in water quality to achieve the numeric goals and to address the HPWQCs and other priority pollutants. Chosen strategies were identified and selected based on their likelihood of achieving one or more of several of the following outcomes:

- Effectively prohibiting non-stormwater discharges to the MS4 (dry weather);
- Reducing pollutants in stormwater discharges from the MS4 to the maximum extent practicable (wet weather); and/or
- Protecting beneficial uses of receiving waters from discharges from the MS4.

Key strategy implementation highlights are provided in this section to demonstrate progress to goals. Copermittees are implementing BMPs to target various sources of pollutants, including dry weather sources of flow and nutrients. These include both baseline JRMP program strategies and enhancements from what is required as part of the JRMPs. The full list of strategies identified in the WQIP for implementation by each Copermittee are provided in **Appendix 2**, with implementation status (i.e.,

active implementation, planned, or not triggered) and progress (i.e., fully implemented, partially implemented, or not implemented), and if planned for FY 2020, where applicable.

2.1 WATERSHED STRATEGIES

The Copermittees of the WMA are actively participating in the Santa Margarita River Nutrient Initiative Group (SMRNIG), composed of a broad range of stakeholders with diverse interests, which was formed in 2012 to address nutrient issues in the SMR Watershed. The Stakeholder Group (SAG), with support from a Technical Advisory Committee (TAC), is working through a collaborative, inclusive, and regional process, using state of the science techniques, to develop regulatory targets and monitoring programs, and to recommend management approaches to ensure that the biological, chemical, and physical integrity of the SMR and its tributaries are protected. Phases I and II of technical work (conducted from 2011-2018) and led by the Southern California Coastal Water Research Project (SCCWRP), developed models to apply a Nutrient Numeric Endpoint methodology to evaluate nutrient impacts to the Estuary, collected comparable data for nutrient loading and transport processes, and developed regulatory targets for the Estuary.

During the 2018-2019 reporting year, the SMRNIG held quarterly meetings. The meeting schedule during the reporting period is shown in **Table 2-3**. The District began supporting and coordinating TAC and SAG meetings in the fall of 2019.

Table 2-3 SMRNIG Meetings held during FY 2019

Date	TAC	SAG	Location
Oct 24, 2018	Yes	Yes	Temecula City Hall
Jan 23, 2019	No	Yes	Temecula City Hall
Apr 24, 2019	Yes	Yes	Temecula City Hall
Jun 26, 2019	Yes	Yes	SCCWRP Costa Mesa

In early 2019, the group initiated Phase III of the technical work, which extends the efforts conducted for the Estuary in Phases I and II to explore a range of biostimulatory targets that are protective of beneficial uses in the SMR main stem under the present climate conditions and under climate change and/or extreme climate scenarios. Phase III will also identify potential restoration actions to improve biointegrity and reduce eutrophication, and will calculate load and waste load allocations required to meet the proposed biostimulatory targets. The technical work in Phase III is being funded by the San Diego Water Board.

The work of the SMRNIG provided foundational information used by the San Diego Water Board in developing the Draft Staff Report and the 2019 Investigative Order for the SMR Estuary. The District coordinated with the San Diego Water Board to hold a Public Workshop for the draft Investigative Order on October 24, 2018 at the City of Temecula. Thereafter, the District has provided a facilitator and coordinated TAC and SAG meetings with the San Diego Water Board and the science team being led by SCCWRP. Watershed Copermittees together with U.S. Marine Corps Base Camp Pendleton developed a Workplan and Quality Assurance Project Plan (QAPP), as required by the 2019

Investigative Order. The SMRNIG meetings provided opportunity for input by the TAC during development of the Workplan and QAPP.

2.2 MIDDLE SMR SUBWATERSHED

The Riverside County Copermittees are the responsible agencies for the numeric goals in the Middle SMR Subwatershed. Progress toward goals and strategies, which the Copermittees are implementing or planning in order to achieve these goals, are described in the following subsections.

2.2.1 Middle SMR Subwatershed Progress to Goals

Progress toward achieving interim goals for the Middle SMR Subwatershed is presented in **Table 2-4**, which includes six different compliance pathways. Each Copermittee in the Middle SMR Subwatershed has the option of demonstrating the goal has been achieved through any one of the six pathways. The pathways are presented sequentially and separated by "OR" to indicate that the goal can be achieved through any one of the six pathways.

Table 2-4. Progress toward Interim Eutrophication Impacts and Nutrient Loading Numeric Goals, Middle SMR Subwatershed (Riverside County Copermittees)

Path-way	Interim Goal	Metric	Baseline	Goal Due Date	Goal Status
1 OR	*10% load reduction in dry weather loadings in receiving waters: TN: 993 lb/yr TP: 99 lb/yr*	*Assessment of loadings in the Santa Margarita River (receiving water) at the base of the Middle SMR Subwatershed*	*TN: 60,796 lb/yr TP: 6,004 lb/yr*	*FY 2023*	*Compliance pathway under evaluation*
2 OR	*Numeric interim and final goals to be determined based on outcome of TMDL Alternative for the Santa Margarita River. Numeric targets listed in **Table 2-1** (refer to Appendix 3)*	*Assessment of receiving water conditions in the Santa Margarita Estuary*	*Not yet determined*	*Not yet determined*	*Compliance pathway under evaluation*
3 OR	*10% reduction in non-stormwater flows within agency control*[1]	*Assessment of load reductions from implementation actions (based on outfall monitoring or other assessment metrics)*	*Not yet determined*	*FY 2023*	*Compliance pathway under evaluation*
4 OR	*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, TP39 Riverside County: TN 286, TP 28*	*Assessment of load reductions from implementation actions (based on outfall monitoring or other assessment metrics)*	*See Pathway 1*	*FY 2023*	*Compliance pathway under evaluation*
5 OR	*Assess progress toward achieving final goal (using other pathways)*	*Source investigations*	*Not yet determined*	*Not yet determined*	*Compliance pathway under evaluation*
6	The Copermittees develop and implement the jurisdictional strategies as described in the accepted WQIP	Implementation of JRMP, enhanced JRMP strategies, optional jurisdictional strategies, or optional WMA strategies, as triggered through an iterative, adaptive management approach	N/A	FY 2023	**Met for FY 2019** Strategies proposed in the WQIP were implemented. See **Appendix 2** for details.

[1] 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. 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.

2.2.2 Middle SMR Subwatershed Strategy Implementation and Planning

Highlights of strategies implemented by the Riverside County Copermittees across the region are presented below, followed by highlights of individual Copermittee strategy implementation and planning in accordance with Provision F.3.b(3)(d)(ii) and (iii). The highlights include both strategies that were implemented and strategies for which planning occurred during the reporting period. The status of each strategy listed in the WQIP is provided in **Appendix 2**, including whether it was implemented during the reporting period, whether it is planned to be implemented in the next reporting period, and whether any modifications are proposed.

2.2.2.1 Riverside Copermittee Programs

Regional Education and Outreach Program

Five-Year Strategic Plan

The Riverside County Watershed Protection Program recently completed a Five-Year Public Education and Outreach Strategic Plan. This plan will be available on the District's stormwater webpage by Summer 2020. The purpose of this plan was to develop strategies to advance the County-wide Education and Outreach Program by creating a roadmap that could guide the Copermittees in implementing these strategies uniformly across each jurisdiction. To this end, the Copermittees developed goals that could then be readily applied. These goals included complying with the educational requirements of the Permit, engaging with the community to foster a commitment to improve water quality, implementing measures to further modify residential behavior toward dry-weather flows, engaging residents in litter-reduction campaigns, etc. This plan also included numeric objectives necessary to reach these goals by the end of the five-year implementation period. These objectives focus on optimizing the number of school presentations (Kindergarten through 8th grades) to students and increasing the number of social media followers, email subscribers, and public impressions currently garnered by the public. During FY 2019, the Copermittees were still in the process of detailing the data collection process in support of the new goals. As a result, numeric updates are not included in this current annual report but are anticipated to be available in future annual reports.

During FY 2019, outreach to school-age children was conducted county-wide. In the SMR WMA, 19 presentations at six schools reached 685 students. For kindergarten to grade 6, the outreach program consisted of a presentation and supplemental handouts focused on key pollution prevention activities that children and their families can implement at home. Students pledged to become Watershed Warriors to protect their local environment and received Watershed Warrior certificates. For students in grades 7 and 8, the presentation focused on key pollution prevention issues and solutions that students can take to address the issues in their school and community, and students gathered in groups to brainstorm preventative solutions for challenges facing pollution prevention.

Public Education Strategic Taskforce (PEST) Committee

PEST is a technical committee consisting of representatives from each watershed group in Riverside County. It was established following the completion of the Five-Year Public Education and Outreach Strategic Plan to enable its implementation as well as to enable the continued implementation of the regional public education activities common to, shared, and funded by all three watershed groups.

Overwatering Webpage

During this reporting period, the Riverside County Watershed Protection Program launched an over-watering webpage (https://www.rcwatershed.org/overwatering/). This page (**Figure 2-2**) contains beneficial information about how to recognize and prevent over-irrigation, short videos, links to water districts and the District's reporting form, and contact number to report illegal discharges.

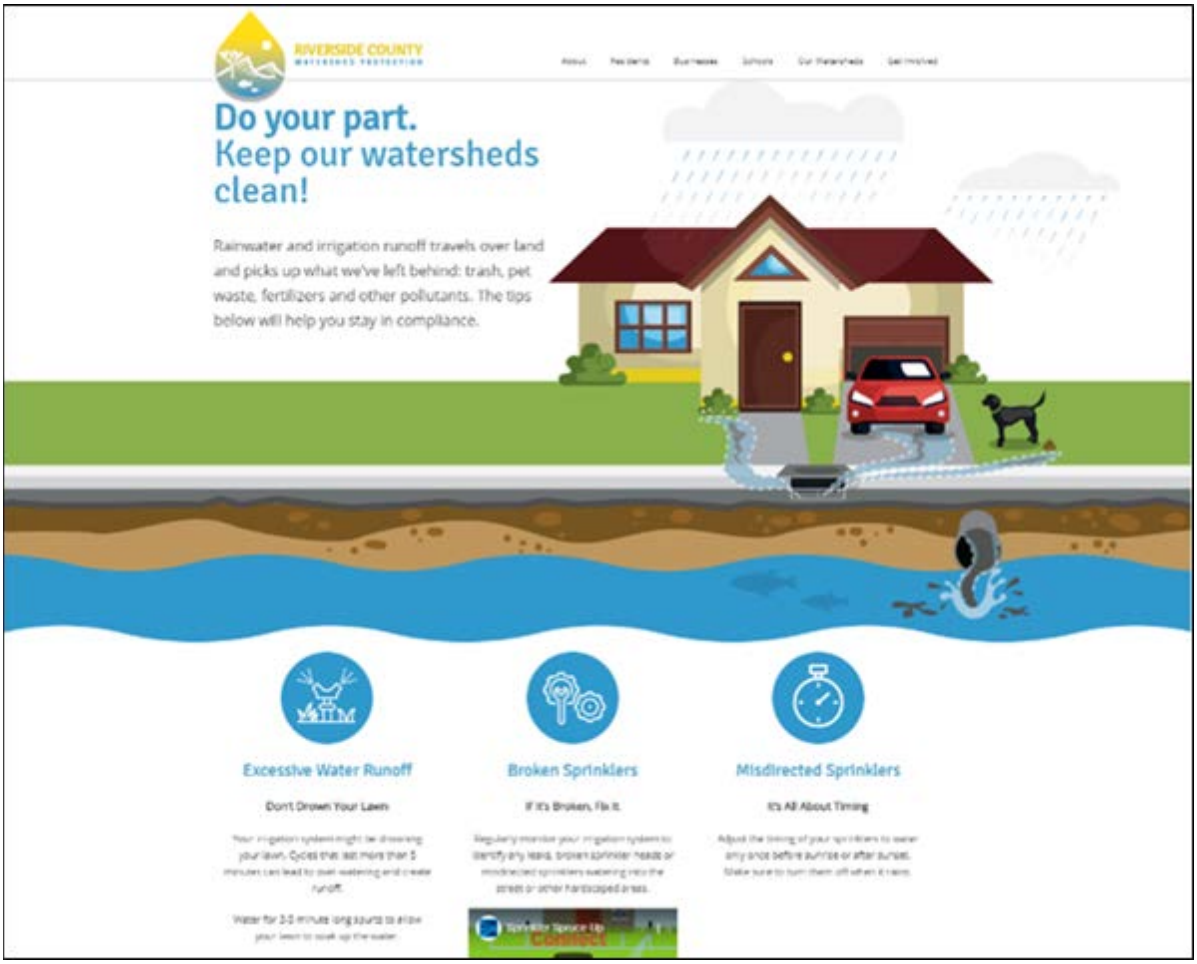


Figure 2-2. Riverside County Watershed Protection Program's Overwatering Webpage

Overwatering Doorhanger

A doorhanger (**Figure 2-3**) was created to work in conjunction with the over-watering webpage. This doorhanger has multiple uses. It was designed to be used throughout residential and business communities to supplement the various educational brochures and hand-outs currently provided by Copermittees, or it can be used as an enforcement tool to identify violations and require immediate attention by the recipient. The door hanger is distributed as an educational material with all enforcement actions.

Figure 2-3. Over-irrigation Educational Door Hanger

Business Outreach

During 2019, outreach to businesses with professional landscape designers and architects in the SMR WMA was also conducted which focused on urban runoff. Efforts included developing a guide for landscape professionals, digital and limited print assets, and a database for landscape professionals, as well as conducting telephone-based outreach to landscape professionals.

During FY 2020, implementation of the work plan will include:

- Revise and update the school education program.
- Review and update business outreach focusing on home improvement and pet stores.
- Update website with a focus on over-irrigation.

Digital News and Social Media

Monthly digital newsletters featured compelling articles to engage citizens and stakeholders, promote watershed protection, encourage pollution prevention, and modify behavior. These newsletters also guided visitors to the Watershed Protection website and associated social media sites.

Earth Day 2019 Social Media Contest

This contest was developed in support of Earth Day to encourage Riverside County residents to share how they protect their environment. This contest was posted on social media () and further boosted with paid advertising to reach as many audiences as possible. To enter the contest, participants were required to like the post, tag at least two friends, and follow the page. Three entries were then chosen to win a hydro flask.

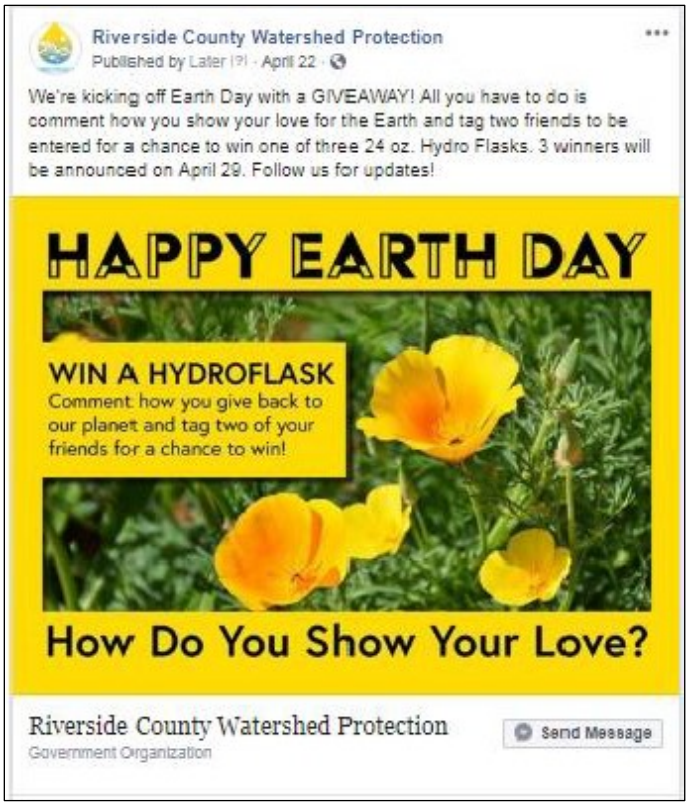


Figure 2-4. Earth Day Contest Social Media Post

Award

The Riverside County Watershed Protection Program was honored to receive a Capella Award of Distinction (**Figure 2-5**) for its social media campaign of the Earth Day Contest.

Figure 2-5. Capella Award

Upper Santa Margarita River Watershed Storm Water Resource Plan (USRW SWRP)[7]

The 2019 Upper Santa Margarita River Watershed Storm Water Resource Plan (USMRW SWRP) is an integrated plan that focuses on regional watershed-based stormwater priorities and on developing projects with multiple benefits in the Riverside County portion of the SMR WMA. The purpose of the SWRP is to guide development, facilitate implementation, and improve funding eligibility of stormwater projects that will provide benefits such as improved water quality, augmented water supply, and reduced flood risk. The SWRP also acts as a vehicle for agency collaboration to allow development of regional stormwater and dry weather runoff solutions. The SWRP was developed out of previous cooperative water management planning efforts in the Planning Area, which is also covered by the SMR WQIP. The SWRP works closely with the WQIP as well as the Upper Santa Margarita Watershed Integrated Regional Water Management Plan (IRWMP).

This SWRP has been constructed as a functionally equivalent SWRP that meets the 2015 Guidelines requirements released by the State Water Resources Control Board (State Water Board) by referencing existing documents where possible, and including new SWRP-specific information for items that are not covered by existing documents. In December 2019, the SWRP was submitted to the State Water Board to verify concurrence with the California Water Code and State Water Board's SWRP Guidelines, which would allow eligible entities within the region with projects in the SWRP to compete for grant funds through all chapters of Proposition 1.

Illicit Discharge Detection and Elimination (IDDE) and Major MS4 Outfall Monitoring

The Riverside County Copermittees implement programs to identify and eliminate prohibited discharges. The Copermittees also monitor major MS4 outfalls during dry weather, which can help identify prohibited discharges. Reducing prohibited non-stormwater discharges is expected to be an important contributor to meeting TMDL Alternative goals.

[7] The Upper SMR Watershed area described by the USRW SWRP is Riverside County portion of the WMA and includes the Middle SMR Subwatershed defined in the WQIP.

Dry weather major MS4 outfall monitoring from 2018-2019 shows that most outfalls either have no flow (includes ponded sites) or have flow rates that are too small to measure (referred to as "trickle" flow in the monitoring data). As shown in **Figure 2-6**, less than 20 of the almost 200 outfalls at which flow data was collected in 2018-2019 had measurable flow.

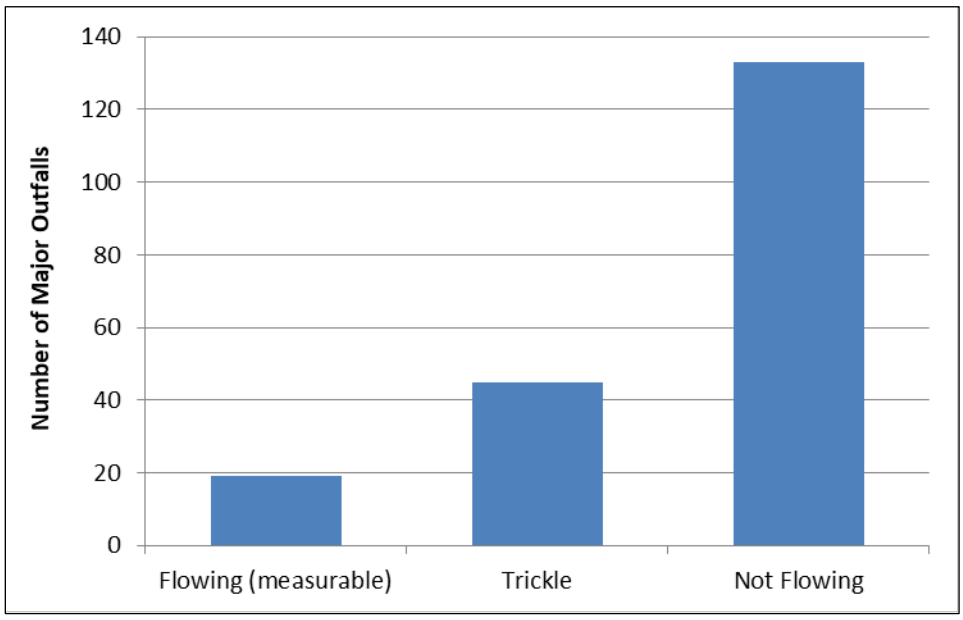


Figure 2-6. 2018-2019 Riverside Copermittee Major Outfall Flow Status

Alternative Compliance Credit Trading Program Guidance

In November 2018, the Western Riverside Council of Governments (WRCOG), in collaboration with the Riverside County Copermittees, completed a draft manual for an Alternative Compliance Water Quality Credit System as described in Provision II.E.3.c(3)(e). WRCOG developed this guidance as a means of maintaining and managing a record of credits generated and used under the Permit's Alternative Compliance provisions, which allow for the off-site treatment of development-related stormwater runoff using "credits" created by supplemental treatment and control on other sites. This program would create a regional credit bank that facilitates the generation, management, and proper use of Alternative Compliance credits. Credits would be developed for project BMPs using the accepted Water Quality Equivalency Guidance that was developed by the County of San Diego. The draft guidance is currently under internal review and the Riverside County Copermittees expect to begin discussions regarding the guidance with San Diego Water Board staff in 2020. The Water Quality Credit System requires review and approval of the Executive Officer, and, if approved, would be incorporated into the WQIP in a future update.

2.2.2.2 County of Riverside

During FY 2019, the County of Riverside implemented strategies described in the WQIP, and implementation status is provided by strategy in **Section 5.3** of **Appendix 2**. Highlights of strategies implemented by the County to address the eutrophication and nutrient HPWQC are summarized as follows.

Eliminating Illicit Discharges and Illegal Connections

The County of Riverside has mapped MS4 facilities and is monitoring high priority areas known for illicit discharges and illegal connections. A reporting process, which includes providing educational materials to residents, is in place. Staff training on IC/ID elimination and reporting was conducted in FY 2019.

Warm Springs Creek Integrated Mitigation Project

This project will result in the creation of over 1,500 linear feet of new intermittent channel and seasonal wetlands. The project will preserve, restore and enhance the existing un-named creek tributary to Warm Springs Creek, ephemeral drainages, and associated wetland habitats. The 100% design was completed in FY 2019 (**Figure 2-7**) and construction is planned to begin in FY 2020.

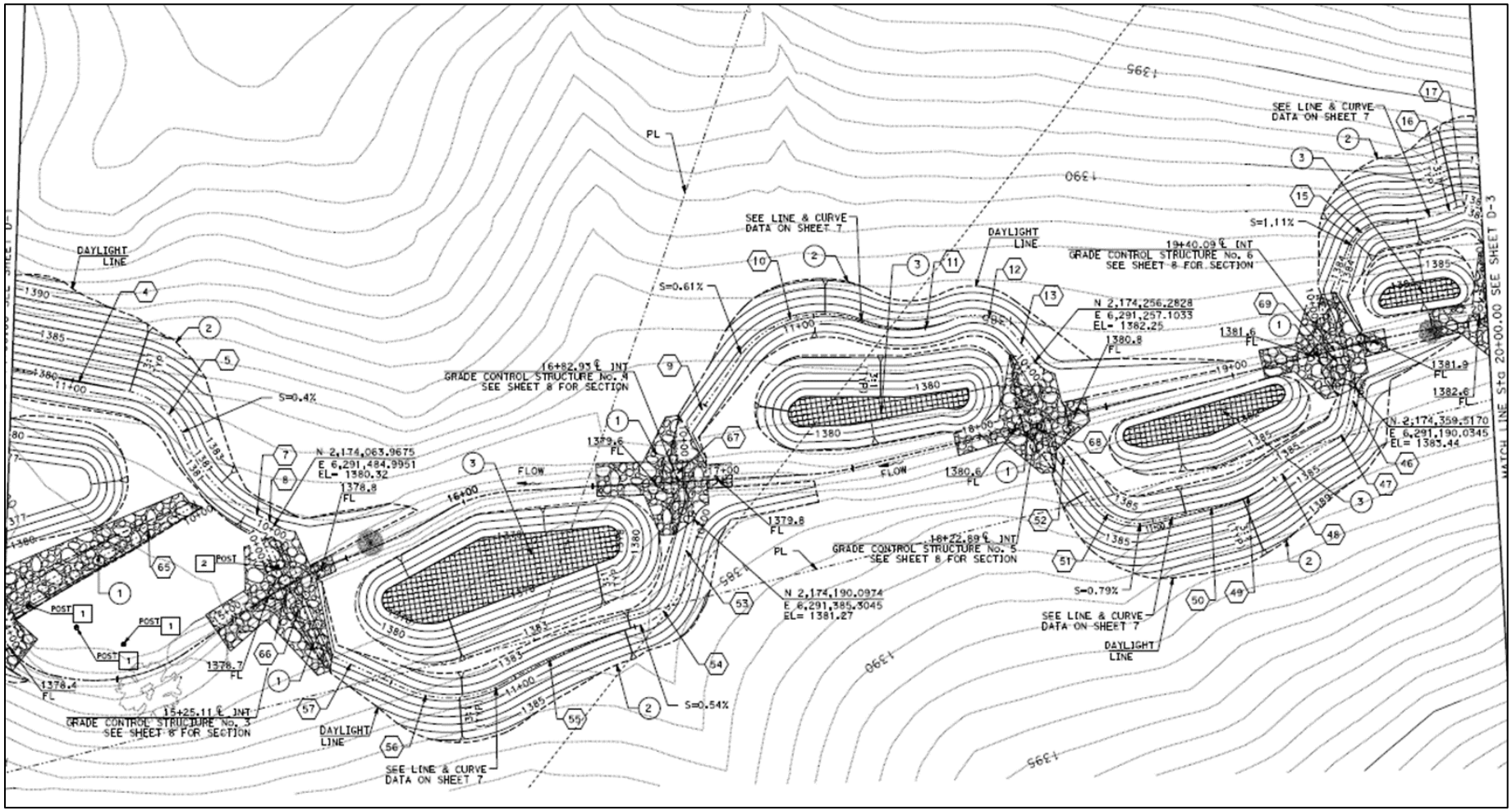


Figure 2-7. Portion of Completed Plans for Warm Springs Creek Integrated Mitigated Project

Facilitating Public Reporting

The public can report pollutant issues with the County's "RivCo" mobile application (app) (**Figure 2-8**). The app includes options to report illegal dumping and necessary maintenance to storm drains. Service requests can also be submitted on the County of Riverside's website.

Figure 2-8. RivCo Mobile App

2.2.2.3 Riverside County Flood Control and Water Conservation District

During FY 2019, the District implemented the strategies described in the WQIP, and implementation status is provided by strategy in **Section 6.3** of **Appendix 2**. Highlights of strategies implemented by the District to address the eutrophication and nutrient HPWQC are summarized as follows.

Public Reporting of ICIDs

The District operated a County-wide hotline number and two weblinks for public reporting. One weblink was dedicated to reporting ICIDs (**Figure 2-9**), and the other is dedicated to non-ICID stormwater items such as clogged storm drains and illegal dumping (**Figure 2-10**).

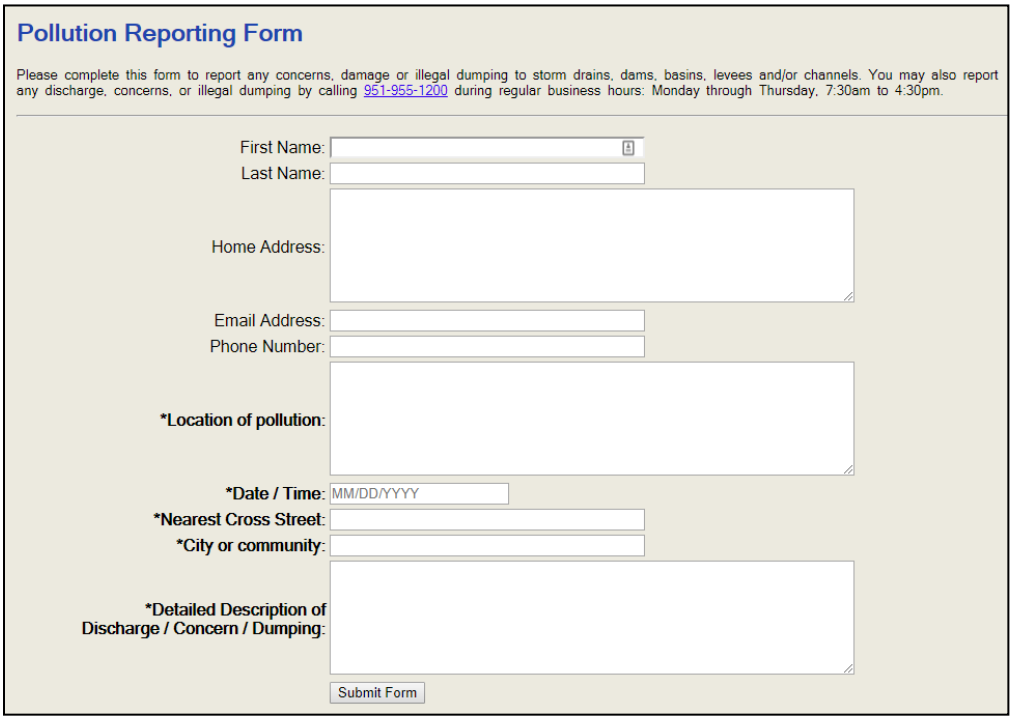


Figure 2-9. Webpage for Reporting ICIDs

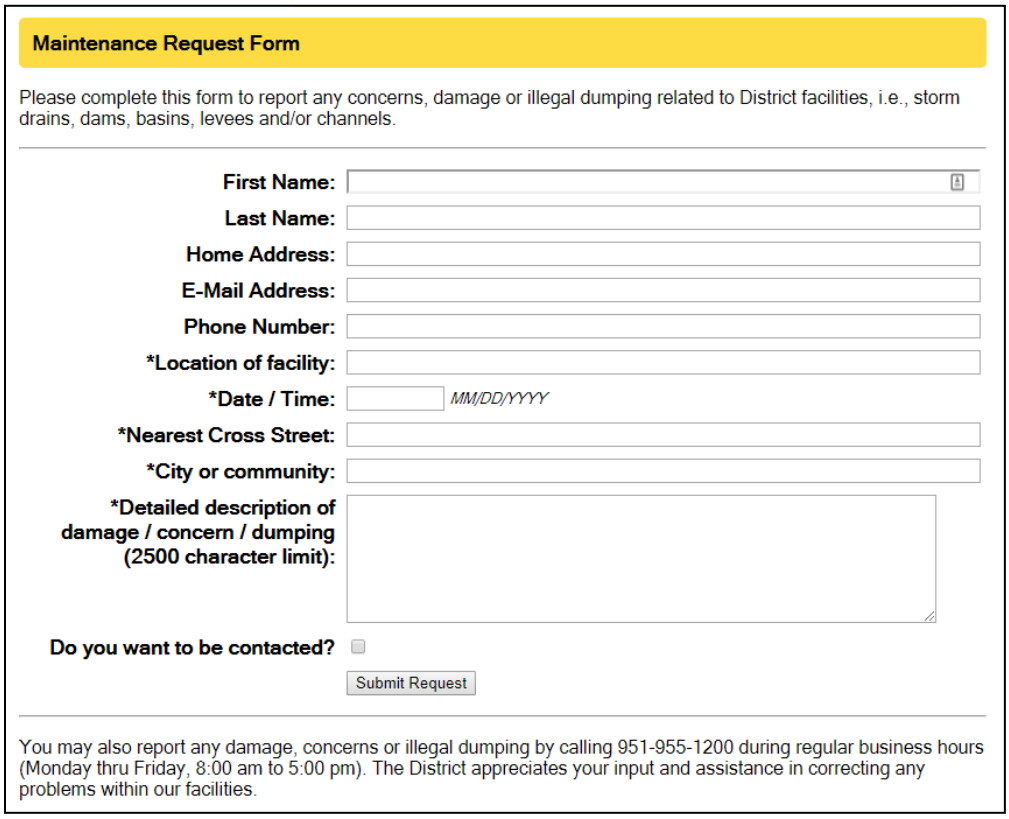


Figure 2-10. Webpage for Reporting Non-ICID Stormwater Items

Inspection of District Outfalls

During FY 2019, the District field screened 100% (82 outfalls) of its major outfall inventory in early spring, then screened 95% (78 outfalls) a second time in early summer, and in a third round screened 46 outfalls known to be accessible and not dry (i.e. flowing, trickle flow, or ponded) in late summer. Accessible major outfalls with water presence will continue to be prioritized for additional field screenings in dry weather as a targeted approach to flow source tracking.

During these field screenings, the District's monitoring staff informed the District's IDDE inspector of any non-stormwater discharges observed, confirmed outfall station location, and flow status (i.e. flowing, trickle flow or ponded conditions). For outfalls with measureable dry weather flow, the District's IDDE inspector conducted follow-up investigations as soon as possible by tracing flows into the upstream drainage area to identify sources, and contacts the respective Copermittee to report the discharge. The District logs and tracks these observed or reported discharges for future reference and follow-up. This process is described in the IDDE Response Guidance in the District's JRMP. All identified dischargers were notified of the discharge prohibitions and provided with educational materials to assist in correcting the condition causing the discharge. It is anticipated that many of these discharges can be eliminated over the next Permit term.

Transient Area Clean-up

A transient encampment area cleanup was conducted at Santa Gertrudis Valley Tucalota Creek at Willows Avenue. The amount of trash cleaned up was 2.52 tons.

"Science Day" Public Outreach

The Riverside County Watershed Protection Division has partnered with the Santa Margarita Group of the Sierra Club and the San Diego State University Field Station Program to create the Santa Margarita Ecological Reserve Science Day. This biannual workshop focuses on educating elementary and high school students about their own watershed and the impact an individual can make to the environment. On both November 18, 2018 and May 18, 2019 approximately 30 students visited the Santa Margarita Ecological Reserve to learn about water quality from environmental professionals in a variety of fields including flood control planners, water district engineers, and staff from both the Sierra Club and AmeriCorps (**Figure 2-11**). Students had the opportunity to collect water samples from the SMR and conduct a variety of colorimetric analyses including dissolved oxygen, total alkalinity, nitrate, turbidity, pH, and phosphate. Results were compared within the group with discussions of what the results could tell them about the water quality. For example, high nitrate and phosphate results could lead to algae growth and eutrophication issues. Emphasis was put on what they can do at home to improve the overall health of their watershed including limiting fertilizers and pesticides, eliminating overwatering activities to reduce dry weather flows and, keeping trash out of the waterways.

Figure 2-11. Science Day

Regional Detention Basin

The District is planning on installing a regional detention basin in the City of Wildomar (**Figure 2-12**). This project is included in the USRW SWRP described in **Section 2.2.2.1**. The basin will be 19.1-acres in size with flow-through infiltration functions and a multi-benefit park. The basin footprint is intended to be the hydrologic low-point for a 2,310-acre tributary watershed of open space, low to medium density residential, and some commercial land uses. The project charter specifies that it will support 100-year storm events and have a storage capacity of 143.6 ac-ft, with a peak inflow of 2,400 cfs and a peak outflow of 1,080 cfs with the potential to infiltrate 33 acre-feet per year.

Figure 2-12. Wildomar Regional Detention Basin Project Area
Approximate project location is circled in yellow

Basin Infiltration Feasibility Testing

Beginning in 2016, the District conducted a geotechnical analysis of seven District-owned basins to determine if efficient recharge of retained storm water into the basins is feasible, and if so, to provide preliminary basin-specific infiltration rates based on measured soil/bedrock permeability. Three of the tested basins were in the SMR WMA: the Murrieta Creek Channel Basin, the Murrieta Valley I-215 Retention Basin, and the Browning Street Storm Drain Outlet Basin. The study included:

- Review of published and unpublished literature and maps
- A geologic field reconnaissance of each site and surrounding areas
- Logging and sampling of exploratory borings for testing and evaluation at each site
- Laboratory testing on selected samples
- Deep and shallow infiltration testing and/or double-ring infiltrometer testing at each site

The final map product for this work was completed in September 2018, and serves to support ongoing watershed planning efforts.

2.2.2.4 City of Murrieta

During FY 2019, the City of Murrieta implemented the strategies described in the WQIP, and implementation status by strategy is provided in **Section 2.3** of **Appendix 2**. Highlights of strategies implemented by the City to address the eutrophication and nutrient HPWQC are summarized below. Most of the City's strategies were not due to begin in FY 2019. The City will be initiating several additional strategies to address the HPWQC in the coming years, as described in the WQIP.

Enhanced Municipal Training Programs

Field staff attended enhanced municipal training programs developed and put on by the District in FY 2019. The program focused on the WQIPs, HPWQCs, elimination of illicit discharges, and elimination of dry weather flow. Training programs will continue in FY 2020.

Enhanced Commercial and Training Programs

Inspection staff attended enhanced commercial and industrial training developed and put on by the District in FY 2019. Programs focused on the WQIP, HPWQC, and specific nutrient issues at commercial and industrial businesses. Inspection staff will continue attending the training program in FY 2020.

Data Management

In FY 2019, the City began assessing its current data management. Through FY 2020, the City will be researching data management systems to facilitate tracking and recording of facilities and related inspections.

2.2.2.5 City of Temecula

During FY 2019, the City of Temecula implemented the strategies described in the WQIP. Implementation status is provided by strategy in **Section 3.3** of **Appendix 2**. Two highlighted strategies implemented by the City to address the eutrophication and nutrient loading HPWQCs are summarized below.

Alternative Compliance Program

The City of Temecula has developed and begun implementing an alternative compliance program for development projects. The City generates credits, which are then used for City projects or private projects. When a private project uses credits generated by the City, the private project owner pays the City a one time in-lieu fee to compensate the City for the capital and long-term operation and maintenance costs of the BMP. Due to safety factors built into the Water Quality Equivalency process used to calculate credits, use of alternative compliance provides additional water quality benefits compared to standard onsite compliance, including additional reductions of nutrients, a HPWQC in the SMR WMA.

Examples of projects the City has completed to generate credits include land restoration and installing higher efficiency proprietary BMPs to control trash.

Land Restoration

Land restoration is generally completed on land that was formerly agricultural, which has been identified as a potential source of nutrients, the HPWQC for the portion of the WMA in which the City of Temecula is located. Land restoration involves installing mulch over bare ground to reduce runoff and erosion, installing rock in flow paths to prevent erosion, and filling in previously eroded areas to reduce the potential for future erosion. These mechanisms reduce erosion, runoff, and discharge of nutrients from previously agricultural areas. In one land restoration project the City completed, the area where mulch was applied was historically agricultural and currently is used as an equestrian trail next to a street. The City's land restoration activities in this area therefore likely reduced not only nutrients but also bacteria. A YouTube video of the site before and after land restoration was completed can be viewed at https://www.youtube.com/watch?v=blOf3ZGUCik&feature=youtu.be. Screen captures from the video showing before and after conditions in one part of the project are provided in **Figure 2-13**.

Figure 2-13. Photos from Before and After a City of Temecula Land Restoration Project

Higher Efficiency BMPs for Trash Amendments Compliance

The City is also installing higher efficiency media filtration type devices as part of its approach to complying with the State Trash Amendments.[8] Typical BMPs installed only to meet Trash Amendments requirements consist mainly of screens with openings of about 5 millimeters. These devices are effective at removing trash but generally are not as effective at removing other pollutants.

The City of Temecula has begun installing media filtration devices in storm drain inlets at which trash controls would need to be installed to meet Trash Amendments requirements. Media filters provide treatment for other pollutants in addition to trash, including nutrients. For example, the City has installed Bio Clean Kraken media filters (https://biocleanenvironmental.com/kraken-filter/), which have Washington State Department of Ecology Technology Acceptance Protocol-Ecology (TAPE) certification for phosphorus and total suspended solids treatment. TAPE certification is a nationally recognized standard and is cited in BMP Design Manuals in the San Diego region.

[8] Amendment to the Water Quality Control Plan for Ocean Waters of California to Control Trash (Ocean Plan) and Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, And Estuaries of California (ISWEBE Plan) adopted by the State Water Board on April 7, 2015.

Because of this additional treatment beyond what basic trash controls would provide, the City is able to generate alternative compliance credits that it can use for its own capital improvement projects or that it can sell to private developers. This provides both additional water quality benefits relative to installing only the basic trash controls needed to meet Trash Amendments requirements and a funding source to pay for BMP installation and maintenance needed to comply with the Trash Amendments, which has no designated funding source.

The City owns and operates all BMPs or other practices used to generate alternative compliance credits and maintains them as needed. City ownership and maintenance of BMPs that generate credits provides assurance that the BMPs will continue to be maintained and provide the anticipated water quality benefits on which the credits are based. Credits generated and/or used for projects are documents in project-specific Water Quality Management Plans, as applicable. The City also maintains a master tracking spreadsheet of credits generated and sold.

Response to Irrigation Runoff Prohibition Audit

In February of 2019, the City received an audit from the San Diego Water Board that focused on the City's legal authority to prohibit discharges to its MS4 from irrigation runoff and the City's education, outreach, public reporting mechanisms related to the prohibition of irrigation runoff. The City submitted a detailed response to the San Diego Water Board in September 2019. Some of the actions the City described in its response letter are highlighted below. The City of Temecula recognizes the importance of addressing dry weather flows as part of its suite of strategies to address the HPWQC and is taking action accordingly.

Ordinance Update

Ordinances are being updated to reflect current illicit discharge and connections requirements and strategies to reduce non-stormwater discharges to the MS4. The revisions focus on clarifying the prohibition of irrigation runoff. Revised ordinances have been drafted and approved by City Council, and implementation is expected for FY 2020.

Public Education and Outreach

In FY 2019, the City updated its website, app, and outreach materials to ensure the irrigation runoff discharge prohibition is clearly identified for the public and that a clear mechanism for reporting observed irrigation runoff discharges is available to members of the public.

The City revised its website on March 12, 2019. Draft changes were submitted to the San Diego Water Board for review prior to publishing the revisions. The City's website also contains an online complaint form and hotline phone number to report illegal discharges. **Figure 2-14** shows screenshots from the City's updated website.

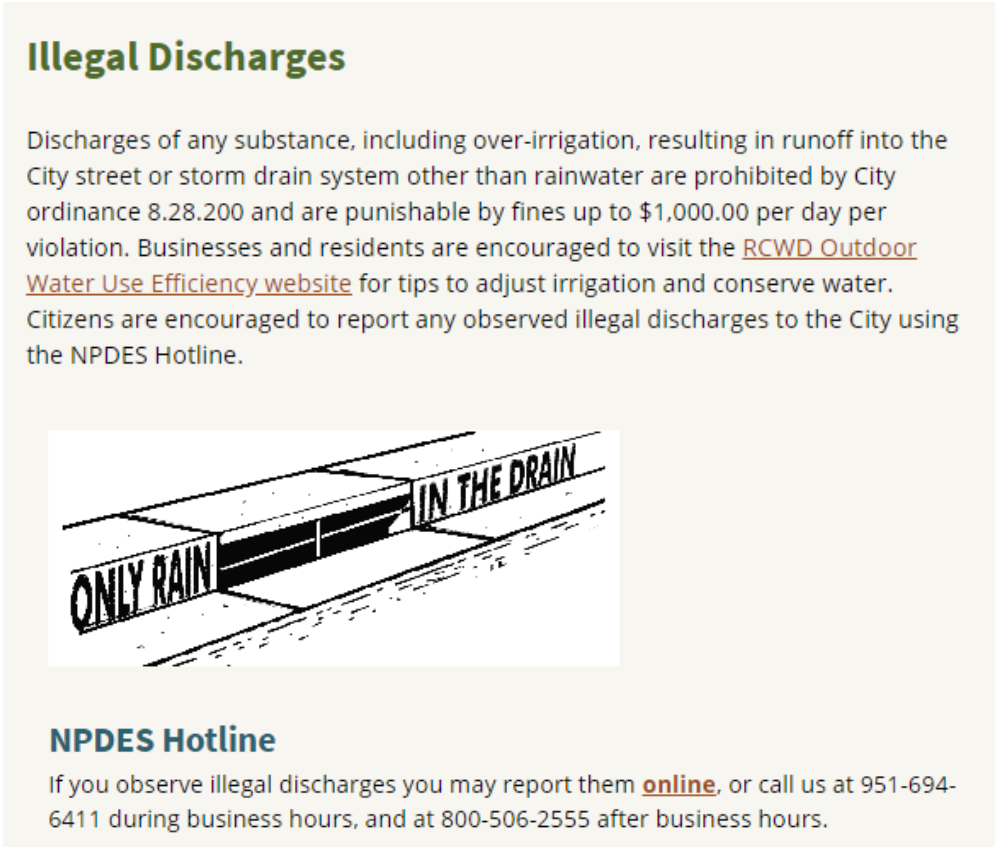


Figure 2-14. Updates to City Website Regarding the Prohibition of Over-irrigation

Residents can also report illegal discharges, including irrigation runoff, through the City Mobile Application (**Figure 2-15**). Water waste reported through the app is directed to Rancho California Municipal Water District. The City actively partners with the Rancho California Municipal Water District to enforce its irrigation runoff discharge prohibitions.

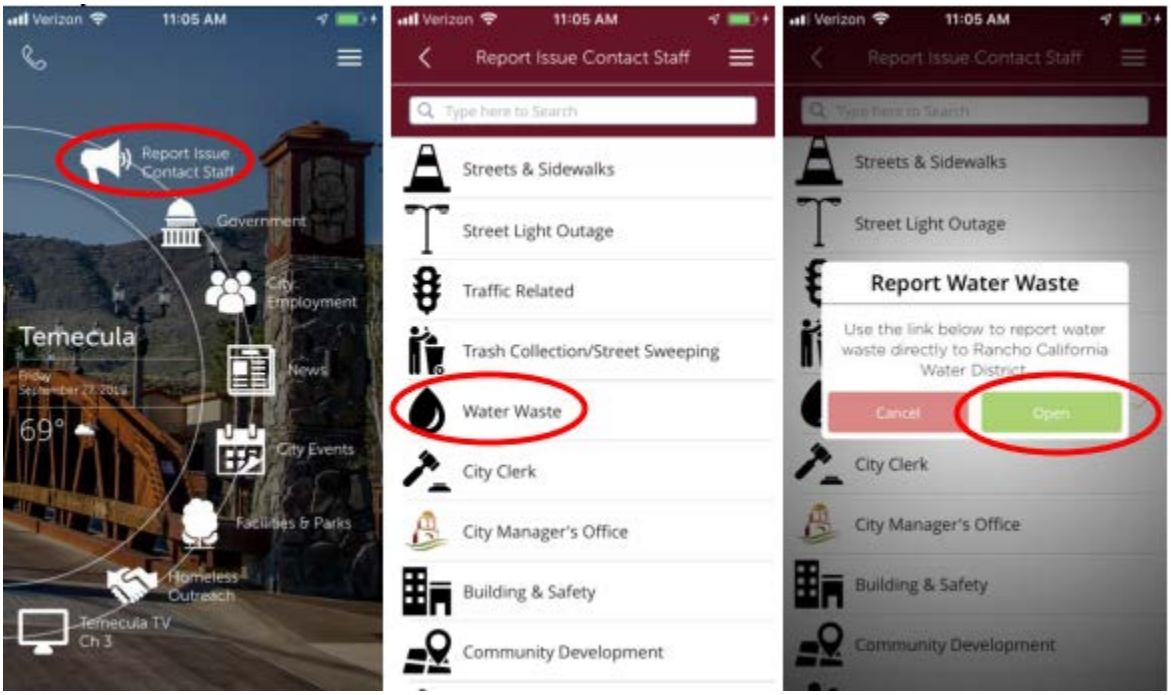


Figure 2-15. Reporting Illegal Discharges through City Mobile Application

In addition, the City has worked with the Riverside County Flood Control District to develop a door hanger addressing the irrigation runoff prohibition (**Figure 2-3**). The door hanger is distributed as an educational material with all enforcement actions.

2.2.2.6 City of Wildomar

During FY 2019, the City of Wildomar implemented the strategies described in the WQIP, and implementation status is provided by strategy in **Section 4.3** of **Appendix 2**. Highlights of strategies implemented by the City to address the eutrophication and nutrient HPWQC are summarized as follows.

Working with HOAs to Eliminate Dry Weather Flows

During 2018-2019 MS4 outfall monitoring, City staff observed flows in outfalls that appeared to be caused by irrigation runoff from a specific community with a homeowners' association (HOA). City staff shared this information with the HOA manager and informed them of the over-irrigation runoff prohibitions. Following the conversations with City staff, the HOA manager expressed their willingness to support the City's educational efforts by providing information to their residents regarding this issue. The City is planning to continue to work with the HOA manager and is planning to reach out to other HOA managers, to provide education to residents about the over-irrigation runoff prohibitions. Based on FY 2019 dry weather MS4 outfall monitoring, many of the City's major outfalls are dry.

Enhanced Outreach to Businesses

The City provides businesses with BMP handouts and educational materials upon approval of their business registration. Nurseries are given handouts targeting nutrient pollutant reduction; livestock/ equestrian operations are given handouts targeting animal care; and home-based businesses are given

irrigation reduction handouts, as well as educational materials specific to their business activities. These materials include California Stormwater Quality Association (CASQA) BMP Fact Sheets and handouts available at RCWatershed.org, depending on the type of business.

Reporting Stormwater Issues to City

During the reporting year, the City received an audit from the San Diego Water Board regarding the over-irrigation prohibition. A detailed response to the audit has been included in **Appendix 2** with the JRMP report. In response to the audit, the City made plans to update its ordinances to prohibit over-irrigation runoff and made plans to update its website to better inform the public of the prohibitions. Changes to the City's ordinance and website were completed in the months following the end of the reporting year. The City's website now provides residents with clear mechanisms to report over-irrigation runoff violations (**Figure 2-16**).

Options available include illicit connections, illegal discharges, over-irrigation runoff, illegal dumping, and blocked channels and storm drains.

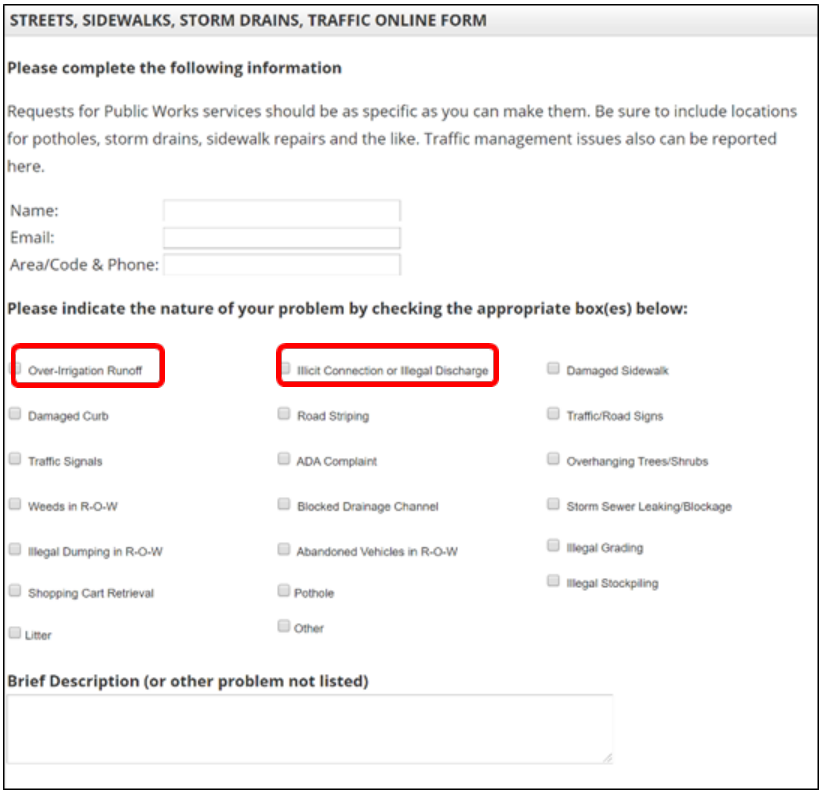


Figure 2-16. Request Submittal Page on City of Wildomar Website

Over-Irrigation Runoff Education

In coordination with the other Riverside County Copermittees, the City of Wildomar participated in the development of a new Over-Irrigation Runoff Doorhanger to help educate residents regarding the over-irrigation runoff prohibitions and to better equip City staff to respond to reports or observations of over-

irrigation runoff. The doorhanger was developed during the reporting period and is now currently in active use. A copy of the doorhanger is included in the City's Over-Irrigation Audit Responses and is shown in **Figure 2-3**.

New Street Sweeping Services

The City added two arterial roads to the list of streets that receive regular street sweeping services. Grand Ave. and Clinton Keith Rd. now receive street sweeping services where none were provided before. This street sweeping is expected to remove roadway pollutants and improve the quality of stormwater runoff from the roadway.

2.3 LOWER SMR SUBWATERSHED

Reducing dry weather flows from the San Diego County storm water outfalls will ultimately reduce the nutrient loading that leads to the eutrophic conditions in the SMR Estuary.

The County of San Diego is the responsible agency for the numeric goals in the Lower SMR Subwatershed. Progress toward the goals and strategies the County of San Diego is implementing or planning to help meet the goals are described in the following subsections.

2.3.1 Lower SMR Subwatershed Progress to Goals

Progress toward the interim goals for the Lower SMR Subwatershed is presented in **Table 2-5**. The compliance pathways for the County of San Diego to achieve WQIP goals are based on six different metrics. The County of San Diego has the option of demonstrating goals have been met through any one of the six pathways. The pathways are presented sequentially and separated by "OR" to indicate that the goal can be achieved through any one of the six pathways.

Table 2-5. Progress toward Interim Eutrophication Impacts and Nutrient Loading Numeric Goals, Lower SMR Subwatershed (County of San Diego)

Path-way	Goal	Metric	Baseline	Interim Goal	Goal Due Date	Goal Status
1 OR	Effectively eliminate anthropogenic dry weather discharges from MS4 outfalls to the receiving water	Project completion	Turf replacement project not completed	Complete turf replacement in Rainbow Park	FY 2023	**Met:** Project completed (1.7 acres of grass replaced with artificial turf)
		Percent reduction in aggregate flow volume	Not yet determined[1]	Reduce the baseline aggregate flow volume by 25%	FY 2023	In progress
2 OR	*Demonstrate that the Santa Margarita River Estuary targets have been attained*	*Algal biomass level in SMR Estuary*	*N/A*	*Primary numeric targets listed in **Table 2-1** (refer to **Appendix 3**)*	*FY 2038 (Final Goal)*	*Not using this compliance pathway*
		OR				
		Algal biomass level in SMR Estuary AND SQO benthic community structure	*N/A*	*Secondary numeric targets listed in **Table 2-1** (refer to **Appendix 3**)*	*FY 2038 (Final Goal)*	*Not using this compliance pathway*
3 OR	*Discharger is attaining nutrient load reduction*	*Percent nutrient load reduction*	*Not yet determined*	*76%*	*FY 2038 (Final Goal)*	*Not using this compliance pathway*
4 OR	*Discharger is attaining the load allocations defined in the TMDL Alternative for the SMR Estuary*	*Nutrient loading*	*Not yet determined*	*Not yet determined*	*FY 2038 (Final Goal)*	*Not using this compliance pathway*
5 OR	*Exceedances of the targets are due to non-controllable sources*	*Documentation that exceedances are due to non-controllable sources*	*N/A*	*Demonstrate that all exceedances of targets are due to non-controllable sources*	*FY 2038 (Final Goal)*	*Not using this compliance pathway*
6	*Demonstrate that management actions to attain allocations are being implemented through mechanisms defined in each applicable Order[2]*	*Implementation of proposed management actions*	*N/A*	*Implement proposed management actions according to proposed schedules.*	*FY 2038 (Final Goal)*	*Not using this compliance pathway*

[1] A baseline will be established during the 2019-2020 monitoring year after additional data have been collected under the accepted WQIP.

[2] 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.

2.3.2 Lower SMR Subwatershed Strategy Implementation and Planning

During FY 2019, the County of San Diego implemented the strategies described in the WQIP, and implementation status is provided by strategy in **Section 7.3** of **Appendix 2**. Highlights of strategies implemented by the County to address the eutrophication and nutrient HPWQC are summarized below. Note that these strategies were generally implemented throughout the County's jurisdiction in the SMR Watershed, including both the Lower SMR Subwatershed and the Rainbow Creek Watershed. Details on additional strategies implemented for the Rainbow Creek Watershed are provided in **Section 2.4.3**.

2.3.2.1 Gardening and Agricultural Outreach Programs

Rainbow Creek BMP Flyer and Community Outreach

The County Department of Agriculture, Weights, and Measures (AWM) conducts inspections of commercial nurseries to ensure compliance with the MS4 Permit and Watershed Protection Ordinance (WPO). Nurseries must implement minimum BMPs required by the WPO, which include pollution prevention measures addressing nutrients as they apply to the facility. AWM inspects irrigated lands and works with farmers in response to observations or complaints of problematic non-stormwater discharges. AWM refers farmers to resources for advice on managing agricultural water quality, including pollution prevention measures pertaining to fertilizer handling and application, reduction of irrigation runoff, and erosion management.

Figure 2-17. Rainbow Creek Nutrient Reduction and Management Overview Flyer

In collaboration with AWM, the County Watershed Protection Program (WPP) designed a Rainbow Creek Nutrient Reduction and Management Plan overview flyer (**Figure 2-17**) during the reporting period. The flyer uses community based social marketing principles to convey BMP information to help nurseries reduce nutrient contributions to Rainbow Creek. Information conveyed in the flyer includes irrigation management, nutrient management, erosion and runoff management, and training and record keeping. The flyer is currently being translated into Spanish.

In June 2019, the County led the Rainbow Creek Focus Group at the Fallbrook Women's Center to better understand the public's perception of regulatory terminology (e.g., TMDL, nutrient, etc.), how residents use nutrients for landscaping, and their concerns around the water quality of Rainbow Creek. The outcomes from the focus groups will be used to develop materials that will help Rainbow Valley residents reduce their nitrogen and phosphorus contributions to Rainbow Creek.

"Let's All Do Our Part" Fertilizer Flyer

The County developed a "Fertilizer" flyer (**Figure 2-18**) as part of its "Let's All Do Our Part!" outreach campaign. The flyer was designed using community based social marketing principles to convey BMP information to residents to help reduce excess fertilizer from entering the County stormwater conveyance system.

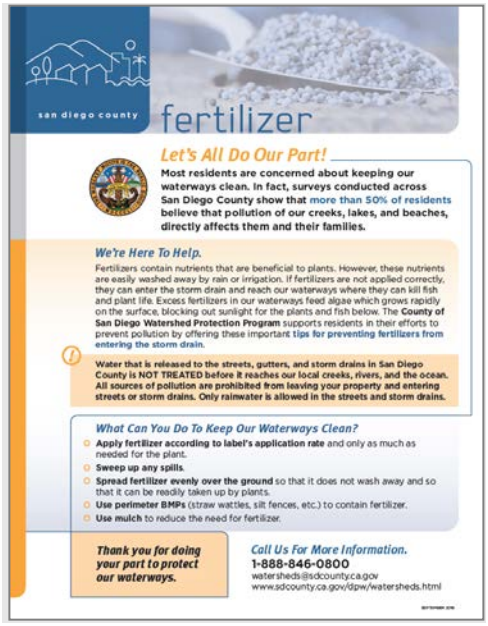


Figure 2-18. Fertilizer Flyer as Part of the County's "Let's All Do Our Part" Outreach Campaign

Backyard Composting and Gardening Education Program

The County continued to conduct education and outreach for proper residential composting techniques through the County's Backyard Composting and Gardening Education Program and its contract with the Solana Center for Environmental Innovation. Composting offers multiple benefits including helping residents minimize their carbon footprint by keeping food and yard waste out of the landfill, reduce the need for synthetic fertilizers and pesticides, and increase soil water retention.

In FY 2019, 17 composting workshops, 24 school presentations, and 15 community events were held reaching a total of 5,631 residents. Additionally, the Solana Center held one Master Composter Course certifying 15 Master Composters. The course is a five-week intensive training for community members interested in gaining an advanced level of knowledge and experience with composting. Upon completion of the program, participants become composting ambassadors in their communities by providing their knowledge and insights into proper composting practices.

2.3.2.2 Agricultural Water Quality Program

AWM is authorized to inspect commercial nurseries and greenhouse facilities applicable to the MS4 discharges within the unincorporated areas. AWM's inspection frequencies are prioritized based on the facility's assigned *Threat To Water Quality* (TTWQ), 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 TTWQ. The goal for each inspection is to ensure compliance with the County's Watershed Protection Ordinance. For locations where it has been determined that a non-compliance exists, AWM follows the Enforcement Response Plan as described in the JRMP, Section 9.0, and will continue escalating legal authority established for inventoried commercial agricultural businesses. The AWM commercial business inventory is included as Attachment 5.7 of the County's JRMP.

In FY 2019, updates were made to the "Return to Compliance" Process that is outlined on the inspection form (**Figure 2-19**) that is distributed to each inspected facility to assist with returning to compliance if BMP deficiencies are observed during an inspection. These updates were a result of coordinating with the County WPP to ensure consistency between the two departments. AWM and WPP made a coordinated effort to improve the inspection program during FY 2019 and will continue to work closely to adaptively manage the commercial agriculture inspection program.

Additionally, the following strategies were implemented during the reporting period to ensure agricultural water quality goals are achieved and are a result of adaptive management:

- Reported potential Agricultural Order non-filers to the San Diego Water Board. County staff notify the San Diego Water Board when it becomes aware of an agricultural operation that appears to require coverage under the Agricultural Order.
- Notified agricultural businesses within the County unincorporated area of the requirement to enroll in the San Diego Water Board Agricultural Order.
- Enhanced education and outreach activities and materials development in collaboration with University of California Cooperative Extension Office (UCCE) such as:
    - Distributed and promoted the State Water Efficiency & Enhancement Program and updated the Agriculture Water Quality workshops targeting commercial audiences to include an enforcement component if polluting behaviors persist.
    - Provided contact information for various organizations that can assist with BMP implementation at agricultural operations, such as Mission Resource Conservation District, Natural Resource Conservation Service, and UCCE.
    - Combined outreach on the requirements of the Watershed Protection Ordinance and the opportunities for water conservation rebates and incentives offered by other agencies.
    - Continued supporting the UCCE Agricultural Water Quality Continuing Education Course, "Water School," that promotes the protection of water quality and encourages BMPs for commercial agriculture and the general public.

Highlights of the Agricultural Water Quality Program include: a 96% return to compliance of facilities with cited non-compliances in an initial inspection, onsite outreach by inspectors at each inspection, distribution of BMP educational brochures and information presented on the County's AWM website, and distribution of the San Diego Water Board's Agricultural Orders informational flyer in Spanish and English. These strategies resulted in noticeable improvements to BMP implementation at many commercial nurseries and greenhouses throughout the WMA.

The above-mentioned strategies resulted in noticeable improvements to BMP implementation at many commercial nurseries and greenhouses in the Rainbow Creek Watershed. Specifically, Hines Nursery replaced two uncovered and leaking fertilizer tanks with a new tank that is fully covered and protected from rainfall, and facility staff removed trash and other debris from the property and onsite drainage ditches (**Figure 2-20**).

FREQUENTLY ASKED QUESTIONS

- I HAVE RECEIVED A NOTICE OF VIOLATION, WHAT SHOULD I DO?
  Correct the violation as soon as possible and before the "Correct Violations By" date shown on your inspection report. The goal of the inspection is to ensure compliance with the County's Watershed Protection ordinance, which protects and results in improved water quality for San Diego County's water resources.

- WHAT HAPPENS IF I HAVE NOT CORRECTED THE VIOLATION(S) BY THE DUE DATE?
  If the violation(s) still is/are not corrected, an Administrative Citation Warning with an immediate correction requirement may be issued. Failure to comply with the Citation Warning may result in the following sequence of Administrative Citations with an associated fine due within 30 days.

  1st Citation – *up to $100*
  2nd Citation – *up to $200*
  3rd Citation – *up to $500*
  4th and Subsequent Citations- *up to $1000*

- WHO CAN I CALL WITH QUESTIONS? Call the Agricultural Water Quality Program at (858) 614-7786 and ask to speak with your inspector or a supervising inspector.

- WHERE CAN I FIND INFORMATION ABOUT MAINTAINING COMPLIANCE TO HELP AVOID VIOLATIONS IN THE FUTURE? Communicate regularly with your area inspector. Visit the Department's website at www.sandiegocounty.gov/awm/awq. You may also request information by calling the Agricultural Water Quality Program at (858) 614-7786.

- WHAT ARE THE MOST COMMON VIOLATIONS FOUND? Failure to provide evidence of stormwater training for employees/workers, failure to implement appropriate Best Management Practices (BMPs) for erosion and sediment control, irrigation water and nutrient application, and material storage.

- HOW LONG DO I HAVE TO KEEP MY RECORDS? Maintain, on site, the most recent evidence of the annual facility review, all BMP operation & maintenance procedures, and annual worker training.

- WHERE CAN I FIND ADDITIONAL RESOURCES? Additional assistance is available from:

  UC Cooperative Extension
  858-822-7711 or https://ucanr.edu/sites/agwaterquality/Grower_Resources/.
  Mission Resource Conservation District
  760-728-1332 or www.missionrcd.org.
  Natural Resources Conservation Service
  760-745-2061 or www.nrcs.usda.gov.
  Nutrient Reduction and Management Plan
  http://www.projectcleanwater.org/rainbow-creek-nutrient-and-management-plan/.

- CONTACT:

County of San Diego Department of Agriculture, Weights and Measures
9325 Hazard Way, Suite 100
San Diego, CA 92123
(858) 614-7786 AWQ.AWM@sdcounty.ca.gov

Figure 2-19. County of San Diego AWM Inspection Form

Before **After**

Figure 2-20. Uncovered and Leaking Fertilizer Tanks, Before and After

Further, the County has identified additional strategies to be implemented in the Rainbow Creek Watershed for nutrient, erosion, and irrigation runoff control to help achieve water quality goals. These additional strategies are effective during FY 2020 and will be included in the FY 2020 JRMP update. The newly added strategies are also to address the San Diego Water Board's concerns regarding nutrient reduction in the Rainbow Creek Watershed that are described in the 2017-2018 WQIP Annual Report review letter dated July 19, 2019 to the SMR WMA Copermittees, and in the Compliance Pathway for Rainbow Creek Nutrient TMDL letter dated September 4, 2019 to the County of San Diego.

- Increase regulatory presence and achieve higher inspection frequency depending on level of compliance throughout the year in the MS4 unincorporated area by adding staff hours:
    - 0.5 full-time supervisor to have a dedicated supervisor over the Agricultural Water Quality Program
    - 2 full-time inspectors
- Increase inspection frequency up to four inspections per High TTWQ existing commercial agricultural facility and depending on the facility's compliance history.
- Conduct additional inspections in response to elevated nutrient monitoring results to try and identify and eliminate pollutant sources within corresponding drainage areas.
- Enhance education outreach materials and activities focused on Rainbow Creek Nutrient Reduction Management Plan goals in coordination with UCCE.
- Provide BMP outreach documents in English and Spanish at every inspected site.

- Annually review commercial agricultural facilities in the Rainbow Creek watershed that may discharge pollutants to the County MS4 and add any newly identified facilities to the inventory.

Focus investigative efforts on identifying significant sources of nutrients.

2.3.2.3 Equestrian Outreach Programs

The County WPP continued to collaborate with the Solana Center for Environmental Innovation, and regularly conduct equestrian focused, manure management workshops and outreach events (**Figure 2-21**).

Figure 2-21. Manure Management Educational Handout

Workshops are dynamic two-hour sessions specifically designed for horse owners and stable managers that discuss proper techniques on manure management and equestrian health. The educational format emphasizes the importance of proper manure management, its impact to local waterways, and role in promoting a healthy, sustainable environment.

Outreach events are designed to further bolster the County's community-based social marketing strategy by encouraging community participation and environmental awareness. Educational outreach events provide a venue to offer engaging, relevant activities and information on manure management and watershed protection.

Additionally, the County of San Diego designed outreach materials, in collaboration with The Solana Center, specifically catered to the events and workshops (**Figure 2-22**). In the future, the County plans on piloting a new program that seeks to offer functional and active demonstration sites where County residents can learn about the theories and techniques used in manure composting.

The County's Equine Best Management Practices Manual developed for horse owners and facilities for managing stormwater runoff is accessible on the County of San Diego Watershed Protection Program web page that provides Residential Stormwater Information and Resources.

Figure 2-22. Equestrian Manure Management Workshops

2.3.2.4 School and Community Outreach Programs

Rainwater Harvesting Incentives

Harvesting rainwater can reduce the amount of water leaving a property during a rain event, potentially reducing runoff pollution from entering our streams and oceans. Utilizing harvested rainwater can also reduce dependency on the municipal water supply and save residents money on their water bills.

The County worked with the San Diego County Water Authority and Metropolitan Water District of Southern California to provide rebate opportunities at County-sponsored outreach events and rain barrel sales events (**Figure 2-23**). The County also offered a supplemental discount to unincorporated residents and collaborated with the Solana Center for Environmental Innovation to host and promote these events using social media, newsletters, local newspaper ads, and in-person outreach. Events were held at the Water Conservation Garden in El Cajon on November 3, 2018 and the headquarters of the Rincon del Diablo Municipal Water District in Escondido on February 16, 2019. A total of 650 50-gallon rain barrels were sold at the events, of which 323 were sold to unincorporated residents during FY 2019 through the programs.

Figure 2-23. County-Sponsored Rain Barrel Distribution and Sales Event

School Presentations and Community Outreach Events

The County invests in school-age education and community outreach through a partnership with I Love a Clean San Diego (ILACSD) (**Figure 2-24**).

Interactive presentations are scheduled during the school year at high schools in the unincorporated County. The presentations focus on key concepts of pollution prevention and watershed protection. As part of this program, teachers are provided with worksheets to expand the learning opportunities of students. Approximately 150 presentations were given to students last year.

Figure 2-24. Material from Outreach with ILACSD

In addition, ILACSD seeks opportunities to attend events, such as street fairs or other community gatherings, and provides outreach to the general public about watershed protection. They provide outreach materials on preventing irrigation runoff, trash management, erosion and sediment control techniques, and other topics. During the reporting period, ILACSD attended more than 20 community events throughout the County.

San Diego County Office of Education Partnership

The County continues to sponsor the popular Splash Lab and Green Machine education programs which provide students with hands-on water quality, soil science, and Integrated Pest Management experiences. The Green Machine presentation is designed for grade levels K-4 and the Splash Lab presentation is designed for grade levels 4 to 8. During FY 2019, a total of 3,340 students attended Splash Lab presentations and a total of 3,199 students attended Green Machine presentations. The total student attendance for both Splash Lab and Green Machine presentations during FY 2019 was 6,539.

2.3.2.5 Outreach to Reduce Non-Stormwater Flows

The County of San Diego has a robust citizen outreach program about the importance of reducing non-stormwater flows, such as irrigation runoff. Due to the challenges of implementing long-term behavior change, the County has multiple outreach strategies that attempt to reach broad segments of the population. Many of these strategies have been implemented for years but are evaluated and updated annually as needed. Included below are descriptions of programs that were adapted in the last FY or highlights from implementation.

2.3.2.6 Monitoring and Investigations to Reduce Non-Stormwater Flows

The County continued to refine and expand existing efforts to address non-stormwater discharges, and increased outfall monitoring and site investigations during the reporting period. During the dry season, May 1 to September 30, equipment is installed at priority outfalls that continuously measure fluctuations in flow over time (**Figure 2-25**); this is important information to identify and abate the sources of flow. Staff regularly reviews this data to look for evidence of sources of non-stormwater

flow at outfalls. For example, sites where flow rates did not change significantly over the course of a day or week may indicate non-anthropogenic flow sources. Spikes in flow rates at night or in the early morning, especially with a cyclical, specific day of the week pattern, may be an indicator of irrigation runoff.

Figure 2-25. Example Flow Meter and Weir Installation

The County used these data to support their after-hours residential flow investigation program. This program entails visiting priority outfalls during periods identified as "peak-flow" on the outfall hydrographs. Peak flows are most common overnight, in the early morning, and on weekend hours. Since residents and businesses are not typically active at those times, they may not realize they have irrigation runoff due to broken, misaligned, or poorly timed sprinklers. By daybreak, evidence of these types of problems may not be obvious, which is why the County continues to dedicate extensive resources to this important program.

Over the course of the calendar year, the County visited all accessible residential management areas in their jurisdiction at least once (**Figure 2-26**). Each inspection covers the specific geography and documents any instances of irrigation runoff at a specific property by opening an inspection record using the County's Field Inspections Mobile Application. Upgrades and optimizations to the application were made in support of this program as needed throughout the reporting period.

In addition to residential management area inspections, priority drainage areas are visited monthly during the dry season. The list of priority outfalls is chosen based on many factors, including flow rates, land use composition in the drainage area, and accessibility. Prior to inspections, the hydrograph data is reviewed to determine the "peak flow" time for each specific outfall. The data analysts focus on identifying patterns in peak flows, in an attempt to hone-in on irrigation-related flows. Every month, the newest available data is reviewed to ensure that site visits are timed to coincide as much as possible with clear irrigation runoff peak times.

Figure 2-26. Outreach Material Left at the Front Door During Inspection

In the last few months of the reporting period, the County developed and implemented a new outreach letter that is mailed shortly after cases of irrigation runoff are documented at specific properties. Approximately 70% of properties returned to compliance within 30 days after the initial outreach letter was sent to the responsible party. For the remaining cases, County staff continues to follow-up on each case until compliance is achieved.

2.3.2.7 Water District Collaboration and Non-Stormwater Flow Source Study

Persistent flows through MS4 outfalls may be attributed to a variety of sources including natural sources such as groundwater flows or permitted flows from water districts. Through routine inspections and detailed source investigations, County staff have identified water districts as sources of large non-stormwater discharges. Water districts' potable water discharges are permitted under Statewide National Pollutant Discharge Elimination System (NPDES) Permit 2014-0194-DWQ. Any discharges that exceed 1 acre-foot (325,850 gallons) are required to be reported to the Regional Board. Water districts typically do not release more than 1 acre-foot of water per day as they tend to distribute their maintenance flows over multiple workdays. As a result, large volumes of permitted dry weather flows are being released to the MS4 without notification or quantification of flow. To better understand this source of non-stormwater flow, the County conducted a study of the state Department of Water Resources Water Audits for the San Diego Region and continues to collaborate with individual water districts. The results of the Water Audit reviews and examples of collaboration between the County and water districts are provided below.

Starting in 2017, water districts serving more than 3,000 customers or delivering more than 3,000 acre-feet of water per year are required to report water loss rates to the state Department of Water Resources annually. Those water audits are reported publicly at http://wuedata.water.ca.gov/. Through this reporting, there are two entries that water districts report that MS4s can review to determine an approximate volume of water that may be lost to the watershed and to the MS4: "Real Losses" and "Unbilled Authorized Consumption".

"Real Losses"[9] are the physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. Real losses are reported as the annual volume lost through all types of leaks, breaks and overflows. Water districts annually report their losses in gallons per service connection per day. A graph showing the real losses reported by San Diego Region water districts for FY 2019 is provided below (**Figure 2-27**).

[9] https://www.epa.gov/sites/production/files/2015-04/documents/epa816f13002.pdf

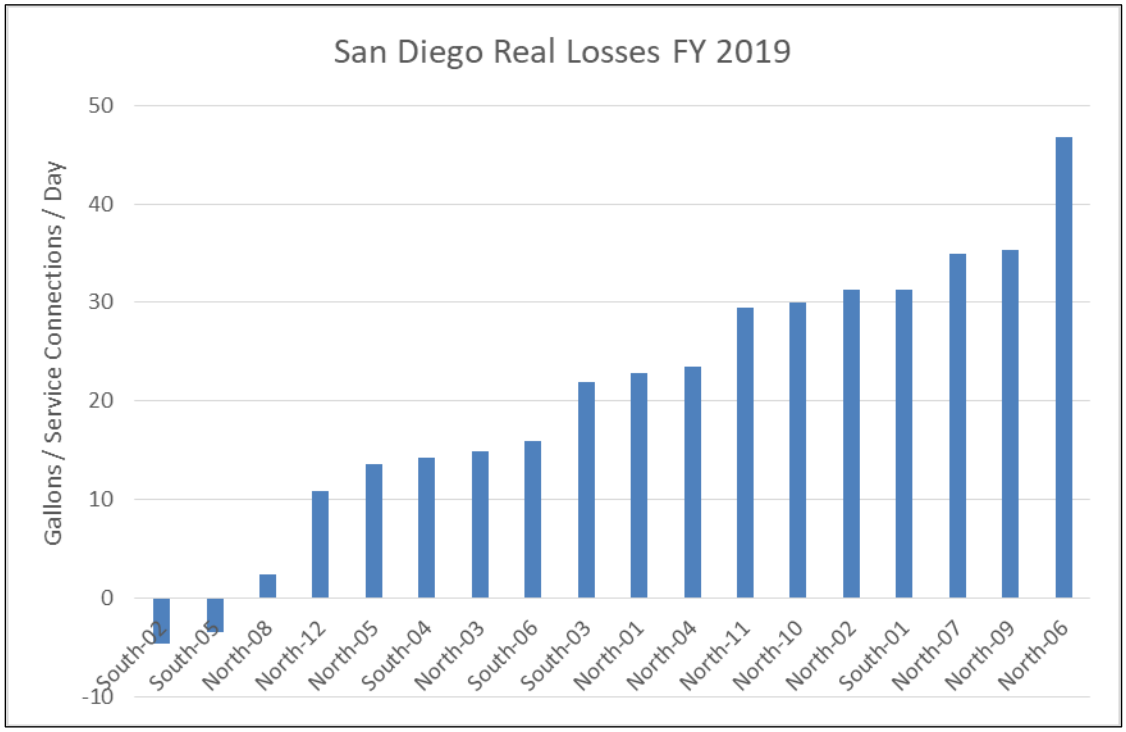


Figure 2-27. Real Losses for San Diego Region Water Districts per Service Connection (FY 2019)

When reviewing the Water Audits, the gallons lost to the watershed per day due to leaks, breaks, and overflows can be calculated by multiplying the gallons per service connection per day by the number of service connections in each water district. The total for the San Diego Region is over 17 million gallons lost per day in FY 2019. One district has a significantly large amount of service connections, and therefore lost the most water to the watershed (**Figure 2-28**). Water district service areas cross watershed and jurisdictional boundaries, therefore volumes lost to any particular watershed or jurisdiction are challenging to estimate.

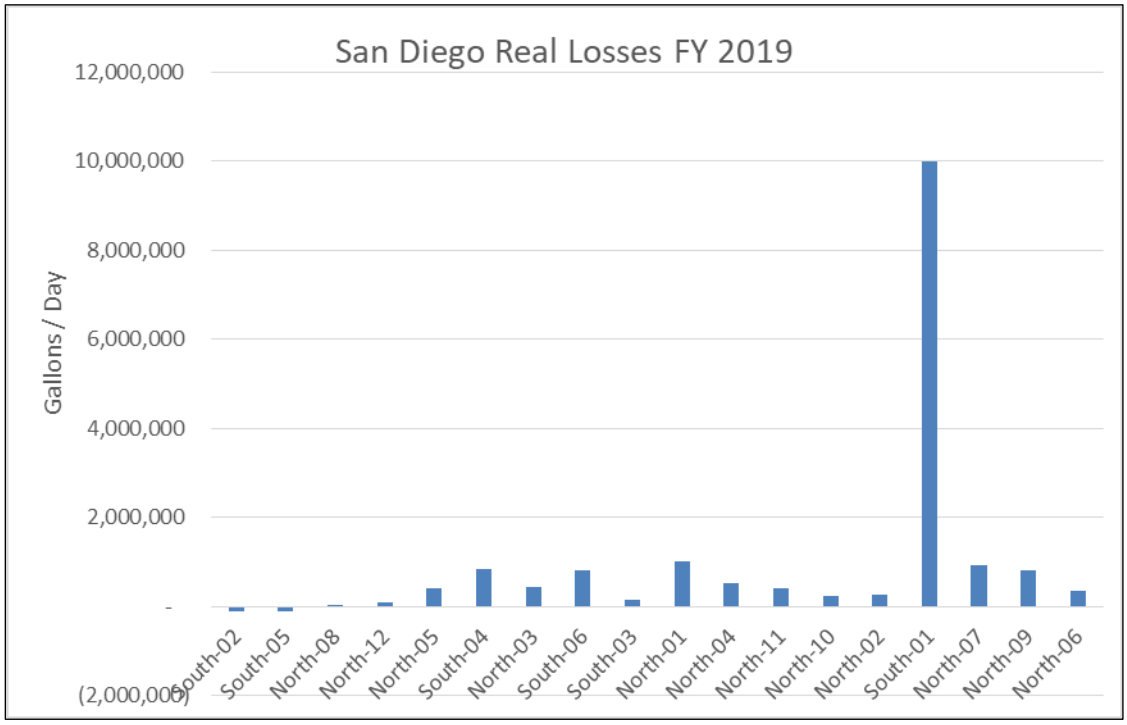


Figure 2-28. Real Losses for San Diego Region Water Districts by Gallons per Day (FY 2019)

"Unbilled Authorized Consumption"[10] is all consumption that is unbilled, but still authorized by the utility. This includes "unbilled metered" and "unbilled unmetered". "Unbilled metered"[11] is metered consumption, which is authorized by the water utility, but, for any reason, is deemed by utility policy to be unbilled. This could include metered water consumed by the utility itself in treatment of distribution operations, or metered water provided to civic institutions free of charge. The unbilled metered total for the San Diego region is over 500,000 gallons lost per day in FY 2019.

"Unbilled unmetered"[12] is typically water used in activities such as firefighting, maintenance flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. (all of which would likely flow to the MS4). The unbilled unmetered total for the San Diego region is over 700,000 gallons lost per day in FY 2019. Some water districts meter their use of water while performing routine flushing of mains and sewers, whereas others do not, therefore maintenance flows discharged to the MS4 may be categorized in either of these two categories.

The unbilled unmetered field is tedious to quantify, so a default of 1.25% is available for the water districts to use; however, 15 of the 18 San Diego water districts shown in **Figure 2-29** used their own values. Since water districts quantify their authorized discharges differently, it is difficult to compare these numbers amongst the districts or to determine the amount of water related to maintenance discharges alone. In the future, it may be possible for water districts to report their maintenance

[10] https://www.epa.gov/sites/production/files/2015-04/documents/epa816f13002.pdf
[11] http://wuedata.water.ca.gov/
[12] http://wuedata.water.ca.gov/

discharges to the MS4 separately in the unbilled unmetered field to better quantify these inputs to the MS4.

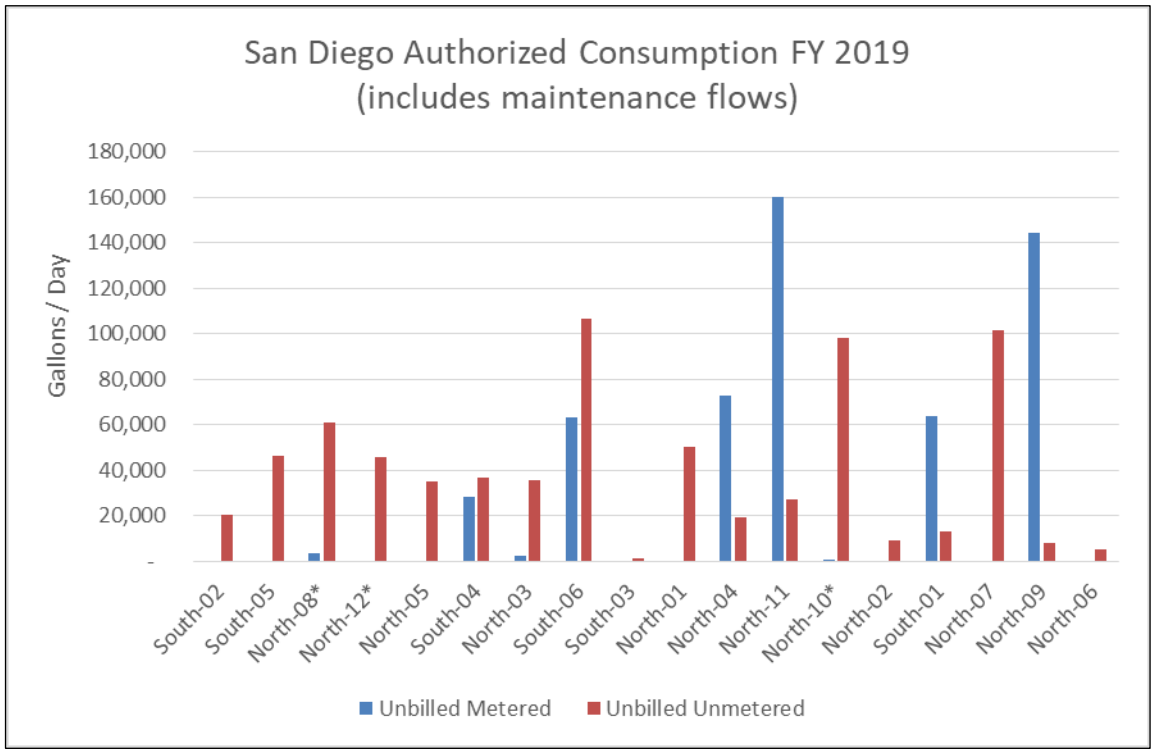


Figure 2-29. Unbilled Authorized Consumption for San Diego Region Water Districts (FY 2019)

The County's investigation and collaboration with partner agencies has resulted in a better understanding of water district operations and their water losses to the watershed and MS4. These significant water losses within the watershed likely contribute to some persistently flowing outfalls that cannot be explained by other sources like irrigation runoff alone. In addition to reviewing the Department of Water Resources Water Loss Audits, the County coordinated with several water districts during the reporting period.

The County Water Authority works collaboratively with the County of San Diego by providing water pipeline shutdown reports. These reports include a dewatering plan that details dechlorination and erosion potential restrictions. The report also includes a detailed water quality report, CEQA exemption, and volume expected to be released (usually several acre-feet). These reports allow Copermittees to ensure the safety of their teams potentially working in downstream MS4/waterways and account for permitted discharges that may contribute to persistent dry weather flows within an outfall. The County Water Authority network spans the Santa Margarita River, San Luis Rey River, Carlsbad, San Dieguito, Los Peñasquitos, San Diego River, and San Diego Bay, and Tijuana Watersheds.

The County continues to reach out to water district partners with the goal of continuing collaborative relationships as those described above. Since water districts are only required per their permits to

report discharges over 1 acre-foot to the municipalities, many are not set up to report smaller ongoing and regular maintenance discharges that may contribute to persistently flowing MS4 outfalls. The County's investigation and collaboration with partner agencies has resulted in a better understanding of water district operations and sources of other dry weather flows that typically arise from activities of other agencies operating in the unincorporated area or natural sources.

2.3.2.8 Green Street Guidance Update

The County of San Diego developed Appendix K of the County BMP Design Manual Guidance on Green Infrastructure to provide developers with strategies to improve water quality within the context of roadway improvements. This guidance was provided in the 2016 BMP Design Manual and updated in the 2019 version. The updates to the Guidance on Green Infrastructure included:

- A reorganization of the appendix that removed project specific guidance, i.e., design criteria, standard drawings, specifications and maintenance schedule, from the manual in favor of placing them on the County website for Development Support. This will make future revisions to this guidance simpler to implement; thereby encouraging the implementation of adaptive management.
- A new section titled Green Streets Performance Standard. The County has developed a specific standard for Priority Development Project Exemption as described in MS4 Permit Provision E.3.b.(3). This new section explains the performance standard and how to maintain compliance with it.
- A new section was added titled, *Green Parking Lots Guidelines*. This section provides guidance to developers who would like to incorporate green infrastructure elements in a parking lot.

Currently, the Green Streets Specifications and Green Streets Drawings are undergoing extensive review and revision that will incorporate the expertise of various divisions within the Department of Public Works to ensure the best possible end product and certainty of constructability. These documents were developed to provide specific details to contractors about Green Infrastructure strategies not already available in the Greenbook or Caltrans Standard Specifications as well as provide a starting point for design and construction for green infrastructure strategies within the road right-of-way. The County anticipates completion of the review and revision of the Green Streets Specifications and Green Streets Drawings to be in FY 2020.

2.3.2.9 Eliminating Wastewater Discharges

Sewer System Vulnerability Study

The wastewater systems in most of the unincorporated area are operated and maintained by agencies other than the County. The County maintains regular communication with these agencies and assists in responses to sewage spills, as needed.

The County conducts an ongoing Vulnerability Study of the limited portions of wastewater systems within the unincorporated area that are owned and operated by the County. The study is focusing on locations where County wastewater infrastructure intersects with blue line streams. These locations are being identified for further investigation of potential exfiltration from the sanitary sewer system that may impact receiving waters. Ninety-two pipe segments were taken into consideration for the analysis, including vulnerable water body crossings and pipelines adjacent to water bodies. Field work

was completed in July 2018 and involved evaluating access, erosion, pipe and manhole conditions, and other factors that may contribute to the vulnerability of the sanitary sewer system operated by the County.

As a result of the ongoing analysis, the County created inspection programs to assess any vulnerable assets prior to the rainy season, as well as during and after storm events. Results of the analysis will be incorporated into the County's overall asset management program to allow for reassessment of conditions based on new data and an efficient use of resources to minimize the risk of vulnerable pipe segments.

Effluent Discharge Response and Enforcement

The County also responds promptly to reports of wastewater on the ground, typically from failing septic systems or private laterals, as they are received. Examples of the County's response and enforcement efforts relating to effluent discharge are provided below.

Grocery Outlet Center on Main Avenue in Fallbrook

During a stormwater inspection, a discharge originating from the sewer lateral behind a Grocery Outlet Center in Fallbrook was observed (**Figure 2-30**). Pacific Drain and Plumbing was on-site fixing the issue at the time of the investigation. County staff contacted the property manager and the Fallbrook Public Utility District immediately. The discharge was stopped during the investigation and District employees used a vacuum truck to remove any effluent on the surface and sanitized the affected area properly. A notice of violation was issued to the property manager to cease and desist the unlawful discharge of sewage to the stormwater conveyance system.

Before
Sewage discharge behind Grocery Outlet

Before
Pacific Drain and Plumbing was on site fixing sewage discharge during the observed discharge

After
FPUD sanitizing the affected area

After
Site of initial discharge after cleanup

Figure 2-30. Grocery Outlet Wastewater Discharge Cleanup

Septic System Upgrades

Several advanced septic systems have been installed in the Rainbow Creek Watershed including two large systems that serve non-residential properties.

Vallecitos School Septic System Upgrade

Historically, the County Department of Environmental Health (DEH) has required the school to pump the septic tank to reduce the risk of system failure and possibility of effluent surfacing on the ground. In early 2018, DEH worked with the school to upgrade the septic system to an advanced treatment system which became active in April 2018.

Vallecitos School serves 200 students and 25 staff with an approximate typical sewage discharge of 2,800 gallons per day and a peak discharge of 3,200 gallons per day. The new advanced treatment system uses NSF-approved, jet aeration treatment units to achieve secondary wastewater treatment and reductions in fecal coliform bacteria prior to drip disposal. Upon installation of the new system it was noted that the existing septic tank was in poor condition, with sewage effluent in full contact with groundwater. Upon completion of the new system the existing system was abandoned and destroyed as required by County Code. The Vallecitos School will be required to maintain an ongoing Operation & Maintenance inspection program with a contracted service provider to ensure the new onsite wastewater treatment system continues to provide proper treatment of the wastewater generated by the school.

Rainbow Oaks Restaurant Septic System Upgrade

County DEH staff conducted an inspection of Rainbow Oaks Restaurant on February 8, 2019, and observed a failing sewage disposal field. A Notice of Violation was issued on February 14th, 2019, ordering the restaurant to cease and desist discharging wastewater to the ground surface by pumping the septic tanks, obtaining a design for a replacement septic system and obtaining permits to install the new system. County DEH issued a septic repair permit on March 7th, and the new system was inspected and approved on July 3rd. Rainbow Oaks Restaurant continued to pump the septic tanks frequently through the duration of the repair process to prevent further surfacing of sewage. The newly installed septic system, classified as a supplemental treatment system, was designed to properly treat the wastewater generated from the restaurant, while also maintaining the required 2-foot of vertical separation distance to groundwater and 100-foot setback to Rainbow Creek (**Figure 2-31**).

Figure 2-31. Advanced Treatment Septic System at Rainbow Oaks Restaurant

2.3.2.10 Bacteria Focused Programs

Pet Waste Pollution Prevention Education and Outreach

"Poo Points" Outreach Program

On October 16, 2018, the County WPP received a CASQA award for Outstanding News, Information, Outreach, and Media Project for the "Poo Points" Outreach Program at the CASQA 14th Annual Conference. The program has been supported by the County for many years and continued to make an impact in FY 2019. "Poo Points" is a youth-driven outreach program aimed at promoting proper management of pet waste by property owners.

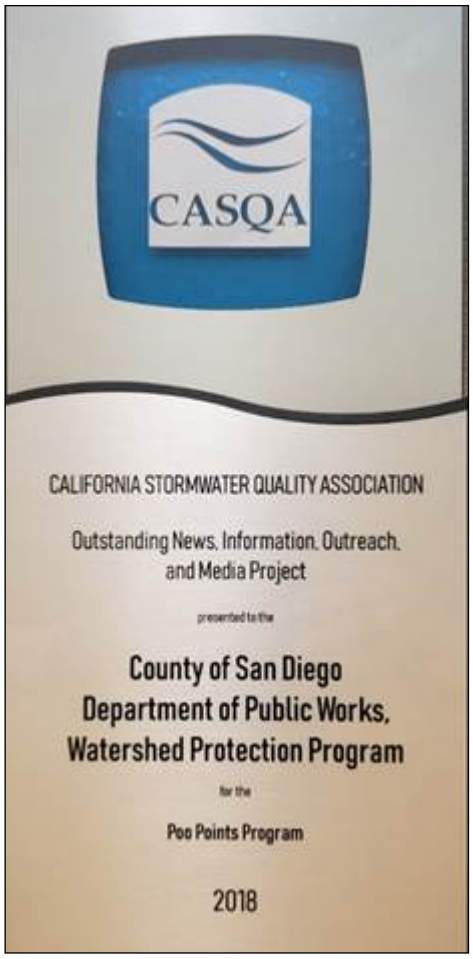


Figure 2-32. "Poo Points" Outreach Program 2018 CASQA Award

The program engages local youth groups, such as Girl and Boy Scout troops and 4-H clubs, who educate and obtain in-person commitments from their dog-owning neighbors to pick up after dogs in areas with a high likelihood of runoff. Youth participants earn a "Poo Patch" for successfully completing the outreach (**Figure 2-32**). The program has consistently demonstrated increases in self-reported perceptions of dog waste as a contributor to pollution of local waterways and frequency of cleanup. Additionally, the program provides opportunities for leadership and community service that are consistent with the mission of these youth organizations. To date, hundreds of youth and community members have participated in the "Poo Points" Outreach Program.

Pet Waste Education Materials

Additionally, the County developed a new "Pet Waste" handout as part of its "Let's All Do Our Part!" outreach campaign (**Figure 2-33**). The flyer was designed using community based social marketing principles to convey BMP information to residents to help reduce bacteria from pet waste from entering the County stormwater conveyance system. County inspectors hand out educational materials as part of routine residential inspections and often engage residents in conversations about practical ways to prevent stormwater pollution.

During the reporting period, the County increased outreach to pet related-businesses and veterinary clinics. This resulted in 32 businesses committing to display the "You know what to 'Doo'" posters and 34 businesses received pet waste outreach and education material. A total of 605 English pet waste flyers and 307 Spanish pet waste flyers were delivered during the reporting period.

Figure 2-33. Pet Waste Flyer and "You know what to 'Doo'" Outreach Material in English and Spanish

Pet Waste Event Outreach

During FY 2019, the County partnered with I Love A Clean San Diego to attend 44 community events, during which 419 pet waste surveys were completed and 399 commitments to pick up after their pet waste at least weekly were filled by residents.

2.3.2.11 Sediment Load Reduction

The County works to raise awareness to businesses and residents about sediment pollution. Displaced sediment or a threat of sediment displacement to roads or waterways occurs because BMPs are absent or inadequate. This is a common concern received through the stormwater hotline and also can be identified through routine inspections. This year the County experienced significant rainfall, which increased the amount of sediment-related concerns. Examples of the County's efforts to resolve sediment and erosion control issues are summarized below.

Erosion Control Outreach

Rates of erosion and runoff can increase after a large fire such as the 20118 West Fire in Alpine, as vegetation and other groundcover that would have otherwise reduced the erosive potential of rain events is destroyed. After any major wildfire, DPW assesses public roads and structures for erosion or debris flow risk. Through aerial imagery, soil maps, topographic maps, and other references, DPW reviewed and assessed roads and structures threatened by erosion and debris flows in areas affected by the fire. Ground surveys were conducted to identify hazards that represented a threat to life and property.

The County opened an Erosion Control Assistance Center in Alpine to help private property owners, including fire survivors and people living in and around the burned areas, with free sandbags, gravel bags, and fiber rolls. The County offered to visit private properties affected by burn areas and advise how to protect structures from erosion. Additionally, the County reached out with erosion control

information and guidance through the County News Center, social media, and direct mail to property owners in the fire impacted areas while also working with stakeholder partners to share the information with their community contacts.

The County also worked with the Natural Resource Conservation Service to request federal funding from the Emergency Watershed Protection program to assist property owners with erosion control on their private lands. Such measures included applying hydraulic mulch to burned slopes, installing gravel and sandbag berms.

In addition, the County translated erosion outreach material into Spanish including: Homeowner's Guide for Flood, Debris, and Erosion Control (**Figure 2-34**); Fiber Roll Implementation; Sandbag Implementation; and Homeowner's Guide: Seeding for Erosion Control in Burned Landscaping Adjacent to Homes. The materials were developed to assist homeowners in controlling erosion on their property that may result from fires. Materials are available at various County road stations, erosion control centers, and are downloadable at the County's website.[13]

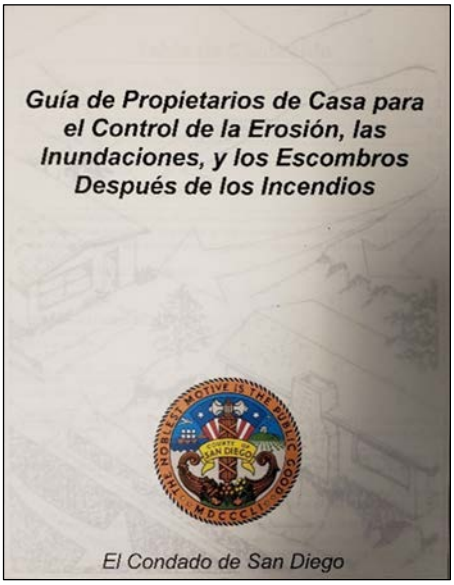


Figure 2-34. Spanish Translated Homeowner's Guide for Flood, Debris, and Erosion Control

2.3.2.12 Working with Homeless and Transient Populations

The unincorporated area in the county is over 3,500 square miles and has fewer urban areas and a lower population density than most incorporated cities. Homeless populations in the unincorporated areas typically shelter in flood channels, road culverts, parks, open spaces, and on private properties.

Cleanup and Sanitation Program

The County's Department of Public Works established the Cleanup and Sanitation Program (CSP) in October 2018 to continue and centralize the work taking place that addresses encampments in flood control channels, drainage culverts, and County maintained road right-of-way. The CSP team was created with three new full time employee positions is responsible for the assessment of known encampment sites, overseeing the cleanup of these sites, recovering personal property to allow it to be reclaimed by homeless individuals, managing associated contracts, and coordinating with homeless outreach teams to offer assistance to persons experiencing homelessness. In addition to these duties, the team has enhanced contract tracking systems, increased coordination with other agencies, and implemented updated public notices so that they are easier to read (these notices now include more resource information and contact numbers and contain ordinance statutes to aid law enforcement). In FY 2019, staff and contractors completed 1,089 site visits and 260 cleanups, removed over 72 tons of solid and universal waste and 348 gallons of hazardous waste, and disinfected and sanitized County facilities 168 times.

Code Compliance

Additionally, the County's Code Compliance Division within the Planning and Development Services Department (Code Compliance) responds to residential complaints regarding homeless encampments

[13] https://www.sandiegocounty.gov/content/sdc/dpw/flood/erosion-control-homeowners-assistance-center-.html

which may pose a threat to safety, human health, or the environment. In the case of confirmed homeless encampments on private property, the Department of Planning and Development Services (PDS) Code Compliance Division has added a full-time position to manage their encampment-related caseload and coordinate with other departments and agencies regarding encampment-related issues. Encampments on private property are addressed by first notifying property owners and educating them about their responsibility to maintain their properties; many property owners are initially unaware of the homeless encampments on their property. Following staff outreach, a majority of private property owners clean their property themselves or hire a contractor to clean their property. Cleanup efforts initiated by private property owners frequently include coordination of services provided by the Sheriff and Integrative Services to assist homeless individuals. When property owners are unwilling or unable to clean their property themselves, County staff proceeds with abatement at the property owner's expense. After a property is cleaned, the Code Compliance Division routinely monitors it in order to address any recurring issues as quickly as possible. In FY 2019, 41 private property cleanups were conducted; the majority of cleanups were conducted by the property owners voluntarily.

The County also continues to coordinate with neighboring cities and other agencies to discuss alternative response activities, share best practices, and discuss sustainability efforts.

2.3.2.13 Cleanup Events

Volunteer Cleanup Events

ILACSD and the County partnered with and developed relationships with local communities, gathering 1,541 volunteers to complete 32 cleanups, removing a total of 14,880 pounds of debris Countywide (**Figure 2-35**). In addition to the site-specific cleanups, the County continued to be a sponsor for two regional cleanup events: Coastal Cleanup Day, where 6,808 volunteers worked to clean up and beautify 106 cleanup sites and removed 138,499 pounds of litter and debris, and the Creek to Bay Cleanup Event, where 6,463 volunteers removed more than 145,000 pounds of litter and debris from 116 sites throughout the County. Within the SMR WMA, ILACSD and the County hosted 3 cleanups with 53 participants and removed 634 pounds of trash.

This year, the partnership between ILACSD and the County aligned middle and high school water quality presentation with upcoming community cleanup events to better connect the topics learned in the presentation to environmental behavior changes.

Figure 2-35. ILACSD and County Hosted Volunteer Cleanup Event

Tire Removal

As part of the Local Government Waste Tire Amnesty Grant, the County held four single-day tire amnesty events in the unincorporated area communities of Fallbrook, Valley Center and Lincoln Acres to provide residents with free and convenient recycling and disposal options for illegally dumped or stockpiled materials. The County hired a state certified tire hauler to provide labor and hauling services to collect waste tires and partnered with the Local Conservation Corps to provide tire hauling services for the Valley Center event. A total of 1,991 tires, weighing 24.89 tons, were collected during the year.

Additionally, in response to a request from residents in the eastern section of San Diego's back county, the County collaborated with various community groups and partners that allowed 281 residents to participate in four special collection events in Fallbrook, Jacumba, Lakeside, and Pine Valley. The County's Recycling Section, as part of the Department of Public Works, partnered with a volunteer cleanup group and EDCO to collect waste tires, green waste, metal/appliances, and provided free mulch for takeaway at the Lakeside collection event. Approximately 10 tons of green waste and seven tons of scrap metal/appliances were collected from residents during these special collection events.

2.3.2.14 Trash Education and Enforcement

Industrial/Commercial Inspections

The County evaluates businesses' trash management procedures during stormwater Industrial and Commercial inspections. Trash is a nuisance condition in and of itself, but also has the potential to carry bacteria or other pollutant contributions to the storm drain conveyance system. Inspectors review required trash BMPs with responsible parties during inspections. Most inspected facilities did not have deficiencies related to trash, debris, dumpsters, and/or material management. When corrections were needed, County staff worked with the responsible parties to address the deficiencies noted and provided

educational materials such as the "Loading Areas and Dumpsters" handout[14] that was developed during the reporting period.

Trash Study

Trash and litter as stormwater pollutants present a unique challenge, as it is often transported a great distance from its original source. This creates significant challenges for achieving behavior change through traditional information and awareness measures focused on trash. There are numerous behaviors and audiences associated with reducing trash including covering trash cans in commercial areas, cleaning up loading docks, placing cigarette butts in appropriate bins, covering up truck loads, packing out trash on hiking trails, and reducing use of single-use plastics. However, achieving measurable changes in behavior requires tying observed trash back to its source or audience and then developing an understanding of both the personal and contextual factors that result in the trash entering the storm drain system.

In order to address trash generated by commercial areas, a community based social marketing firm was used to create a behavior-based data-driven model for trash reduction. Systematic observations of trash and litter across 36 retail centers located throughout the unincorporated areas were made as part of the study. Data collected included observations of exiting litter (amount, location, and type), collection bins, and other contextual information (e.g., number of patrons and employees). The results of the observations pointed to cigarette butts as the most prominent type of trash across all the 36 locations (**Figure 2-36**). There was also an observed lack of cigarette butt receptacles, particularly in employee break areas. Based on the contextual information gathered from the observations, a series of interviews were conducted with store managers, customers, and employees to identify motivational factors associated with cigarette butt littering.

As a result of this pilot, the County is continuing to explore partnerships with the stores for implementing cigarette butt receptacles. Results of the pilot study were presented at the CASQA 2018 14th Annual Conference.

[14] https://www.sandiegocounty.gov/content/dam/sdc/dpw/WATERSHED_PROTECTION_PROGRAM/watershedpdf/IndustComm/English/ComFlyer0918_LoadingF1.pdf

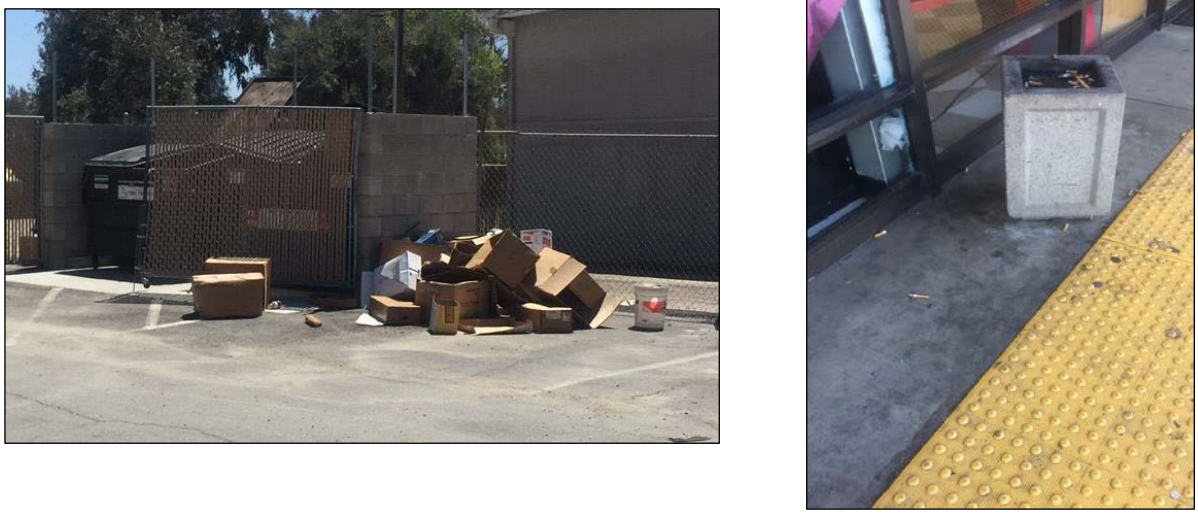


Figure 2-36. Most Common Sources of Trash in Commercial Areas as Part of the County's Trash Study

Special Events Outreach

Special Events have the potential to discharge pollutants and generate a significant amount of trash and litter. In order to control these pollutants, the County developed a new Special Events flyer using community based social marketing principles to convey BMP information (**Figure 2-37**). These flyers are designed for special events coordinators, local business owners, charitable organizations, non-profit organizations, bike/run event organizers, etc., to help them prevent pollution from entering the stormwater conveyance system during their events.

Additionally, the County conducts random stormwater inspections after special events to evaluate if the site was properly maintained. If BMP deficiencies are observed during these inspections, such as failing to contain and dispose of trash and materials, the responsible party (e.g., the event coordinator) may be subject to verbal and/or written warnings, fines, and/or denial of future event permits. The new flyers are now distributed to all applicants that request a special event permit from the County's DEH, with the goal of making it easier for applicants to understand and implement BMPs.

Figure 2-37. Special Events Flyer Provided to Special Events Coordinators

2.4 RAINBOW CREEK

The Rainbow Creek Nutrient TMDL is based on the numeric interpretation of the narrative Basin Plan (Regional Water Board, 1994) water quality objectives for biostimulatory substances for the protection of the COLD and WARM beneficial uses. The County of San Diego is the responsible agency for the Rainbow Creek numeric goals. Progress toward the goals and the strategies the County of San Diego is implementing or planning to help meet the goals are described in the following subsections.

2.4.1 Rainbow Creek Nutrient TMDL Compliance Pathway Selection and Load Reductions

The following pathways for meeting final compliance with the Rainbow Creek Nutrient TMDL are provided in Specific Provision E.3.b(3) of Attachment E of the MS4 Permit:

> "(a) There is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR
> (b) There are no exceedances of the final receiving water limitations under Specific Provision 3.b.(2)(a) in the receiving water at, or downstream of the Responsible Copermittee's MS4 outfalls; OR
> (c) There are no exceedances of the final effluent limitations under Specific Provision 3.b.(2)(b)(i) at the Responsible Copermittee's MS4 outfalls; OR
> (d) The annual pollutant loads from given land uses discharging to and from the MS4s do not exceed the final effluent limitations under Specific Provision 3.b.(2)(b)(ii); OR
> (e) The Responsible Copermittee develops and implements the Water Quality Improvement Plan as follows: …"

In the September 4, 2019 letter to the County of San Diego, the San Diego Water Board notified the County of deficiencies in the reasonable assurance demonstration used to select the implementation of

the WQIP as a pathway for compliance with the Nutrient TMDL. In response to this letter, the County of San Diego has re-evaluated its approach to meeting compliance with the TMDL.

Based upon a thorough evaluation of these compliance pathways, the County of San Diego has elected to pursue pathway (d) above in which annual pollutant loads from given land uses discharging to and from the MS4s do not exceed the final effluent limitations (i.e., allowable annual loads) to meet compliance with the Nutrient TMDL. The allowable annual loads for pathway (d) are presented in Table 3.3 of Attachment E.3 of the MS4 Permit (Special Provision 3.b.(2)(b)(ii)).

As indicated in the Rainbow Creek Compliance Analysis that was completed as part of the SMR WMA WQIP (Santa Margarita MS4 Copermittees, 2018), quantitative modeling has been conducted since development of the Nutrient TMDL. This modeling effort improves upon the spreadsheet approach used to develop the TMDL. The overall robust modeling efforts[15] conducted for the SMR Watershed through several Proposition 84 grant projects included the SMR WMA Copermittees, the Regional Board, and other watershed stakeholders. The modeling was conducted to address nutrient loading to the main stem of the SMR to support the development of an alternative Nutrient TMDL for the Santa Margarita River and Estuary. Further, the San Diego Water Board relied upon the modeling results in a recent Investigative Order No. R9-2019-0007, which is the first step in considering the development of an alternative Nutrient TMDL to protect the beneficial uses of the SMR Estuary.

The updated model was used to develop the annual total nitrogen (TN) and total phosphorus (TP) loads from the given land uses of commercial nurseries, parks, residential areas, and urban areas as identified in Table 3.3 of Attachment E.3 of the MS4 Permit. Updates to the table using the modeling approach resulted in lower allowable TN and TP loads discharging from the MS4 from specific land uses (**Table 2-6**) as compared to the allowable loads listed in Table 3.3 of Attachment E.3 of the MS4 Permit. Details of the modeling approach and results are presented in **Attachment 5B** to **Appendix 5**, and a summary of the updates is presented in the following paragraphs.

2.4.1.1 Updates to TMDL Land Use Final Effluent Limitations/WQIP Goals

As part of the model updates, existing and allowable TN and TP loads and required reductions for the MS4 drainage area were established for an annual rainfall average for Water Year (WY) 2007 to WY 2016, as shown in **Table 2-6**. Instead of using WY 2003, which was used to model the allowable loads used for the reasonable analysis demonstration presented in the WQIP, the updated model uses a 10-year averaging period. This improves the representation of rainfall conditions in the watershed. For reference, existing TN and TP loads for land uses not assigned as MS4 in Attachment E.3 of the MS4 Permit were included for informational purposes.

[15] 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).

Table 2-6. MS4 Existing (Modeled) and Allowable TN and TP Loads and Required Reductions for the Rainbow Creek Nutrient TMDL based on Annual Rainfall Average for WY 2007 to WY 2016 (kg/yr)

TMDL Land Use Category	Existing (Modeled) TN Load	Existing (Modeled) TP Load	Allowable TN Load (Final Effluent Limitation)	Allowable TP Load (Final Effluent Limitation)	Required TN Load Reduction	Required TP Load Reduction
Commercial nurseries	83.1	4.1	9.5	0.9	73.7 (89%)	3.2 (77%)
Parks	1.3	0.09	0.8	0.08	0.5 (36%)	0.01 (5%)
Residential areas	24.7	1.2	13.9	1.4	10.8 (44%)	0.0 (0%)[1]
Urban areas	15.5	1.1	9.8	1.0	5.7 (37%)	0.1 (8%)
MS4 TMDL Compliance Subtotal	**124.6**	**6.5**	**34.0**	**3.4**	**90.7 (73%)**	**3.31 (51%)[2]**
Agricultural fields[3]	46.9	4.6	--	--	--	--
Orchards[3]	12.7	0.4	--	--	--	--
Caltrans[3]	53.4	4.2	--	--	--	--
Other[3]	18.0	0.4	--	--	--	--
Total MS4 Area[3]	**255.6**	**16.1**	--	--	--	--

1: Actual difference between the Existing Modeled TP Load and Allowable TP Load is -0.2 kg/yr. A Required TP Reduction of 0.0 (0%) is shown to reflect antidegradation.
2: Total Required TP Reduction calculated assuming 0.0 kg TP/yr required reduction for residential areas, as stated in (1). However, the actual Total Required TP Reduction is 3.1 kg/yr (48%), accounting for the greater allowable load compared to the existing load in residential areas.
3: Provided for reference to include all land uses within the MS4 drainage area.

2.4.2 Rainbow Creek Progress to Goals

The pathway options to achieve final numeric goals for nutrients in Rainbow Creek by the County of San Diego as given in the WQIP reflect the same five pathway options in Attachment E.3 but are presented in a different order (i.e., 1 = '(e)', 2 = '(b)', 3 = '(c)', 4 = '(a)', and 5 = '(d)' as shown in **Table 2-7**). The County of San Diego has elected to pursue Pathway 5 (i.e., Pathway '(d)' from Attachment E.3), and, based on the updated model described above, is providing updated allowable loads (i.e., final effluent limitations), which are shown in the "Goals" column of **Table 2-7**. Replaced values from Table 3.3 in Attachment E.3 of the MS4 Permit and to Table 4-4 of the SMR WMA WQIP are shown as text strikethrough.

Table 2-7 shows the status of progress to goals, which are not due to be achieved until December 31, 2021. Strategy implementation and planning to meet goals are described in **Section 2.4.3**.

Table 2-7. Progress toward Nutrient Numeric Goals due December 31, 2021; Rainbow Creek[1] (San Diego County)

Compliance Pathway		Indicator		Goal	Goal Status
1 OR	*Implement Accepted Water Quality Improvement Plan MS4 Permit Attachment E, Section E.3.b(3)(e)*	*Implementation of a WQIP 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 WQIP; the responsible Copermittees continue to implement the required BMPs; and the responsible Copermittees continue to perform the specific monitoring and assessments to demonstrate compliance.*			*Not using this compliance pathway*
2 OR	*Receiving Water: Meet receiving water limitations MS4 Permit Attachment E, Section E.3.b(3)(b)*	*Nitrate (as N)*		*10 mg/L*	*Not using this compliance pathway*
		Total Nitrogen		*1.0 mg/L*	
		Total Phosphorus		*0.1 mg/L*	
3 OR	*MS4 Discharges: Meet final effluent limitations expressed as concentrations in the storm drain discharge MS4 Permit Attachment E, Section E.3.b(3)(c)*	*Nitrate (as N)*		*10 mg/L*	*Not using this compliance pathway*
		Total Nitrogen		*1.0 mg/L*	
		Total Phosphorus		*0.1 mg/L*	
4 OR	*MS4 Discharges: No direct or indirect storm drain discharges to receiving water MS4 Permit Attachment E, Section E.3.b(3)(a)*	*100% reduction in anthropogenic discharges from storm drain outfalls to Rainbow Creek*			*Not using this compliance pathway*
5	MS4 Discharges: Final effluent limitations expressed as annual allowable loads[2] MS4 Permit Attachment E, Section E.3.b(3)(d)	Total Nitrogen	Commercial Nurseries	~~116~~ 9.5 kg/yr	In progress; see Section 2.4.3 for additional details and 2.4.1 for proposed modifications to the allowable loads
			Parks	~~3~~ 0.8 kg/yr	
			Residential Areas	~~149~~ 13.9 kg/yr	
			Urban Areas	~~27~~ 9.8 kg/yr	
		Total Phosphorus	Commercial Nurseries	~~3~~ 0.9 kg/yr	
			Parks	~~0.10~~ 0.08 kg/yr	
			Residential Areas	~~12~~ 1.4 kg/yr	
			Urban Areas	~~6~~ 1.0 kg/yr	

[1] Baselines are not included in this table. Baselines for Rainbow Creek goals are not included in the accepted WQIP, and none of the goals are expressed in terms that are relative to a baseline, so baselines are not necessary to evaluate progress toward the goals.
[2] Pathway 5 goals that were based on Table 3.3 in Attachment E.3 of the MS4 Permit are shown in strikeout. The Final Effluent Limitations Expressed as Annual Loads in MS4 Discharges to Rainbow Creek based on Annual Rainfall Average for WY 2007 to WY 2016 are shown as proposed updates.

2.4.3 Rainbow Creek Strategy Implementation and Planning

To meet Rainbow Creek Nutrient TMDL requirements the County of San Diego is implementing and planning structural and non-structural BMPs. Details on implemented and planned BMPs, including next steps, are provided in the following subsections. Note that in addition to the Rainbow Creek specific strategies described below, many of the strategies described in **Section 2.3.2** above are also being implemented in the County's jurisdiction within the Rainbow Creek Subwatershed.

2.4.3.1 Structural BMP Implementation and Stream Restoration Opportunities

To achieve compliance with the Rainbow Creek Nutrient TMDL and to meet the final WQIP goals by December 31, 2021, the County continues to construct water quality improvement projects and to investigate additional opportunities to construct projects that will reduce nutrient loads to Rainbow Creek. Specifically, the County completed a 1.7-acre turf conversion project and is pursuing stream restoration and BMP retrofits, or their equivalent, consisting of subsurface wetland channels and bioretention swales within segments of the County's road drainage system in the Rainbow Creek Watershed. A description of the completed and future projects and their expected contributions toward meeting the final effluent limitations are described below.

2.4.3.1.1 Rainbow Park Turf Replacement Project

To reduce nutrient loads from park land use, the County completed the Rainbow Park Turf Replacement Project which converted 1.7 acres of grass on an existing multi-use soccer and baseball field to artificial turf with an underdrainage system. The project reduces TN loads by 0.27 kilograms per year and TP loads by 0.01 kilograms per year, supporting the required TMDL load reduction from park land uses. This load reduction is based on updating the land cover for the park from "park" to "artificial turf" in the model, which affects the assumed nutrient concentrations present in runoff from the park.

The project allows for year-round use of the field and eliminates water use and associated costs for the multi-use sports field. The project was funded with $1.34 million in FY 2015 State Water Board "Drought Response Action Plan" funds. Ongoing maintenance of the field is funded by County Service Area 81 and conducted by the County's Department of Parks and Recreation. The project was presented to the Rainbow Community Planning Group in November 2016 and was completed in September 2017. **Figure 2-38** provides photos of the multi-use sports field before and after turf replacement.

Before

After

Figure 2-38. Rainbow Park Sports Field Before (Top) and After (Bottom) Turf Replacement

2.4.3.1.2 BMP Retrofits and Stream Restoration

The County continues its commitment to timely comply with the requirements of the Rainbow Creek Nutrient TMDL. To achieve this end, preliminary design was completed, and funding was secured for four BMP retrofits consisting of lined, subsurface wetland channels and bioretention swales within segments of the County's road drainage system. **Figure 2-39** is a rendering of the proposed subsurface wetland channels during wet weather.

Figure 2-39. Example Rendered Subsurface Wetland Channel During Wet Weather

The four BMP retrofits (**Figure 2-40**) will treat runoff from approximately 511 acres consisting of the TMDL-designated land uses as well as other land uses, which will treat 68% of the total MS4 outfall drainage area within the Rainbow Creek Watershed. Specifically, the retrofits will treat all, or portions of, drainage areas of four MS4 outfalls: HST01, MS4-SMG-088, MS4-SMG-087, and MS4-SMG-086. The BMP retrofits will be located along Fifth Street and the southern extent of Huffstatler Street; along the southern extent of Rainbow Valley Boulevard; along the northern extent of Rainbow Valley Boulevard; and along the northern extent of Huffstatler Street. **Figure 2-40** provides a map of the approximate locations of the BMP retrofit projects and the associated outfall drainage areas.

In combination with the park turf replacement project, these four BMP retrofits will achieve 89.3% and 152.3% of the TN and TP load reductions, respectively, assigned to the MS4 (**Table 2-8**). Since there is still a 10.7% deficit in the required TN load reduction after implementation of the projects discussed above, the County will move forward with either an additional BMP retrofit project in the drainage area to Outfall MS4-SMG-096 (or equivalent project), a stream restoration project, or load reductions achieved through enhanced non-structural BMPs (i.e., strategies) to meet the required load reduction. Additionally, to meet the required nutrient reduction targets by December 31, 2021, the County may consider a combination of these efforts. The expected nutrient reduction to be achieved by each project is presented in **Table 2-8**.

Furthermore, public-private partnerships are being actively pursued to add 100-foot riparian buffers, creek restoration, or re-vegetation activities near Rainbow Creek. This action pursues the recommendations from the Rainbow Creek Compliance Analysis that was completed as part of the SMR WMA WQIP (Santa Margarita MS4 Copermittees, 2018). Additional information on non-structural BMP implementation is included in the following section.

In anticipation of the construction of the four BMP retrofits or equivalent structural projects, baseline monitoring for flow and nutrients during at least one wet weather event will be continued at HST-01 and will also be conducted at two additional MS4 BMP retrofit sites beginning during the 2019-2020 wet season. These baseline data will be used to measure the effectiveness of the MS4 BMP retrofits after construction.

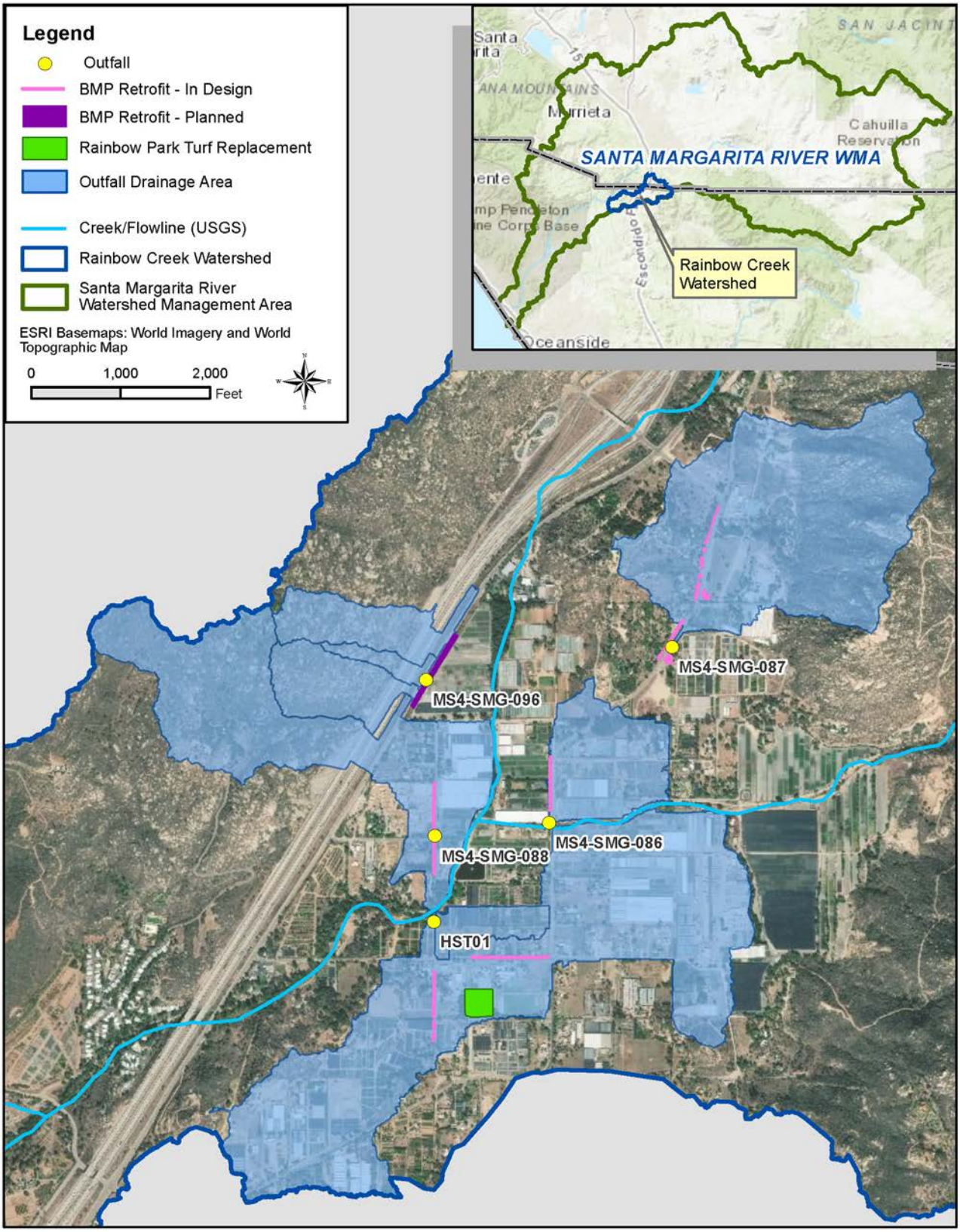


Figure 2-40. Locations of BMP Retrofits and Associated MS4 Outfall Drainage Areas

Table 2-8. Drainage Areas and Updated Nutrient Load Reductions for MS4 BMP Retrofits or Equivalents to be Completed Prior to December 31, 2021

#	Project/Outfall ID	Drainage Area Treated (acres)	Drainage Area Treated (%)	TN Load Reduction (kg/yr)	TN MS4 Target (%)	TP Load Reduction (kg/yr)	TP MS4 Target (%)
Completed Projects							
1	Rainbow Park Turf	1.7[1]	N/A[1]	0.27	0.3%	0.01	0.3%
BMP Retrofit Projects in Design							
2	HST01	215	29%	45.5	50%	3.0	90%
3	MS4-SMG-086	37	5%	12.1	13%	0.8	23%
4	MS4-SMG-087	145	19%	13.4	15%	0.8	23%
5	MS4-SMG-088	114	15%	9.7	11%	0.5	15%
AND							
Planned Projects/BMPs							
6	MS4-SMG-096 (BMP Retrofit)	52	7%	10.2	11%	0.7	21%
OR							
7	Stream Restoration	TBD	TBD	18.3	20%	1.7	52%
OR							
8	Enhanced Non-Structural	TBD	TBD	TBD	TBD	TBD	TBD
Totals for Project Nos. 1-6		**563**	**75%**	**91.1**	**100%**	**5.7**	**173%**
Totals for Project Nos. 1-5 and		**511**	**68%**	**99.2**	**109%**	**6.8**	**204%**
Totals Project Nos. 1-5 and Enhanced Non-structural BMPs[2]		**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**
TMDL Required Load Reduction		**--**	**--**	***90.7***	***73%***	***3.31***	***51%***

Note: TN – total nitrogen; TP – total phosphorus

[1] This project is within the drainage area to HST01; therefore, it is not included in the drainage area totals listed below to avoid double counting the acreage. However, the project is factored into the calculations for TN and TP load reductions.

[2] Since estimating the reduction of nutrients from non-structural BMPs is challenging, load reductions from non-structural BMPs are not factored into the modeled load reductions at this time but may be in the future when methods for quantifying nutrient load reductions from non-structural BMPs are further refined. Refer to **Section 2.4.3.2** for additional information on non-structural BMPs.

2.4.3.2 Implementation of Non-Structural BMPs

In addition to the aforementioned BMP retrofit projects and stream restoration approaches, the County will continue implementation of non-structural BMPs to reduce nutrients in runoff. However, estimating the reduction of nutrients from non-structural BMPs can be challenging. Thus, nutrient load reduction from non-structural BMPs is not factored into the modeled load reductions at this time but may be in the future when methods for quantifying nutrient load reductions from non-structural BMPs are further refined. The County will continue to search for opportunities to better quantify nutrient load reductions from non-structural BMPs.

Nevertheless, these institutional programs are important because they focus on controlling the sources of pollution throughout the landscape before pollutants can be washed downstream by stormwater runoff. The County currently implements a variety of jurisdictional non-structural strategies (i.e., BMPs), including inspections, enforcement, and education and outreach at commercial agricultural facilities. Below are brief descriptions of example existing non-structural strategies. **Section 2.3.2** and **Appendix 2** of this report include additional details on the non-structural strategies implemented by the County to minimize the contribution of nutrients to receiving waters through the MS4. **Appendix 2** also identifies optional strategies (i.e., enhanced non-structural BMPs) that are being implemented, or will be implemented as needed through an adaptive management process, to meet the WQIP goals (i.e., TMDL compliance targets) for Rainbow Creek.

2.4.3.2.1 Inspections and Enforcement

The County's Department of Agriculture, Weights, and Measures (AWM) is authorized to respond to stormwater complaints and inspect commercial nurseries and greenhouse facilities to follow up that violations have been addressed and resolved. Inspections are regularly and thoroughly conducted across the Rainbow Creek Watershed. The inspections are both routine and in response to reported violations. Violations are reported to the County by phone or e-mail and can be made by the public or by County employees (who receive "see something, say something" watershed training). Details on additional focused effort in the Rainbow Creek Watershed are provided below. Additional details on the AWM Agricultural Water Quality Program are presented in **Section 2.3.2.2**.

Focused Agricultural Strategies for the Rainbow Creek Watershed

The Rainbow Creek Nutrient Reduction and Management Plan (NRMP) was completed in 2016 and outlines several waste control and cleaning practices for County-responsible sources. Strategies include the Agricultural Water Quality Program described in **Section 2.3.2.2** and NRMP management practices for irrigation, nutrient control, and erosion and runoff recommended for agricultural operations. Further, the County has identified additional specific strategies to help achieve water quality improvement goals in the Rainbow Creek Watershed as discussed in **Section 2.3.2.2**. The County of San Diego will update its JRMP to describe its programs to address agricultural water quality during the next fiscal year, as described in **Section 7.5** of **Appendix 2**.

In addition to inspection and enforcement for commercial agricultural facilities completed by the County of San Diego AWM as described above, the County WPP conducts industrial, commercial and residential audits in the Rainbow Creek Watershed. Residential audits include inspection of parcels and roads to identify signs of improper discharge or irrigation runoff. If a residential discharge complaint is filed, an inspection is conducted to assess whether a violation is present. Additionally, under the IDDE Program, County DEH investigates complaints or notifications of potential failing septic systems (which can be a source of nutrients) to determine if repairs are required.

2.4.3.2.2 Education and Outreach

The County of San Diego has implemented a robust education and outreach program for watershed protection. The County hired the Mission Resource Conservation District (MRCD), who hosted workshops on stormwater management and source control for the SMR WMA. These workshops include training and information on agricultural BMPs, agricultural watering and fertilizing practices, "green" gardening, integrated pest management, gardening with butterflies, how to hire a landscape professional, "Life after Lawn", property management, and Rain Barrels. MRCD has hosted 16

workshops over the past five years with as many 185 attendees. Incentives are used to increase the attendance at these workshops, such as rain barrels, thermometers, and gift cards. Additional residential stormwater resources are made available on the County Department of Public Works website. The County has offered an educational module on septic system function, how to properly care and maintain a system, and identify when a system is failing. Homeowners that complete the module were eligible for a septic pumping rebate. The County has also held two workshops to inform growers about the requirements they will be held to through the Agricultural Orders.

2.4.3.2.3 University of California Cooperative Extension (UCCE) Program

Through 319(h) grants, the County has worked to collaborate with growers on irrigation, erosion, and runoff BMPs. As part of the grants, the UCCE conducted site visits, documented existing BMPs, and provided recommended improvements. The grants were intended to cover half the implementation cost of any recommendations made by the UCCE. Although very few of the nurseries chose to participate, some structural BMPs were installed with irrigation tailwater return pumps. Additional non-structural BMPs include sandbags, repair of a water collection pond pump, and tracking control.

2.4.3.2.4 Septic System Upgrades

The Rainbow Creek Nutrient TMDL identifies septic systems as contributors of approximately five percent of the total nitrogen loading to Rainbow Creek, and the San Diego Water Board identified improperly-maintained septic systems as a potential source of nutrient loading. Septic systems are also considered to be potential non-point source discharges that could contribute nutrient loading to receiving waters, and are therefore not considered to be point sources from the MS4. However, there are septic systems commonly found upstream of reaches identified as impacted by eutrophication impacts or nutrient loading, such as Rainbow Creek. Leaking or malfunctioning septic systems have the potential to contribute to nutrient loads through two mechanisms: 1) direct infiltration to the receiving water, and 2) infiltration to the MS4 (SMR WMA Copermittees, 2018).

Even though the County's MS4 Permit does not include the septic contribution from the Nutrient TMDL, the County DEH oversees the permitting of septic systems and enforces the Local Agency Management Program for septic systems that was approved by the San Diego Water Board in 2015. In the last few years, six septic system repairs or upgrades have occurred in the Rainbow Creek watershed. Notably, these repairs included the installation of large advanced treatment systems at Vallecitos Elementary School and Rainbow Oaks Restaurant. Both facilities are near Rainbow Creek, within the Rainbow Valley where the depth to groundwater is relatively shallow. These upgrades will minimize the impact of these septic systems on nutrient loading to Rainbow Creek. Additional details on the two referenced upgrades are provided in **Section 2.3.2.9**.

2.4.3.3 Next Steps

The County is committed to achieving TMDL compliance and meeting the WQIP goals and continues with project planning, design, and construction into FY 2020 and FY 2021. Major tasks to be completed in FY 2020 include the following:

- Evaluate additional opportunities for BMP retrofits to treat runoff from other persistently flowing major outfalls to Rainbow Creek if present.
- Complete a jurisdictional waters determination for the road drainage segments planned for BMP retrofits.

- Complete surveys and geotechnical investigations for the project areas.
- Engage resource agencies and San Diego Water Board when project areas are further refined.
- Complete 70% design plans for the four BMP retrofits for the projects currently in design.
- Continue to search for opportunities to better quantify pollutant load reductions from non-structural BMPs.
- Further evaluate the feasibility of additional planned BMPs and/or non-structural BMPs and expedite selected projects to complete by December 2021.
- Pursue the feasibility of launching an incentive program to encourage public-private partnerships for stream restoration activities along Rainbow Creek.
- Conduct baseline monitoring for flow and nutrients at HST-01 and at two additional MS4 BMP retrofit sites during the wet season.
- Increase regulatory presence and achieve higher inspection frequency depending on level of compliance throughout the year in the MS4 unincorporated area by adding staff hours:
    - 0.5 full-time supervisor to have a dedicated supervisor over the Agricultural Water Quality Program
    - 2 full-time AWM inspectors
- Increase inspection frequency up to four inspections per High TTWQ existing commercial agricultural facility and depending on the facility's compliance history.
- Conduct additional inspections in response to elevated nutrient monitoring results to try and identify and eliminate pollutant sources within corresponding drainage areas.
- Enhance education outreach materials and activities focused on Rainbow Creek Nutrient Reduction Management Plan goals in coordination with UCCE.
- Provide BMP outreach documents in English and Spanish at every inspected site.
- Annually review commercial agricultural facilities in the Rainbow Creek watershed that may discharge pollutants to the County MS4 and add any newly identified facilities to the inventory.
- Focus investigative efforts on identifying significant sources of nutrients.

Major tasks to be completed in FY 2021 include the following:

- Seek approval from the County Board of Supervisors by January 2021 to advertise and award for the construction of the four BMP retrofits with the goal of project completion by December 2021.
- Further evaluate the feasibility of additional planned BMPs and/or non-structural BMPs and expedite selected projects to complete by December 2021.
- If planning an incentive program to encourage public-private partnerships is determined to be feasible, then actively pursue public-private partnerships for stream restoration activities along Rainbow Creek.
- Conduct baseline monitoring for flow and nutrients at HST-01 and at two additional MS4 BMP retrofit sites during the wet season.

3.0 MONITORING AND ASSESSMENT

The Permit requires an outcome-based approach to improve water quality in stormwater and non-stormwater discharges, guided by strategies and goals identified in the WQIP. By conducting multiple types of monitoring activities, the Copermittees collect data to evaluate progress toward achieving numeric goals and determine if modifications to JRMP strategies or monitoring activities are necessary (**Figure 3-1**). This section describes results as they pertain to the HPWQCs, eutrophication and nutrient loading. To streamline the text of this WQIP Annual Report, assessment of monitoring data related to other PWQCs, which strategies also address, is provided in **Appendix 4**. A completeness check of the monitoring data, requested by the July 19, 2019 San Diego Water Board letter, is also provided in **Appendix 4**.

Following acceptance of the WQIP on November 27, 2018, monitoring for the 2018-2019 monitoring year (October 1 to September 30) was conducted in accordance with the schedule within the WQIP MAP. This monitoring year included dry weather outfall sampling for two events, wet weather outfall sampling for one event, and outfall field screening activities. Receiving water monitoring under the WQIP will be initiated in the next year in accordance with the WQIP MAP schedule.

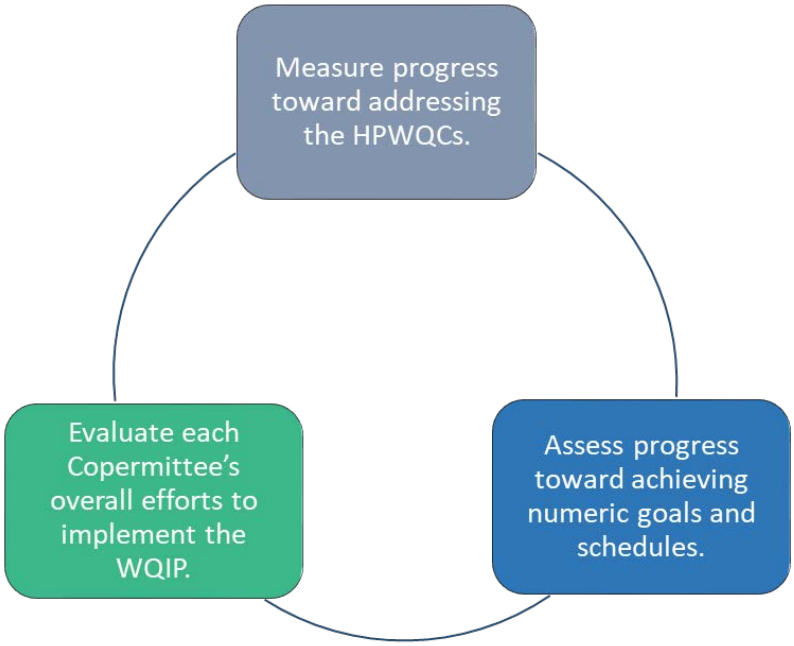


Figure 3-1. Objectives of the Monitoring and Assessment Program

3.1 PRECIPITATION

Figure 3-2 shows rainfall totals at six precipitation stations for 2018-2019 and the prior two years. Precipitation totals are provided for fiscal years (July 1 to June 30) for consistency with the rainfall period for the wet weather MS4 assessments provided in **Appendix 4**. Rainfall totals for 2018-2019 were above average, ranging from 12.96 to 24.36 inches in the SMR WMA, with about half of the rainfall across the WMA occurring in January and February. These 2018-2019 totals were more than triple those measured at the same stations during the 2017-2018 monitoring period, and slightly more than those measured during 2016-2017. Totals were greater than the historical average rainfall, and temperatures generally remained above average throughout the year (National Oceanic and Atmospheric Administration, 2018).

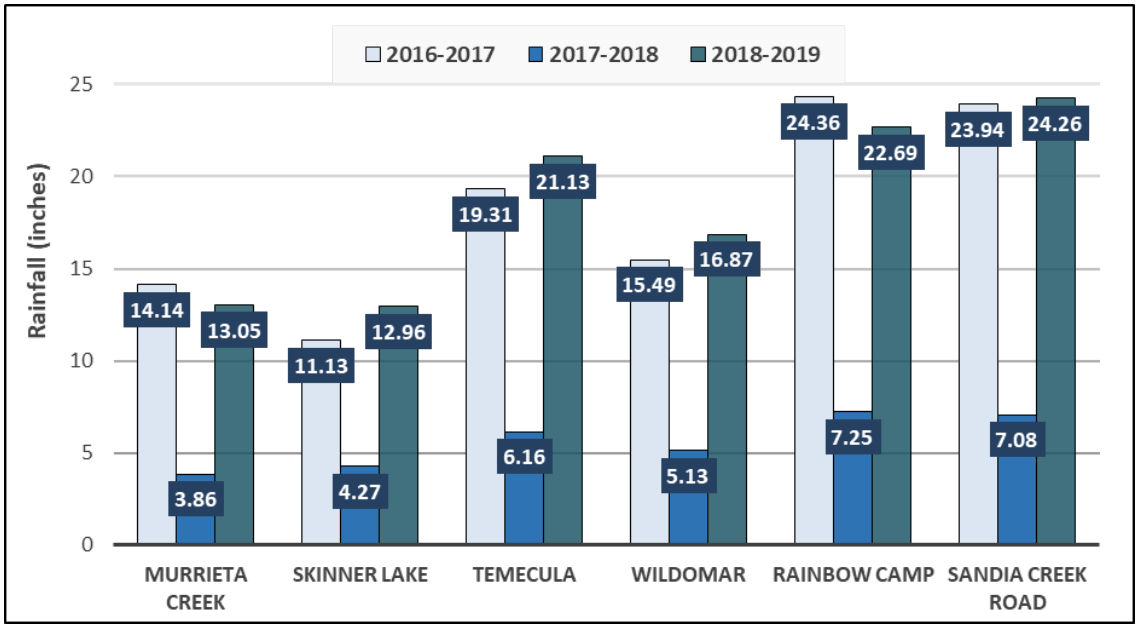


Figure 3-2. Rainfall for Fiscal Year 2018-2019 and Two Previous Fiscal Years

3.2 RECEIVING WATER MONITORING

The purpose of receiving water monitoring is to characterize current conditions and trends in chemical, physical, and biological conditions of a receiving water to determine whether beneficial uses are being protected, maintained, or enhanced. The anticipated schedule for receiving water monitoring at the long-term monitoring stations (LTMS) in the WMA is provided in Section 5.3.1 of the WQIP. An overview of receiving water monitoring activities for 2018-2019 is presented in **Table 3-1**. A summary of results from each of these programs with respect to the HPWQCs (eutrophication and nutrient loading) is presented below. Additional details and results for programs not related to the HPWQCs are presented in **Appendix 4**. These programs include Bight '18 sediment quality monitoring in the SMR Estuary and hydromodification monitoring (HMP) conducted by the Riverside County

Copermittees to complete requirements of their previous MS4 Permit [Provision F.1.h.(1)(m) of Order No. R9-2010-0016].

Table 3-1. Elements of Water Quality Improvement Plan Receiving Water Monitoring

Monitoring Programs		Dry	Wet	Monitoring Element	Conducted 2018-2019
Long-Term[1]		●	●	Field parameters, conventionals, bacteria, nutrients, metals, pesticides, toxicity (chronic), TIE/TREs	–
		●		Hydromodification	–
		●		Bioassessment	–
Regional	Bight[2] (Sediment Quality)	●		Chemistry, toxicity, benthic infauna	✓
	SMC	●		Bioassessment	✓
Hydromodification Monitoring. Program (HMP)			●	Channel assessments; flow monitoring; sediment transport monitoring	✓ (Riverside Copermittees)[3]
Rainbow Creek Nutrient TMDL		●		Nutrients	✓
Monitoring to Assess Goals and Schedules		●	●	Varies by goal and jurisdiction	✓

SMC = Southern California Stormwater Monitoring Coalition; Bight = Southern California Bight Regional Monitoring Program; TIE = Toxicity Identification Evaluation; TRE = Toxicity Reduction Evaluation

1 – Long-term receiving water monitoring was conducted during the 2016-2017 monitoring year. Results were reported in the 2016-2017 Transitional Monitoring and Assessment Report. During 2018-2019, transitional receiving water monitoring was conducted by the County of San Diego, as the WQIP had not yet been accepted at the beginning of the monitoring year and a dry weather sampling event had already been conducted.

2 – 2018 Southern California Bight Regional Monitoring was conducted during summer 2018. Results reported in this 2018-2019 WQIP Annual Report satisfy the anticipated sediment quality monitoring required for the next Permit term.

3 – Riverside County Copermittees conducted HMP Monitoring during the 2018-2019 monitoring year for their 2016 HMP. The County of San Diego completed their monitoring for the 2011 HMP in the 2014-2015 monitoring year. Results are presented in the *Effectiveness Assessment of the San Diego Hydromodification Management Plan.*

3.2.1 Regional Monitoring Programs

Regional monitoring includes several studies that provide information to evaluate various aspects of receiving water health on a regional scale. The Copermittees participated in the SMC Regional Monitoring Program and Bight '18 during the 2018-2019 monitoring year. Because data collected under Bight '18 do not include water quality data for nutrients, results are presented in **Appendix 4**. SMC Program results related to nutrients are summarized below, with details and results not related to nutrients provided in **Appendix 4** and its attachments. More detailed results will be available in the final report developed by the SMC Workgroup. The final report produced under the 2015-2019 Workplan is anticipated in the spring of 2021 (SCCWRP, 2015).

Bioassessment monitoring for the 2018-2019 monitoring period was conducted during Spring 2019 as part of the SMC Regional Monitoring Program. Monitoring for the SMC Program was conducted in accordance with *Bioassessment Survey of the Stormwater Monitoring Coalition. Workplan for*

Years 2015 through 2019 (SMC Workplan) (SCCWRP, 2015). In addition to bioassessment data, chemistry data were collected, including physical and general chemistry, periphyton (ash-free dry mass and chlorophyll-a), and nutrients. Within the SMC Program, the San Diego Region is divided into several strata; the SMR WMA is in the Northern San Diego stratum along with the San Luis Rey River WMA. The five sites within the SMR WMA during 2019 included three condition sites and two trend sites (**Figure 3-3**). All sites were located in the Lower SMR Subwatershed; three in the County of San Diego and two in Riverside County. Monitoring results as they relate to nutrients are provided in **Table 3-2** with comparisons to numeric WQOs of the Basin Plan. Nutrient concentrations were below their respective numeric WQOs, except total nitrogen, which exceeded the WQO at all five SMC locations (**Table 3-2**). Dissolved oxygen (DO) concentrations achieved WQOs.

For the two trend sites, 902WE0888 and SMC0109, a trend analysis was conducted to determine if conditions are improving or declining in terms of the monitored constituents based on the five monitoring years of available dry weather monitoring data at trend locations. There were no significant trends related to nutrients. Methods and results for other constituents are described in **Appendix 4**.

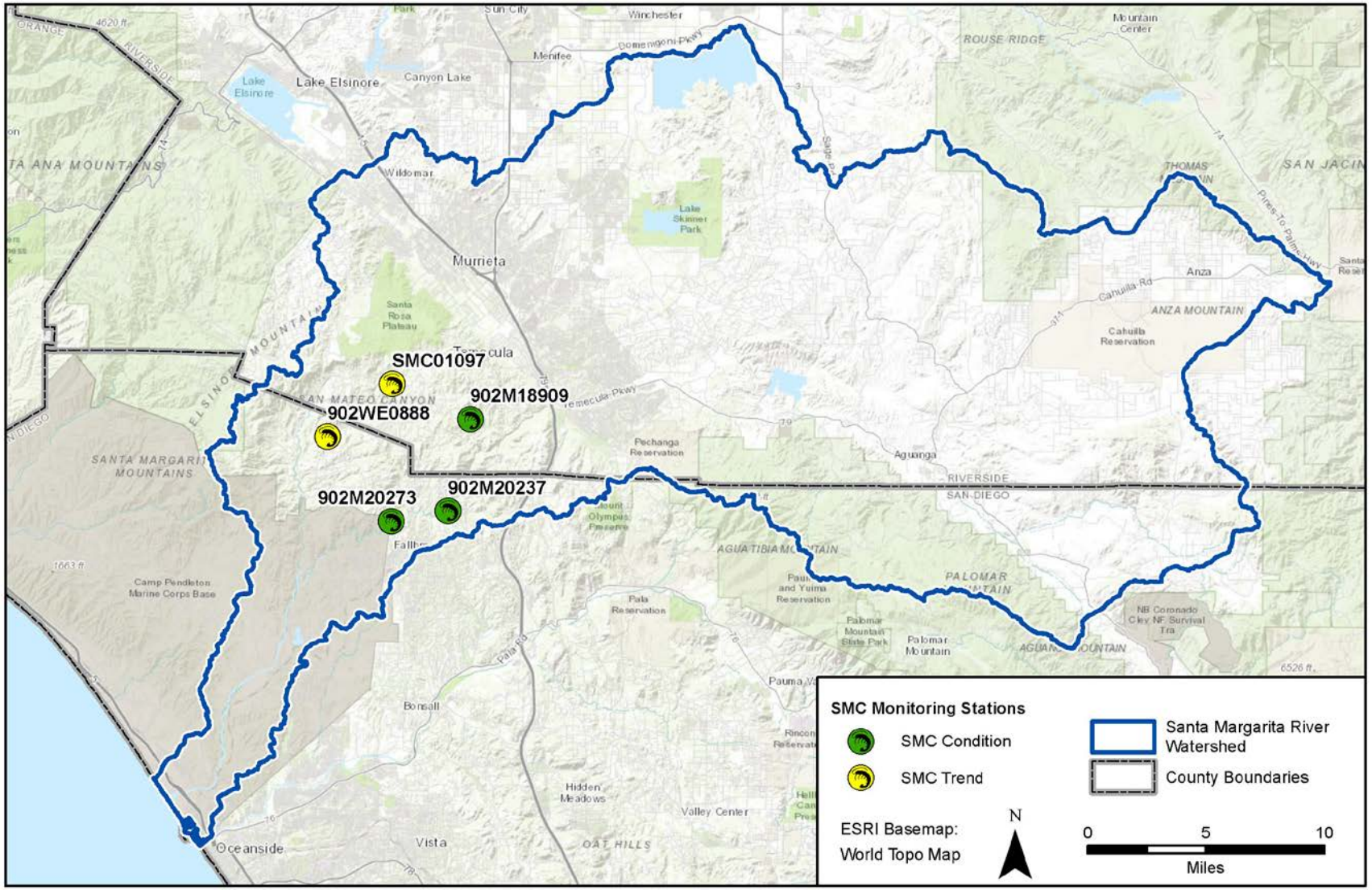


Figure 3-3. 2019 SMC Regional Monitoring Program Locations

Table 3-2. 2019 SMC Chemistry Results Related to Eutrophication and Nutrient Loading

Analyte	Units	Water Quality Objective	Objective Reference	Rainbow Creek Tributary (Via Milpas)	Santa Margarita River	De Luz Creek	Santa Margarita River Tributary at Calle Pico	Sandia Creek
				902.22	902.21	902.21	902.22	902.22
				902M20237	902M20273	902WE0888	902M18909	SMC01097
				6/4/2019	6/12/2019	6/11/2019	5/9/2019	5/9/2019
Physical Chemistry								
Dissolved Oxygen	mg/L	6.0	Basin Plan	8.80	8.51	8.00	8.96	10.20
Periphyton								
Ash-Free Dry Weight	g/m2			57.3	52.2	36	7.6	1.7
Chlorophyll a	mg/m2			9.82	149	155	10.4	28.1
Nutrients								
Ammonia as N	mg/L	(a)	USEPA Freshwater Criteria	<0.048	<0.048	<0.048	<0.044	<0.044
Nitrate + Nitrite as N	mg/L	10 (b)	Basin Plan	9.5	2	6.1	20	5.5
Nitrate as N	mg/L			9.5	2	6.1	20	5.5
Nitrite as N	mg/L			<0.010	0.016J	<0.010	0.0095J	0.016
Orthophosphate as P	mg/L			0.05	0.022	0.016	0.047J	<0.016
Total Kjeldahl Nitrogen	mg/L			<0.050	0.38	<0.050	NR	NR
Total Nitrogen	mg/L	1	Basin Plan	9.5	2.4	6.1	20	6.0
Total Phosphorus	mg/L	0.1	Basin Plan	0.06	0.052	0.019J	0.09	0.06

NR – not recorded.
< - Results less than the method detection limit.
(a) Water Quality Benchmark is based on the criterion continuous concentration (CCC) using water temperature and pH as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the MUN beneficial as described in the Basin Plan, 1994 (with amendments effective on or before May 17, 2016).
J - Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
Shaded results do not meet water quality benchmarks.

3.2.2 Transitional Receiving Water Monitoring in the Lower SMR Subwatershed

The County of San Diego conducted transitional receiving water monitoring at one mass loading station (MLS), SMR-MLS-2, which is one of three LTMS identified for the SMR WMA that will be monitored under the WQIP MAP beginning in the 2019-2020 monitoring year. The transitional monitoring had been initiated and two sampling events completed prior to the November 2018 acceptance of the WQIP. While continuation of transitional monitoring after WQIP acceptance was not required, the County chose to complete the two remaining transitional receiving water monitoring events originally planned for the 2018-2019 monitoring year. The County of Riverside had not yet received sampleable storms in 2018-2019 prior to the acceptance of the WQIP; therefore, the transitional monitoring program was discontinued by the Riverside County Copermittees as required in the WQIP acceptance letter, and WQIP monitoring was initiated with the first storm of the season.

Water quality monitoring at SMR-MLS-2 was conducted during two dry weather events (i.e., not within 72 hours of a rain event totaling 0.1 inch or greater) and two wet weather events. Analyses included field measurements, flow monitoring, and chemical, bacteriological, and toxicity testing. Wet weather monitoring was performed during the first rainfall event of the monitoring year, and during one monitoring event after February 1, in accordance with the transitional monitoring requirements of the Permit. Sampling methodology is described in **Appendix 4** and further detailed in the Transitional Receiving Water Monitoring Workplan (Weston Solutions, Inc. [WESTON], 2015a). Analytical sample results are presented in **Appendix 4.**

A trend analysis was conducted using available historical NPDES monitoring data for dry weather monitoring (five monitoring years) and for wet weather monitoring (six monitoring years) at SMR-MLS-2. No significant trends related to nutrients during dry weather were identified, and the only wet weather trend related to nutrients was a decreasing trend for ammonia as N. In addition, a decreasing wet weather trend for biochemical oxygen demand (BOD) was observed. BOD directly affects the amount of DO in rivers and streams. The greater the BOD, the more rapidly oxygen is depleted in the stream. Additional details of the trends evaluation are provided in **Appendix 4**.

3.2.3 Total Maximum Daily Load Monitoring

Compliance with the Rainbow Creek Nutrient TMDL may be demonstrated via one of five compliance pathways identified in Attachment E.3 of the Permit, including meeting final receiving water limitations (RWLs). Receiving water monitoring data can be used to assess the receiving water limitations compliance pathway. During 2018-2019, monitoring associated with the Rainbow Creek Nutrient TMDL was conducted at the locations shown in **Figure 3-4**.

Samples were collected when flow was present. Main stem sites were observed with flowing water during each monitoring event with the following exceptions:

- The furthest upstream main stem location, Jubilee Way (RBC01) was observed with flowing water only during visits conducted from February through June 2019.
- Metropolitan Water District (MWD) Crossing (RBC10) was observed with flowing water during visits conducted from December 2018 through July 2019.

For tributary stations, only Rainbow Glen (RGT01) and Willow Glen (WGT01) were observed flowing during each monitoring event. Other tributaries or other TMDL stations had observed flow conditions as follows:

- Chica Tributary (RVT02) was observed flowing during every event from December 2018.
- Margarita Glen (MGT01) and Via Milpas (VMT01) were observed flowing in only March and April 2019.
- HST01 and HST02, which are not receiving water stations, were observed flowing from December 2018 through May 2019.

Concentrations of total nitrogen were above the RWL (1 mg/L) in all but one of the 112 samples collected as part of the Rainbow Creek Nutrient TMDL Monitoring Program in the 2018-2019 monitoring year. All but two of the 112 samples collected during the 2018-2019 monitoring year were above the total phosphorus RWL of 0.1 mg/L.

The highest receiving water mean concentrations of total nitrogen and total phosphorus on the main stem were measured at RBC02 (at Huffstatler Road), followed by RBC04 (at Old Highway 395). The lowest mean concentrations for total nitrogen and total phosphorus on the main stem were measured at RBC01 (Jubilee Way) and SMG06 (at Stage Coach Lane). These results may indicate that nutrients were added to the system downstream of RBC01 (Jubilee Way) and upstream of RBC02 (at Huffstatler Road).

In tributaries to Rainbow Creek, the highest mean concentrations of total nitrogen and total phosphorus were observed at RVT02 (Chica Tributary). This tributary enters Rainbow Creek downstream of RBC01 and just upstream of RBC02.

Statistically significant increasing trends in total nitrogen concentrations were evident at five of the seven monitoring locations along the main stem of Rainbow Creek as shown in **Table 3-3**. Of the five tributary monitoring locations, four of the sites were determined to have significant decreasing trends for total nitrogen and one site, RVT02 was found to have a significant increasing trend in total nitrogen. Data from HST01 (MS4 outfall) and HST02 (in ditch upstream of outfall) indicated increasing trends for total nitrogen.

For total phosphorus concentrations, five of the main stem locations had statistically significant decreasing trends. Among the tributary locations, only one significant decreasing trend for total phosphorus concentrations was identified at Chica Tributary (RVT02). HST01 and HST02 had significantly increasing trends in total phosphorus concentrations.

Additional detail is presented in the Rainbow Creek Nutrient TMDL Monitoring Program Report provided as **Attachment 4D** to **Appendix 4**.

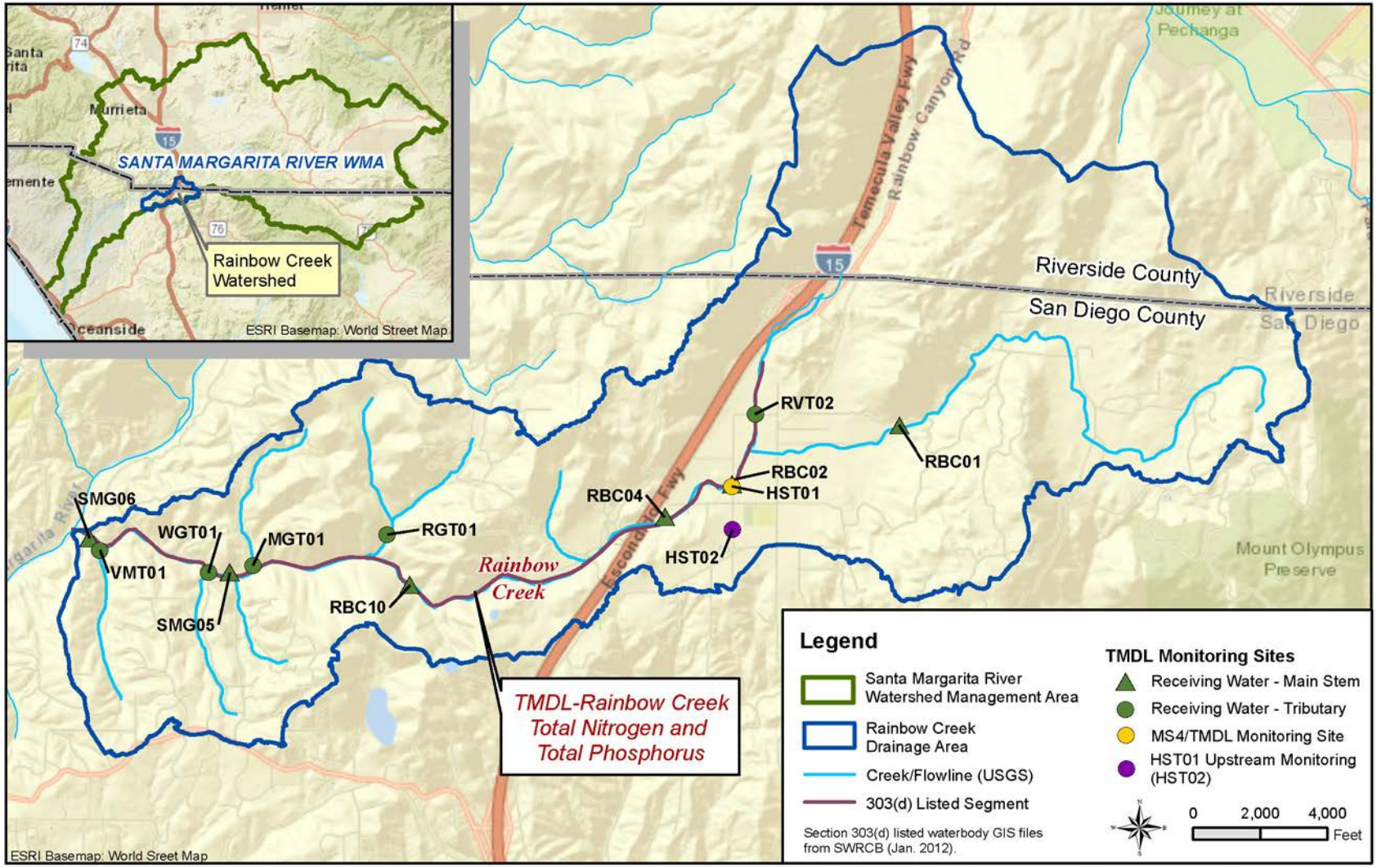


Figure 3-4. Rainbow Creek Nutrient TMDL Compliance Monitoring Locations

Table 3-3. TMDL Monitoring Trend Analysis Results

Site ID	Description	Statistically Significant Trends	
		Total Nitrogen	Total Phosphorus
Main Stem			
RBC01	Rainbow Creek at Jubilee Way	No Trend Identified	
RBC02	Rainbow Creek at Huffstatler Road	▲	▼
RBC04	Rainbow Creek at Old Highway 395	▲	▼
RBC10	Rainbow Creek at MWD Crossing	▲	No Trend Identified
SMG05	Rainbow Creek at Willow Glen Road	▲	▼
RBC06*	Rainbow Creek at 2219 Willow Glen Road	▲	▼
SMG06	Rainbow Creek at Stage Coach Lane	No Trend Identified	▼
Tributary			
RVT02	Chica Tributary at 1st Street	▲	▼
RGT01	Rainbow Glen Tributary to Rainbow Creek	▼	No Trend Identified
MGT01	Margarita Glen Tributary to Rainbow Creek	▼	No Trend Identified
WGT01	Willow Glen Tributary at Willow Glen Road	▼	No Trend Identified
VMT01	Via Milpas Tributary to Rainbow Creek	▼	No Trend Identified
Other TMDL Compliance Monitoring Locations			
HST01	Brow Ditch to Rainbow Creek at Huffstatler Road	▲	▲
HST02	Brow Ditch to Rainbow Creek at Huffstatler Road	▲	▲

▲ indicates an increasing trend (declining water quality);
▼ indicates a decreasing trend (improving water quality)
*RBC06 was removed from the monitoring list starting in November 2018 due to access restrictions.

3.3 MS4 OUTFALL MONITORING

The purpose of MS4 Outfall Monitoring is to evaluate the water quality of discharges from MS4 outfalls during dry and wet weather conditions. During dry conditions, the program also facilitates elimination of non-stormwater discharges to waterbodies through follow-up investigations, referrals, enforcement, and IDDE program activities. The data generated are used to identify and quantify pollutants in discharges, guide pollutant source identification efforts, and track progress toward achieving numeric goals.

The 2018-2019 monitoring year was the first under the WQIP MAP. An overview of the MS4 outfall monitoring activities is presented in **Table 3-4**. A summary of results from each of these programs with respect to eutrophication and nutrient loading is presented below. Detailed results, assessments, and results for programs not related to the HPWQCs are presented in **Appendix 4** and its attachments.

Table 3-4. Elements of Water Quality Improvement Plan MS4 Outfall Monitoring

Monitoring Programs	Dry	Wet	Monitoring Element	Conducted 2018-2019
Field Screening	●		Visual: flow condition, presence and assessment of trash in and around the station, IC/IDs, station description (i.e., deposits or stains, vegetation condition, structural condition, observable biology)	✓
MS4 Outfall	●		Field parameters, conventionals, bacteria, nutrients, metals	✓
		●	Field parameters, conventionals, bacteria, nutrients, metals	✓
Illicit Discharge Detection and Elimination	●		Visual surveys, and, if warranted, field parameter testing, analytical testing, follow-up investigations, and/or referral to enforcement.	✓

IC/ID – Illegal connection and illicit discharge
Shaded cells show the monitoring year covered by this report.

3.3.1 Dry Weather MS4 Outfall Monitoring

Dry weather monitoring is conducted to identify sources of non-stormwater flow and assess the effectiveness of strategies to address non-stormwater flows that transport nutrients. IDDE program activities are also focused on identifying and eliminating non-stormwater flows that may discharge nutrients and other PWQC pollutants in urban runoff. Overall, elimination of illicit non-stormwater flows from the agency's outfalls benefits all PWQCs by eliminating pollutant transport in discharges. Additionally, these programs will generate data to track the trends related to the PWQCs and the general water quality conditions within the watershed.

3.3.1.1 MS4 Outfall Discharge Monitoring Station Inventory

Provision D.2.a.(1) of the Permit requires Copermittees to identify major outfalls discharging to their receiving waters, geo-locate these outfalls on a map of the MS4, and create a major MS4 outfall discharge monitoring station inventory. The County of San Diego developed their major MS4 outfall inventory during the 2013-2014 monitoring year, and the Riverside County Copermittees began developing their major MS4 outfall inventory during 2016-2017. Refinements have been made since these inventories were developed. The City of Wildomar added an outfall and the District removed one, resulting in no change to the count of 265 major outfalls in the inventory.

The number of major outfalls monitored under each element of the MS4 Outfall Monitoring Program by each Copermittee is provided in **Table 3-5**. In accordance with Provision D.2.b.(1) of the Permit, Copermittees with fewer than 125 major storm drain outfalls in their inventory, which includes each of the Copermittees in the SMR WMA, must conduct field screening at 80% of these major outfalls twice per monitoring year (October 1st through September 30th). The major outfalls monitored per year is subject to change based on new information, updates to Copermittees' MS4 outfall inventories, changes

in transient or persistent flow classifications, and/or changes or updates to priority water quality conditions.

Table 3-5. Number of Major MS4 Outfalls Monitored per Copermittee

Copermittee	Field Screening (Provision D.2.b(1))	Dry Weather Monitoring (Provision D.2.b(2))	Wet Weather Monitoring (Provision D.2.c)
City of Murrieta	31	5	1
City of Temecula	119	5	1
City of Wildomar	13	5	1
County of Riverside	7	5	1
County of San Diego	13	5	1
District	82	5	1

The locations of these major MS4 outfalls are shown in **Figure 3-5** with the outfalls monitored during highest priority outfall monitoring (**Section 3.3.1.3**) and wet weather monitoring (**Section 3.3.2**). No major outfalls have been identified within the Upper SMR Subwatershed within either Riverside or San Diego County.

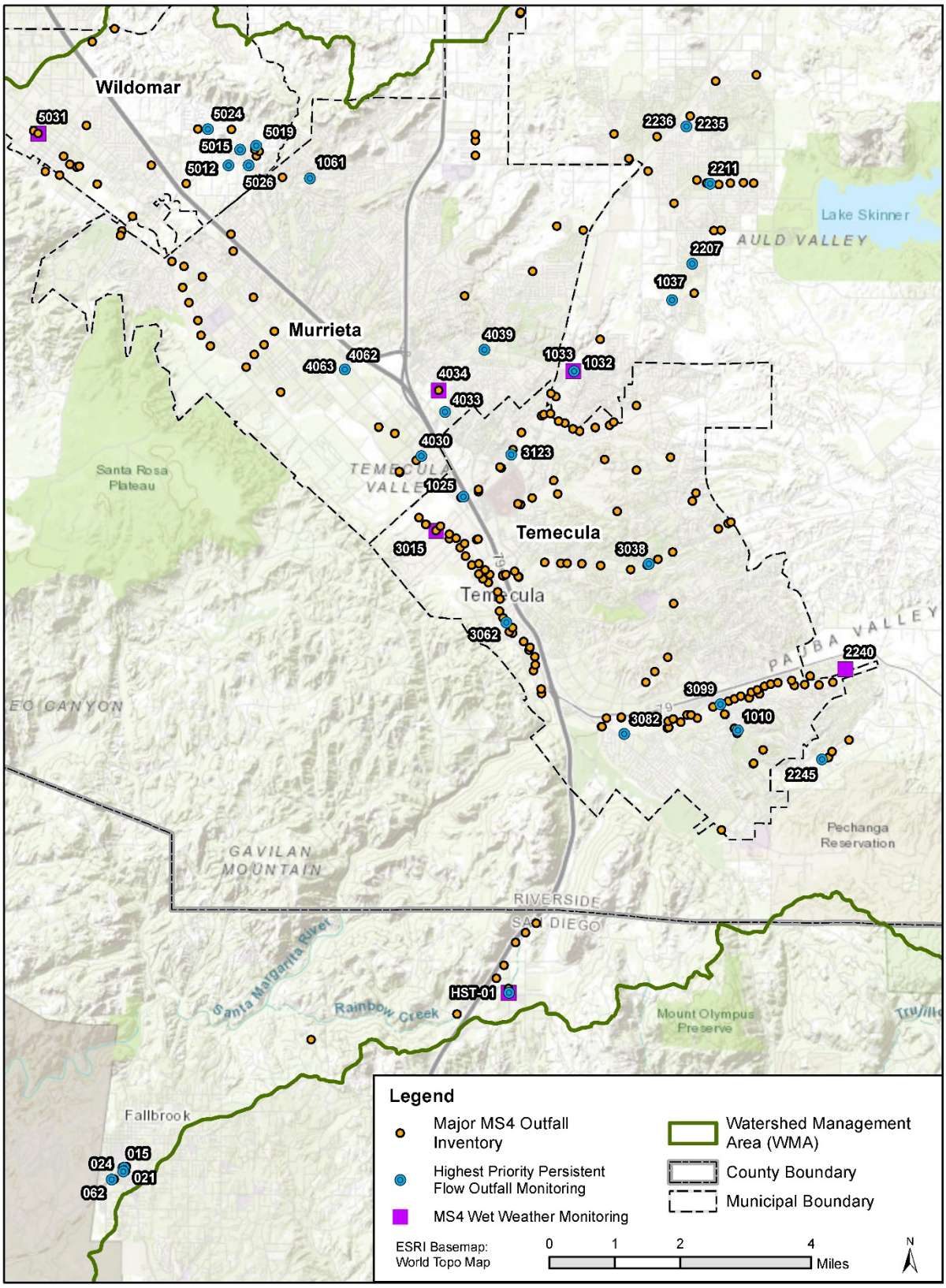


Figure 3-5. 2018-2019 Dry Weather and Wet Weather MS4 Outfall Monitoring Locations

3.3.1.2 Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Field screening is visual monitoring of major storm drain outfalls as outlined in Table D-5 of the Permit. The minimum monitoring frequency is dependent on the number of outfalls in each jurisdiction's inventory as specified by Provision D.2.a.(2)(a) of the Permit. This program is used to identify non-stormwater and illicit discharges, determine which discharges are transient and which are persistent, and prioritize those discharges that will be investigated and eliminated. Effectively eliminating non-stormwater discharges to receiving waters is one of the pathways to achieving the numeric goals outlined in the WQIP. Field screening observation results included the following:

- A summary of the flow conditions (i.e., flowing, trickle flow,[16] ponded, or dry) at the outfall stations during the 2018-2019 field visits is shown in **Figure 3-6**, where the stacked bar shows the number of observations in each flow category for each Copermittee. Given that outfalls are visited more than once, the number of observations is greater than the number of MS4 outfalls monitored.
- As required by Table D.5 in the Permit, Copermittees estimated flow rates at stations where flow was present during field screening. When flow was observed during visual observations, 67% (87 of 130) of the flow rates were less than one gallon per minute.
- The Copermittees determined the flow status of each major MS4 outfall as persistent, transient, dry, or undetermined at the completion of the monitoring year. The numbers of MS4 outfalls in each category are shown in **Figure 3-7**.

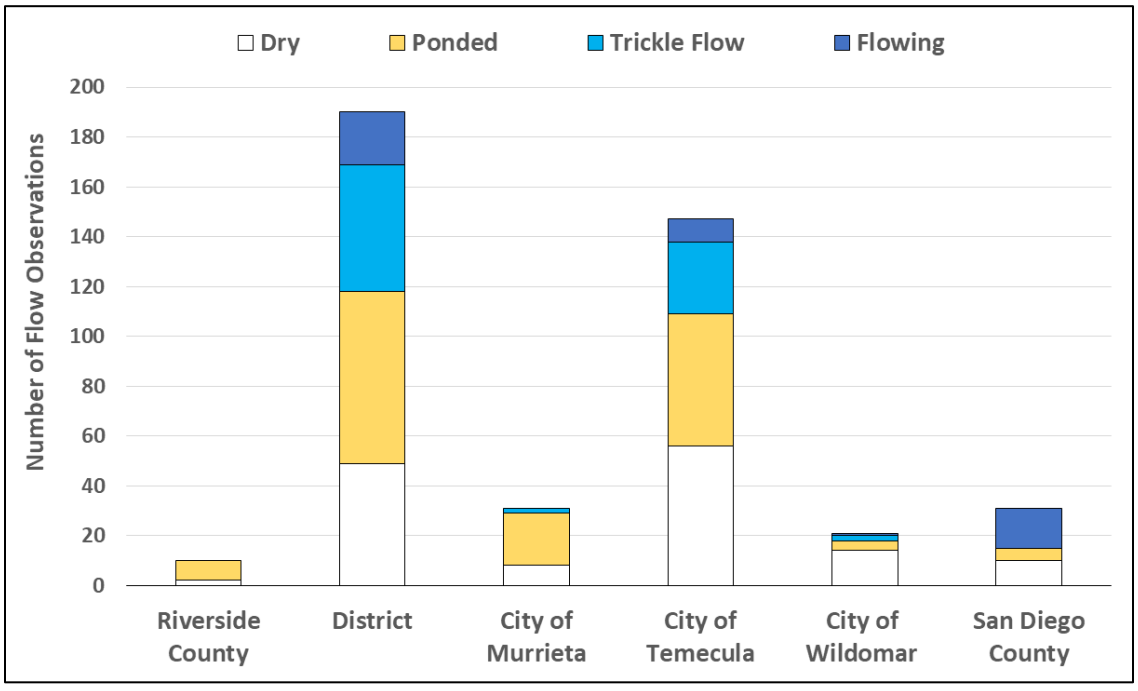


Figure 3-6. Dry Weather Field Screening Flow Observations at Major MS4 Outfalls

[16] Flow category used by Riverside County Copermittees to identify very low flows that are generally unsampleable.

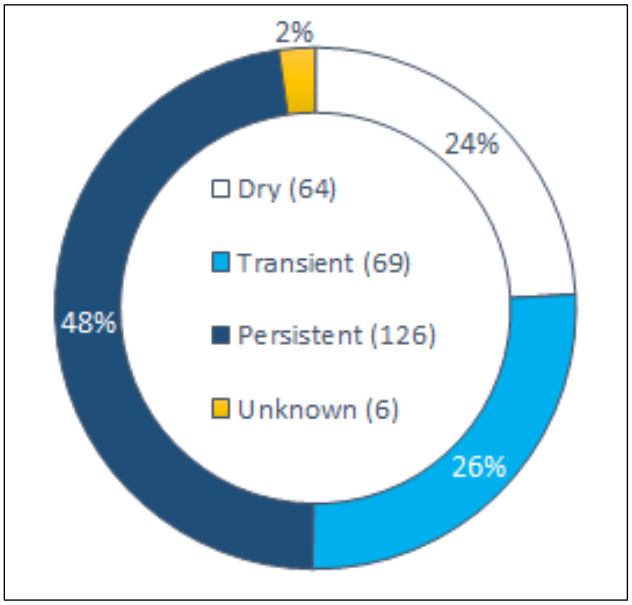


Figure 3-7. Flow Status of Major MS4 Outfalls

A list of prioritized outfalls based on field screening results is maintained and updated as program implementation develops and monitoring occurs. The process used to determine the highest priority outfalls for analytical monitoring is described in **Appendix 5**. Where obvious evidence (e.g., color, odor, high volume) of an illicit discharge was observed during outfall screening, investigations were performed in an effort to locate the source and eliminate the discharge. In cases where discharges were observed, but no obvious illicit discharge was identified as the source, appropriate documentation was recorded, and the locations were prioritized with others for follow-up.

3.3.1.3 Highest Priority MS4 Outfall Dry Weather Monitoring

The 2018-2019 monitoring year was the first year of MS4 outfall dry weather analytical sampling under the WQIP MAP, although the County of San Diego conducted non-stormwater analytical sampling during the 2017-2018 monitoring year. Between May 30 and August 15, 2019, two monitoring events were conducted at the highest priority outfalls for each Copermittee (**Figure 3-5**) if measurable flow was present (Provision D.2.b(2)(e)). Of the 60 outfall events (30 outfalls monitored twice), 39 resulted in a visited not sampled (VNS) result due to lack of measurable flow, as shown in **Table 3-6**. These outfalls were not sampled, as the Permit only requires sampling when measurable flow is present (Provision D.2.b(2)(e)).

Table 3-6. Number of Major MS4 Outfalls Monitored per Copermittee

Copermittee	Outfall	Events VNS	Events Sampleable
City of Murrieta	902MS44030	2 Ponded	0
	902MS44033	2 Ponded	0
	902MS44039	2 Ponded	0
	902MS44062	0	2
	902MS44063	1 Dry, 1 Ponded	0
District	902MS41010	2 Ponded	0
	902MS41025	0	2
	902MS41032	0	2
	902MS41037	0	2
	902MS41061	0	2
Riverside County	902MS42207	2 Ponded	0
	902MS42211	1 Ponded, 1 Trickle	0
	902MS42235	2 Ponded	0
	902MS42236	2 Ponded	0
	902MS42245	2 Ponded	0
City of Temecula	902MS43038	2 Trickle	0
	902MS43062	2 Trickle	0
	902MS43082	1 Ponded, 1 Trickle	0
	902MS43099	2 Dry	0
	902MS43123	1 Ponded, 1 Trickle	0
City of Wildomar	902MS45012	2 Trickle	0
	902MS45015	2 Ponded	0
	902MS45019	1 Dry, 1 Ponded	0
	902MS45024	1 Dry, 1 Ponded	0
	902MS45026	1 Ponded	1
County of San Diego	HST01	0	2
	MS4-SMG-015	0	2
	MS4-SMG-021	0	2
	MS4-SMG-024	0	2
	MS4-SMG-062	0	2

For sampled outfalls, grab samples were collected and analyzed for water quality parameters (pH, temperature, conductivity, DO, turbidity, and hardness), 2014/2016 303(d) List impairments, constituents with non-stormwater action levels (NALs), and those listed in Table D-7 of the Permit. Observational and hydrologic data were also recorded.

Total nitrogen and total phosphorus results for the highest priority outfalls are shown in **Figure 3-8**. All total phosphorus concentrations and all but one total nitrogen concentration exceeded the applicable NALs, which are Maximum Daily Action Levels from Permit Table C-4. These highest priority outfalls were a specific focus for IDDE investigations (**Section 3.3.1.4**).

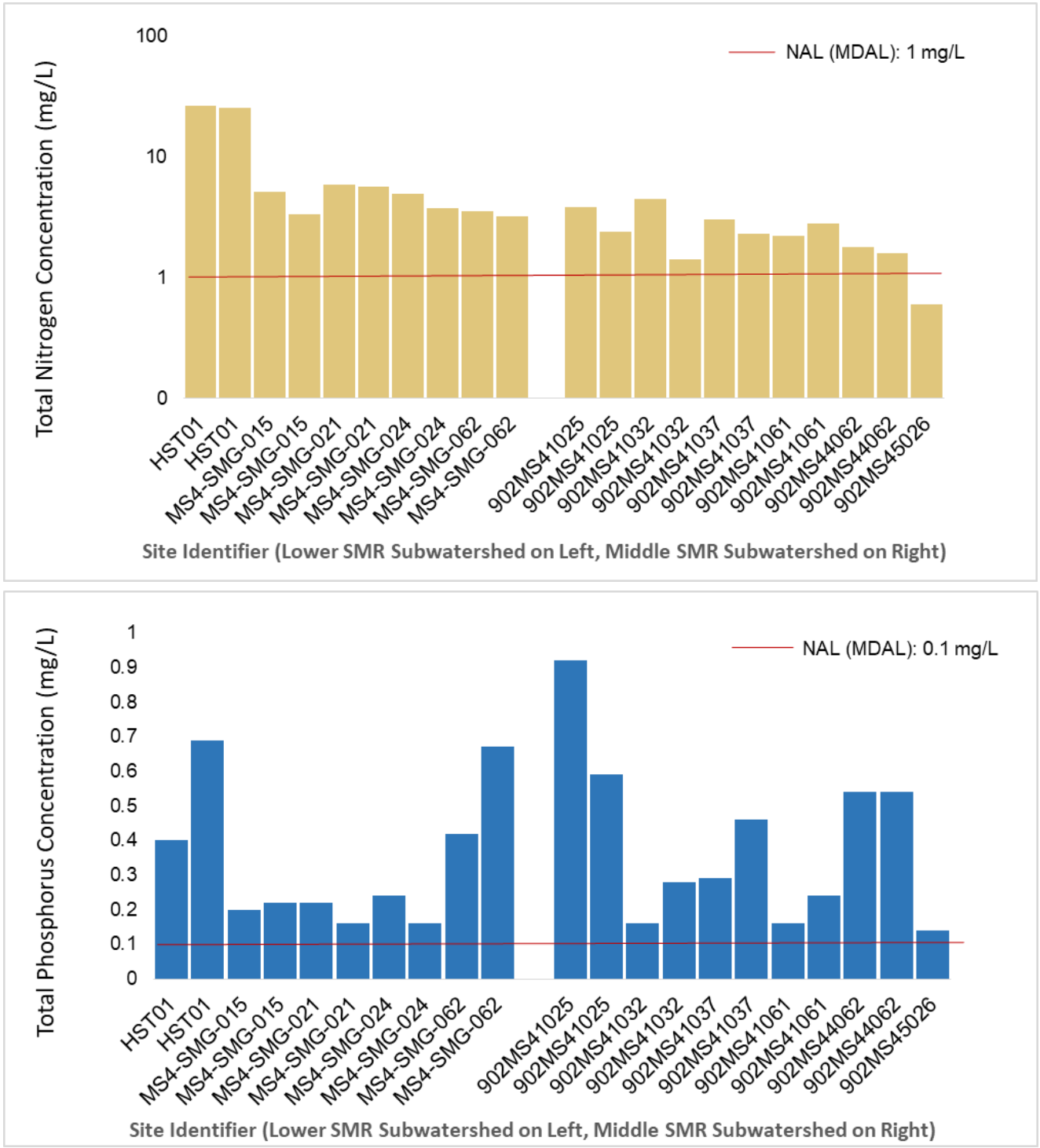


Figure 3-8. Concentrations of Total Nitrogen (Top) and Total Phosphorus (Bottom) in Samples from Highest Priority Outfalls

The highest priority outfalls will continue to be monitored until one of the following conditions outlined in the Permit have been met:

- No flowing or ponded water observed over the three most recent consecutive visits.
- Source has been identified as category of non-stormwater discharge that does not require a NPDES Permit and does not have to be addressed as an illicit discharge.
- No exceedances of NALs.
- Identified as a non-stormwater discharge authorized by a separate NPDES permit.

When an outfall fulfills one of these criteria or the threat to water quality has been reduced (as outlined in the Permit), it will be replaced with the next highest priority outfall on the Copermittee's list for the WMA. The prioritization processes used by the Copermittees is provided in **Appendix 5**. Updates to highest priority outfall lists that have already been determined for the 2019-2020 monitoring year are also provided in **Appendix 5.**

As required by the Permit, annual discharge volumes and non-stormwater pollutant loads were estimated for persistently flowing outfalls. Dry weather visual observation and field investigation data related to known and/or suspected sources of non-stormwater discharge were used to estimate percent contribution from each source, including suspected sources. Results are presented in **Appendix 4** and detailed in **Attachment 4G**.

3.3.1.4 Illicit Discharge Detection and Elimination Program

The data collected during field screenings discussed in **Section 3.3.1.2** are used to help identify persistently flowing outfalls and assist in the prioritization process for IDDE investigations. IDDE investigations are conducted to identify and eliminate sources of dry weather flow within the outfall drainage areas. The highest priority outfalls in the WMA (**Section 3.3.1.3**) were a focus for IDDE investigations. Known and suspected sources of flow identified during routine visits and IDDE investigations performed by the Copermittees are summarized in **Table 3-7**. Results in the table are limited to major outfalls, and more than one source may be identified at a site. The most frequently identified known or suspected source of flow was irrigation runoff. Groundwater infiltration was also a suspected source of dry weather flows at a few outfalls in the WMA.

Table 3-7. Known and Suspected Sources of Persistent and Transient Flows

Copermittee	Known Sources		Suspected Sources			
	Irrigation Runoff	Other	Irrigation Runoff	Ground water	Water District	Other
Middle SMR Subwatershed						
City of Murrieta	-	-	1	-	-	-
City of Temecula	6	-	57	-	4	-
City of Wildomar	-	-	1	-	-	-
County of Riverside	-	-	8	-	-	-
District	40	-	17	1	-	-
Lower SMR Subwatershed						
County of San Diego	-	-	3	3	-	-

Results are limited to major MS4 outfalls and may represent a combination of controllable and uncontrollable sources. More than one source may be identified at a site.

Figure 3-9 shows the suspected flow source types identified at the highest priority outfalls. Additional details are provided in **Appendix 4**.

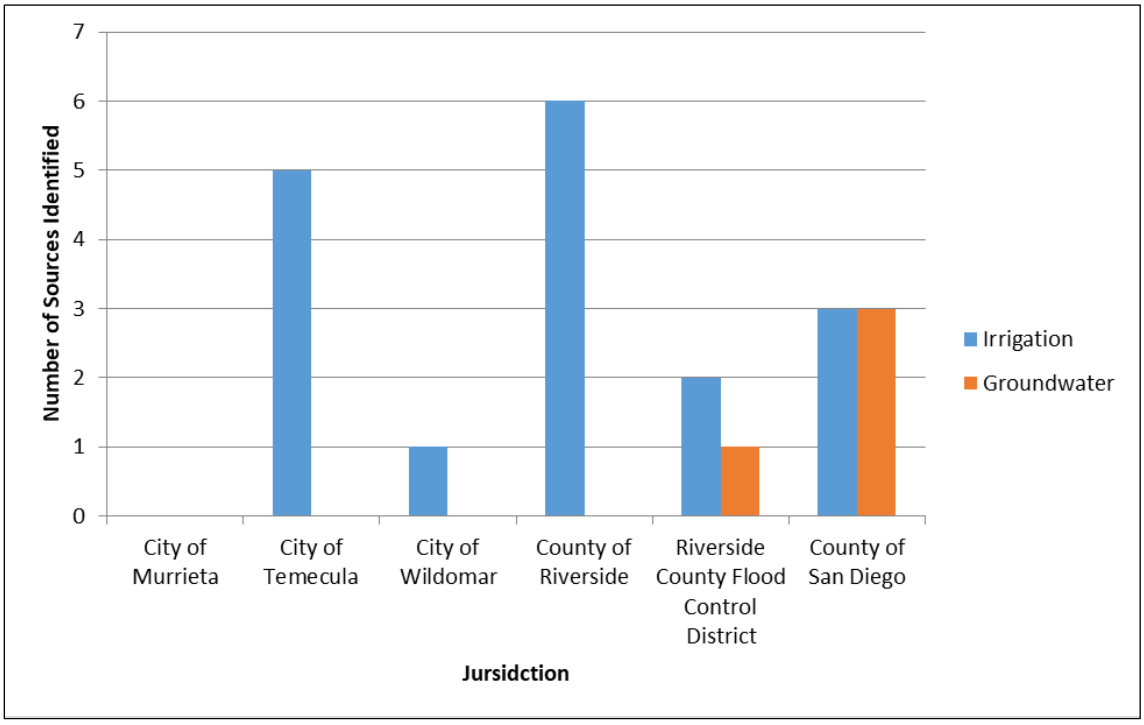


Figure 3-9. Suspected Flow Sources Identified for Highest Priority MS4 Outfalls

3.3.1.5 Rainbow Creek Progress toward Goals Outfall Monitoring

Progress toward compliance with the Rainbow Creek Nutrient TMDL may be demonstrated in several ways, as outlined in Attachment E.3 of the Permit. One of the pathways is to demonstrate compliance is to show that there is "no direct or indirect discharge from the Responsible Copermittee's MS4 to the receiving water". To this end, the County of San Diego conducts additional dry weather monitoring at MS4 outfalls in the Rainbow Creek Watershed to determine whether there are direct or indirect dry weather discharges from the County's MS4 to Rainbow Creek. If discharges are found and sampled for analysis of nutrients, the data collected also address the compliance pathway to show "no exceedances of the final effluent limitations at the Responsible Copermittee's MS4 outfalls." This monitoring is not required by the Permit or the TMDL.

The monitored outfalls are shown in **Figure 3-10**. Monitoring was conducted during dry weather (i.e., not within 72 hours of a rain event totaling 0.1 inch or greater). When flow was observed, flow rates were measured or estimated and a grab sample was collected and analyzed for ammonia, nitrate as N, nitrite as N, total Kjeldahl nitrogen (TKN), orthophosphate as P, and total phosphate as P. Total nitrogen concentrations were calculated by adding the concentrations of TKN, nitrate as N, and nitrite as N. A total of 31 samples were collected during the monitoring year.

During 2018-2019, 15 of the 21 monitored MS4 locations[17] were ponded or flowing during at least one site visit. **Figure 3-11** shows the percentage of dry visits at each monitored outfall. Flow rates were generally low (flow was calculated as < 0.1 cfs for 27 of 31 samples). The majority of flowing observations were recorded at three stations, HST01, HST02, and MS4-SMG-057. Nutrient concentrations were above TMDL effluent limitations for total nitrogen in 25 of 31 samples and for total phosphorus in 28 of 31 samples.

The County will continue monthly monitoring at all MS4 outfalls with a potential to discharge into Rainbow Creek during dry weather and to observe and address potential sources of any flowing or standing water.

Additional information can be found in the associated report, *2018-2019 County of San Diego Storm Drain Outfall Monitoring at Rainbow Creek* provided in **Attachment 4D** to **Appendix 4**.

[17] There are 20 outfalls monitored and one location upstream of an outfall (HST01) in the drainage ditch, which is referred to as HST02.

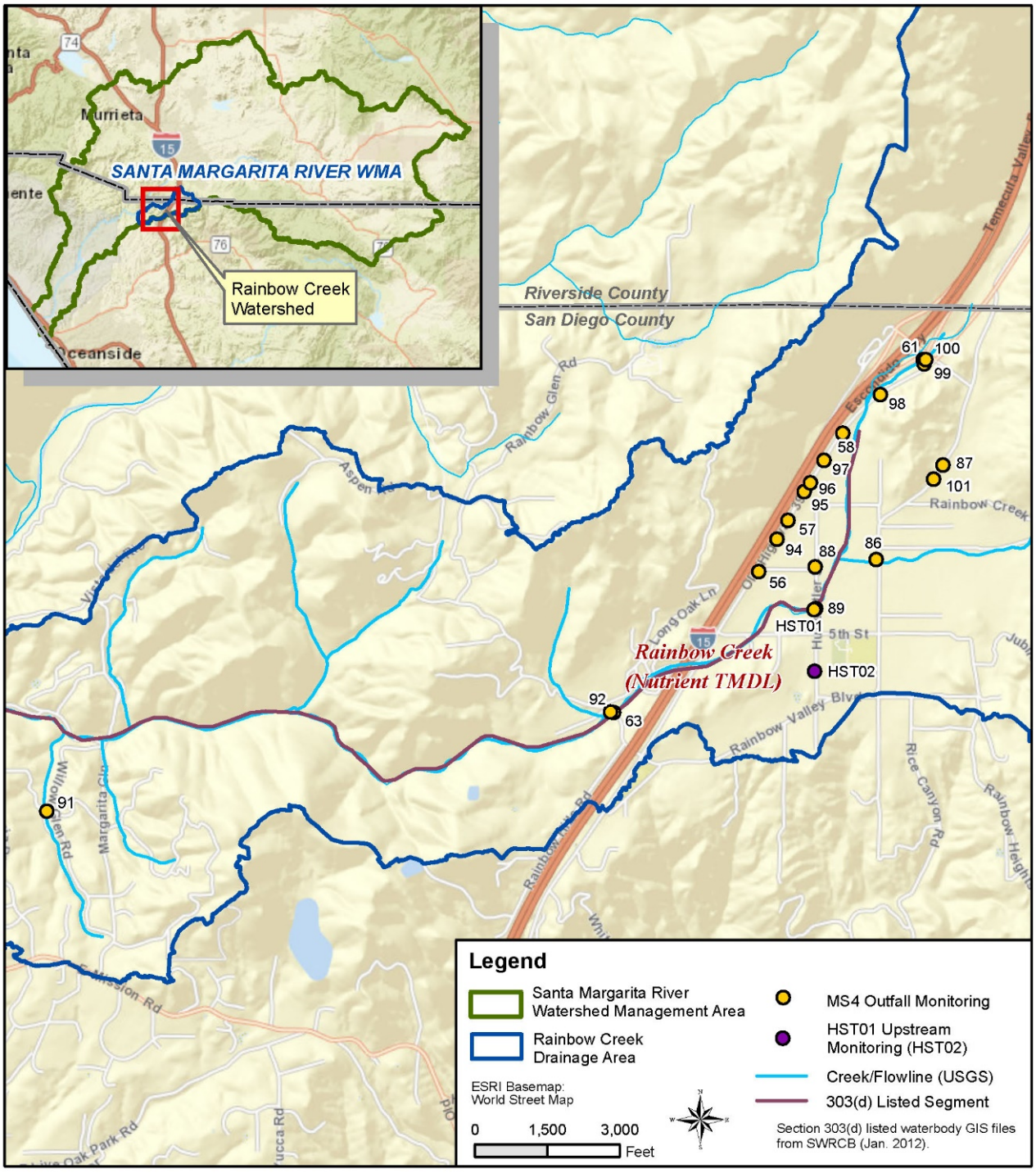


Figure 3-10. Rainbow Creek Watershed Dry Weather MS4 Outfall Monitoring Locations

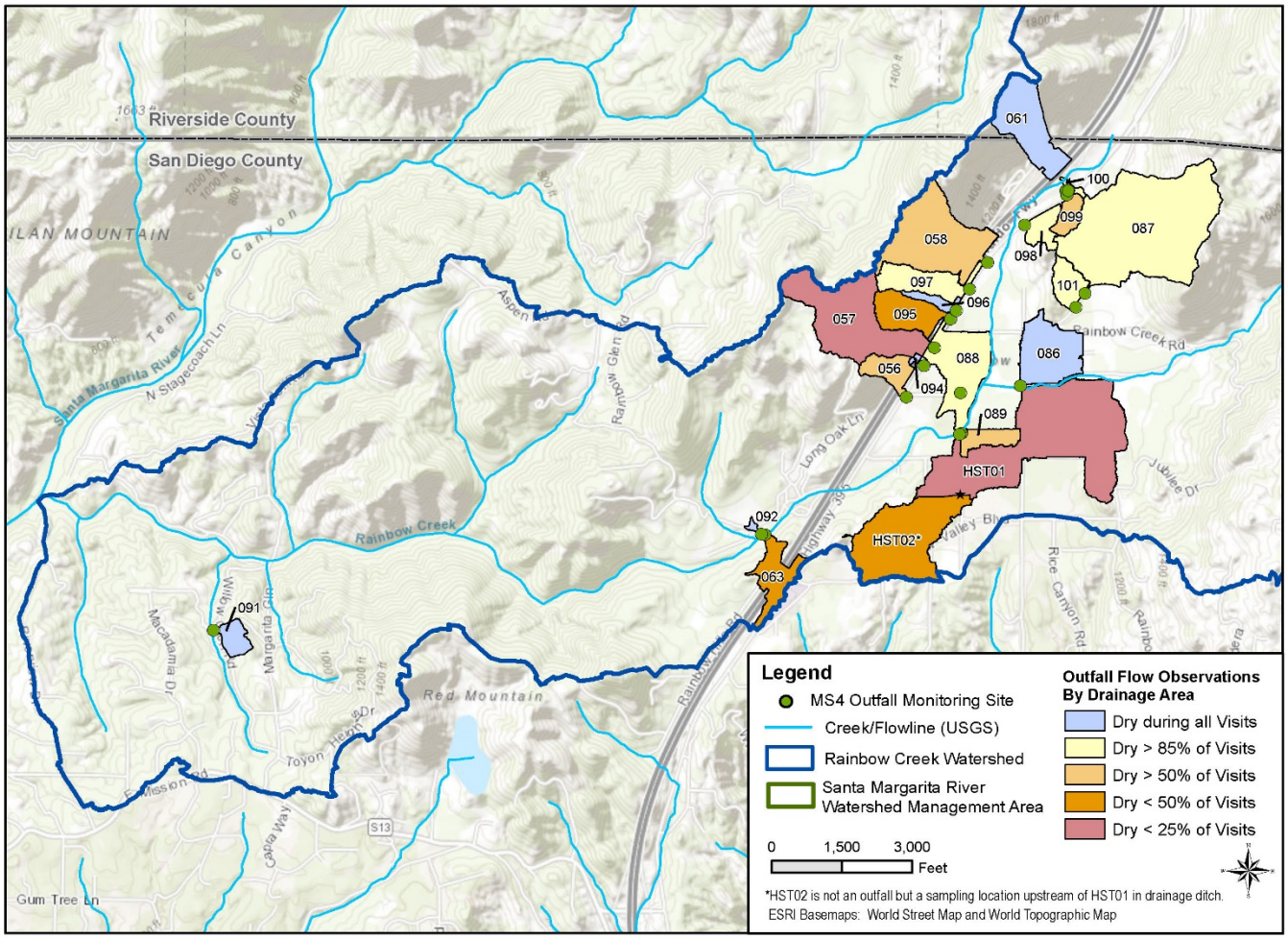


Figure 3-11. Percentage of Dry Visits at Rainbow Creek Dry Weather MS4 Monitoring Stations

3.3.2 Wet Weather MS4 Outfall Monitoring

Wet weather MS4 outfall monitoring was conducted once at each location during the wet season (i.e., October 1 through April 30). The locations of the monitored outfalls are presented in **Table 3-8** and are shown in **Figure 3-5**. 2018-2019 was the third year of monitoring at all six locations.

Grab samples were collected and analyzed for field parameters (pH, temperature, specific conductivity, DO, and turbidity) and indicator bacteria concentrations. For all other constituents, a time-weighted (Riverside County Copermittees) or flow-weighted (County of San Diego) composite sample was collected and analyzed for the conventional constituents, nutrients, and total and dissolved metals. Additional WMA-specific constituents were also analyzed, including constituents listed as a cause for impairment of receiving waters in the WMA on the 2014/2016 Section 303(d) List and constituents from implementation plans or load reduction plans developed for watersheds for which the Copermittees are listed as responsible parties under a TMDL. Analytical results for nutrients are provided in **Table 3-9**. Stormwater action levels (SALs) apply to all outfalls, but the final effluent limitation of the Rainbow Creek Nutrient TMDL apply only to HST01. Exceedances for nutrients were observed only at HST01. Nitrite as N and total nitrogen were above final effluent limitations given in

the Rainbow Creek Nutrient TMDL; nitrate + nitrite as N was above the SAL given in Table C-5 of the Permit, and total phosphorous was above both the final effluent limitation and the SAL.

Table 3-8. 2018-2019 Wet Weather MS4 Outfall Discharge Monitoring Stations

MS4 Outfall Name	Site Description	Jurisdiction	HSA Name/ No.	Latitude	Longitude
Lower SMR Subwatershed					
HST01[1]	Brow Ditch to Rainbow Creek @ Huffstatler Road	County of San Diego	Vallecitos/ 902.23	33.41422	-117.15197
Middle SMR Subwatershed					
902MS45031	Outlet to NW side of Wildomar Channel @ Gruwell Street	City of Wildomar	Wildomar/ 902.31	33.6037	-117.2787
902MS44034[2]	RCP Outlet to Warm Springs Creek d/s of M.H.S. Road	City of Murrieta	French/ 902.33	33.5475	-117.1719
902MS41033	Outlet to W side of Tucalota Creek south of M.H.S. Road	District	Gertrudis/ 902.42	33.5521	-117.1364
902MS43015	Outlet to Murrieta Creek @ Diaz Road behind Rancho California Water District pump station	City of Temecula	Murrieta/ 902.32	33.5165	-117.1723
902MS42240	Outlet to Temecula Creek @ South of Breeze Way Place and Summit View	County of Riverside	Pauba/ 902.51	33.4866	-117.0636
Upper SMR Subwatershed					
There are no major outfalls identified in the Upper SMR Subwatershed.					

[1] Previously also identified as SMR-MS4-091. HST01 used for consistency with station name used for TMDL and MS4 outfall monitoring in the Rainbow Creek Watershed. MS4-SMG-089 flowed into HST01 during the monitored storm.

[2] Previously 902MS4034.

Table 3-9. 2018-2019 Wet Weather MS4 Outfall Discharge Monitoring Analytical Results

Analyte	Units	Final Effluent Limitation[1]	SAL[2]	902MS45031 (902.31)	902MS41033 (902.42)	902MS44034 (902.33)	902MS43015 (902.32)	902MS42240 (902.51)	HST01* (902.23)
				12/05/2018-12/06/2018	11/29/2018-11/30/2018	11/29/2018-11/30/2018	11/29/2018-11/30/2018	12/05/2018-12/06/2018	10/12/2018-10/13/2018
Nutrients									
Ammonia as N	mg/L			0.96	0.21	0.2	0.11	0.26	1.4
Ammonia as N (Unionized)	mg/L			<0.0000046	0.0055	0.00052	0.0029	<0.0000046	NS
Nitrate as N	mg/L	10		0.91	1.2	2.1	0.36	1.2	19
Nitrate + Nitrite as N	mg/L		2.6	0.978	1.276	2.169	0.371	1.238	19.22
Nitrite as N	mg/L			0.068	0.076	0.069	0.011	0.038	0.22
Total Kjeldahl Nitrogen	mg/L			3.3	1.9	1.9	0.52	1.6	5.8
Total Nitrogen	mg/L	1		4.3	3.2	4.1	0.9	2.8	25.02
Total Phosphorus	mg/L	0.1	1.46	0.57	0.45	0.38	0.22	0.52	1.8
Dissolved Phosphorus	mg/L			0.26	0.29	0.29	0.29	0.44	NS
Orthophosphate as P	mg/L			0.2	0.12	0.23	0.12	0.41	1.7
Total Phosphate	mg/L			1.7	1.3	1.1	0.65	1.6	NS
Orthophosphate as PO_4	mg/L			0.62	0.38	0.72	0.38	1.2	NS

< - Results are less than the method detection limit.

* Previously SMR-MS4-091. Renamed for consistency with TMDL and MS4 outfall monitoring in the Rainbow Creek Watershed. During large storms, HST01 receives flow from MS4-SMG-089. This condition occurred during the October 12, 2019 monitoring event.

NS - Not sampled.

Hydrologic subarea is shown in parenthesis following monitoring station name.

[1] Final Effluent Limitations from Table 6.2c. San Diego Regional Water Quality Control Board Order No. R9-2013-0001, Attachment E. Only applies to HST01.

[2] Storm Water Action Levels for Discharges from MS4s to Receiving Waters, Table C-5. San Diego Regional Water Quality Control Board Order No. R9-2013-0001.

Shaded results did not meet the Final Effluent Limitation (bacteria at HST01) or Stormwater Action Level.

3.4 SPECIAL STUDIES

Special studies conducted during the first year (2018-2019) of WQIP implementation are summarized in the following subsections. Also summarized below are several ongoing projects that are continuing to support the development of alternative approaches for establishing biostimulatory targets in the SMR Estuary and River. Special studies conducted during the 2018-2019 reporting period and ongoing projects with monitoring efforts in prior and future years of the WQIP MAP are shown in **Figure 3-13** at the end of this section. As WQIP implementation continues, special studies will continue to support these efforts as well as provide additional information about the spatial distribution, processes, and sources of nutrients and non-stormwater flow in the watershed. In the Rainbow Creek Watershed, where septic systems have been identified by the San Diego Water Board as contributors to total nitrogen loading to Rainbow Creek, special studies are ongoing to identify and eliminate these sources of human fecal contamination and nutrients.

3.4.1 Santa Margarita River Nutrient Initiative Group

During the 2018-2019 year, no work was planned for this special study, rather monitoring is scheduled for WQIP year 3 (2020-2021) as described in the schedule of the WQIP MAP. Future monitoring is intended to coincide with a dry weather monitoring event at the long-term receiving water stations.

As described in the WQIP, the SMRNIG is piloting alternative approaches to establish biostimulatory targets based on recent science. This work includes developing targets in three phases: Phase I – SMR Estuary; Phase II – Lower SMR Mainstem (confluence of De Luz Creek to Estuary); Phase III – Upper SMR Mainstem (top of SMR gorge to confluence of De Luz Creek). In addition, Phase III includes evaluation of the impact of climate change scenarios on biological conditions in the SMR Estuary and River, an evaluation of possible restoration actions that could improve the level of biointegrity, and an estimation of nutrient load and wasteload allocations expected to achieve the biostimulatory targets in the river.

During WQIP implementation, Copermittees will continue to support the study effort under the SMRNIG by including in-kind monitoring of additional parameters at the long-term receiving water stations during a dry weather monitoring event as relevant to the Nutrient Numeric Endpoint framework, an alternative regulatory approach advocated by State Water Board staff and United States Environmental Protection Agency (USEPA) Region 9. This will consist of collection of additional samples from the long-term receiving water stations to be analyzed for ammonium, orthophosphate, total dissolved nitrogen, total dissolved phosphorus, particulate organic carbon, particulate organic nitrogen, particulate phosphorus, phytoplankton chlorophyll-a, algal carbon-nitrogen content, and algal phosphorus content. The Copermittees will continue to support future phases of the Nutrient Numeric Endpoint development efforts.

3.4.2 Participation in SMC California LID Evaluation and Analysis Network (SMC CLEAN) Project

The SMC has taken a lead role in gathering and evaluating available Low Impact Development (LID) BMP data. The SMC's California LID Evaluation and Analysis Network (CLEAN) project is designed to develop an understanding of the effectiveness of LID BMPs in southern California, "both in the short term for use in calibration of watershed programs and the long term for modification of LID design, construction, and maintenance through coordination with project partners and others performing LID

monitoring and serving as a clearinghouse for LID monitoring information"(SCCWRP, 2017). The District, on behalf of the Copermittees, collaborates with the SMC CLEAN project and supports its mission by providing quantification of LID BMP performance and serving as a participating agency for LID monitoring information.

The District coordinated with the Santa Ana Watershed Project Authority on a Proposition 84 grant to construct an LID Testing and Demonstration Facility at the District's 15-acre headquarters in Riverside, California. The LID Testing and Demonstration Facility (**Figure 3-12**), monitors and evaluates LID BMPs with respect to Southern California's semi-arid environment. The facility was implemented in 2012, and a total of 15 storm events have been monitored from 2012 to 2019. Six storm events were sampled during the 2018-2019 wet season. In accordance with the District's LID Monitoring Plan and QAPP, the facility collects volume and pollutant data, i.e. influent and effluent samples from its monitored BMP sites, to gauge BMP performance and effectiveness. There are currently 10 stations that can be monitored; not all stations are monitored in the same storm event:

- 601 – Pavement Control
- 602 – Porous Concrete with Filtration
- 603 – Porous Concrete without Filtration
- 604 – Porous Asphalt with Filtration
- 605 – Porous Asphalt without Filtration
- 606 – Bioretention Basin Influent
- 607 – Bioretention Overflow
- 608 – Bioretention Basin Effluent
- 609 – Planter Box
- 610 – Planter Box Control

Data gathered from the SMC CLEAN project will aid in the management of the HPWQCs of the SMR WMA. The District's LID Facility currently monitors nutrients including: ammonia, inorganic nitrogen, nitrite, ortho phosphorus, dissolved phosphorus, total phosphorus, TKN, and total nitrogen. Understanding how these nutrients and other pollutants react with the different types of media and BMP designs can assist in the appropriate selection of BMPs during the development of Water Quality Management Plans. Samples are collected, composited, and processed to determine pollutant concentrations and results are assessed by the District.

Figure 3-12. Photographs of the LID Integrated Management Plan Testing and Demonstration Facility

Nutrient data from all 15 storm events monitored from 2012-2019 were consolidated and assessed in an effort to gauge the BMPs' performance in nutrient reduction. The results of this data analysis are summarized as follows and detailed in **Appendix 4**:

- Ammonia was reduced across all monitored BMPs.
- Bioretention Basin reduced inorganic nitrogen concentrations while all the other BMP systems increased inorganic nitrogen concentrations in the effluent.
- Porous Asphalt systems (with and without filtration) and the Planter Box reduced nitrite concentrations.

- Porous Concrete, with and without filtration, and the Bioretention Basin increased concentrations of nitrite.
- Porous pavements reduced concentrations of ortho phosphorus and dissolved phosphorus.
- Bioretention Basin and the Planter Box increased concentrations of ortho phosphorus. The long-term data suggests that the Bioretention Basin potentially introduces the most ortho phosphorus into the system.
- All porous pavements removed dissolved phosphorus and total phosphorus.
- Bioretention Basin and the Planter Box were both found to increase concentrations of dissolved phosphorus and total phosphorus.
- Porous Concrete without Filtration and the Bioretention Basin were the most effective at removing TN. The Planter Box added the most TN.

The District has made changes to BMPs to evaluate effects on pollutant removal, which are further documented in **Appendix 4**. Of recent note, the District rebuilt its Bioretention Basin before the start of the 2018-2019 wet season with improvements in drainage design and soil type, and implementation of specialized vegetation. Results indicate that, except for nitrite and dissolved phosphorus, the nutrient reduction potential of the Bioretention Basin was greatly improved following its retrofit.

The Bioretention Basin's retrofit won the CASQA 2019 Award for Outstanding Stormwater BMP Implementation Project. The project was evaluated on several criteria such as: how well the BMP effectively integrates into the target site or program, the BMP's targeting of priority pollutants or pollutants of concern, the BMP's achievement of objectives and producing of valuable results, the inclusion of outstanding elements which distinguish it from other BMPs, and whether the project has been promoted via professional publications. The District will continue to monitor and sample the Bioretention Basin as well as its other BMPs to further study nutrient and pollutant behavior in relation to SMC CLEAN's short-term and long-term goals for Green Infrastructure.

3.4.3 Post-Fire Stormwater Monitoring Study – 2019 Tenaja Fire

In response to a recent fire in the Middle and Lower watershed areas, the District, on behalf of the Copermittees initiated a task order for the monitoring of stormwater discharges from the affected area of the 2019 Tenaja Fire. The Tenaja fire burned approximately 1,939 acres in the SMR WMA during September 2019. A sampling design was developed to assess the potential water quality impacts of the 2019 Tenaja Fire based on the guidance included in the SMC Post-Fire Water Quality Monitoring Plan[18] with a focus on the HPWQCs. Due to the time constraints of implementing the special study in time for the first rain event following the 2019 Tenaja Fire, the development of the scope of work document, as well as the development of a simplified post-fire water quality monitoring workplan, was expedited (provided in **Attachment 4K** to **Appendix 4**). General sampling protocols will be based on the monitoring plan describe therein and the general practices of the QAPP in Volume II of the District's Consolidated Monitoring Plan (CMP), as a reference. The sampling design is focused on characterizing the contaminant flux from post-fire runoff over two wet weather seasons (e.g., 2019-20 and 2020-2021). The study is designed to assess contaminant concentration and flux by sampling stormwater

[18] Post-Fire Water Quality Monitoring Plan prepared by the Southern California Coastal Water Research Project (SCCWRP) and SMC titled "Effects of Post-fire Runoff on Surface Water Quality: Development of a Southern California Regional Monitoring Program with Management Questions and Implementation Recommendations" (SCCWRP, 2009). The Post-Fire Water Quality Monitoring Plan can be found at the following link:
http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/598_SoCalRegionalFireMonitoringPlan.pdf

runoff from the terminal end of burned catchments and comparing the data to reference sites, and to assess the effects of the Tenaja Fire on the contribution of pollutant loads from post-fire runoff. The data will be used to assess the potential post-fire water quality impacts, with a focus on the HPWQCs identified by the WQIP, observed at the WQIP's most proximate long-term receiving water monitoring station. The results of this monitoring special study will be summarized in the subsequent WQIP Annual Report.

3.4.4 Dry Weather Microbial Source Tracking Study – Rainbow Creek Watershed

The County of San Diego is conducting a study in support of the Rainbow Creek Nutrient TMDL (San Diego Water Board, 2005). The Nutrient TMDL identified septic systems as contributors of approximately five percent of the total nitrogen loading to Rainbow Creek, and the San Diego Water Board identified improperly-maintained septic systems as a potential source of nutrient loading. The study includes collection of dry weather samples from outfalls and receiving waters in the Rainbow Creek Watershed for analysis of fecal indicator bacteria and human-associated fecal marker HF183 (HF183), which may assist in determining if discharges from septic systems occur during dry weather.

Monthly monitoring began in June 2019 and is expected to continue until June 2020. Once the monitoring program has been completed, results will be used to determine whether human sources of fecal contamination may be present and, if so, to evaluate the spatial and temporal patterns and identify areas with suspected septic system influence on dry weather flows where additional actions may be necessary.

Samples are collected in conjunction with the Rainbow Creek Nutrient TMDL monitoring program and the Rainbow Creek MS4 Outfall monitoring program (a voluntary program implemented by the County). Results from June through September 2019 are summarized in **Table 3-10**, and data collected after September 2019 will be included in the 2019-2020 WQIP Annual Report.

Table 3-10. Dry Weather Microbial Source Tracking Results in the Rainbow Creek Watershed, June to September 2019

Month (2019)	Sampling Frequency*	No. MS4 Sites Sampled*	No. TMDL Sites Sampled*	HF183 Detection
June	Monthly	3 of 19	11 of 13	RBC04
July		3 of 19	9 of 13	MS4-SMG-095
August		1 of 19	7 of 13	None
September		2 of 19	7 of 13	None

* Sites were sampled during each monthly event where flowing water was present.

As a result of the HF183 detection at Outfall MS4-SMG-095, follow up samples were collected weekly for eight weeks in August and September 2019. One result from the follow up sampling indicated high levels of HF183 (i.e., 183,168 copies/100mL) and prompted additional investigations of potential sources. A camera and flow meter were installed to continuously measure dry weather flows and record flow conditions at the site. Weekly HF183 sampling continued through October 2019, including sampling for additional analytes to aid in identification of the flow source.

Additional details on the HF183 monitoring special study, and the follow-up sampling conducted in August and September at MS4-SMG-095, can be found in the study report, which is provided as **Attachment 4K** of **Appendix 4**; results for the sampling conducted in October 2019 will be presented in next year's WQIP Annual Report.

3.4.5 Dry Weather MS4 Outfall Flow Source Investigation (Isotope / Geochemical Study)

To further address non-stormwater flows from the storm drain system during the dry season the County of San Diego, in collaboration with San Diego State University, initiated a source identification water quality study during the summer of 2018 in several watersheds. Samples of the storm drain system discharges were collected at outfalls and, for comparison, water samples were also collected from potential source waters that include tap water, groundwater, and other accessible sources of water. The goal of the stable isotope analysis was to quantify the percentage of imported water and groundwater in the monitored non-stormwater outfall discharges. Geochemical and other analyses were used to further characterize potential sources as irrigation runoff with tap or reclaimed water, groundwater intrusion, water district line flushing and/or other permitted and/or non-permitted discharges into the storm drain system. Data from each location are being used to help identify which discharges or portions of discharges may best be addressed through which WQIP strategies including education and outreach, and other BMPs. Results indicated that flow sources varied from nearly all tap water to nearly all groundwater, with flow at most monitored sites consisting of a mixture of sources.

In this ongoing study, additional data were collected between July and October of 2019, which included four locations in the Lower SMR Subwatershed, which was not part of the 2018 study. In the entire County of San Diego unincorporated area, the 2019 study included five rounds of sampling and analysis of 53 storm drain outfalls and 25 imported water reference sites on a biweekly basis at locations throughout the unincorporated area. For the storm drain outfall sites, 32 sites were sampled for geochemistry and isotopes, 16 sites for isotopes only, and 5 sites for geochemistry only. All 25 reference sites were sampled for geochemistry and isotopes. Results are being used to evaluate mineral composition and other indicators of tap water for comparison with local imported water sources (currently limited to publicly available groundwater data) and compared to results from the 2018 study; however, no sampling was conducted in the SMR WMA in 2018. Similar to the previous year's efforts, a tiered approach to a multiple lines of evidence assessment will be incorporated using flow, stable isotopes, geochemistry, and indicator analyses data. The goal of these assessments is to evaluate relative proportions of groundwater versus imported water at sampled sites. Results for this study will be presented in next year's WQIP Annual Report.

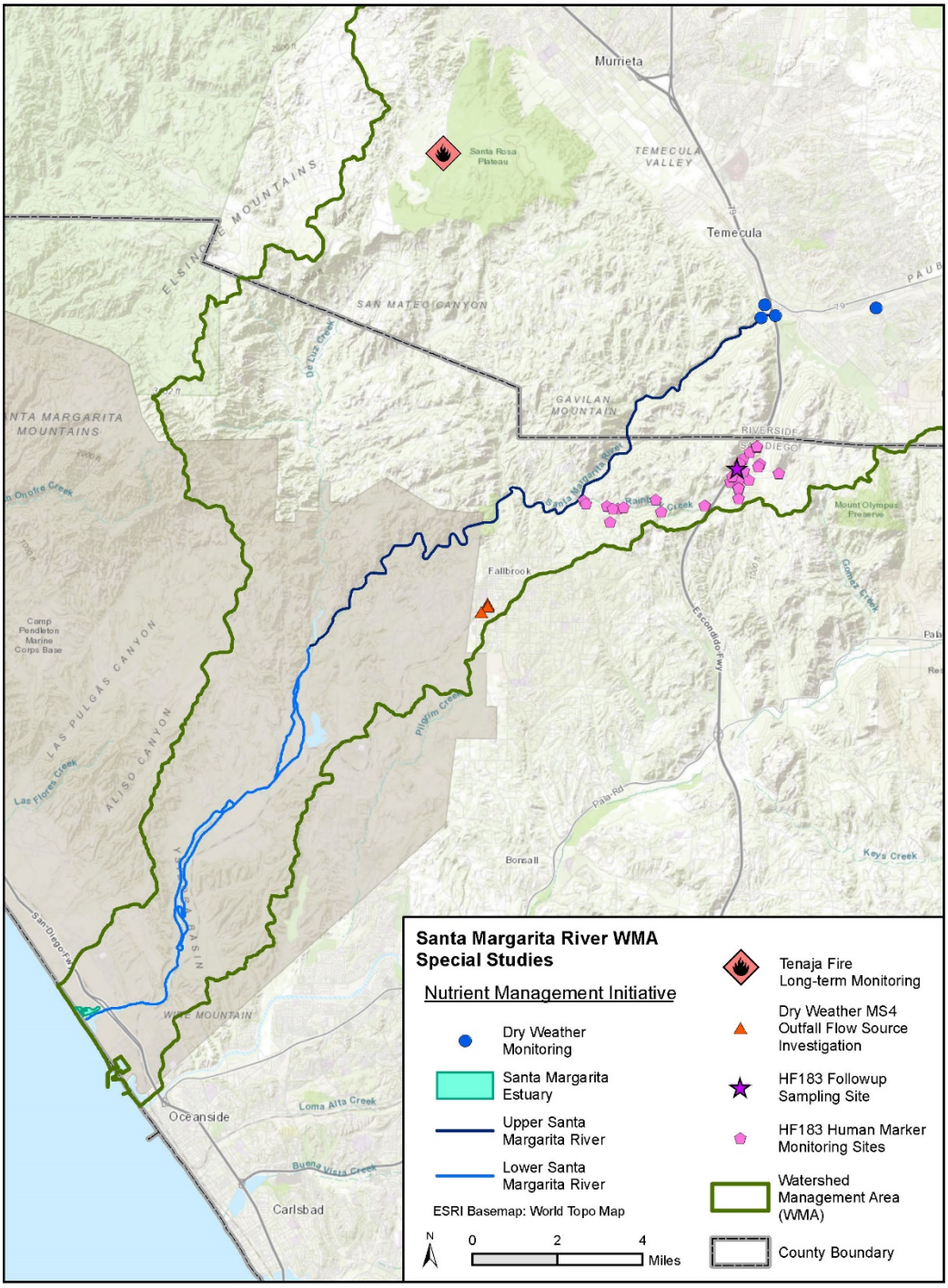


Figure 3-13. Special Studies conducted in 2018-2019 and Ongoing SMRNIG Contributions

4.0 ADAPTIVE MANAGEMENT

This section presents a summary of the potential triggers for adaptation of the WQIP and the results of the adaptive management process for the SMR WMA after the 2018-2019 monitoring year, with additional detail provided in **Appendix 5**.

Adaptive management is an iterative approach to re-evaluate the water quality conditions, priorities, numeric goals, strategies, and schedules based on the requirements of the Permit. The adaptive management process details how the Copermittees use new data and information to improve the WQIP through updates to priorities, assessments of and adjustments to goals, updates to strategies to achieve the goals, and updates to the monitoring and assessment program to provide the necessary data to support the process.

The adaptive management process may be triggered when new information becomes available, including results of routine monitoring and special studies, new regulatory drivers, results of program effectiveness assessments and progress towards numeric goals, and recommendations from the public and/or the San Diego Water Board, as described in Permit Provision B.5. The timing of the adaptive management requirements is typically either annually or at the end of the Permit term. Renewal of the Permit may result in the need for revisions to various components of the WQIP after Permit reissuance.

4.1 DRIVERS FOR ADAPTATIVE MANAGEMENT

The potential triggers for adaptive management are summarized in **Table 4-1**, and the triggers applicable to the 2018-2019 monitoring year are described in **Section 4.2**.

Of the triggers listed in **Table 4-1**, adaptive management at this time is largely driven by regulatory considerations, which include new regulatory actions at the State or local level and San Diego Water Board recommendations, rather than assessment of programmatic and monitoring data collected during this first partial year of WQIP implementation. Continued and further implementation of strategies and collection of additional monitoring and programmatic data is necessary for an evaluation of these data that leads to meaningful adaptive management of the WQIP, which was accepted in November 2018.

Table 4-1. Potential Triggers for Adaptive Management within the Water Quality Improvement Plan

Trigger	Frequency for Assessment	Potential Area(s) for Adaptation			
		Priority Water Quality Conditions	Goals and Schedules	Strategies and Schedules	Monitoring and Assessment
Exceedances of Receiving Water Limitations	Annual			✓	✓
Exceedances of Non-stormwater Action Levels or Stormwater Action Levels	Annual			✓	✓
Special Studies Results	Annual, as results are available		✓	✓	✓
New Regulatory Actions	Annual, as applicable	✓	✓	✓	✓
Water Board Recommendations	Annual, as applicable	✓	✓	✓	✓
Program Effectiveness Assessments/ Progress Towards Goals	Annual			✓	✓

Among the new regulatory actions during the 2018-2019 reporting year, the 2019 Investigative Order was issued by the San Diego Water Board. The 2019 Investigative Order, as part of the TMDL Alternative, requires the development of a water quality monitoring and assessment program to track progress towards achieving numeric targets (**Table 2-1)** and total nitrogen and total phosphorus loading reductions to the Estuary. The requirements were developed in collaboration with the Dischargers through the SMRNIG. WQIP goals include reducing dry weather nutrient loading from both the Middle and Lower SMR Subwatersheds to address the TMDL Alternative for the SMR Estuary. Further, the numeric targets from the Draft Staff Report are included in one of the compliance pathways for both the Middle and Lower SMR Subwatersheds.

As introduced in **Section 1.0**, Copermittees received several comment letters from the San Diego Water Board including:

- 2017-2018 WQIP Annual Report review letter dated July 19, 2019
- Compliance Pathway for Rainbow Creek Nutrient TMDL letter dated September 4, 2019
- Program Audit letters regarding irrigation runoff (early 2019)

The letters are briefly described below. All items listed in the comment letters for response are summarized in **Table 1-2**, and detailed responses for items due by January 31, 2020 are provided in **Appendix 5**.

2017-2018 WQIP Annual Report Review Letter Dated July 19, 2019:

The San Diego Water Board conducted reviews of all 2017-2018 WQIP Annual Reports for the San Diego Region, and provided each WMA with the results of these reviews and requirements with deadlines for addressing the items in letters. Many of the San Diego Water Board's requests based on the review of the 2017-2018 WQIP Annual Report for the SMR WMA are to be addressed in future annual reports, i.e., January 31, 2021 or later. A summary of responses to those items due for the SMR WMA with this WQIP Annual Report submittal (i.e., items to be addressed by January 31, 2020) is provided in **Appendix 5**.

Compliance Pathway for Rainbow Creek Nutrient TMDL Letter Dated September 4, 2019:

In the September 4, 2019 letter to the County of San Diego, the San Diego Water Board notified the County of deficiencies in the reasonable assurance demonstration used to select the implementation of the WQIP as a pathway for compliance with the Rainbow Creek Nutrient TMDL. In response to this letter, the County of San Diego has re-evaluated its approach to meeting compliance with the TMDL. The methods and results of this re-evaluation are presented in **Section 2.4.1** with supporting documentation provided in **Attachment 5B** (Technical Memorandum from Tetra Tech) to **Appendix 5.** In addition, the County has identified additional specific strategies focused on agriculture which are in part due to the comment letter. A summary of the enhanced strategies for Rainbow Creek is provided in **Section 2.4.3**. The County of San Diego will update its JRMP to describe its programs to address agricultural water quality during the next fiscal year, as described in **Section 7.5** of **Appendix 2**.

Program Audit Letters

During 2019, the Riverside County Copermittees received letters describing the findings from a San Diego Water Board desktop audit related to non-stormwater flow prohibitions, focusing on irrigation runoff. The audit was based on a review of publicly available written documentation, such as website content, reports, and ordinances. Copermittees received comments in their audit letters that called for updating their websites to improve access to educational content about irrigation runoff and mechanisms to report irrigation runoff when observed. Some Copermittees also received notices of violation related to Permit requirements to establish legal authority to prohibit non-stormwater discharges. Website updates, educational materials, and ordinance updates have been completed or are underway as needed in response to the audit letters. Program improvements are described in **Section 2,** and responses to audit letters are provided in **Appendix 2** with JRMP reports.

Other regulatory actions that may affect the WQIP and MAP in the future include the 2014 Basin Plan Triennial Review and approval of the Statewide Bacteria Provisions, which are described in **Appendix 5**.

Based upon the identified triggers, an evaluation of potential adaptive management of WQIP elements is conducted for priority water quality conditions, numeric goals, strategies, and/or schedules, if applicable. Summary results of this process are provided below. Additional detail regarding triggers for adaptive management, analysis and findings from 2018-2019 results, and other supporting information is provided in **Appendix 5**.

4.2 WATER QUALITY IMPROVEMENT PLAN ELEMENTS FOR ADAPTATION

4.2.1 Priority Water Quality Conditions

In accordance with the Permit, the priority water quality conditions within the watershed *may* be re-evaluated as needed as part of the annual reporting process. PWQCs, HPWQCs, and numeric goals are generally established based on longer periods of record compared to a monitoring year. This assessment would most appropriately be conducted following the collection of sufficient data to make scientifically-based decisions. The 2018-2019 monitoring year was the first in accordance with the WQIP's MAP, and monitoring results indicated that no modifications to the priority and highest priority water quality conditions identified by the WQIP are necessary at this time. However, the July 19, 2019 San Diego Water Board letter requirements may warrant reconsideration of priorities for the SMR WMA for the WQIP update due on January 31, 2021.

4.2.2 Goals, Strategies and Schedules

Evaluation of the current goals, strategies, and schedules is required by the Permit as part of this WQIP Annual Report. The information that may be used to modify these elements of the WQIP through adaptive management is summarized in **Table 4-2**.

Table 4-2. Information Used to Modify Strategies and Schedules

Evidence	WQIP AR Sections	2018-2019 Status	Changes Triggered (Y/N)
Receiving water monitoring results.	**Section 3.2, Appendix 4**	No new information pertaining to receiving water exceedances not addressed by the WQIP.	N
Storm drain outfall monitoring results.	**Section 3.3, Appendix 4**	NAL and SAL exceedances are consistent with WMA priority constituents.	N
Special studies results.	**Section 3.4, Appendix 4**	Data from these studies provide additional information about concentrations and sources of nutrients in the SMR Watershed.	N
New or updated regulations.	**Section 4.0**	Regulatory drivers for 2018-2019 include the Investigative Order, the July 19, 2019 San Diego Water Board letter, Rainbow Creek Nutrient TMDL letter, program audit letters, and approval of the Statewide Bacteria Provisions. Adaptive management will also be required as the Trash Amendments are incorporated into the Permit.	Y
Program effectiveness assessments and progress toward achieving numeric goals.	**Section 2.0**	The Copermittees did not have goals due to be achieved during 2018-2019 but are implementing strategies to reduce eutrophication impacts and nutrient loading in the Middle SMR Subwatershed (Pathway 6), the Lower SMR Subwatershed (Pathway 1), and in Rainbow Creek (Pathway 5). The Copermittees are also adaptively designing and conducting special studies to gather data that will drive effective strategies. The County of San Diego is addressing comments in the San Diego Water Board letters to improve the effectiveness of their program in Rainbow Creek Watershed.	N

As of the 2018-2019 reporting year, the Copermittees in the SMR WMA have been implementing their jurisdictional strategies under the accepted WQIP for less than one year. As described in **Section 2.0**, the Copermittees are demonstrating progress in implementing the existing strategies and programmatic changes are not generally expected at this early stage of implementation. Additional information over a longer period of time is likely needed to assess effectiveness of current efforts. Minor administrative changes, including clarifications, correction of typos and errors, and edits to WQIP strategies, are identified as markup to the Copermittees' tables in **Appendix 2**.

The District made changes to their JRMP and WQMP and have provided errata pages of revisions in **Appendix 2**. The County of San Diego also updated their BMP Design Manual and made some administrative changes to their JRMP and strategies. Further, new strategies were implemented by the County's Agriculture, Weights, and Measures Agricultural Water Quality Program, and details are provided in **Appendix 5**.

As summarized in **Section 4.1,** comment letters issued by the San Diego Water Board during the 2018-2019 reporting year have provided feedback necessitating some adaptive management of goals and strategies. In particular, updates to goals associated with Rainbow Creek Compliance Pathway 5 are proposed by the County of San Diego as well, and enhancements to agriculture focused strategies have been identified. Some changes are proposed with this WQIP Annual Report and other items will be addressed in future annual reports in accordance with requested timelines in the letters. The full list of responses to comments and proposed updates are provided in **Appendix 5** with supporting information and/or links to report sections that also address specific comment letter items.

4.2.3 Monitoring and Assessment

Changes to the MAP may be triggered by several factors including:

- Modifications to other elements of the WQIP, including priority water quality conditions, numeric goals and schedules, and/or strategies and schedules.
- Identification of data gaps through Permit-required assessments.
- Results of special studies.
- Requests/requirements from the San Diego Water Board.

Of these triggers, modifications to the MAP will be needed based on new requirements from the San Diego Water Board, including the 2019 Investigative Order, comments provided in the 2017-2018 WQIP Annual Report review letter, and comments received in the Rainbow Creek Nutrient TMDL letter.

The 2019 Investigative Order required the development of a Monitoring and Assessment Program Workplan (Workplan) that outlined a water quality monitoring and assessment program to track progress towards achieving the numeric targets listed in the Draft Staff Report and total nitrogen and total phosphorus loading reductions to the Estuary. This Workplan has been prepared and was submitted to the San Diego Water Board in November 2019. Monitoring is anticipated to begin in April 2020 and will be conducted for four years, ending after October 2023. The MAP will be updated to reflect the requirements of the 2019 Investigative Order for the Copermittees as part of the January 31, 2021 WQIP Annual Report submittal. Monitoring reports will be prepared annually to allow the

Dischargers to evaluate the effectiveness of their actions to reduce nitrogen and phosphorus loading to the Estuary and achieve the numeric targets of the Draft Staff Report. The final report, which evaluates all four years of data, is to be submitted to the San Diego Water Board in March 2024.

Changes to highest priority outfalls for analytical monitoring are planned for the 2019-2020 monitoring year based on review of 2018-2019 monitoring results and application of their outfall prioritization processes by the Copermittees. In response to a comment from the San Diego Water Board, the Copermittees have summarized their outfall prioritization processes, addressed questions regarding specific historical monitoring locations, and have documented the reasons for changes to their highest priority outfalls (see **Appendix 5**).

5.0 CONCLUSIONS AND NEXT STEPS

During FY 2019, the Copermittees implemented a broad range of strategies to address the eutrophication and nutrient loading HPWQCs. Although these strategies are focused on achieving improvements in water quality related to eutrophication and nutrients, implementation of the chosen strategies will also improve conditions in relation to PWQCs and other potential contaminants such as bacteria and trash, providing a multi-benefit approach to implementation. In addition to completing all of the monitoring and assessment required by the Permit and MAP for the 2018-2019 monitoring year, additional special studies were also accomplished and planned. A summary of findings and achievements as they pertain to eutrophication and nutrients is presented in **Table 5-1**.

The Copermittees did not have goals due to be achieved during 2018-2019 but are implementing strategies to reduce eutrophication impacts and nutrient loading in the Middle SMR Subwatershed (Pathway 6), the Lower SMR Subwatershed (Pathway 1), and Rainbow Creek (Pathway 5). They are collecting data toward evaluating progress, planning studies focused on the HPWQCs and non-stormwater flows, and have developed a workplan for monitoring and assessment in accordance with the 2019 Investigative Order. Since the Copermittees have only been implementing the accepted WQIP since November 2018, continued and further implementation of strategies and collection of additional monitoring and programmatic data is necessary for an evaluation that leads to meaningful adaptive management. Assessment of progress to goals thus far demonstrates that the Copermittees are implementing measures to be on track to meet goals. The Copermittees will continue to implement their strategies and demonstrate progress toward achieving the goals set forth in the WQIP.

Next steps planned for the Copermittees in the WMA are summarized in **Table 5-2**.

Table 5-1. Summary of Findings and Achievements Related to Nutrients for the 2018-2019 Reporting Period

Monitoring Element	Location of Detailed Results	Major Findings and Achievements
Progress to Goals and Jurisdictional Programs		
Vary by Jurisdiction	Section 2.0 Appendix 2	• The Copermittees in the watershed did not have goals due to be achieved during 2018-2019 but are making progress addressing the HPWQCs. o The Copermittees in the Middle SMR Subwatershed met their interim goal during FY 2019 by implementing strategies proposed in the WQIP (Pathway 6). o The County of San Diego met one of their interim goals for the Lower SMR Subwatershed during FY2019 by completing the turf replacement project in Rainbow Park (Pathway 1). o The County of San Diego is making progress toward compliance with Rainbow Creek Nutrient TMDL goals by demonstrating reductions in final effluent limitations expressed as annual allowable loads (Pathway 5). • The Copermittees are implementing strategies to address the eutrophication and nutrient loading HPWQCs, including the following: o The County of Riverside has completed 100% design on the Warm Springs Creek Integrated Mitigation Project, which will result in the creation of over 1,500 linear feet of new intermittent channel and seasonal wetlands. o The District operated a County-wide hotline number and two weblinks for public reporting of ICIDs and non-ICID stormwater issues. o The City of Murrieta has implemented an enhanced municipal training program focusing on elimination of illicit discharges and dry weather flow and has developed an enhanced commercial training program that will focus on nutrient issues at commercial and industrial businesses. o The City of Temecula has developed and begun implementing an alternative compliance program for development projects, including land restoration and installation of higher efficiency BMPs to control trash. o The City of Wildomar is working with HOAs to eliminate dry weather flows from over-irrigation. o The County of San Diego has completed preliminary design and secured funding for four BMP retrofit projects within segments of the County's road drainage system to treat 68% of the total MS4 outfall drainage area within the Rainbow Creek Watershed.
Receiving Water Monitoring		
Rainbow Creek Nutrient TMDL Monitoring	Section 3.2.3 Appendix 4 Section 4.1.4	• Concentrations of total nitrogen and total phosphorus were above the RWLs in most samples collected from the main stem and tributaries. • Results indicate that nutrients may be added to the system downstream of RBC01 (Jubilee Way) and upstream of RBC02 (at Huffstatler Road). • Statistically significant increasing trends for total nitrogen were identified in five of the seven main stem locations, and significant decreasing trends for total nitrogen were identified at four of the five tributary locations. All significant trends for total phosphorus in main stem and tributary locations were decreasing. HST01 and HST02 indicated increasing trends for total nitrogen and total phosphorus.
SMC Regional Monitoring	Section 3.2.1 Appendix 4 Section 4.1.1	• Total nitrogen results were above the Basin Plan numeric WQO and total phosphorus concentrations were below the WQO at all five locations monitored in the SMR WMA. • Nitrate as N in the SMR Tributary at Calle Pico was the only other nutrient above numeric WQOs.
MS4 Outfall Monitoring		
Dry Weather Field Screening	Section 3.3.1.2 Appendix 4 Section 4.2.1	• Of the 60 visits conducted for highest priority persistent flow discharge monitoring, 30 visits resulted in dry or ponded conditions and an additional 9 had trickle flow that was not measurable. • Based on field screening visits and available historical data, the flow status of each major storm drain outfall was determined as persistent (48%), transient (26%), dry (24%), or undetermined (2%) at the completion of the monitoring year. • The highest priority outfalls in each jurisdiction were prioritized for dry weather monitoring.
Highest Priority Storm Drain Outfall Dry Weather Monitoring	Section 3.3.1.3 Appendix 4 Section 4.2.2	• All samples collected from monitored outfalls exceeded the NAL for total phosphorus, and all but one sample exceeded the NAL for total nitrogen (HPWQCs in the WMA). NALs for indicator bacteria and iron and manganese (PWQCs in the WMA) were also exceeded at several monitored outfalls. This shows that monitoring results are consistent with the HPWQC and PWQCs for the WMA and monitoring results confirm highest priority outfalls that were sampleable. • Data collected during 2018-2019 were used to estimate the non-stormwater volumes and pollutant loads collectively discharged from the major storm drain outfalls with persistent non-stormwater flows in each Copermittee's jurisdiction.
Storm Drain Outfall Wet Weather Monitoring	Section 3.3.2 Appendix 4 Section 4.2.5	• Total nitrogen was above the Rainbow Creek Nutrient TMDL effluent limitation and total phosphorus was above the SAL at HST01. Samples from the other five outfalls were below the applicable nutrient effluent limitations. The only other SAL exceedances were for turbidity at two outfalls. • Building upon the transitional wet weather storm drain outfall program, a more robust data set was developed for the land-use based assessment of wet weather storm drain outfall discharges. Changes to the assessments are anticipated based on feedback from the San Diego Water Board, and discussions are on-going to better align, in the future, assessment requirements with objectives to assess progress to goals.
Illicit Discharge Detection and Elimination Program	Section 3.3.1.4 Appendix 4 Section 4.2.4	• The highest priority outfalls with persistent non-stormwater flow were a focus for IDDE investigations. The most common identified source of non-stormwater flow was irrigation runoff.
Special Studies		
Special Studies	Section 3.4 Appendix 4 Section 4.4	• Special studies provide additional information about the spatial distribution, processes, and sources of nutrients. o Microbial source tracking study results are being used to identify focused areas for further investigation to narrow down the source(s) of human fecal contamination from septic systems, which have been identified as contributors of approximately five percent of the total nitrogen loading to Rainbow Creek. Bacteria is also a PWQC in the WMA. o The composition of sources of non-stormwater flow, which may potentially carry nutrients, is being evaluated in order to determine which sources are due to groundwater, and which flows are due to prohibited non-stormwater discharges.

Table 5-2. Next Steps

Copermittee	Project	Description
All	Monitoring for the 2019 Investigative Order	Monitoring in accordance with the SMR Estuary Monitoring and Assessment Workplan and QAPP developed for the 2019 Investigative Order is anticipated to begin in April 2020 and will be conducted for four years. The WQIP MAP will be updated to reflect the requirements of the 2019 Investigative Order for the Copermittees as part of the January 31, 2021 WQIP Annual Report submittal.
	Long Term Receiving Water Monitoring	Long Term Receiving Water Monitoring under the WQIP MAP will begin during the 2019-2020 monitoring year.
	Addressing 2017-2018 WQIP Annual Report Review Letter	The Copermittees will continue to respond as required. The adaptive management general topics are to be addressed in the 2019-2020 reporting year.
	Program Audit Letters	The Copermittees will implement improvements if needed in response to Program Audit letters regarding the prohibition of irrigation runoff.
Riverside Copermittees	Regional Education and Outreach Program	The Riverside County Watershed Protection Program is implementing a Five-Year Public Strategic Plan for Public Education and Outreach. During FY 2020, implementation of the work plan will include revising and updating the school education program, reviewing and updating the business outreach focusing on home improvement and pet stores, and updating the website with a focus on over-irrigation.
	Upper Santa Margarita River Watershed Storm Water Resource Plan (SWRP)	In December 2019, the SWRP was submitted to the State Water Board to verify concurrence with the California Water Code and State Water Board's SWRP Guidelines, which will allow projects in the SWRP to compete for grant funds through all chapters of Proposition 1.
County of Riverside	Warm Spring Creek Integrated Mitigation Project	To preserve, restore and enhance the existing un-named creek tributary to Warm Springs Creek, ephemeral drainages, and associated wetland habitats, the County is planning to create over 1,500 linear feet of new intermittent channel and seasonal wetlands. The 100% design was completed in FY 2019 and construction is planned to begin in FY 2020.
Riverside County Flood Control and Water Conservation District	Regional Detention Basin	The District is planning to build a regional detention basin in the City of Wildomar. The basin will be a 19.1-acre, flow-through/infiltration, multi-benefit park. The basin footprint is intended to be the hydrologic low-point for a 2,310 acre tributary watershed of open space, low to medium density residential, and some commercial land uses.
City of Murrieta	Enhanced Municipal Training Programs	Enhanced municipal training programs focused on the WQIPs, HPWQC, elimination of illicit discharges, and elimination of dry weather flow will continue in FY 2020.
	Enhanced Commercial and	In FY 2020, inspection staff will be attending the new enhanced commercial and industrial training program focused on the WQIP,

Table 5-2. Next Steps

Copermittee	Project	Description
	Industrial Training Programs	HPQWC, and specific nutrient issues at commercial and industrial businesses.
	Data Management	The City's process of assessing its current data management will continue through FY 2020, and evaluations will be made on how a new data management system could be used to facilitate tracking and recording.
City of Temecula	Higher Efficiency BMPs for Trash Amendments Compliance	The City of Temecula will continue installing media filtration devices in storm drain inlets. Media filters provide treatment for other pollutants in addition to trash, including nutrients.
	Response to Irrigation Runoff Prohibition Audit: Ordinance Update	Ordinances are being updated to reflect current IC/ID requirements and strategies to reduce non-stormwater discharges to the MS4. The revisions focus on clarifying the prohibition of irrigation runoff. Revised ordinances have been drafted and approved by City Council, and implementation is expected for FY 2020.
City of Wildomar	Working with HOAs to Eliminate Dry Weather Flows	The City is planning to continue to work with the HOA managers to provide education to residents about the over-irrigation runoff prohibitions.
County of San Diego	Rainbow Creek BMP Retrofits and Stream Restoration	In anticipation of the construction of four BMP retrofits or equivalent structural projects, baseline monitoring for flow and nutrients during at least one wet weather event will be conducted at HST-01 and two additional MS4 BMP retrofit sites beginning during the 2019-2020 wet season. In FY 2020, the County will complete 70% design plans for the four BMP retrofits for the projects currently in design. The County will also further evaluate the feasibility of additional planned BMPs and/or non-structural BMPs and expedite selected projects to complete by December 2021.
	Focused Agricultural Strategies for the Rainbow Creek Watershed	The County of San Diego has identified and is implementing additional strategies focused on agriculture that include increasing the inspection frequency of High TTWQ existing commercial agricultural facilities and annually reviewing commercial agricultural facilities in the watershed that may discharge pollutants to the County MS4 and add newly identified facilities to the inventory. The JRMP will be updated during FY2020.

6.0 REFERENCES

Amweg, E. L., Weston, D.P. and Ureda, N.M. 2005. *Use and toxicity of pyrethroid pesticides in the Central Valley, California, USA*. Environmental Toxicology and Chemistry 24, 966-972.

Anderson, K.L., Whitlock, J.E. and Harwood, V.J. 2005. *Persistence and differential survival of fecal indicator bacteria in subtropical waters and sediments*. Applied and Environmental Microbiology 71, 3041-3048.

Central California Coast. (n.d.). LID Plant Guidance for Bioretention.

County of San Diego Department of Public Works Watershed Protection Program, 2010. *Sampling and Analysis Plan for Rainbow Creek Nutrient Reduction TMDL Implementation Water Quality Monitoring*. January 2010.

County of San Diego Department of Public Works Watershed Protection Program, 2010. *Sampling and Analysis Plan for Rainbow Creek Nutrient Reduction TMDL Implementation Water Quality Monitoring*. January 2010.

County of San Diego Department of Public Works Watershed Protection Program, 2018. *Model BMP Design Manual - San Diego Region For Permanent Site Design, Storm Water Treatment and Hydromodification Management.* May 2018.

District (Riverside County Flood Control and Water Conservation District). 2018. *Hydrology Manual.* April 2018.

District (Riverside County Flood Control and Water Conservation District), Riverside County, County of San Diego, City of Wildomar, City of Temecula, City of Murrieta (SMR WMA Copermittees). 2018. *Santa Margarita River Watershed Management Area Water Quality Improvement Plan*. Prepared by Larry Walker Associates, et al. January 2018.

Herrera Environmental Consultants, Inc. (2015). Analysis of Bioretention Soil Media for Improved Nitrogen, Phosphorous and Copper Retention.

Kendall, M. 1975. *Rank Correlation Methods,* 4th Edition. Charles Griffin, London.

Mann, H.B. 1945. Non-Parametric tests against trend. *Econometrica.* 13:245-259.

Maund, S.J., Hamer M.J., Lane M.C., Farrelly E., Rapley J.H., Goggin U.M. and W.E. Gentle. 2002. *Partitioning, bioavailability, and toxicity of the pyrethroid insecticide cypermethrin in sediments*. Environmental Toxicology and Chemistry 21, 9-15.

Monash University. (2015). Adoption Guidelines for Stormwater Biofiltration Systems (Version 2).

NOAA (National Oceanic and Atmospheric Administration). 2018. National Centers for Environmental Information, State of the Climate: National Climate Reports. Accessed September 2019 from https://www.ncdc.noaa.gov/sotc/.

Ode, P.R., Fetscher, A.E., and L.B. Busse. 2016. Standard Operating Procedures (SOP) for the Collection of Field Data for Bioassessments of California Wadeable Streams: Benthic Macroinvertebrates, Algae, and Physical Habitat. SWAMP Bioassessment Procedures. May 2016. Accessed at: https://www.waterboards.ca.gov/water_issues/programs/swamp/bioassessment/docs/combined_sop_2016.pdf

San Diego Water Board (San Diego Regional Water Quality Control Board). 1994. *Water Quality Control Plan for the San Diego Basin*. September 8, 1994. Amendments adopted through 2016.

San Diego Water Board (San Diego Regional Water Quality Control Board). 2005. *California Regional Water Quality Control Board San Diego Region, Order No.* R9-2005-0036. *A Resolution Adopting An Amendment to the Water Quality Control Plan for the San Diego Region (9) To Incorporate Total Maximum Daily Loads (TMDLs) For Total Nitrogen and Total Phosphorus in the Rainbow Creek Watershed, San Diego County.* February 2005.

San Diego Water Board (San Diego Regional Water Quality Control Board). 2015. *California Regional Water Quality Control Board San Diego Region, Order No. R9-2013-0001, As Amended by Order Nos. R9-2015-0001 and R9-2015-0100, NPDES No. CAS0109266, National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds Within the San Diego Region*. July 2015.

San Diego Water Board (Regional Water Quality Control Board). 2019. *California Regional Water Quality Control Board San Diego Region, Investigative Order No. R9-2019-0007, An Order Directing the Cities of Murrieta, Temecula, and Wildomar, the Counties of San Diego and Riverside, the Riverside Flood Control and Water Conservation District, and the United States Marine Corps Base Camp Pendleton to Design and Implement a Water Quality Improvement Monitoring and Assessment Program for Eutrophic Conditions in the Santa Margarita River Estuary and Watershed, California*. May 2019.

SCCWRP (Southern California Coastal Water Research Project). 2015. *Bioassessment Survey of the Stormwater Monitoring Coalition. Workplan for Years 2015 through 2019.* Version 1.0. SCCWRP Technical Report 849. February 2015. Accessed at: http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/849_SMCWorkplan2015.pdf

SCCWRP (Southern California Coastal Water Research Project). 2018. *Southern California Bight 2018 Regional Monitoring Program. 2018 Planning Documents.* September 2018. Accessed at: http://www.sccwrp.org/Documents/BightDocuments/Bight18Documents/Bight18PlanningDocuments.aspx

Schumm, S. A., M.D. Harvey, and C. C. Watson. 1984. Incised Channels: Morphology, Dynamics, and Control. Water Resources Publications, Littleton Colorado.

State Water Board (State Water Resources Control Board). 2009. *Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality*. Effective August 25, 2009. Accessed at: https://www.waterboards.ca.gov/water_issues/programs/bptcp/docs/sediment/sed_qlty_part1.pdf

State Water Board (State Water Resources Control Board). 2017. *Final 2014 and 2016 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report)*. October 2018.

Stormwater Monitoring Condition (SMC). 2015. *Bioassessment of streams in southern California: A report on the first five years of the SMC Stream Survey*. Prepared by SCCWRP. Costa Mesa, CA.

Sutula and Schultz, 2018. Status of Eutrophication in the Upper (2016-2017) and Lower Main (2015-2016) of the Santa Margarita River, San Diego County, California. Phase II Proposition 84 Grant Report, May 2018.

Sutula et al., 2018. Science Supporting Decisions on Biostimulatory Substances in the Lower Main Stem of the Santa Margarita River Watershed. Phase II Proposition 84 Grant Report, June 2018.

TetraTech, 2018. Santa Margarita River Watershed Model and Lower River Nutrient Response Models. Prepared for the County of San Diego as a Proposition 84 Grant Report.

USEPA (U.S. Environmental Protection Agency). 2013. Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater, EPA-822-R-13-001. April 2013.

WESTON (Weston Solutions, Inc.) 2015a. *Transitional Receiving Water Monitoring Work Plan*. Prepared for the San Diego County Regional Copermittees. Revised November 2015.

WESTON (Weston Solutions, Inc.) 2015b. *Five-year Assessment of Random and Targeted MS4 Outfall Discharge Data Collected under NPDES Permit Order No. R9-2007-0001 in San Diego County Watersheds*. Prepared for the San Diego County Regional Copermittees. January 2015.

WESTON (Weston Solutions, Inc.) 2016. *Transitional Monitoring and Assessment Program Report for the Santa Margarita River Watershed Management Area (2014-2015)*. Prepared for the San Diego County Regional Copermittees. January 2016.

WESTON (Weston Solutions, Inc.) 2018. *Transitional Monitoring and Assessment Program Report for the Santa Margarita River Watershed Management Area (2016-2017).* Prepared for the San Diego County Regional Copermittees. January 2018.

Wheelock C.E., J.L. Miller, M.J. Miller, S.J. Gee, G. Shan, B.D. Hammock. 2004. *Development of toxicity identification evaluation procedures for pyrethroid detection using esterase activity*. Environmental Toxicology and Chemistry 23, 2699-708.

Zinger, Yaron, Godecke-Tobias Blecken, Tim D. Fletcher, Maria Viklander, and Ana Deletić. 2013. "Optimising Nitrogen Removal in Existing Stormwater Biofilters: Benefits and Tradeoffs of a Retrofitted Saturated Zone." Ecological Engineering 51: 75–82.