County of San Diego

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January 29, 2016

Laurie Walsh, Senior Water Resource Control Engineer
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108-2700

Dear Ms. Walsh:

COUNTY OF SAN DIEGO, PERMIT R9-2013-0001, PIN 255223 – SUBMITTAL OF THE ANNUAL REPORT FOR THE SANTA MARGARITA RIVER WATERSHED AND THE TRANSITIONAL MONITORING AND ASSESEMENT PROGRAM ANNUAL REPORTS FOR 8 WATERSHED MANAGEMENT AREAS

On behalf of the San Diego County Copermittees, the County of San Diego (County) is pleased to submit the attached reports in accordance with requirements set forth in Provisions D.1.a., F.3.b. and Attachment E of Order R9-2013-0001, National Pollution 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, NPDES No. CAS0109266 (Permit). The reports present data, assessments and activities for the 2014-2015 monitoring year

The attached Annual Report for the Santa Margarita River Watershed contains a summary of watershed-specific program activities and applicable required reports. The Transitional Monitoring and Assessment Program Annual Reports for the eight watershed management areas (San Luis Rey, Carlsbad, San Dieguito, Los Peñasquitos, Mission Bay and La Jolla, San Diego River, San Diego Bay, and Tijuana) covered by the Permit include receiving water and MS4 outfall monitoring data summarized and presented in tabular and graphical form and assessed as required by Provisions D.4.a.(1)(a), D.4.b.(1)(a)(i), and D.4.b.(2)(a)(i). Also, for watersheds subject to Total Maximum Daily Loads (TMDLs), (Santa Margarita River, San Luis Rey, Los Penasquitos, San Diego River, San Diego Bay and Mission Bay/ La Jolla), TMDL monitoring reports required per MS4 Permit Attachment E are included as appendices..

If you have any questions or require additional information, please contact Jo Ann Weber, Land Use Environmental Planning Manager, at (858) 495-5317 or e-mail at JoAnn.Weber@sdcounty.ca.gov.

Sincerely,

Todd Snyder

TODD E. SNYDER, Manager
Watershed Protection Program

Attachments: Annual Report for Santa Margarita Watershed Management Area and Transitional Monitoring and Assessment Program Annual Reports for the following watershed management areas: San Luis Rey, Carlsbad, San Dieguito, Los Peñasquitos, Mission Bay and La Jolla, San Diego River, San Diego Bay, and Tijuana (one electronic copy of each on CD)

cc: Eugene Bromley, USEPA, Region IX, Permits Issuance Section (W-5-1), 75 Hawthorne Street, San Francisco, CA 94105
Tim Murphy, City of Carlsbad (PIN 213271)
Boushra Salem, City of Chula Vista, (PIN 214491)
Scott Huth, City of Coronado (PIN 215783)
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Jaime Campos, City of El Cajon (PIN 222391)
Erik Steenblock, City of Encinitas (PIN 222765)
Helen Davies, City of Escondido (PIN 222931)
Chris Helmer, City of Imperial Beach (PIN 232267)
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Reed Thornberry, City of San Marcos (PIN 255407)
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Taryn Kjolsing, City of Solana Beach (PIN 257637)
Joanna Wisniewska, County of San Diego (PIN 255223)
Cheryl Filar, City of Vista (PIN 270704)
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County of San Diego

SARAH E. AGHASSI
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SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA ANNUAL REPORT PER PROVISIONS D.1.a., F.3.b AND ATTACHMENT E, STATEMENT OF CERTIFICATION

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.

Sarah Aghassi
SARAH E. AGHASSI

Date 1/29/16

Santa Margarita River Watershed Management Area
County of San Diego FY14-15 Annual Report – Activity Summary

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, Place Identification Number 255223

As the only Permittee in the Santa Margarita Watershed covered by a regional stormwater permit during Fiscal Year 2014-15, the County is required to implement transitional receiving water monitoring (Provision D.1.a), transitional monitoring and assessment program annual reports, transitional Jurisdictional Runoff Management Program annual reports (Provision F.3.b), and the applicable Total Maximum Daily Load (TMDL) requirements in Attachment E.

This is a summary of watershed activities implemented by the County of San Diego during FY 2014-15 in the Santa Margarita River Watershed Management Area.

Santa Margarita River Watershed Activities

Transitional Monitoring Program

During the 2014-2015 monitoring year, receiving water monitoring was conducted during three wet and three dry weather events at one long-term monitoring station (LTMS), SMR-MLS-2. Results were compared to relevant water quality benchmarks developed under the 2007 Permit, and a trend analysis was performed. Post-storm synthetic pyrethroid sediment monitoring, and hydromodification and bioassessment monitoring was also conducted at the LTMS. In addition, dry weather receiving water monitoring was conducted as part of the Stormwater Monitoring Coalition (SMC) Regional Monitoring Program.

MS4 outfall monitoring consisted of transitional dry weather MS4 outfall discharge field screening, and transitional wet weather MS4 outfall discharge monitoring during the 2014-2015 monitoring year. In addition, the MS4 outfall discharge monitoring station inventory was refined. Details of this monitoring including methods and results are provided in the attached *Transitional Monitoring and Assessment Program Report for the Santa Margarita River Watershed Management Area (2014-2015)* (Attachment A).

Transitional Jurisdictional Runoff Management Program (JRMP)

The County submitted the Transitional JRMP Monitoring Report on October 30, 2015. Attachment D (Jurisdictional Runoff Management Program Annual Report Form) of the submittal is provided in Attachment B.

Santa Margarita Watershed Nutrient Initiative

Background: The Santa Margarita Watershed Nutrient Initiative (SMR NI) – Stakeholder Group is a group of agency representatives and interested stakeholders engaged in the development of biostimulatory substance criteria and watershed management strategies for the Santa Margarita estuary and river. This work is a follow-on effort to the 2006 San Diego Lagoons Investigative Order (R9-2006-0076; Lagoon Order) and subsequent work plan developed jointly by the San Diego Regional Water Quality Control Board (SDRWQCB) and watershed stakeholders. This process is focused on evaluating watershed-based approaches to support the development of an alternative TMDL in the Santa Margarita River Watershed and estuary that ensures protection of beneficial uses while identifying the most resource-effective solutions to addressing the impairment. In addition, other State Board and SDRWQCB priorities such as increased recycled water use and development of additional local water supplies will be addressed, where feasible.

This effort consists of three phases (Phase 1, 2, and 3). Each phase involves water quality sampling in different areas of the watershed with the objective of improving understanding of the site-specific factors that affect the occurrence of biostimulatory substances in the estuary, river, and tributaries. The County of San Diego, on behalf of the SMR-NI stakeholder group was awarded Proposition 84 grant funds from the San Diego Region Integrated Regional Water Management (IRWM) Program to support Phase 1 and Phase 2 of this effort. The Upper Santa Margarita River IRWM Program provided additional funding to support Phase 1, and has entered into contracts with Southern California Coastal Water Research Project (SCCWRP) to continue work on the project. The grant funding helps support the SMR-NI stakeholder group as it oversees the development of an estuary model that is funded by the United States Marine Corps Base Camp Pendleton (USMC Camp Pen). The estuary model is a tool for assessing various nutrient loading sources and their impacts on the estuary. Phase 3 has not yet been funded.

Annual Activity Summary: During FY2014-15, the Process Plan and Quality Assurance Project Plan (QAPP) were finalized and submitted to the SDRWQCB. The SMR-NI stakeholder group met once, and the Technical Advisory Committee (TAC) and TAC modeling subcommittee met five times to support the following work:

- SCCWRP and Space and Naval Warfare Systems Command (SPAWAR; under contract with USMC Camp Pen.) worked to calibrate and validate the estuary water quality model
- SPAWAR conducted estuary macroalgae and groundwater monitoring
- SCCWRP conducted five water quality sampling events in the lower river and worked on software code improvements for macroalgae representation in the estuary water quality model.

Information on these efforts is available on www.projectcleanwater.org.

Rainbow Creek Total Nitrogen and Total Phosphorus TMDL Activities

<u>Monitoring Program</u>

Water Quality: The County has implemented a water quality monitoring program in the Rainbow Creek Watershed since 2004 to provide data in support of the TMDL for total nitrogen and total phosphorous in Rainbow Creek. The objective of this monitoring program is to characterize baseline conditions for nutrients. Monitoring locations include those identified as “strategic nodes” by the SDRWQCB during the development of the TMDL technical report. Physical water parameters of pH, electrical conductivity, turbidity, dissolved oxygen, temperature, and salinity are measured in the field along with other observations, including flow. Laboratory analyses for nitrate, nitrite, total Kjeldahl nitrogen, ammonia, orthophosphate, total phosphorous, and total dissolved solids (TDS) are conducted on a subset of the samples. This monitoring program is consistent with the Rainbow Creek TMDL Monitoring Plan and QAPP approved by the

SDRWCB. The Rainbow Creek Water Quality Monitoring Program Data Summary for FY 2014-2015 is provided as Attachment C.

Dry Weather Flows: A second monitoring study was conducted to address whether dry weather flows from the County's MS4 affect nutrient concentrations in Rainbow Creek. All MS4 drainages into Rainbow Creek were initially identified through a desktop GIS analysis, followed by a detailed field reconnaissance to identify specific locations for sampling. For the 2014-2015 monitoring year, monitoring visits were conducted monthly during dry weather and, if flow was observed, instantaneous discharge rate was measured, and a grab sample was collected for nutrient analysis. With the exception of one historical site, all monitoring locations (11 out of 12) were dry on nearly all sampling occasions. At the one location where flow was present, total nitrogen and total phosphorus concentrations consistently exceeded their respective water quality benchmarks of 1 mg/L (for total nitrogen) and 0.1 mg/L (for total phosphorus). It is recommended that efforts to prevent dry weather MS4 flows from entering Rainbow Creek should focus on this location. The Rainbow Creek Dry Weather MS4 Outfall Monitoring Report is provided as Attachment D.

Rainbow Creek Nutrient Source Reduction Program

During FY 2014-15 the County of San Diego continued implementation of California Nonpoint Source Control Program, Federal Clean Water Act Section 319(h) Grant Agreement Number 12-412-259 to implement the Nutrient Source Reduction Program (NSRP) in the Rainbow Creek Watershed. This Program targets the TMDL for total nitrogen and total phosphorus by reducing nonpoint source nutrient loading from agricultural and residential properties and septic systems. The NSRP program elements include:

- Outreach and Education for Agricultural and Residential Property Owners in the form of workshops and on-line tools targeting nutrient source activities;
- Assessment of current conditions and follow-up evaluation of practices implemented as a results of initial assessment for Agricultural and Residential Properties;
- Best Management Practices (BMP) Rebate Program for Agricultural practices and Septic System Maintenance (e.g. pumping); and
- Update the Rainbow Creek Nutrient Reduction Management Plan to include the latest information and science regarding the recommended nutrient-source strategies.

This program was implemented during FY 2014-15 as detailed in the quarterly reports previously submitted to the Regional Board and work continues on schedule.

Attachments

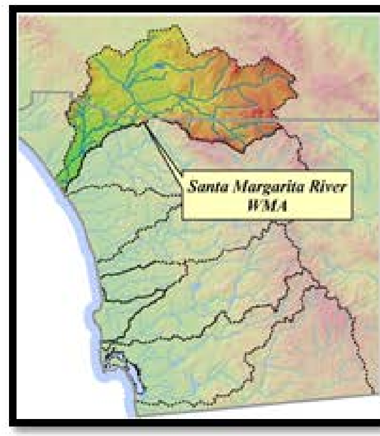
A. Santa Margarita River WMA Transitional Monitoring Report for FY 2014-15
B. County of San Diego FY 2014-15 Transitional JRMP Annual Report
C. Rainbow Creek Water Quality Monitoring Program Data Summary for July 2014 to September 2015
D. Rainbow Creek Dry Weather MS4 Outfall Monitoring Report, December 2015

Attachment A

Santa Margarita River Watershed Management Area Transitional Monitoring and Assessment Program Report (FY 2014-15)

*Due to file size, this attachment, and attachments thereto, are saved on the accompanying CD-R in the folder titled “SMR TMAR 2014-15”

TRANSITIONAL MONITORING AND ASSESSMENT PROGRAM REPORT FOR THE SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA (2014-2015)



Final
January 2016

Prepared for the following
San Diego County MS4 Copermittees:

County of San Diego

Prepared By:

WESTON SOLUTIONS

TRANSITIONAL MONITORING AND ASSESSMENT PROGRAM REPORT FOR THE SANTA MARGARITA RIVER WATERSHED MANAGEMENT AREA (2014-2015)

Prepared For:

San Diego County MS4 Copermittees

Prepared By:

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With Support From:
D-Max Engineering, Inc.
Environmental Science Associates
Larry Walker Associates

Contract Number: 551492

January 2016

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LIST OF ACRONYMS

2007 Permit	RWQCB Order No. R9-2007-0001
2013 Permit	RWQCB Order No. R9-2013-0001
AA	Assessment Area
AFDM	ash-free dry mass
APHA	American Public Health Association
ASBS	Area of Special Biological Significance
Basin Plan	Water Quality Control Plan for the San Diego Basin
BMI	benthic macroinvertebrate
BOD	biochemical oxygen demand
BMP	best management practice
BU	beneficial use
$CaCO_3$	calcium carbonate
Caltrans	California Department of Transportation
CCC	Continuous Criteria Concentration
CDFW	California Department of Fish and Wildlife
CEDEN	California Environmental Data Exchange Network
CF	collector filterer
CFR	Code of Federal Regulations
CG	collector gatherer
CMC	Criteria Maximum Concentration
COC	chain-of-custody
COD	chemical oxygen demand
Copermittees	San Diego Regional Copermittees
CRAM	California Rapid Assessment Method
CSBP	California Stream Bioassessment Procedure
CSCI	California Stream Condition Index
CWA	Clean Water Act
d50	median grain size diameter
DO	dissolved oxygen
EMC	event mean concentration
EPT	ephemeroptera, plecoptera, and trichoptera
HA	hydrologic area
HM	San Diego Hydrology Manual
HMP	Hydromodification Management Plan
HSA	hydrologic subarea
HU	hydrologic unit
IBI	Index of Biotic Integrity
IC/ID	illegal connection and illicit discharges
IDDE	illegal discharge detection and elimination
JRMP	Jurisdictional Runoff Management Plan
LC_{50}	median lethal concentration
LTMS	long-term monitoring station
MAP	Monitoring and Assessment Program
MBAS	methylene blue active substance
MLS	mass loading station
MS4	municipal separate storm sewer system

MSGP	Multi-Sector General Permit
NA	not applicable
NOAA	National Oceanographic and Atmospheric Administration
NOEC	no observed effect concentration
NPDES	National Pollutant Discharge Elimination System
NR	not required
NSQD	National Stormwater Quality Database
NWS	National Weather Service
pH	hydrogen ion concentration
QA	quality assurance
QC	quality control
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SanGIS	San Diego Geographic Information Source
SCCWRP	Southern California Coastal Water Research Project
SDCRC	San Diego County Regional Copermittees
SM	Standard Methods
SMC	Stormwater Monitoring Coalition
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TIE	toxicity identification evaluation
TKN	total Kjeldahl nitrogen
TMAR	Transitional Monitoring and Assessment Report
TMDL	total maximum daily load
TOC	total organic carbon
TSS	total suspended solids
TST	Test of Significant Toxicity
TWAS	temporary watershed assessment station
USEPA	United States Environmental Protection Agency
USGS	United States Geological Service
WESTON®	Weston Solutions, Inc.
WMAA	Watershed Management Area Analysis
WMA	watershed management area
WQIP	Water Quality Improvement Plan
WRCC	Western Regional Climate Center

UNITS OF MEASURE

µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
°C	degrees Celsius
°F	degrees Fahrenheit
ac	acres
cf	cubic feet
g/m^2	grams per square meter
gpm	gallons per minute
lbs	pounds
m	meter
mg/m^2	milligrams per square meter
mg/L	milligrams per liter
mL	milliliter
MPN/100 mL	most probable number per 100 milliliters
ng/dry g	nanograms per dry gram
NTU	Nephelometric Turbidity Units
ppt	parts per thousand
%	percent
<	less than
>	greater than
≥	greater than or equal to

ES EXECUTIVE SUMMARY

ES.1 Purpose

The San Diego County Regional Copermittees (Copermittees) are covered under a municipal National Pollutant Discharge Elimination System (NPDES) permit for discharge of urban runoff to waters of the United States. In May 2013, San Diego Regional Water Quality Control Board (RWQCB) Order No. R9-2013-0001 (2013 Permit) was adopted, replacing Order No. R9-2007-0001 (2007 Permit), effective June 27, 2013. The 2013 Permit prescribes a transitional monitoring program for the 2013-2014 and 2014-2015 monitoring years, between the end of the 2007 Permit term and the completion of the Water Quality Improvement Plans (WQIPs) by Watershed Management Area (WMA) under the 2013 Permit. The purpose of this Transitional Monitoring and Assessment Report (TMAR) is to provide the monitoring data and assessments required by the 2013 Permit for the 2014-2015 transitional monitoring year in the Santa Margarita River WMA. This is the second monitoring report developed under the 2013 Permit.

In the Santa Margarita River WMA, the Responsible Agencies are the County of San Diego, County of Riverside, Riverside County Flood Control and Water Conservation District, and Cities of Murrieta, Temecula, and Wildomar. All but the County of San Diego have been covered under a different municipal separate storm sewer system (MS4) permit (R9-2010-0016) which expired on November 10, 2015. The County of San Diego is not required to implement the requirements of Provision B of the 2013 Permit, which requires the development of the WQIPs through a collaborative effort by the Responsible Agencies in each WMA and other key stakeholders, until the Riverside County Copermittees have been notified of coverage under the 2013 Permit. On November 18, 2015, the RWQCB adopted Tentative Order No. R9-2015-0100 (RWQCB, 2015b), which extends coverage of the 2013 Permit to the Riverside County Copermittees effective January 7, 2016.

The WQIP for the Santa Margarita River WMA will identify priority water quality conditions, highest priority water quality conditions, known and suspected sources of pollutants contributing to the highest priority water quality conditions, the beneficial uses associated with each condition, and water quality improvement goals, strategies, and schedules. The comprehensive document will include a Monitoring and Assessment Program (MAP) that will describe the monitoring and assessment that occurs after the transitional period in accordance with the 2013 Permit. The MAP provides input to the adaptive management process to ultimately improve the effectiveness of the WQIP. The WQIP is not yet in development. Therefore, the findings outlined in this TMAR are limited to those assessments that can be appropriately conducted in the absence of a RWQCB-accepted WQIP.

ES.2 Monitoring and Assessment Methods

NPDES receiving water monitoring was conducted in the Santa Margarita River WMA, per the 2013 Permit, during the 2014-2015 monitoring year. Receiving water monitoring results were compared to relevant water quality benchmarks developed under the 2007 Permit (see Attachment B to Appendix A), and a trend analysis was performed. Post-storm synthetic pyrethroid sediment monitoring was also conducted at the receiving water station during the 2014-2015 monitoring year, and dry weather receiving water monitoring was conducted as part of the Stormwater Monitoring Coalition (SMC) Regional Monitoring Program. The County of San Diego also conducted total maximum daily load (TMDL) monitoring in Rainbow Creek. In addition, Copermittees supported the San Diego Regional Reference Streams and Beaches special study, which includes monitoring of reference streams within the Santa Margarita River WMA.

During the 2014-2015 monitoring year, MS4 outfall monitoring in compliance with the 2013 Permit included the refinement of the MS4 outfall discharge monitoring station inventory, transitional dry weather MS4 outfall discharge field screening, and transitional wet weather MS4 outfall discharge monitoring.

ES.3 Receiving Water Monitoring Results

Receiving water monitoring locations within the Santa Margarita River WMA are shown in Figure ES-1. Receiving water monitoring was conducted during three wet and three dry weather events under the long-term receiving water requirements of the 2013 Permit at one long-term monitoring station (LTMS), SMR-MLS-2. Two of these events were also monitored in accordance with the transitional monitoring requirements of the 2013 Permit. Dry weather receiving water monitoring was also conducted during the 2014-2015 monitoring year at two SMC Program locations.

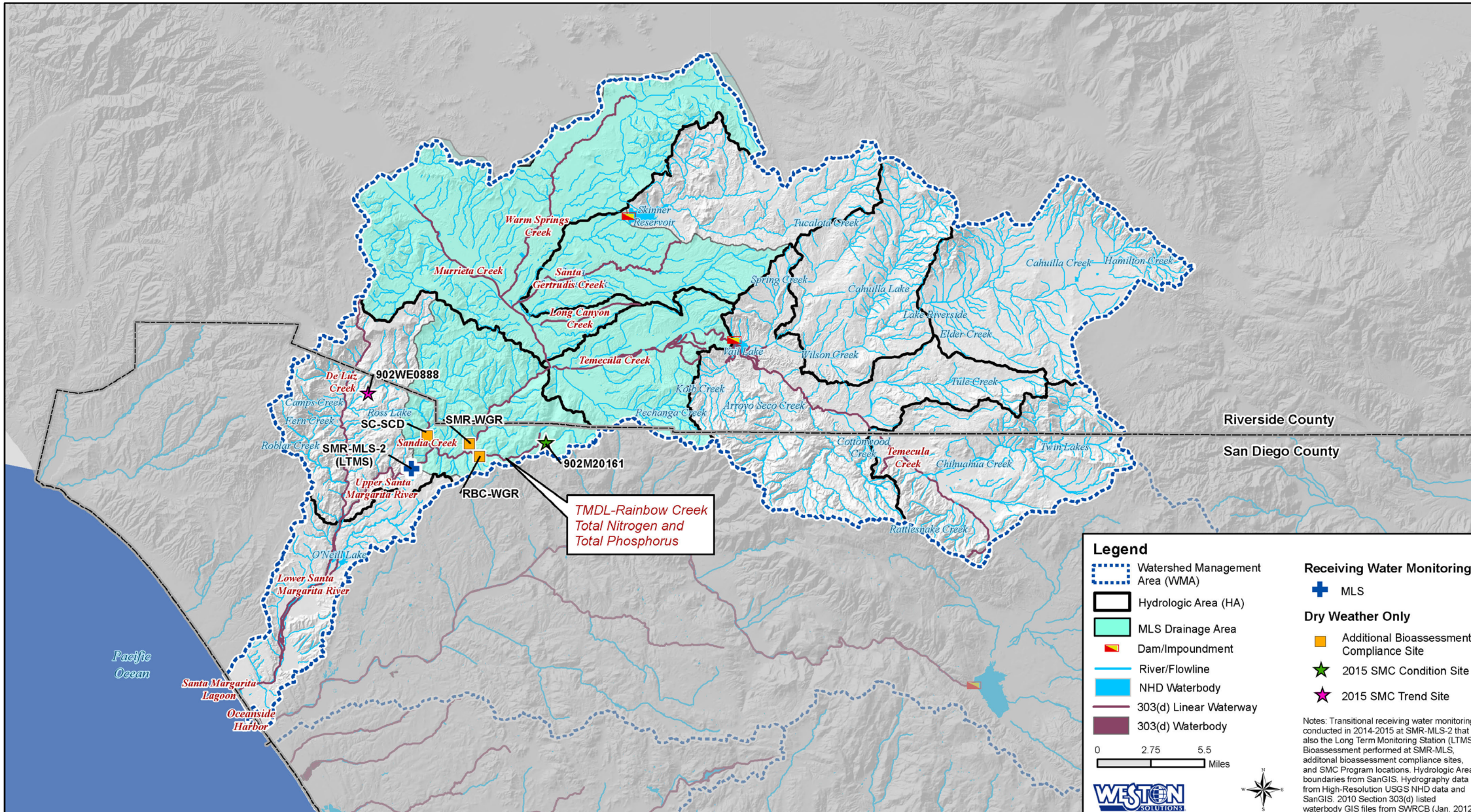


Figure ES-1. Receiving Water Monitoring Locations in the Santa Margarita River WMA

ES.3.1 Dry Weather NPDES Receiving Water Monitoring Results

Concentrations of indicator bacteria, dissolved metals, organophosphorus pesticides, and pyrethroids were below benchmarks during dry weather receiving water monitoring at SMR-MLS-2 (LTMS), and no toxicity was observed. A summary of constituents measured above dry weather benchmarks is presented in Table ES-1 with the rates of exceedance for the 2014-2015 monitoring year and the historical rates of exceedance since 2010 (historical data are presented in Appendix F). The majority of analyzed constituents did not exceed dry weather benchmarks, and these constituents are not included in Table ES-1. Constituents without exceedances during the 2014-2015 monitoring year would also be included in this comparison table if the historical exceedance rate was greater than or equal to 50 percent (≥ 50%). Also above water quality benchmarks during the 2014-2015 monitoring year, sulfate, total iron and total manganese are newly added parameters for the long-term monitoring requirements of the 2013 Permit and have no historical data for comparison.

Table ES-1. Summary of 2014-2015 and Historical Exceedance Rates during Dry Weather in the Santa Margarita River WMA

Constituent	SMR-MLS-2 (LTMS - 902.21) Exceedance Rate	
	2014-2015 (n=3)	Historical (n=4)
Total Nitrogen	33%	25%
Sulfate**	100%	NA
Total Dissolved Solids (TDS)	100%	100%
Iron, Total**	33%	NA
Manganese, Total**	33%	NA

**2014-2015 was the first year of monitoring for this constituent.
NA –Not analyzed.

Results from all three trash assessments conducted during dry weather at SMR-MLS-2 (LTMS) were rated as Optimal, and no threats to human health or aquatic health were observed.

Dry weather trends were assessed using the historical data set for SMR-MLS-2 (LTMS), including the current monitoring year (three years of data since 2010). A summary of trend results is presented in Table ES-2. No statistically significant trends were identified for constituents measured above benchmarks during dry weather.

Table ES-2. Dry Weather Receiving Water Trend Results – Santa Margarita River WMA

Station	Dry	
	Increasing	Decreasing
SMR-MLS-2 (LTMS)	None	Biochemical Oxygen Demand, Dissolved Antimony, Dissolved Phosphorus

ES.3.2 Wet Weather Receiving Water Monitoring Results

Concentrations of nutrients, dissolved metals, and organophosphorus pesticides were below benchmarks during wet weather receiving water monitoring at SMR-MLS-2 (LTMS). A summary of constituents measured above wet weather benchmarks is presented in Table ES-3 with the rates of exceedance for the 2014-2015 monitoring year and the historical rates of exceedance since 2008 (historical data are presented in Appendix F). The majority of analyzed constituents did not exceed dry weather benchmarks, and these constituents are not included in Table ES-3. However, constituents without exceedances during the 2014-2015 monitoring year are included in this comparison table if the historical exceedance rate was ≥ 50%. Sulfate, total iron, total manganese, and the *Selenastrum* toxicity test (based on the Test of Significant Toxicity (TST)) are newly added parameters for the long-term monitoring requirements of the 2013 Permit and have no historical data for comparison.

Table ES-3. Summary of 2014-2015 and Historical Exceedance Rates during Wet Weather in the Santa Margarita River WMA

Constituent or Test	SMR-MLS-2 (LTMS - 902.21) Exceedance Rate	
	2014-2015 (n=3)[1]	Historical (n=5)
Turbidity	0%	60%
Fecal Coliform	67%	100%
Sulfate**	50%	NA
Total Dissolved Solids (TDS)	100%	60%
Total Suspended Solids (TSS)	33%	40%
Iron, Total**	67%	NA
Manganese, Total**	33%	NA
Bifenthrin	33%	20%
Selenastrum 96-hr (2013 Permit)**	33%	NA

* n=2 for sulfate for 2014-2015 data.
**2014-2015 was the first year of monitoring for this constituent.
NA –Not analyzed.

Results from all three trash assessments conducted during wet weather at SMR-MLS-2 (LTMS) were rated as Optimal, and no threats to human health or aquatic health were observed.

Wet weather trends were assessed using the historical data set for SMR-MLS-2 (LTMS), including the current monitoring year (four years of data since 2008). A summary of trend results is presented in Table ES-4. No statistically significant trends were identified for constituents measured above benchmarks during wet weather. Turbidity measurements, which have historically been above the benchmark in 60% of samples at SMR-MLS-2 (LTMS), show a significantly decreasing trend and have dropped below the benchmark since wet weather monitoring began at this station.

Table ES-4. Wet Weather Receiving Water Trend Results – Santa Margarita River WMA

Station	Wet	
	Increasing	Decreasing
SMR-MLS-2 (LTMS)	Conductivity, Dissolved Selenium, Surfactants (MBAS)	Ammonia as N, Biochemical Oxygen Demand, Dissolved Organic Carbon, Dissolved Phosphorus, Total Cadmium, Turbidity

ES.3.3 Synthetic Pyrethroid Monitoring Results

Synthetic pyrethroids were analyzed in sediments collected following the first-flush storm event of the 2014-2015 monitoring year at SMR-MLS-2 (LTMS). All pyrethroid concentrations were below detection limits.

ES.3.4 Hydromodification Monitoring at the Long-Term MLS

Provision D.1.c.(6) of the 2013 Permit requires that hydromodification monitoring be conducted during dry weather at long-term receiving water monitoring locations, and SMR-MLS-2 (LTMS) was monitored in accordance with this program during the 2014-2015 monitoring year. A channel survey and the Southern California Coastal Water Research Project (SCCWRP) channel assessment tool were employed to perform a rapid assessment of the relative susceptibility of the monitored reaches to effects of hydromodification. A summary of the results for SMR-MLS-2 (LTMS) is presented in Table ES-5.

Table ES-5. Hydromodification Monitoring Summary for SMR-MLS-2 (LTMS)

Location	Description	Latitude	Longitude	d50 (mm)	Incision/ Braiding Risk	Vertical Susceptibility	Lateral Susceptibility
SMR-MLS-2 (LTMS) Reach 1	SMR-MLS-2 (LTMS) receiving water monitoring station	33.39814	-117.26273	2	>50%	Very High	Low
SMR-MLS-2 (LTMS) Reach 2	Approximately 750 feet upstream of SMR-MLS-2 (LTMS)	33.39981	-117.26375	2	>50%	Very High	Low
SMR-MLS-2 (LTMS) Reach 3	Approximately 1,500 feet downstream of SMR-MLS-2 (LTMS)	33.39531	-117.26431	2	>50%	Very High	Low

d50 – median grain size diameter

ES.3.5 Bioassessment Monitoring Results

During the 2014-2015 monitoring year, bioassessment monitoring was conducted at four receiving water stations (SMR-MLS-2 (LTMS), RBC-WGR, SC-SCD, and SMR-WGR) and two SMC Regional Monitoring Program stations, trend station 902WE0888 in De Luz Creek and 902M20161 in Rainbow Creek (Figure ES-1).

Table ES-6 summarizes the Index of Biotic Integrity (IBI), California Stream Condition Index (CSCI) and California Rapid Assessment Method (CRAM) scores for the Santa Margarita River WMA. The IBI and CSCI are indices that rate the overall benthic macroinvertebrate community quality, while the CRAM rates the physical habitat quality at a site. The CSCI rated some bioassessment sites higher in quality than the IBI, and these differences are likely driven by the observed to expected component of the CSCI.

Table ES-6. Bioassessment Results Summary for the Santa Margarita River WMA

Station	Index		
	IBI	CSCI	CRAM
SMR-MLS-2 (LTMS - 902.21)	Poor	Likely Altered	High
RBC-WGR (902.22)	Fair	Likely Intact	Moderate
SC-SCD (902.22)	Fair	Likely Intact	High
SMR-WGR (902.22)	Poor	Likely Intact	Moderate
902WE0888 (902.21)	Fair	Possibly Intact	Moderate
902M20161 (902.23)	Very Poor	Very Likely Altered	Low

Analytical chemistry monitoring during dry weather at the two SMC locations indicated that sulfate and total nitrogen concentrations were above benchmarks at both locations. In addition, chloride was above the benchmark at the De Luz Creek location and nitrate + nitrite as N and total phosphorus concentrations were above benchmarks at the Rainbow Creek location.

A trend analysis of IBI scores was conducted for NPDES bioassessment stations for the data collected during the late spring to early summer sampling period between 2001 and 2015. No significant trends were identified for IBI in the Santa Margarita River WMA.

ES.4 Transitional MS4 Outfall Monitoring Results

ES.4.1 MS4 Outfall Discharge Monitoring Station Inventory Results

Per Provision D.2.a(1), Copermittees refined their inventory of major MS4 outfalls discharging to receiving waters during the 2014-2015 monitoring year. The compiled information includes location, outlet size, accessibility, and flow determination (persistent, transient, or dry), if known. In the Santa Margarita River WMA, the MS4 inventory contains 10 major MS4 outfalls (Figure ES-2).

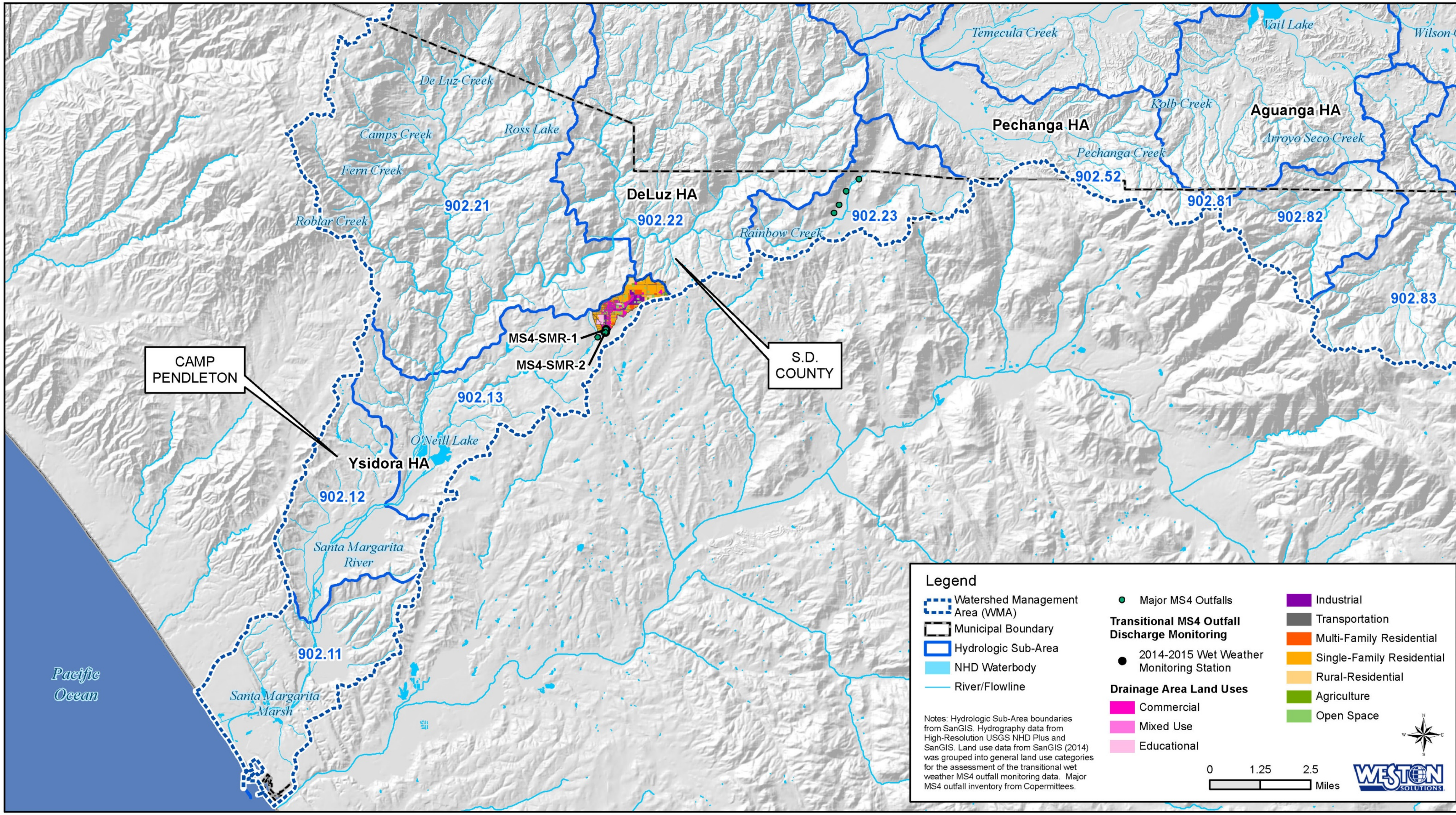


Figure ES-2. Major MS4 Outfalls in the Santa Margarita River WMA and Drainage Areas of Monitored Transitional Wet Weather MS4 Outfalls

ES.4.2 Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Results

The transitional dry weather MS4 outfall discharge field screening results within the Santa Margarita River WMA are summarized in Figure ES-3. Based on field screening visits and historical data as needed and available, the Copermittees determined the flow status of each major MS4 outfall as persistent, transient, dry, tidal, or undetermined. MS4 outfalls with flowing, ponded or pooled water observed during the three most recent visits were identified as having persistent flow. Sites were identified as having transient flow if they were dry during one or two of three visits or, for sites with only two visits, one of two visits. Outfalls considered undetermined were of two categories: (1) sites with two visits that had flowing, ponded or pooled water and no historical data, and therefore required additional visits to make a determination as to whether flow was transient or persistent, or (2) sites with only one visit and no historical data. Dry site categories included those dry for the last three or more consecutive visits, or dry for the last two consecutive visits if only two observations were available. All major outfalls in the Santa Margarita River WMA have now been visited frequently enough to be identified as persistent, transient, or dry ($\geq$3 visits). The majority (60%) of the major MS4 outfalls in the Santa Margarita River WMA were determined to be dry during dry weather MS4 outfall field screening.

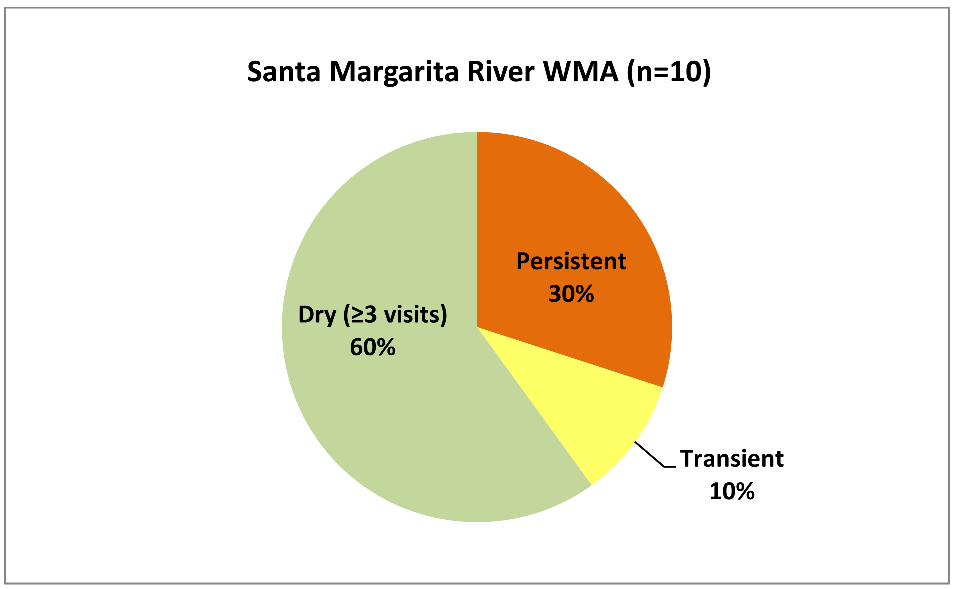


Figure ES-3. Summary of the Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring Flow Determinations for the Santa Margarita River WMA

An assessment of the transitional dry weather MS4 outfall field screening monitoring data was conducted to address the following:

- Identification of known and suspected controllable sources (e.g., facilities, areas, land uses, pollutant generating activities) of transient and persistent flows within the Copermittee's jurisdiction in the WMA;

- Identification of sources of transient and persistent flows within the Copermittee's jurisdiction in the WMA that have been reduced or eliminated; and
- Identification of modifications to the field screening monitoring locations and frequencies for the MS4 outfalls in the inventory necessary to identify and eliminate sources of persistent flow non-storm water discharges.

The County of San Diego did not identify any controllable sources of persistent or transient flow in the Santa Margarita River WMA. In the four cases where flow was observed but the source was not directly observed or otherwise definitively identified, the County of San Diego identified irrigation runoff as a potential or suspected controllable source. With the adoption of the new Jurisdictional Runoff Management Programs (JRMPs) toward the end of the 2014-2015 fiscal year, Copermittees established legal authority to prohibit irrigation runoff as an illicit discharge. In accordance with the updated JRMPs, Copermittees are implementing programs to eliminate irrigation runoff. Because the fiscal year ends June 30, while the monitoring year ends September 30, the irrigation runoff prohibition was in effect for a limited portion of the 2014-2015 monitoring year for most Copermittees. The 2015-2016 monitoring year will be the first monitoring year during which an irrigation runoff prohibition is in place for the entire year. The County also identified groundwater seepage as a suspected uncontrollable source at three of the sites.

ES.5.3 Transitional Wet Weather MS4 Outfall Discharge Monitoring Results

Transitional wet weather MS4 outfall discharge monitoring was conducted at two major MS4 outfalls in the Santa Margarita River WMA (shown with drainage areas in Figure ES-2). Both outfalls were within the Upper Ysidora hydrologic subarea (HSA) (902.13) and were unchanged since the first transitional monitoring year.

Total and dissolved metals concentrations were generally low. Chlorpyrifos concentrations were also low (at MS4-SMR-2) or below the detection limit (at MS4-SMR-1). Indicator bacteria concentrations were higher at MS4-SMR-1 for fecal and total coliform and at MS4-SMR-2 for *Enterococcus*. Nutrient concentrations were also generally higher at MS4-SMR-1.

A transitional wet weather MS4 outfall discharge land-use based assessment was performed in accordance with Provision D.4.b.(2)(b) of the 2013 Permit. The MS4 wet weather monitoring data collected during the 2014-2015 monitoring year built upon those collected during the first transitional monitoring year (2013-2014) and were used to calculate land use hydrologic parameters, storm water runoff volumes, and pollutant loads for the monitored outfalls, as well as for jurisdictional areas within the WMA through an extrapolation of the monitoring data. The distribution of land use types within the drainage areas associated with the monitored outfalls generally resembles that of the WMA.

ES.5 Conclusions

Given that the WQIP and associated numeric goals for the Santa Margarita River WMA have not yet been developed, receiving water monitoring data were assessed using existing benchmarks developed under the 2007 Permit. After the WQIP is accepted, comparisons to numeric goals and assessments of critical beneficial uses in accordance with the WQIP can be accomplished, and data collected and presented here may be re-evaluated according to the criteria established therein.

Following the assessment methodology outlined in the first TMAR, three assessments that can be provided prior to the development and acceptance of the WQIPs include:

1. Evaluation of the status and trends of receiving water quality conditions in coastal waters; enclosed bays, harbors, estuaries, and lagoons; and streams during wet and dry weather. This was accomplished by conducting receiving water monitoring, comparing the results to receiving water – water quality benchmarks, and a trend analysis. In addition, the SMC Regional Monitoring Program has been refined to address data gaps and continue to detect changes in conditions over time at trend sites. Receiving water data and trend analysis results were also evaluated in relation to water quality challenges in the WMA.

The majority of constituents analyzed in receiving waters of the Santa Margarita River WMA during both dry and wet weather were below applicable benchmarks. The constituents most frequently measured above benchmarks were sulfate and total dissolved solids (TDS) during dry weather, and fecal coliform, TDS, and total iron during wet weather. Considering that the exceedance rate for one year of monitoring data (three data points per constituent) provides a limited view of sampling results at a site, examining historical data adds context based on a larger sample size and period of record. A comparison of the annual snapshot to historical data since 2010 for dry weather and 2008 for wet weather (Appendix F) shows that constituents measured above benchmarks for the 2014-2015 monitoring year at SMR-MLS-2 (LTMS) were generally measured above benchmarks historically. One exception is turbidity values, which were below the benchmark during the 2014-2015 monitoring year but have a historical exceedance ratio of 60% during wet weather. While the exceedance rate for one year of monitoring data (three data points) provides limited information, a significant decreasing trend has been identified for turbidity during wet weather (Table ES-7).

Of the constituents measured above benchmarks at SMR-MLS-2 (LTMS), fecal coliform and nitrogen are included on the 303(d) List for the Santa Margarita River (where SMR-MLS-2 is located). The 303(d) List also includes toxicity in the Upper Santa Margarita River, and toxicity to *Selenastrum* growth was observed during one wet weather event. Several constituents included on the 303(d) List for the Santa Margarita River were measured below benchmarks at SMR-MLS-2 (LTMS) during the 2014-2015 monitoring year, including *Enterococcus* and phosphorus.

Analyzing trends is another method for drawing meaningful conclusions from a larger data set as opposed to considering only one monitoring year of data. A summary of statistically significant receiving water trends in relation to water quality challenges in the Santa Margarita River WMA is presented in Table ES-7 below. No increasing trends were identified that are associated with water quality challenges. Decreasing trends associated with water quality challenges include dissolved phosphorus during dry and wet weather (Table ES-7). In addition, a trend analysis of IBI scores was conducted for NPDES bioassessment stations. No statistically significant trend was identified for IBI at SMR-MLS-2 (LTMS).

Table ES-7. Trends in Relation to Water Quality Challenges in the Santa Margarita River WMA

Station	Increasing	Decreasing
	Dry	
SMR-MLS-2 (LTMS)	None	Biochemical Oxygen Demand, Dissolved Antimony, Dissolved Phosphorus
	Wet	
SMR-MLS-2 (LTMS)	Conductivity, Dissolved Selenium, Surfactants (MBAS)	Ammonia as N, Biochemical Oxygen Demand, Dissolved Organic Carbon, Dissolved Phosphorus, Total Cadmium, Turbidity

Underlined text – constituent is included on the 303(d) List for a waterbody associated with the receiving water station.

SMC Regional Monitoring Program dry weather receiving water data indicated that chloride, sulfate, and total nitrogen were above benchmarks at the De Luz Creek location, and sulfate, nitrate + nitrite as N, total nitrogen, and total phosphorus were above benchmarks at the Rainbow Creek location. De Luz Creek is included on the 303(d) List for sulfate and nitrogen. Rainbow Creek is included for sulfate, and has a TMDL for total nitrogen and total phosphorus. Bioassessment data at the SMC locations indicated a Fair IBI score, Possibly Intact biotic integrity based on the CSCI, and Moderate physical habitat quality based on the CRAM at the De Luz Creek location, and a Very Poor IBI score, Very Likely Altered biotic integrity, and Low physical habitat quality at the Rainbow Creek location.

2. ***Evaluation of the MS4 outfall discharge field screening program results for dry weather, with a focus on identification of persistent and transient flows and sources of non-storm water discharges.*** With the addition of the 2014-2015 monitoring year's dry weather field screening data, Copermittees can more definitively identify outfalls with dry weather persistent and transient flows to receiving waters, and distinguish from outfalls that are consistently dry, for prioritization of efforts. There are no outfalls classified as undetermined in the Santa Margarita River WMA. In addition, further progress was made towards identifying known and suspected sources of flows, for prioritization of investigation and elimination. The associated assessment is provided in Section 5.2.3. Irrigation runoff was the most frequently identified source of flows. In accordance with updated Jurisdictional Runoff Management Plans (JRMPs), Copermittees are implementing programs to eliminate irrigation runoff.

3. ***Evaluation of the wet weather monitoring MS4 outfall discharge results including extrapolation of storm water volumes and pollutant loads to the land use types within the WMA.*** As a result of 2014-2015 wet weather monitoring at two MS4 outfalls in the Santa Margarita River WMA, Copermittees developed a more robust data set for the land-use based assessment of wet weather MS4 outfall discharge. In this second transitional monitoring year, water quality and flow data were collected for two outfalls monitored during both years. Annual storm water runoff volumes and pollutant loads were again calculated for monitored sites, building upon the data collected during the first

transitional monitoring year (2013-2014). Further, the land use based event mean concentrations (EMCs) were refined based on the two years of monitoring data for extrapolation of pollutant loads from each jurisdiction. As more data are collected and incorporated into the assessment, runoff coefficients and constituent concentrations will become increasingly representative of existing conditions. If feasible, the amount of monitored Agricultural and Rural-Residential land uses could be increased to provide better representation of these land use categories in the monitoring program. Additionally, since the storm events monitored in the Santa Margarita River WMA were small to average events and monitoring of small to average events alone may not be representative of average wet season precipitation in the region, average (greater than 0.5 inches) to larger (greater than 1 inch) forecasted storm events should, if possible, be monitored at least once during the 2013 Permit period for outfall locations where monitoring will be repeated in the future. The associated assessment is provided in Section 5.2.5.

1.0 INTRODUCTION

The National Pollutant Discharge Elimination System (NPDES) permitting requirements are mandated by the Federal Clean Water Act (CWA). In 1987, the CWA was amended by the Water Quality Act to require the United States Environmental Protection Agency (USEPA) to develop discharge permits under the NPDES program. In California, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) oversee the municipal permit program in accordance with the November 1990 Federal Regulations (40 Code of Federal Regulations (CFR) Part 122) and the Porter–Cologne Act (Division 7 of the Water Code, commencing with Section 13000). These regulations require medium municipal separate storm sewer systems (MS4s) that serve populations over 100,000 or large MS4s that serve populations over 250,000 to obtain coverage under an NPDES discharge permit. Small MS4s that are inter-connected with medium or large MS4s are also regulated under these permits. The San Diego RWQCB has the regulatory authority oversight for the San Diego NPDES permit program.

In San Diego County, 21 Municipal Copermittees (Copermittees) are covered under a municipal NPDES permit for discharge of urban runoff to waters of the United States. In May 2013, RWQCB Order No. R9-2013-0001 (2013 Permit; RWQCB, 2013) was adopted, replacing Order No. R9-2007-0001 (2007 Permit; RWQCB, 2007), effective June 27, 2013. The 2013 Permit prescribes transitional monitoring programs for the receiving water and MS4 outfalls during dry and wet weather for the 2013-2014 and 2014-2015 monitoring years as a two-year transitional period between the 2007 Permit and the completion of the Water Quality Improvement Plans (WQIPs) under the 2013 Permit. During this transitional period, the following Copermittees share the costs of the monitoring required for compliance with the 2013 Permit:

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

In February 2015, the RWQCB adopted Order No. R9-2015-0001 (RWQCB, 2015a) to amend the 2013 Permit, effective April 1, 2015. The amended Order extended coverage of the 2013 Permit to the Orange County Copermittees and incorporated other various edits. On November 18, 2015 the RWQCB adopted Order No. R9-2015-0100 (RWQCB, 2015b) and it became effective on January 7, 2016. This Order amended the 2013 Permit to extend coverage of the 2013 Permit to the Riverside County Copermittees and incorporated various additional edits.

1.1 Monitoring Program Status and Objectives

Provision B of the 2013 Permit requires the development of watershed-specific WQIPs through a collaborative effort by the Responsible Agencies in each Watershed Management Area (WMA) and other key stakeholders. The WQIP will identify the priority water quality conditions, highest priority water quality conditions, known and suspected sources of storm water and non-storm water pollutants contributing to the highest priority water quality conditions, and water quality improvement goals, strategies, and schedules.

The “transitional” monitoring prescribed in the 2013 Permit serves to fill the gap between the expiration of the previous Permit and the acceptance and implementation of the WQIPs. The annual reports for this transitional program are required to cover the program reporting period (October 1 to September 30) and include tables and figures of receiving water and MS4 outfall discharge monitoring data and assessment findings. The Transitional Monitoring and Assessment Annual Reports (TMARs) summarize the data collected during this transitional program, and provide the following assessments where possible:

- Evaluation of the status and trends of receiving water quality conditions in coastal waters; enclosed bays, harbors estuaries, and lagoons; and streams during wet and dry weather;
- Evaluation of the MS4 outfall discharge field screening program results for dry weather, with a focus on identification of persistent and transient flows and sources of non-storm water discharges; and
- Evaluation of the wet weather monitoring MS4 outfall discharge results including extrapolation of storm water volumes and pollutant loads to the land use types within the WMA.

Reporting is conducted by WMA under the 2013 Permit, and a TMAR for each WMA is submitted annually to the RWQCB, by January 31st of each year. This report is the second TMAR under the 2013 Permit for the Santa Margarita River WMA and includes data collected during the 2014-2015 monitoring year. Specific requirements and goals are discussed in the following sections.

1.2 Monitoring Activities

A summary of the monitoring activities required by the 2013 Permit is presented below and in Table 1-1. Monitoring program details are described in Section 4.0.

Provision D.1.a of the 2013 Permit requires continuation of the receiving water programs required by the 2007 Permit. In addition, long-term receiving water monitoring of mass loading station (MLS) locations, including SMR-MLS-2, is required by Provision D.1.b-d of the 2013 Permit. MS4 outfall monitoring requirements were met and participation in regional programs was performed according to the permit requirements (see Table 1-1). The monitoring conducted in the Santa Margarita River WMA under the 2013 Permit during the 2014-2015 monitoring year included the following:

- MLS receiving water monitoring during two dry (ambient) weather and two wet weather events under the transitional monitoring requirements of the 2013 Permit.
- Long-term receiving water monitoring during three dry (ambient) weather and three wet weather events.
- Post-storm synthetic pyrethroid sediment.
- Bioassessment monitoring and participation in the 2015 Stormwater Monitoring Coalition (SMC) regional bioassessment and water quality monitoring survey.
- Total Maximum Daily Load (TMDL) monitoring.
- Special studies.
- Transitional MS4 outfall discharge monitoring including refinement of the MS4 outfall discharge monitoring station inventory, transitional dry weather MS4 outfall discharge field screening (and illegal connection and illicit discharge (IC/ID) investigations as needed), and transitional wet weather MS4 outfall discharge monitoring.

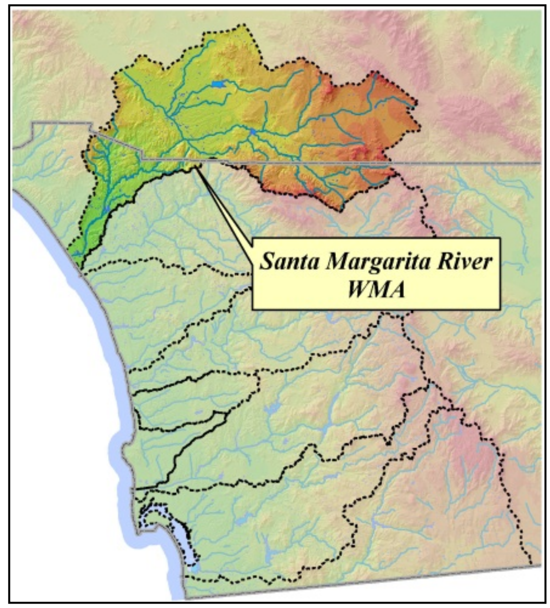
Table 1-1. Monitoring Activities Conducted Under the 2013 Permit in the Santa Margarita River WMA

Monitoring Program Type	Monitoring Program Permit Requirement	Permit Section of R9-2013-0001	Accomplished During 2014–2015 Monitoring Year	Notes
Receiving Water Monitoring	MLS monitoring	D.1.a.	✓	
	TWAS monitoring	D.1.a.	N/A	
	Long-term MLS monitoring	D.1.b - d	✓	
	Bioassessment monitoring	D.1.a. and D.1.c.(5) (Long-term MLS)	✓	
	Sediment Quality Monitoring	D.1.a. and D.1.e	-	Fulfilled by participation in Bight ’13.
	Post-storm pyrethroid monitoring	D.1.a.	✓	
Urban Runoff/ MS4 Outfall Monitoring	MS4 outfall monitoring stations inventory	D.2.a	✓	
	Transitional dry weather MS4 outfall discharge field screening monitoring	D.2.a	✓	
	IC/ID investigation (as needed)	E.2.d.(2)(c-e)	✓	
	Transitional wet weather MS4 outfall discharge monitoring	D.2.a	✓	
Regional Monitoring Program	Stormwater Monitoring Coalition Regional Monitoring (bioassessment workgroup)	D.1.a.	✓	
Other Monitoring	TMDL monitoring	D.1.a.	✓	Total nitrogen and total phosphorus in Rainbow Creek Watershed.
	Special Studies	D.3.a	N/A	San Diego Regional Reference Streams and Beaches Studies
	Area of Special Biological Significance (ASBS) monitoring	D.1.a.	N/A	

N/A - Conducted regionally but not in the Santa Margarita River WMA.

2.0 SANTA MARGARITA RIVER WMA DESCRIPTION

2.1 Regional Setting



The Peninsular Mountain Range divides San Diego County into two Basins. The South Coast Basin or Pacific Basin drains west towards the Pacific Ocean, and contains the majority of San Diego County and the major population centers in the region. The Colorado River Basin or Salton Sea Basin drains east to the Salton Sea and Colorado River. The San Diego Region covers most of San Diego County and portions of southwestern Riverside and Orange Counties. The region is divided into nine WMAs and 11 major hydrologic units (HUs). The nine WMAs are further divided into 49 hydrologic areas (HAs). The San Juan HU (HU 901) is comprised of five HAs, two of which are within San Diego County. The San Juan HU was covered under the Orange County Municipal Storm Water Permit until February of 2015, at which time Orange County Copermittees were extended coverage under the 2013 Permit. The Santa Margarita River WMA is located in the northern portion of San Diego County.

2.2 Regional Climate and Rainfall

The San Diego Region coastal climate is generally mild with annual average temperatures near 65 degrees Fahrenheit (°F). As elevations increase inland, average temperatures decrease to approximately 57 °F in the higher mountain areas. Warm, dry Santa Ana winds are frequent in the fall, resulting in high temperatures during the months of September and October. January is typically the coldest and wettest month of the year (National Oceanic and Atmospheric Administration (NOAA), 2015a).

The coastal portions of San Diego County receive annual average rainfall ranging from less than 9 inches in the extreme southwest to 11 inches in the north. The foothills to the east of the coastal plain receive precipitation ranging from 14 inches in the south to 17 inches in the north. Mountain area precipitation ranges from 20 to 40 inches, depending on slope and elevation (NOAA, 2004).

There are two distinct climatic periods per year: a dry (semi-arid) period from late April to mid-October and a wet period from mid-October through late April. The wet period typically provides 85 to 90 percent (%) of the annual average rainfall for the coastal and inland areas, with the remaining rainfall attributed to residual storms and occasional summer monsoonal storms.

The total annual rainfall in the San Diego Region during the reporting period (October 2014 through September 2015), as measured at Lindbergh Field, was 11.91 inches. This total is more than double the annual rainfall total from the previous reporting period (5.09 inches during 2013-

2014) and is above the historical (1939 to 2015) annual mean of 9.93 inches. The majority of the rainfall during the 2014-2015 reporting period fell during December, May, and July, with the May and July totals exceeding the previous records for those months (Western Regional Climate Center (WRCC), 2015; Figure 2-1).

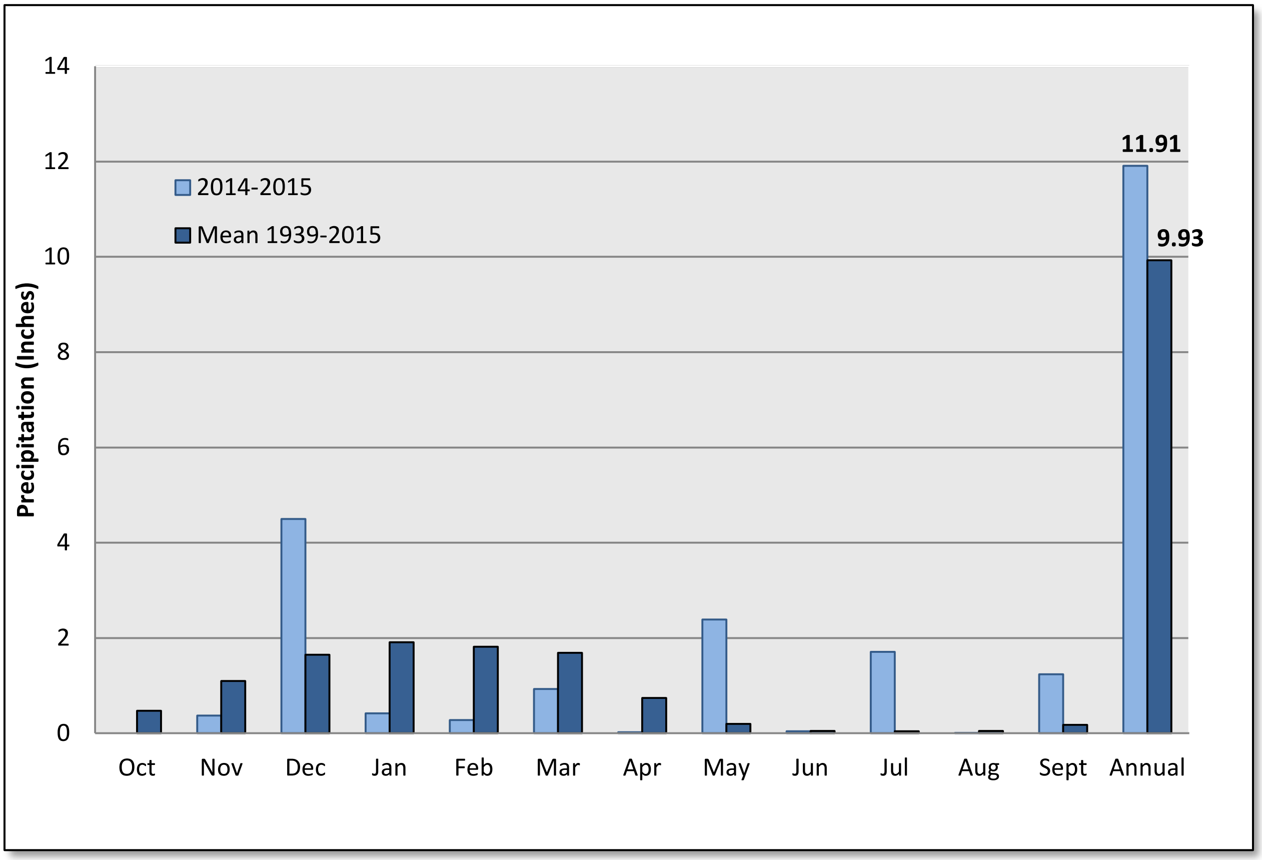


Figure 2-1. San Diego-Lindbergh Field Monthly Precipitation Summary 2014-2015 and Historical Mean (1939–2015)

Regional rainfall amounts and distribution for the 2014-2015 monitoring year are presented in Figure 2-2. Four Alert System Precipitation Gauges (http://sdcfcd.org/whatalert.html) collected rainfall data during the 2014-2015 monitoring year in the Santa Margarita River WMA. Annual rainfall totals at these stations ranged from 11.3 to 14.3 inches, which was greater than the range observed during the 2013-2014 monitoring year (6.5 to 8.8 inches) (Weston Solutions, Inc. (WESTON), 2015). The four Alert gauges were positioned in relatively close proximity, with none located in the comparatively wetter eastern portion of the WMA.

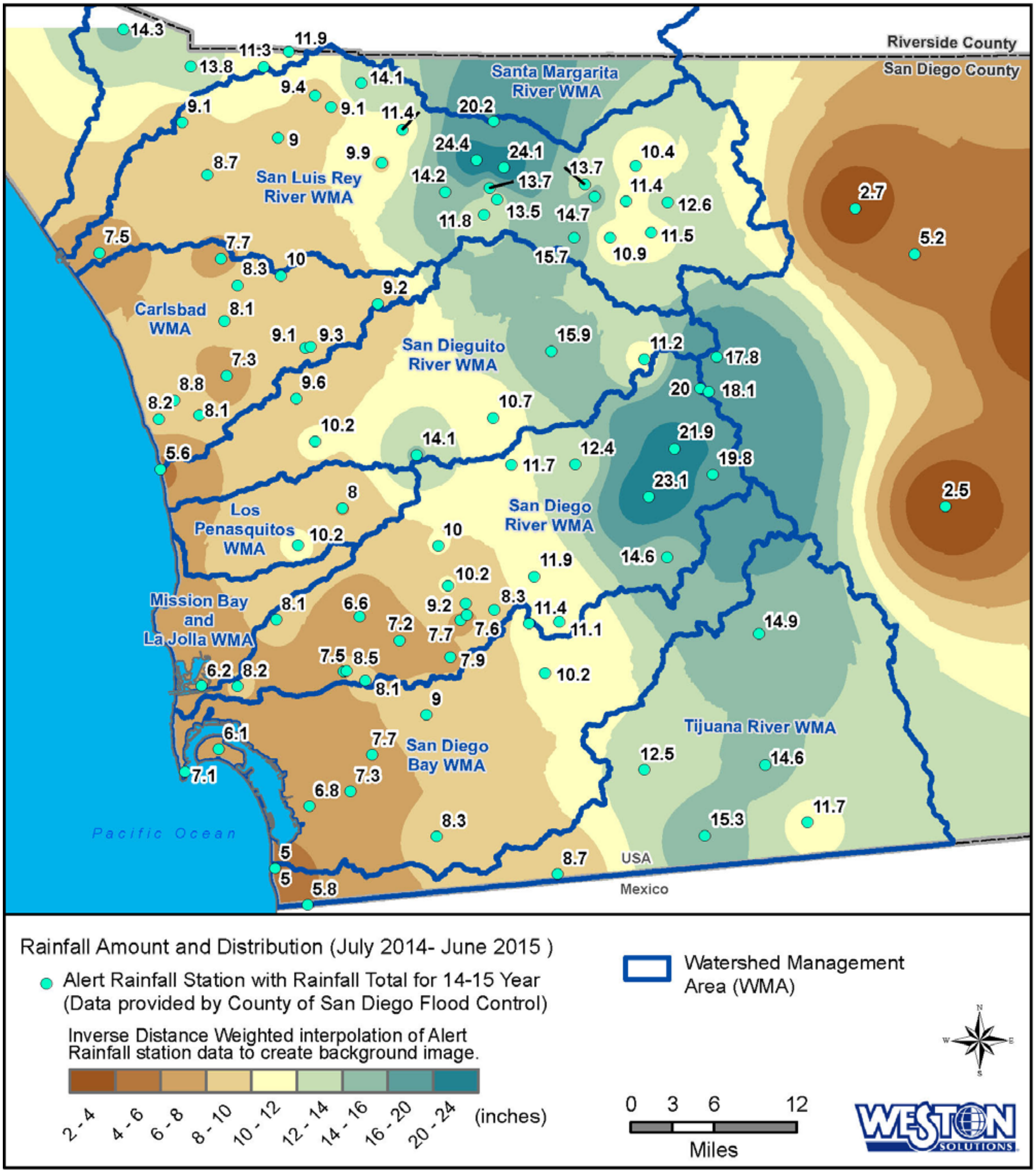


Figure 2-2. Rainfall Amounts and Distribution During the 2014-2015 Monitoring Year

2.3 Significant Regional Events

The NOAA National Weather Service (NWS) Climate Prediction Center provides El Niño Southern Oscillation updates, the archives of which can be accessed on the NOAA website (NOAA, 2015b). During the fall of 2014, the NWS issued an El Niño Watch, indicating increasing probability that El Niño conditions would develop in the eastern Pacific Ocean. Forecasts initially predicted a weak El Niño, beginning in the late fall of 2014 and lasting into the spring of 2015. However, drought conditions observed during 2012-2013 and 2013-2014 persisted and monthly rainfall totals at Lindbergh Field were far below mean historical totals except in December, which had above-average rainfall (Figure 2-1). In addition to drought conditions, California experienced its warmest fall season on record. December 2014 through June 2015 was also warmer than average, and below-average winter snowpack further contributed to drought conditions (NOAA, 2015c). In March 2015, the NWS issued an El Niño Advisory, and weak but strengthening El Niño conditions were observed starting in the late winter into early spring. Record rainfall totals were measured at Lindbergh Field during May and July of 2015. From July through October of 2015, the NWS forecast predicted that the El Niño event would be strong at its peak in late fall or early winter and would have an increasing likelihood of continuing at least through the early spring of 2016 (NOAA 2015b).

2.4 Hydrologic Areas of the Santa Margarita River WMA

The HAs and hydrologic subareas (HSAs) in the Santa Margarita River WMA are listed in Table 2-1 and the HAs and named tributaries are shown in Figure 2-3. The Santa Margarita River WMA (HU 902) is the largest WMA in the San Diego Region, encompassing 494,396 acres, with approximately 75% of the watershed lying in Riverside County and the remaining 25% in San Diego County. The Santa Margarita River WMA consists of nine HAs: Ysidora (902.1), De Luz (902.2), Murrieta (902.3), Auld (902.4), Pechanga (902.5), Wilson (902.6), Cave Rocks (902.7), Aguanga (902.8), and Oak Grove (902.9). These HAs are also broken down into 33 HSAs.

Table 2-1. Hydrologic Areas in the Santa Margarita River WMA

HU	HU No.	HA	HA No.	HSA	HSA No.
Santa Margarita	902	Ysidora	902.1	Lower Ysidora	902.11
				Chappo	902.12
				Upper Ysidora	902.13
		De Luz	902.2	De Luz Creek	902.21
				Gavilan	902.22
				Vallecitos	902.23
		Murrieta	902.3	Wildomar	902.31
				Undefined	902.32
				French	902.33
				Lower Domenigoni	902.34
				Domenigoni	902.35
				Diamond	902.36
		Auld	902.4	Bachelor Mountain	902.41
				Getrudis	902.42
				Lower Tucalota	902.43
				Tucalota	902.44
		Pechanga	902.5	Pauba	902.51
				Wolf	902.52
		Wilson	902.6	Lancaster Valley	902.61
				Lewis	902.62
				Reed Valley	902.63
		Cave Rocks	902.7	Lower Coahuila	902.71
				Upper Coahuila	902.72
				Anza	902.73
				Burnt	902.74
		Aguanga	902.8	Vail	902.81
				Devils Hole	902.82
				Redec	902.83
				Tule Creek	902.84
		Oakgrove	902.9	Lower Culp	902.91
				Previtt Canyon	902.92
				Dodge	902.93
				Chihuahua	902.94

2.5 Land Use, Population, and Jurisdiction

Acreage of each HA within the Santa Margarita River WMA is summarized in Table 2-2 according to Copermittee and jurisdiction (data from San Diego Geographic Information Source (SanGIS), 2012). Jurisdictional boundaries are shown in Figure 2-3 (SanGIS, 2014). Not including the portion of the Santa Margarita River WMA within Riverside County, the Santa Margarita River WMA is located entirely within the unincorporated area of San Diego County. Of the 126,500 acres within the San Diego County portion of the WMA, 32% are under the County of San Diego’s jurisdiction while 64% are federally owned, 3% are state-owned, and 1% are tribal lands.

The largest HA in the Santa Margarita River WMA is the De Luz HA, comprising 33% of the acreage of the WMA. Of the 41,806 acres within the De Luz HA, 37% are federally owned and 1% are state-owned. The second-largest HA in the Santa Margarita River WMA is the Oakgrove

HA, comprising 28% of the WMA's acreage. Of the 35,861 acres within the Oakgrove HA, 60% are federally owned and 9% are state-owned. The Ysidora HA comprises 22% of the acreage of the Santa Margarita River WMA. The federal government owns 95% of the land in the HA while the state owns less than 1%. The Aguanga HA comprises 16% of the acreage of the Santa Margarita River WMA. Of the 19,866 acres within the HA, 86% are federally owned and 5% are tribal lands. The smallest HA within the WMA is the Pechanga HA, making up less than 1% of the WMA's acreage. Of the 1,122 acres within the Pechanga HA, 95% are federally owned.

Land use designations within the Santa Margarita River WMA are summarized in Table 2-3 and illustrated in Figure 2-4. Overall, more urbanized land uses are typically found in the Riverside County portion of the WMA. In the San Diego County portion, land use is primarily military in the western portion of the WMA within the Ysidora HA and western portion of the De Luz HA, and primarily Open Space/Parks and Recreation in the eastern portion of the WMA in the Aguanga and Oakgrove HAs. To date, the Permit covers only those areas where the County of San Diego has jurisdiction and excludes military lands.

The population in the San Diego County portion of the Santa Margarita River WMA was estimated to be 32,803 persons, or 166 persons per square mile, based on block group level population data from the 2010 Census Summary File for California (United States Census Bureau, 2011). This estimate is already greater than the 2005 projection of 31,000 persons by 2020 (San Diego Association of Governments (SANDAG), 2005). The major population center in the watershed is in the Murrieta and Pechanga HAs along the Interstate 15 corridor.

Table 2-2. Summary of Jurisdictions in the Santa Margarita River WMA

Copermittee	Total Land Area* (Acres)	Acreage Within HA*					Land Area By Jurisdiction (%)**			
		902.1 (Ysidora)	902.2 (De Luz)	902.5 (Pechanga)	902.8 (Aguanga)	902.9 (Oakgrove)	Copermittee	Federal	Tribal	State
County of San Diego	126,500	27,844	41,806	1,122	19,866	35,861	32	64	1	3

*Total Land Area and Acreage Within HA include lands under state, tribal or federal ownership.
**Land area by jurisdiction (%) shows the percentage of the total area within that Copermittee's municipal boundary that is under federal, state, or tribal jurisdiction.

Table 2-3. Summary of Land Uses in the Santa Margarita River WMA

Land Use	Land Use % Within HA*					Land Use % Within WMA*
	902.1 (Ysidora)	902.2 (De Luz)	902.5 (Pechanga)	902.8 (Aguanga)	902.9 (Oakgrove)	
Agriculture	2.16	12.93	0.00	0.47	5.36	6.34
Commercial	0.56	0.02	0.00	0.00	0.04	0.14
Commercial Recreation	0.01	0.04	0.00	0.00	0.08	0.04
Industrial	0.21	0.01	0.00	0.00	0.00	0.05
Military	89.85	29.48	0.00	0.00	0.00	29.52
Open Space/Park & Rec	0.02	14.46	94.59	87.37	68.22	38.68
Public Facility	0.37	0.16	0.00	0.01	0.03	0.14
Residential	4.15	0.61	0.00	0.00	0.11	1.15
Spaced Rural Residential	0.19	14.60	0.42	0.02	7.81	7.09
Transportation	1.59	1.27	0.11	0.47	0.61	1.02
Under Construction	0.00	0.00	0.00	0.00	0.00	0.00
Vacant & Undeveloped	0.31	26.38	4.88	11.66	17.74	15.6
Water	0.58	0.05	0.00	0.00	0.00	0.14

*Includes land under state, tribal or federal ownership.

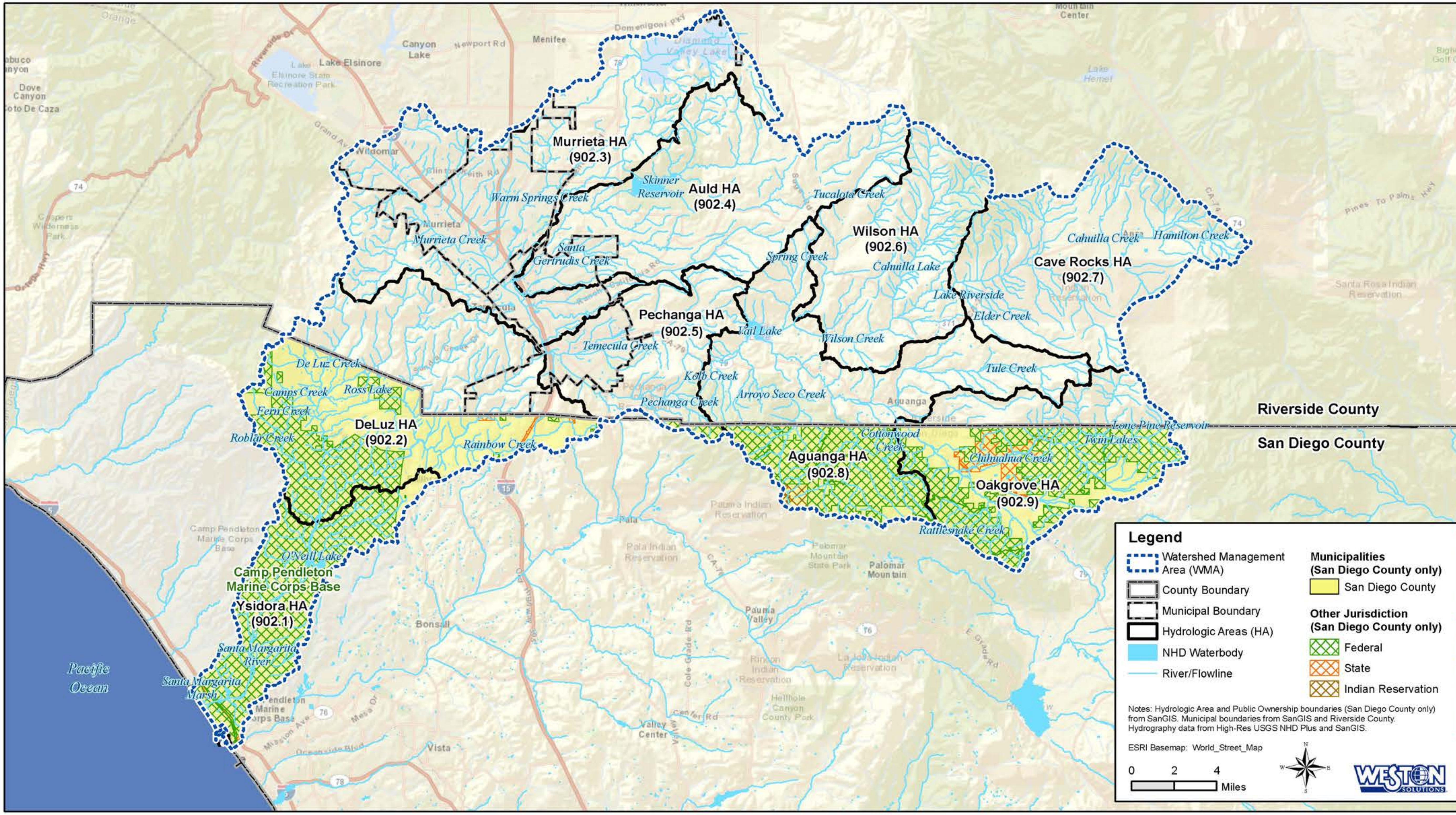


Figure 2-3. Jurisdictional Boundaries, Hydrologic Areas, and Major Waterbodies in the Santa Margarita River WMA

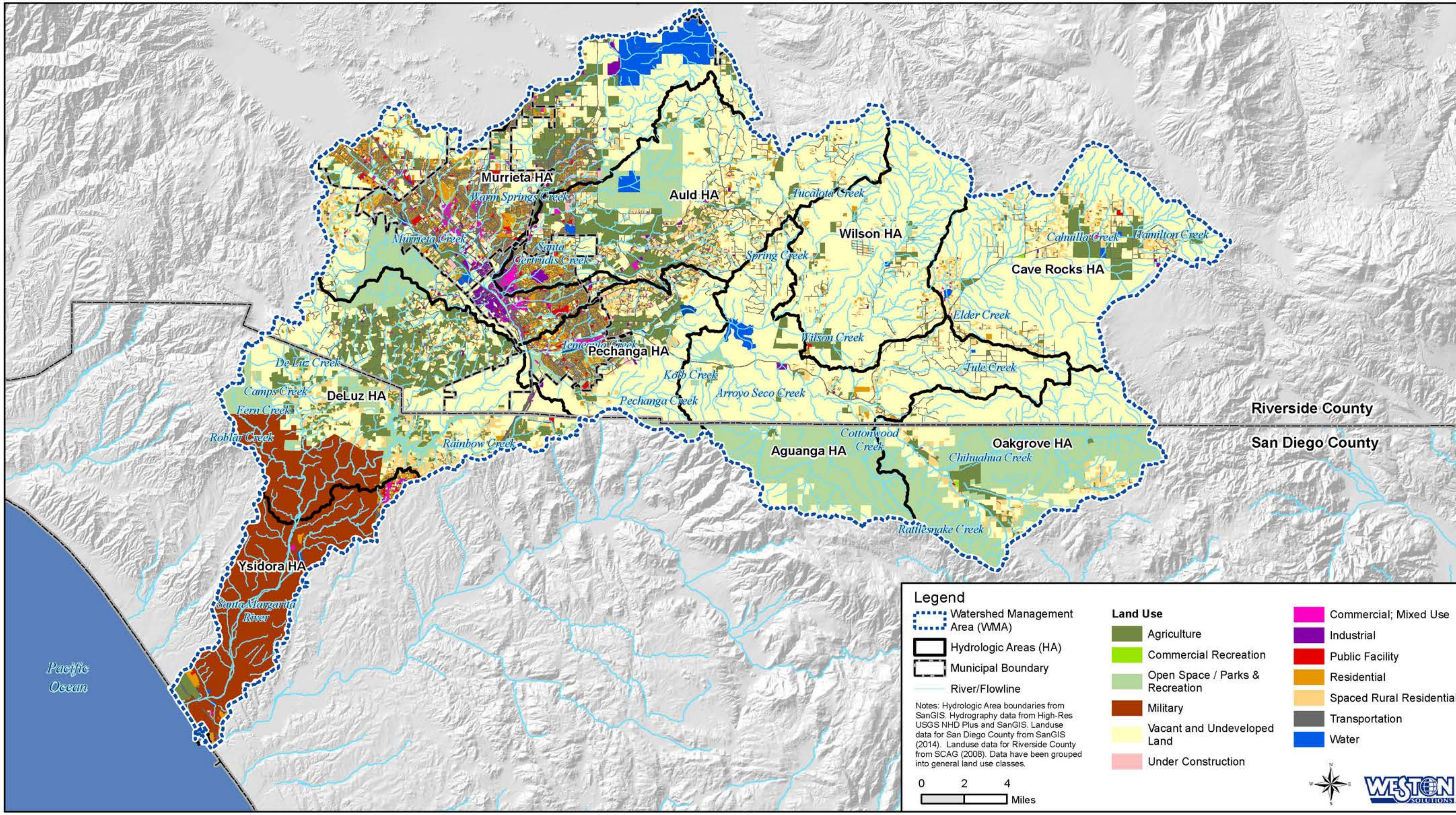


Figure 2-4. Land Use Distribution within the Santa Margarita River WMA

3.0 WATER QUALITY ISSUES

3.1 Beneficial Uses

The Santa Margarita River WMA provides a variety of beneficial uses (Table 3-1). The watershed contains the Santa Margarita River, Temecula Creek, Murrieta Creek, Rainbow Creek, Sandia Creek, Santa Margarita Lagoon, Vail Lake, Skinner Reservoir, and Diamond Valley Lake Reservoir. In addition, Lake O'Neill receives much of its water from the watershed. Nine dams are located in the watershed. However, 92% of the river is categorized as free flowing. The principal aquifer in the watershed is the Santa Margarita Basin. Major waterbodies within the Santa Margarita River WMA are shown in Figure 2-3. A detailed listing of the beneficial uses in the Santa Margarita River WMA by waterbody is provided in Tables 2-2 through 2-5 of the Water Quality Control Plan for the San Diego Basin (Basin Plan; RWQCB, 1994).

Table 3-1. Beneficial Uses in the Santa Margarita River WMA

Beneficial Uses	Inland Surface Waters	Coastal Waters (excluding Pacific Ocean)	Pacific Ocean	Reservoirs and Lakes	Ground-waters
Municipal and domestic supply (MUN)	●			●	●
Agricultural supply (AGR)	●			●	●
Industrial service supply (IND)	●	●	●	●	●
Industrial process supply (PROC)	●			●	●
Groundwater recharge (GWR)	●			●	
Freshwater replenishment (FRSH)					
Hydropower generation (POW)				●	
Navigation (NAV)		●	●		
Contact water recreation (REC-1)	●	●	●	●[1]	
Non-contact water recreation (REC-2)	●	●	●	●	
Commercial and sport fishing (COMM)		●	●		
Warm freshwater habitat (WARM)	●			●	
Cold freshwater habitat (COLD)	●			●	
Biological habitats of special significance (BIOL)	●		●		
Estuarine habitat (EST)					
Wildlife habitat (WILD)	●	●	●	●	
Rare, threatened, or endangered species (RARE)	●	●	●	●	
Marine habitat (MAR)		●	●		
Migration of aquatic organisms (MIGR)		●	●		
Shellfish harvesting (SHELL)		●	●		
Aquaculture (AQUA)			●		
Spawning, reproduction, and/or early development (SPAWN)	●	●	●		

● = Existing
[1] Applies to shore and boat fishing only as other REC-1 uses prohibited (exception is O'Neill Lake).
Note: Beneficial uses vary by HSA. Please refer to the Basin Plan for individual HSAs.
Source: RWQCB, Water Quality Control Plan for the San Diego Basin, September 8, 1994 (Tables 2-2, 2-3, 2-4, and 2-5), amendments adopted through April 4, 2011 (RWQCB, 1994).

3.2 Regulatory Water Quality Challenges

Potential environmental water quality issues in the Santa Margarita River WMA include surface water and groundwater quality degradation, habitat loss, invasive species, and channel bed erosion (San Diego County, 2009). The upper portion of the watershed in Riverside County has been under continuous development, and pollutants/stressors within the watershed include eutrophic conditions, nutrients, pathogens, salinity, pesticides, metals/metalloids, toxicity, and other inorganics. According to the *Clean Water Act 2010 Section 303(d) List/305(b) Integrated Report* (SWRCB, 2010), potential sources of contaminants include urban runoff/storm sewers, agriculture/nurseries, septic tanks, natural sources, flow regulation/modification, and unknown point and nonpoint sources.

The 2010 SWRCB 303(d) List was adopted on August 4, 2010, and was finalized by the USEPA on October 11, 2011. Waterbodies in the Santa Margarita River WMA that were placed on the 2010 SWRCB Section 303(d) List and the beneficial uses potentially impacted by these listings are presented in Table 3-2. Listed waterbodies are also shown on the receiving water map in Section 4.1 (Figure 4-1). Since the 2006 SWRCB Section 303(d) List was published, several pollutants/stressors to Santa Margarita River WMA waterbodies have been delisted. These include Sandia Creek (manganese and nitrogen), Temecula Creek (nitrogen), and Long Canyon Creek (total dissolved solids (TDS)). The SWRCB and Regional Water Boards have historically assessed water quality data every two years to determine whether water bodies require placement on the 303(d) List. However, a new strategy has been devised by the SWRCB that is intended to make the Integrated Report process more efficient. This new strategy establishes three groups of three Regional Water Boards, with an Integrated Report submitted for one of these groups per two-year listing cycle. The next update that will include the San Diego region will be the 2014 Integrated Report. The data submitted for these assessments are available on the SWRCB website.

On February 9, 2005 the San Diego Water Board adopted Resolution No. R9-2005-0036, an *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* (RWQCB, 2005). The TMDL was approved by the SWRCB in November 2005; by the Office of Administrative Law on February 1, 2006; and by the USEPA on March 22, 2006. The TMDL became effective under state law on February 1, 2006, the date of Office of Administrative Law approval. The responsible Copermittee within the Santa Margarita River WMA that is named in the TMDL is the County of San Diego. The compliance requirements and monitoring and reporting requirements of the TMDL were subsequently incorporated into Attachment E of the 2013 Permit.

A TMDL for eutrophic conditions is required to address impairments in Santa Margarita Lagoon. In 2006, the San Diego RWQCB issued an *Investigation Order and Technical Report for Lagoons Total Maximum Daily Load (TMDL) Project* (Order No. R9-2006-0076) that established monitoring requirements for dischargers to better understand water quality conditions within the Slough. Responsible dischargers to the lagoon, as identified within the Lagoon Investigation Order, include the County of San Diego, Riverside County Flood Control and Water Conservation District, North County Transit District, and the California Department of

Transportation (Caltrans). Monitoring under the Order has been completed and the TMDL is in progress.

Table 3-2. Waterbodies on the 2010 State Water Resources Control Board Section 303(d) List – Santa Margarita River WMA

Waterbody Name	HSA	HSA No.	Pollutant/Stressor	Potentially Impacted Beneficial Uses
Lower Santa Margarita River	Lower Ysidora	902.11	*Enterococcus*, fecal coliform	REC-1
			Phosphorus, nitrogen	WARM
Santa Margarita Lagoon	Lower Ysidora	902.11	Eutrophic	EST
Oceanside Harbor	Lower Ysidora	902.11	Copper	MAR
De Luz Creek	De Luz Creek	902.21	Iron, manganese, sulfates	MUN
			Nitrogen	MUN, WARM
Rainbow Creek	Gavilan	902.22	Iron, sulfates, TDS	MUN
			Nitrogen and phosphorus	MUN, WARM
Upper Santa Margarita River	Gavilan	902.22	Phosphorus, toxicity	WARM
Sandia Creek	Gavilan	902.22	Iron , sulfates, TDS	MUN
Long Canyon Creek	undefined	902.32	Chlorpyrifos	WARM
			Iron, manganese	MUN
			Fecal coliform	REC-1
Santa Gertrudis Creek	Gertrudis	902.42	Chlorpyrifos, copper, phosphorus	WARM
			E. coli, fecal coliform	REC-1
			Iron, manganese	MUN
Temecula Creek	Pauba	902.51	Phosphorus and TDS	MUN
			Chlorpyrifos, copper, toxicity	WARM

Source: SWRCB, 2010.
TDS – total dissolved solids
HS A– hydrologic subarea

3.3 Water Quality Improvement Planning

The 2013 Permit outlines the requirements for developing and submitting WQIPs in Provisions B, D, and F. The following sections describe the processes, analyses, public process, and expected timeframes to develop the Santa Margarita River WMA WQIP. The Santa Margarita River WMA includes responsible agencies in Riverside County covered under a different MS4 permit (Order R9-2010-0016), set to expire on November 10, 2015. The RWQCB adopted Order No. R9-2015-0100 (RWQCB, 2015b) at a public hearing on November 18, 2015. This amendment to the 2013 Permit extends coverage to the Riverside County Copermittees, effective January 7, 2016. The County of San Diego was not required to implement the requirements of Provision B for its jurisdiction until the Riverside County Copermittees were notified of coverage under the 2013 Permit. For this reason, the schedule for development of the WQIP for this WMA differs from the other San Diego Region WMAs, and the WQIP development process has not yet started for the Santa Margarita River WMA.

The complete WQIP document submittal will contain the following components identified in Provision B of the 2013 Permit:

- Priority Water Quality Conditions (Provision B.2)
- Goals, Strategies and Schedules (Provision B.3)
- Watershed Management Area Analysis (WMAA; Provision B.3.b.(4)), which the 2013 Permit indicates is optional)
- Monitoring and Assessment Program (MAP; Provision B.4), which will also document how the Responsible Agencies will comply with the applicable portions of Provision D
- Iterative Approach and Adaptive Management Process (Provision B.5)

The requirement to develop Priority Water Quality Conditions and Potential Strategies in the WQIP involves assessment of receiving water conditions and impacts from MS4 discharges followed by an identification of priority water quality conditions and sources of pollutants and/or stressors contributing to the highest priority conditions. The technical process identifies the highest priority water quality conditions to be addressed by the WQIP and potential water quality improvement strategies that may be implemented within the WMA.

The Goals, Strategies and Schedules portion of the WQIP identifies the numeric goals to "measure reasonable progress towards addressing the highest priority water quality conditions" and must provide interim and final numeric goals based on measurable criteria or indicators, including any TMDL goals and/or schedules. Also provided in this portion of the WQIP are jurisdictional strategies and watershed management area strategies that will be implemented to address the highest priority water quality conditions and specific schedules for implementation of the strategies.

The integrated MAP of the WQIP describes the monitoring and assessment that will occur after the transitional period, incorporates at a minimum the monitoring and assessment requirements of Provision D of the Permit, and may be tailored to focus on the highest priority water quality conditions for the WMA. The MAP must be able to track: 1) progress towards achieving the numeric goals and schedules, 2) progress towards addressing the highest priority water quality conditions, and 3) each Copermittee's overall efforts to implement the WQIP. The MAP provides input to the adaptive management process that is also a requirement of the WQIP. The Final WQIP will include an adaptive management approach describing how the iterative process will be implemented to modify and ultimately improve the effectiveness of the WQIP.

4.0 MONITORING METHODS

NPDES receiving water monitoring in the northern WMAs, including the Santa Margarita River WMA, was conducted during the 2014-2015 monitoring year in accordance with the transitional monitoring and long-term monitoring requirements of the 2013 Permit. In addition, receiving water monitoring was conducted as part of the SMC Regional Monitoring Program. MS4 outfall monitoring was also conducted during the 2014-2015 monitoring year. Methodology is summarized in the subsections below and is detailed in the guidance documents referenced in those subsections. These guidance documents include the program-specific workplans *Transitional Receiving Water Monitoring Workplan* (Appendix A), *2013-2014 and 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Monitoring Workplan* (Transitional Wet Weather MS4 Monitoring Workplan; Appendix B), and *Bioassessment Survey of the Stormwater Monitoring Coalition* (Southern California Coastal Water Research Project (SCCWRP), 2015).

Samples were collected for each program in accordance with USEPA sampling protocols (USEPA, 1992). Samples were collected in appropriate containers for the analyses performed and stored on ice between collection and transfer to the analytical laboratories. Chain-of-custody (COC) forms were completed for each sample and appropriate COC procedures were adhered to throughout the transport of the samples. Sample preservatives, where applicable, and holding time requirements were based on recommendations from *Standard Methods (SM) for the Examination of Water and Wastewater* 21st Edition (American Public Health Association (APHA) et al., 2005) and USEPA methods. Quality assurance/quality control (QA/QC) samples, including duplicate samples, field blanks, and equipment rinse blanks, were collected as appropriate for each program to assess sample variability and contamination arising from the collection, transport, or storage of samples. QA/QC procedures are detailed in the workplan for each program. A QA/QC report for each program is provided in Appendix C.

4.1 Receiving Water Monitoring

Receiving water monitoring was conducted during the 2014-2015 monitoring year at one MLS location (Table 4-1, Figure 4-1) during two dry and two wet weather events in accordance with the transitional monitoring requirements of the 2013 Permit. Because SMR-MLS-2 has been designated as the long-term monitoring station (LTMS) for the Santa Margarita River WMA, additional monitoring was conducted in accordance with the long-term receiving water monitoring requirements of the 2013 Permit. Consequently, the LTMS (SMR-MLS-2) was sampled during one additional dry and one additional wet weather event during the 2014-2015 monitoring year. As required by the 2013 Permit, one of the three dry weather events at the LTMS was monitored during a dry weather period within the wet weather season, following the first wet weather event of the season and with an antecedent dry period of at least 72 hours following a storm event producing measurable (greater than (>) 0.1 inch) precipitation.

Table 4-1. 2014-2015 MLS Location in the Santa Margarita River WMA

Watershed	Station Identifier	Dates Sampled	Latitude	Longitude
Santa Margarita River	SMR-MLS-2	Dry: 9/10-11/2014, 1/7-8/2015, 5/5-6/2015	33.398142	-117.26273
		Wet: 11/1/2014, 12/2-4/2014, 3/1-2/2015		

4.1.1 Flow Monitoring

Flow monitoring equipment, consisting of an American Sigma flowmeter and flow sensor, was installed at the MLS at the beginning of the monitoring year. The equipment remained on site for the duration of the monitoring year. Stream flow rates were determined using stream stage (i.e., stream height). Flow sensors continuously measured stream stage and relayed that information to the flowmeter. Flow rates were calculated using site-specific rating curves.

The site-specific relationships between flow and stage were derived using standardized stream rating protocols developed by the United States Geological Survey (USGS) (Rantz, 1982; Oberg et al., 2005). To accurately measure flow in streams three critical elements were needed to develop rating curves, as follows:

- An accurate survey of the stream channel cross section and longitudinal slope.
- Accurate level measurements based on a fixed point.
- Measurements of velocity and flows at several points throughout the rating curve including low flow, mid flow, and peak flow conditions.

Cross section and channel thalweg (longitudinal) surveys were conducted at each station to gather basic hydraulic measurements of the receiving water channels. The flow sensor was secured to the bottom of the channel at each station, at a known location in the channel cross section. Field crews measured in-stream instantaneous flow rate and stage using USGS rating techniques and a flowmeter. The measurements were combined to produce a rating curve for each station. Rating curves were extended to high stream stages not measured using site-specific survey information and the Chézy–Manning formula (Linsley et al., 1982). In the event of equipment malfunction during wet weather, missing flow data were replaced by creating or using existing hydraulic models. For more detailed information regarding flow monitoring and measurement, refer to the Transitional Receiving Water Monitoring Workplan (Appendix A).

4.1.2 Water Quality Sampling

Grab samples were collected for constituents that are not amenable to composite sampling, including field parameters (temperature, hydrogen ion concentration (pH), and specific conductivity), biochemical oxygen demand (BOD), oil and grease, and indicator bacteria (total and fecal coliform and *Enterococcus*). Dry weather flow-weighted composite samples were collected over a typical 24-hour period, with a minimum of three sample aliquots collected per hour. Wet weather flow-weighted composite samples were collected by taking sample aliquots across the hydrograph of the storm event. Based on the anticipated size of the storm, a flow-proportioned pacing was programmed into the automated sampling equipment. Some variation may have occurred depending on actual storm intensity and duration. Composite samples were analyzed for general physical and chemical constituents, nutrients, metals, organophosphorus pesticides, synthetic pyrethroids (during wet weather only), and toxicity (to the cladoceran *Ceriodaphnia dubia*, the freshwater amphipod *Hyalella azteca*, and the freshwater plant *Selenastrum capricornutum*). Detailed sampling and analysis methodology and a table summarizing each of the analyzed constituents, volume requirements, analytical methods, reporting limits, and holding times are presented in the Transitional Receiving Water Monitoring Workplan (Appendix A). The analyzed constituents and reporting limits are shown in Table 4-2.

The monitoring data were compared to the existing receiving water - water quality benchmarks developed under the 2007 Permit, which are provided as an attachment to Appendix A.

Table 4-2. Constituents and Reporting Limits for 2014-2015 Transitional Receiving Water Samples in the Santa Margarita River WMA

Constituent	Target Reporting Limit	Units
Physical Chemistry		
pH	0.01	pH
Specific Conductance	1	µS/cm
Temperature	0.1	^{o}C
Turbidity	0.1	NTU
Bacteriological		
Total coliform	20	MPN/100mL
Fecal coliform	20	MPN/100mL
Enterococcus	20	MPN/100mL
Nutrients		
Ammonia as N	0.10	mg/L
Nitrate as N	0.10	mg/L
Nitrite as N	0.10	mg/L
Total Kjeldahl Nitrogen (TKN)	0.10	mg/L
Dissolved Phosphorus	0.010	mg/L
Total Phosphorus	0.010	mg/L
General Chemistry		
Biochemical Oxygen Demand (BOD), five-day	2.0	mg/L
Chemical Oxygen Demand (COD)	5.0	mg/L
Dissolved Organic Carbon (DOC)	0.50	mg/L
Total Organic Carbon (TOC)	0.30	mg/L
Oil and grease	5.0	mg/L
Methylene Blue Active Substances (MBAS)	0.050	mg/L
Total Dissolved Solids	10	mg/L
Total Suspended Solids	5.0	mg/L
Total Hardness	0.662	mg/L
Metals		
Antimony (Sb)	0.0005	mg/L
Arsenic (As)	0.0004	mg/L
Cadmium (Cd)	0.0001	mg/L
Chromium (Cr)	0.0002	mg/L
Copper (Cu)	0.0005	mg/L
Lead (Pb)	0.0002	mg/L
Nickel (Ni)	0.0008	mg/L
Selenium (Se)	0.0004	mg/L
Zinc (Zn)	0.005	mg/L
Organophosphorus Pesticides		
Chlorpyrifos	0.010	µg/L
Diazinon	0.010	µg/L
Malathion	0.010	µg/L
Synthetic pyrethroids (storm events only)	2-10	ng/L
Toxicity (*C. dubia, H. azteca, S. capricornutum***)**	-	-

4.1.3 Long-Term Receiving Water Monitoring

Long-term monitoring in the Santa Margarita River WMA at SMR-MLS-2 (LTMS) was conducted in accordance with Provision D.1.b–d of the 2013 Permit. Field observations were made and grab samples were collected for field parameters (pH, temperature, specific conductivity, dissolved oxygen (DO), and turbidity) and indicator bacteria (total coliform, fecal coliform, and *Enterococcus*). Dry weather flow-weighted composite samples were collected over a typical 24-hour period, with a minimum of three sample aliquots collected per hour. Wet weather flow-weighted composite samples were collected by taking sample aliquots across the hydrograph of the storm event. Based on the anticipated size of the storm, a flow-proportioned pacing was programmed into the automated sampling equipment. Some variation may have occurred depending on actual storm intensity and duration.

Composite samples were analyzed for general physical and chemical constituents, nutrients, metals, pesticides, synthetic pyrethroids, and toxicity. Chemical constituents analyzed included those listed as a cause for impairment of receiving waters in the WMA on the Section 303(d) List and those for implementation plans or load reduction plans developed for watersheds for which the Copermittees are listed as responsible parties under a TMDL. Therefore, analytical constituent lists for receiving water monitoring at long-term MLS locations are watershed-specific. The constituent list analyzed for each long-term MLS is presented in Attachment A of the Transitional Receiving Water Monitoring Workplan (Appendix A). Toxicity tests were conducted on the cladoceran *Ceriodaphnia dubia*, the freshwater minnow *Pimephales promelas*, and the freshwater plant *Selenastrum capricornutum* if sample salinity was less than (<) 1 part per thousand (ppt). If sample salinity was greater than or equal to (≥) 1 ppt, the purple sea urchin *Strongylocentrotus purpuratus* was used for toxicity testing. Toxicity data collected under the long-term monitoring requirements of the 2013 Permit were analyzed using the Test of Significant Toxicity (TST) (USEPA, 2010) and given a Pass or Fail assessment. Detailed sampling and analysis methodology and a table summarizing each of the analyzed constituents, volume requirements, analytical methods, reporting limits, and holding times are presented in the Transitional Receiving Water Monitoring Workplan (Appendix A). The analyzed constituents and reporting limits are shown below in Table 4-3.

Table 4-3. Constituents and Reporting Limits for 2014-2015 Long-Term Receiving Water Samples from SMR-MLS-2 (LTMS)

Constituent	Target Reporting Limit	Units
Physical Chemistry		
pH	0.01	pH
Temperature	0.1	^{o}C
Specific Conductance	1	µS/cm
Dissolved Oxygen	0.01	mg/L
Turbidity	0.1	NTU
Bacteriological		
Total coliform	20	MPN/100 mL
Fecal coliform	20	MPN/100 mL
Enterococcus	20	MPN/100 mL
Nutrients		
Ammonia as N	0.10	mg/L
Nitrate as N	0.10	mg/L
Nitrite as N	0.10	mg/L
Total Kjeldahl Nitrogen (TKN)	0.10	mg/L
Orthophosphate	0.0020	mg/L
Total Phosphorus	0.010	mg/L
General Chemistry		
Dissolved Organic Carbon (DOC)	0.50	mg/L
Total Organic Carbon (TOC)	0.30	mg/L
Sulfate	0.50	mg/L
Methylene Blue Active Substances (MBAS)	0.050	mg/L
Total Dissolved Solids (TDS)	10	mg/L
Total Suspended Solids (TSS)	5.0	mg/L
Total hardness	0.662	mg/L
Metals		
Arsenic (As)	0.0004	mg/L
Cadmium (Cd)	0.0001	mg/L
Chromium (Cr)	0.0002	mg/L
Copper (Cu)	0.0005	mg/L
Iron (Fe)	0.010	mg/L
Lead (Pb)	0.0002	mg/L
Manganese (Mn)	0.0002	mg/L
Mercury (Hg)	0.00005	mg/L
Nickel (Ni)	0.0008	mg/L
Selenium (Se)	0.0004	mg/L
Thallium (Tl)	0.0002	mg/L
Zinc (Zn)	0.005	mg/L
Organophosphate Pesticides	0.01	µg/L
Chlorpyrifos	0.010	µg/L
Synthetic pyrethroids	2-10	ng/L
Toxicity*	N/A	Pass/Fail

*If sample has salinity < 1ppt, then tests include *Pimephales promelas*, *Ceriodaphnia dubia*, *Selenastrum capricornutum*. If sample has salinity > 1ppt, tests include *Strongylocentrotus purpuratus*.

4.1.4 Pollutant Load Calculations

Pollutant loadings to the MLS were calculated for each monitored event. A graphical representation (i.e., storm hydrograph) for each storm event was used to determine the length of wet weather runoff (typically to a point within 10% of the baseflow or after a clear recession and relatively steady water level, as compared to the hydrograph rise and fall). Event volumes were calculated, and for each monitored event, the flow weighted event mean concentration (EMC) was calculated, based on the samples collected during the monitoring period. The load for each event was then calculated by applying the EMC to the event volume. Similar to the method used to calculate event loads, pollutant loadings to the MLS were calculated for annual wet weather runoff. Additional details are presented in the Transitional Receiving Water Monitoring Workplan (Appendix A).

4.1.5 Trend Analysis

Trend analysis was conducted for constituents measured at the MLS using current and historical data. The nonparametric Mann-Kendall test for linear trend was used to evaluate whether concentrations of a constituent have increased or decreased significantly since the base year. Sen’s slope estimator (Sen, 1968) was used to estimate the magnitude of change over time when a significant trend was observed. Scatterplots were created from the current and historical data used in the trend analysis for constituents identified as significantly increasing or decreasing in concentration at the MLS. Additional details are presented in the Transitional Receiving Water Monitoring Workplan (Appendix A).

4.1.6 Trash Assessments

Trash assessments were conducted in accordance with the *Monitoring Workplan for the Assessment of Trash in San Diego County* (San Diego County Regional Copermittees (SDCRC), 2007a). The assessments consisted of visual observations to determine whether trash had been or had the potential to be mobilized by water at a station. An assessment form was completed at each station. The information entered on the form included the qualitative assessment of the presence of trash (e.g., optimal, marginal, etc.) and the presence of threats to human and/or aquatic health.

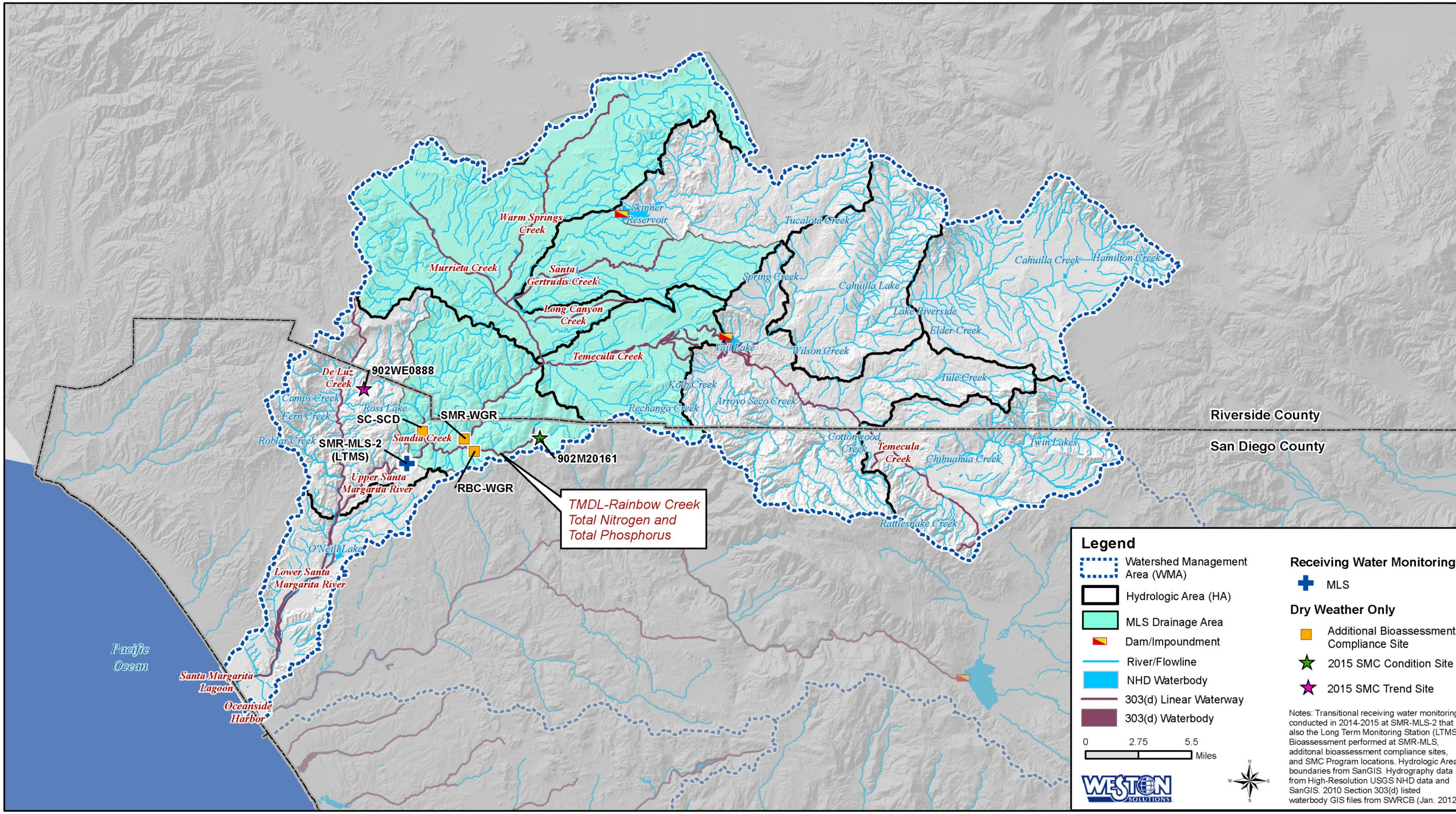


Figure 4-1. Receiving Water Monitoring Locations in the Santa Margarita River WMA

4.2 Post-Storm Synthetic Pyrethroid Monitoring

Post-storm synthetic pyrethroid sediment monitoring was required during the 2014-2015 wet weather monitoring year by the transitional monitoring requirements of the 2013 Permit and was conducted in accordance with *Monitoring Workplan for the Assessment of Synthetic Pyrethroids in San Diego County Watersheds* (SDCRC), 2007b). Samples of surface (i.e., recently deposited) sediments were collected from SMR-MLS-2 within two weeks of the first-flush rainfall event of the 2014-2015 monitoring year. Field measurements (pH, specific conductance, temperature, and turbidity) were taken from the water column at the MLS and empirical observations of the site, water, and sediment quality were recorded on field logs. A composite sample consisting of sediment from five locations along each of three transects was collected at the MLS for chemical analysis. Detailed methodology and a table summarizing the analyzed constituents, analytical methods, and reporting limits are presented in the *Monitoring Workplan for the Assessment of Synthetic Pyrethroids in San Diego County Watersheds* (SDCRC), 2007b). The analyzed constituents and reporting limits are shown below in Table 4-4.

Table 4-4. Constituents and Reporting Limits for Post-Storm Synthetic Pyrethroid Sediment Samples in the Santa Margarita River WMA

Group	Analyte	Reporting Limit	Units
Synthetic pyrethroids	Allethrin	10	ng/dry g
	Bifenthrin	25	ng/dry g
	Cyfluthrin	25	ng/dry g
	Cypermethrin	25	ng/dry g
	Danitol	25	ng/dry g
	Deltamethrin	25	ng/dry g
	L-Cyhalothrin	25	ng/dry g
	Permethrin	25	ng/dry g
	Prallethrin	25	ng/dry g
	Piperonyl butoxide	25	ng/dry g
Conventionals	TOC	1	%
	Grain size distribution	NA	%

NA – not applicable

4.3 Hydromodification Monitoring at Long-term MLS

Hydromodification monitoring was required by Provisions D.1.g and J.2.a of the 2007 Permit, the goal of which was to assess whether the Hydromodification Management Plan (HMP) (Brown and Caldwell, 2011), as implemented, has been effective at preventing "increased erosion of channel beds and banks, sediment pollution generation, or other impacts to beneficial uses and stream habitat" resulting from land development. In addition to hydromodification monitoring conducted in accordance with the HMP Monitoring Plan, dry weather receiving water hydromodification monitoring at the MLS (LTMS) locations is a requirement of Provision D.1.c.(6) of the 2013 Permit.

During 2014-2015, dry weather hydromodification monitoring was conducted at SMR-MLS-2 (LTMS) (Figure 4-1). Monitoring coincided with dry weather receiving water bioassessment monitoring and included observations and/or measurements of channel conditions (dimensions, hydrologic and geomorphic conditions, and presence and condition of vegetation and habitat), discharge locations, habitat integrity, photo documentation of existing erosion and habitat impacts, dimensions of bed or bank erosion, and known or suspected cause(s) of existing downstream erosion or habitat impact. The SCCWRP channel assessment tool was employed to perform a rapid assessment of the relative susceptibility of the monitored reaches to effects of hydromodification. Methodology is detailed in the Transitional Receiving Water Monitoring Workplan (Appendix A).

4.4 Rapid Stream Bioassessment Monitoring and SMC Regional Bioassessment Program

Rapid stream bioassessment monitoring in the Santa Margarita River WMA was conducted for the 2014-2015 monitoring year from spring to summer of 2015 under the transitional and long-term receiving water monitoring requirements of the 2013 Permit and as part of the SMC Regional Monitoring Program. Monitoring locations are listed in Table 4-5 and Table 4-6 and are shown in Figure 4-1. Methodology is summarized below and is detailed in the Transitional Receiving Water Monitoring Workplan (Appendix A).

Benthic macroinvertebrate (BMI) and physical habitat data were collected following the Surface Water Ambient Monitoring Program (SWAMP) *Standard Operating Procedures for Collecting Benthic Macroinvertebrates and Associated Physical and Chemical Data for Ambient Bioassessments in California* (Ode, 2007) using the reach-wide benthos method. Benthic algae monitoring was conducted in accordance with the SWAMP protocol *Standard Operating Procedures for Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California* (Fetscher et al., 2009). Samples were collected and processed for ash-free dry mass (AFDM), chlorophyll-a analysis, and periphyton taxonomy. Reach-wide algal cover was quantified as part of the SWAMP physical habitat assessment. Physical habitat quality of the monitoring sites was quantified using the SWAMP and California Rapid Assessment Method (CRAM) for riverine wetlands (Collins et al., 2012) protocols.

Participation in the SMC Regional Monitoring Program was conducted following the protocols developed by the SMC Bioassessment Technical Workgroup. The probabilistic survey design implemented from 2009 through 2013 was suspended in 2014. The 2014 SMC Regional Monitoring Program included two special studies, a non-perennial stream study with the goal of validating and refining the assessment tools for use in non-perennial streams and a trend site study with the goal of detecting changes in conditions over time at probabilistic sites. In 2015, monitoring for the first of five years under the updated SMC Regional Monitoring Program (SCCWRP, 2015) was conducted. Several modifications were made to the previous surveys to address data gaps. Specifically, monitoring of high-priority stressors (i.e., habitat, nutrients, and ionic composition) was continued while monitoring of low-priority stressors (i.e., water column metals, pyrethroids, and toxicity) was discontinued. Flow regime (hydrologic state checklist derived from Gallart et al. (2010) and water level loggers), vertebrate occurrence, and new stressors of interest (i.e., sediment pyrethroids and toxicity) were added to the list of monitored parameters, although sediment sampling has been deferred until further action by the SMC Executive Committee. In addition, the physical habitat assessment has been enhanced with hydromodification screening (modified from Bledsoe et al., 2010) at unarmored or partially armored condition sites and a channel engineering checklist at all condition sites. The hydromodification screening and channel engineering checklist will also be assessed at trend sites at least once during the five-year study. Probabilistic sites originally sampled under the 2009-2013 SMC Workplan were resampled as Trend sites under the 2015-2019 SMC Workplan. These Trend sites will continue to be monitored annually through 2019 with the intent of assessing increasing and decreasing trends associated with the BMI and algae communities.

Bioassessment monitoring was conducted in the Santa Margarita River WMA during the 2014-2015 monitoring year at four receiving water locations (Table 4-5) and two SMC Regional Monitoring Program locations (Table 4-6). In addition, three reference stations, none of which were located in the Santa Margarita River WMA, were designated for comparison with urban affected stations. Monitoring locations are shown in Figure 4-1. Comparison of urban monitoring stations to reference stations is not limited to the three reference stations sampled in this program. The benthic community summary indices that provide community quality ratings already incorporate a broad range of historical reference stations throughout the region.

Table 4-5. 2014-2015 Bioassessment Monitoring Locations, Santa Margarita River WMA (Receiving Water Monitoring)

Watershed	Station Identifier	Date Sampled	Latitude	Longitude
Santa Margarita River	SMR-MLS-2	6/4/2015	33.39530	-117.26413
Santa Margarita River	RBC-WGR	6/3/2015	33.40773	-117.20246
Santa Margarita River	SMR-WGR	6/3/2015	33.41709	-117.21176
Santa Margarita River	SC-SCD	6/4/2015	33.42271	-117.24916

Table 4-6. 2014-2015 Bioassessment Monitoring Locations, Santa Margarita River WMA (SMC Program)

WMA	Watershed	Station Identifier	Date Sampled	Latitude	Longitude
Santa Margarita River	Santa Margarita River	902M20161	6/25/2015	33.41868	-117.14384
Trend Site – Developed					
Santa Margarita River	Santa Margarita River	902WE0888	6/16/2015	33.45432	-117.30237

Monitoring was conducted using SWAMP methodology to sample and analyze populations of BMI, with sampling conducted from downstream to upstream covering a 150-meter (m) reach. Sampling included BMI collection, multi-habitat periphyton (benthic algae) collection, and physical habitat quality assessment as described in the Transitional Receiving Water Monitoring Workplan (Appendix A).

Water quality measurements were taken as part of the physical habitat quality assessment at each site using a YSI Model 6920 data sonde, and included water temperature, specific conductivity, pH, turbidity, and DO. Stream flow velocity was measured with a Marsh-McBirney Model 2000 portable flowmeter, or was visually estimated when the water was too shallow for the flowmeter.

4.4.1 Bioassessment Laboratory and Data Analyses

Laboratory analyses conducted as part of the SMC Regional Monitoring Program included BMI taxonomy by Ecoanalysts Inc., BMI taxonomic QC analysis by the California Department of

Fish and Wildlife (CDFW) Aquatic Bioassessment Laboratory, benthic algae taxonomy by California State University – San Marcos (soft algae and diatoms), and chemistry analyses by Weck Laboratories, Inc. and PHYSIS Environmental Laboratories, Inc. Samples were collected following the protocols outlined in the *Bioassessment Survey of the Stormwater Monitoring Coalition* (SCCWRP, 2015). BMI data analyses included a taxonomic listing of all BMIs identified in the surveys and calculation of the biological metrics listed in the California Stream Bioassessment Procedure (CSBP). Additionally, the calculation of two indices that rate the overall BMI community quality was performed, including the Index of Biotic Integrity (IBI; Ode et al., 2005) and the California Stream Condition Index (CSCI; Mazor et al., in press). The CSCI is a newly developed analytical tool intended to become the primary BMI community quality index. Algal data analyses included a taxonomic listing of all taxa identified and calculation of algal metrics and three algal IBIs (Fetscher et al., 2014 and SCCWRP, 2014). The improved methodology for data analysis outlined in the more recent documents (Mazor et al., in press; Fetscher et al., 2014; and SCCWRP, 2014) was used in the evaluation of data.

4.5 Toxicity Identification Evaluations

Toxicity Identification Evaluations (TIEs) may be conducted when significant toxicity is repeatedly observed in a sample and the cause has not been previously investigated. No TIEs were conducted in the Santa Margarita River WMA during the 2014-2015 monitoring year.

4.6 Receiving Water Assessments Required under the 2013 Permit

NPDES receiving water monitoring was conducted in the Santa Margarita River WMA during the 2014-2015 monitoring year. Receiving water monitoring was also conducted as part of the SMC Regional Monitoring Program. The 2013 Permit describes specific assessments in the TMAR to be performed with the transitional receiving water data monitoring data for inclusion including Provision D.4.a.(2) given as follows:

D.4.a.(2) The Copermittees must assess the status and trends of receiving water conditions in 1) coastal waters, 2) enclosed bays, harbors, estuaries, and lagoons, and 3) streams under dry and wet weather conditions. For each of the three types of receiving waters in each WMA the Copermittees must:

- *(a) Determine whether or not conditions are meeting the numeric goals in B.3.a;*
- *(b) Identify the most critical beneficial uses (BUs) that must be protected to ensure overall health of the receiving water;*
- *(c) Determine whether or not those critical beneficial uses are being protected;*
- *(d) Identify short-term and /or long-term improvements or degradation of those critical beneficial uses;*
- *(e) Determine whether or not strategies established in the Water Quality Improvement Plan contribute towards progress in achieving the interim and final numeric goals of the Water Quality Improvement Plan;*
- *(f) Identify data gaps in the monitoring data necessary to assess Provisions D.4.a.(2)(a)-(e).*

Because of their comprehensive nature, most of the above assessments are more appropriately performed as part of the WQIP development process (see Section 3.3). In most cases, this TMAR presents only one year of data collected under the Permit, whereas the WQIP will integrate many years of water quality data into the development of priorities, goals, and strategies aimed at protecting beneficial uses in the WMA.

With respect to the first requirement, *(a) Determine whether or not conditions are meeting the numeric goals in B.3.a*, the highest priority water quality conditions and numeric goals are yet to be completed and accepted in the WQIP, which is not yet in development (see Section 3.3). For this reason, assessments related to numeric goals set in the WQIP cannot be conducted. Therefore, the receiving water data collected during this transitional monitoring year are compared to existing water quality benchmarks established under the 2007 Permit (see Attachment B of Appendix A). Once the WQIP is developed and accepted by the RWQCB, receiving water data will be compared to numeric goals established in the WQIP as well as to updated water quality benchmarks, as applicable.

With respect to the second requirement, *(b) Identify the most critical beneficial uses (BUs) that must be protected to ensure overall health of the receiving water,* the Responsible Agencies will identify the beneficial uses associated with the priority and highest priority water quality conditions to be listed in the WQIP. As the WQIP still needs to be developed and accepted, it is premature to identify the most critical beneficial uses in the TMAR. For the same reason, the third requirement, *(c) Determine whether or not those critical beneficial uses are being protected,* cannot yet be addressed in this TMAR.

With respect to the fourth requirement, *(d) Identify short-term and /or long-term improvements or degradation of those critical beneficial uses,* although the critical beneficial uses have not yet been formally identified (WQIP has not yet been developed), potential water quality improvement and/or degradation can be evaluated through trend analysis. Trend analysis was conducted for constituents measured at the MLS using current and historical data and is presented in Sections 5.1.1.1 (dry weather) and 5.1.2.1 (wet weather) of this report. The nonparametric Mann-Kendall test for linear trend was used to evaluate whether concentrations of a constituent have increased or decreased significantly since the base year. Sen's slope estimator (Sen, 1968) was used to estimate the magnitude of change over time when a significant trend was observed. Scatterplots were created from the current and historical data used in the trend analysis for constituents identified as significantly increasing or decreasing in concentration at SMR-MLS-2 (LTMS). Additional methods are presented in the Transitional Receiving Water Monitoring Workplan (Appendix A). In examining these trends, it is helpful to compare the data to existing water quality benchmarks, where available, to assist in determining how meaningful a trend might be. As this analysis is based on many years of data, this assessment can provide an indication of the protection of beneficial uses associated with these constituents over time.

With respect to the fifth and sixth requirements, *(e) Determine whether or not strategies established in the WQIP contribute towards progress in achieving the interim and final numeric goals* and *(f) Identify data gaps (…),* the assessments cannot be made at this time as the priority conditions and goals and the strategies supporting their achievement of goals will be identified through the WQIP development process. Implementation will commence upon acceptance of the WQIPs. As part of WQIP development, the Responsible Agencies will identify and present the relevant data gaps.

4.7 Transitional MS4 Outfall Discharge Monitoring

As part of the WQIP process, Copermittees will develop a program to monitor discharges from MS4 outfalls during dry and wet weather that meets the requirements of Provisions D.2.b and D.2.c of the 2013 Permit. Since the WQIP for the Santa Margarita River WMA has not been developed, transitional MS4 outfall discharge monitoring per Provision D.2.a of the 2013 Permit was conducted during the 2014-2015 monitoring year including MS4 outfall dry weather field screening and the second year of transitional wet weather MS4 outfall monitoring.

4.7.1 MS4 Outfall Discharge Monitoring Station Inventory

Provision D.2.a.(1) of the 2013 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 MS4 outfall discharge monitoring station inventory. The inventory must include the coordinates of each outfall's point of discharge, its WMA and HSA location, its size, its accessibility with respect to safety and critical habitat, its approximate drainage area, and its flow classification (e.g., persistent dry weather flow, transient dry weather flow, no dry weather flow, or unknown).

4.7.2 Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring

Provision D.2.a.(2) of the 2013 Permit requires Copermittees to perform dry weather field screening of MS4 outfall in the inventory described in Section 4.7.1 in order to identify non-storm water and illicit discharges, determine which discharges are transient and which are persistent, and prioritize those discharges that will be investigated and eliminated. 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 2013 Permit.

Visual observations as outlined in Table D-5 of the 2013 Permit were recorded at each inspected MS4 outfall discharge monitoring station using field data sheets developed by the Copermittees (Appendix J). Observations included the station ID and location; station description; presence of flow or pooled or ponded water; flow estimation, characteristics, and potential sources (where flow was present); characteristics and sources of pooled or ponded water, if applicable; trash assessment; and observations regarding signs of illicit connections or illegal dumping. A data sharing template was developed in order to compile general site descriptions, visual observations, and any field or analytical data from multiple jurisdictions at the WMA level for reporting in the TMAR.

4.7.3 Dry Weather Field Investigations (Illegal Discharge Detection and Elimination (IDDE) Monitoring)

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 dry weather flows were observed, but no obvious illicit discharge(s) were identified as the source(s), the observations were recorded and the locations were appropriately prioritized for follow-up.

4.7.4 Transitional Wet Weather MS4 Outfall Discharge Monitoring

Transitional wet weather MS4 outfall discharge monitoring stations were selected from the inventory described in Section 4.7.1, as required by Provision D.2.a.(3) of the 2013 Permit. For the Santa Margarita River WMA, the County of San Diego selected two stations for the portion of the WMA within its jurisdiction to be monitored during the transitional period until the Riverside County Copermittees are notified of coverage under the 2013 Permit. The transitional wet weather MS4 outfall discharge monitoring stations located within the Santa Margarita River WMA are presented in Table 4-7. Both outfalls were located in the Upper Ysidora HSA. These locations are also shown with their corresponding land use designations in Figure 4-2. Both stations are unchanged since the first year of transitional wet weather MS4 outfall monitoring.

Table 4-7. 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Monitoring Stations in the Santa Margarita River WMA

MS4 Outfall Name	Jurisdictional Identifier	Jurisdiction	HSA Name/No.	Latitude	Longitude
MS4-SMR-1	COSD MS4 SMG01	County of San Diego	Upper Ysidora/902.13	33.37477	-117.25327
MS4-SMR-2	COSD MS4 SMG02	County of San Diego	Upper Ysidora/902.13	33.37384	-117.25351

On November 18, 2015, the RWQCB adopted Order No. R9-2015-0100 (RWQCB, 2015b), which extends coverage of the 2013 Permit to the Riverside County Copermittees, effective January 7, 2016. The Riverside County Copermittees will select stations consistent with the requirements of Provision D.2.a.(3) to have, within the entire WMA, at least five stations representative of storm water discharges from Residential, Commercial, Industrial, and typical Mixed-Use land uses and at least one station for each Copermittee within the WMA.

4.7.4.1 Transitional Wet Weather MS4 Outfall Monitoring

During the 2014-2015 monitoring year, transitional wet weather MS4 outfall monitoring was conducted during the wet season (i.e., October 1 through April 30). Each selected outfall was monitored once, and, in compliance with Provision D.2.a.(3)(b), at least 10% of samples were collected during the first wet weather event of the season, including one station within each WMA. Monitoring was conducted in accordance with methods outlined in the Transitional Wet Weather MS4 Monitoring Workplan (Appendix B).

A field observation data sheet (Appendix B) was completed, which described site conditions during sample collection. Flow rates and volumes were measured or estimated from each MS4 outfall discharge monitoring station. Flow was monitored at each outfall to determine the volume of runoff from the storm events. Flow was estimated with a Sigma 920 Flowmeter with an area velocity sensor and pressure transducer. The sensor measures water level and velocity, and flow was calculated based on the cross sectional area of the pipe, level of water, slope and velocity. Flow may have also been estimated using a HOBO level logger. The HOBO level logger is a pressure transducer only, and in these cases the flow was estimated based on the area of the pipe, level of water, and slope.

Grab samples were collected during elevated flows between the second and sixth hours of runoff to measure field parameters (pH, temperature, specific conductivity, DO, and turbidity) and indicator bacteria concentrations. If an event lasted less than two hours, the grab sample was collected as close to the peak of flow as possible. Field parameters were measured using a YSI 6920 series water quality probe.

For all other constituents, a time-weighted composite sample was collected with a Sigma 900MAX autosampler (or similar type device) either for the length of the storm event or 24 hours, whichever was shorter. If unattended automated sampling was not feasible due to security or safety issues, the composite sample was collected by combining a minimum of four grab samples. Composite samples were 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 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. The analyte list, methods, and method detection limits for each WMA are provided in Attachment A to the Transitional Wet Weather MS4 Monitoring Workplan (Appendix B). The analyzed constituents and reporting limits are shown in Table 4-8.

Table 4-8. Constituents and Reporting Limits for Transitional Wet Weather MS4 Samples in the Santa Margarita River WMA

Analytical Monitoring Constituents	Target Reporting Limit	Units
Physical Chemistry		
Dissolved Oxygen	0.01	mg/L
pH	0.01	pH
Specific Conductivity	1	µS/cm
Temperature	0.1	^{o}C
Turbidity	0.1	NTU
Bacteriological		
Total Coliform	20	MPN/100 mL
Fecal Coliform	20	MPN/100 mL
Enterococcus	20	MPN/100 mL
General Chemistry		
Ammonia	0.1	mg/L
Dissolved Organic Carbon (DOC)	0.5	mg/L
Nitrite*	0.1	mg/L
Nitrate*	0.1	mg/L
Dissolved Phosphorus (Ortho Phosphate)	0.002	mg/L
Sulfate	0.5	mg/L
Methylene Blue Active Substances (MBAS)	0.05	mg/L
Total Dissolved Solids (TDS)	10	mg/L
Total Hardness	0.662	mg/L
Total Kjeldahl Nitrogen (TKN)	0.1	mg/L
Total Organic Carbon (TOC)	0.3	mg/L
Total Phosphorus	0.01	mg/L
Total Suspended Solids (TSS)	5	mg/L
Metals (Total and Dissolved)		
Arsenic	0.0004	mg/L
Cadmium	0.0001	mg/L

Table 4-8. Constituents and Reporting Limits for Transitional Wet Weather MS4 Samples in the Santa Margarita River WMA

Analytical Monitoring Constituents	Target Reporting Limit	Units
Chromium	0.0002	mg/L
Copper	0.0005	mg/L
Iron	0.01	mg/L
Lead	0.0002	mg/L
Manganese	0.0002	mg/L
Nickel	0.0008	mg/L
Selenium	0.0002	mg/L
Thallium	0.0002	mg/L
Zinc	0.005	mg/L
Pesticides		
Chlorpyrifos	0.01	µg/L

* Nitrite and nitrate may be combined and reported as nitrite + nitrate

4.7.4.2 Land Use-Based Assessment

Provision D.4.b.(2)(b)(i) of the 2013 Permit requires assessment of wet weather monitoring data collected under the transitional wet weather MS4 outfall discharge monitoring program. The Copermittees must utilize a watershed model or other method to calculate or estimate the following for each monitoring year:

> *[a] The average storm water runoff coefficient for each land use type within the WMA;*
>
> *[b] The volume of storm water and pollutant loads discharged from each of the Copermittee's monitored MS4 outfalls in its jurisdiction to receiving waters within the WMA for each storm event with measurable rainfall greater than 0.1 inch;*
>
> *[c] The total flow volume and pollutant loadings discharged from the Copermittee's jurisdiction within the Watershed Management Area over the course of the wet season, extrapolated from the data produced from the monitored MS4 outfalls; and*
>
> *[d] The percent contribution of storm water volumes and pollutant loads discharged from each land use type within each HSA with a major MS4 outfall to receiving waters or within each major MS4 outfall to receiving waters in the Copermittee's jurisdiction within the WMA for each storm event with measurable rainfall greater than 0.1 inch.*

The overall methods used in the assessment are described along with the results in Section 5.2.5 for clarity of presentation. The technical approach is described in greater detail within the Transitional Wet Weather MS4 Monitoring Workplan (Appendix B). Given that the assessment is land use based, one of the first steps was to develop appropriate land use groupings that would be used in estimating land use-based discharge volumes and pollutant loads. Land use categories were developed from the grouping of more specific SanGIS land use classes as shown in Table 4-9. The Agriculture and Open Space land use types were also subdivided based on the hydrologic soil type (e.g., soil type A, B, C, or D).

Table 4-9. Land Use Categorization Used for Transitional MS4 Wet Weather Modeling

Assessment Land Use Category	SanGIS Land Use Class
Agriculture	Golf Course; Orchard or Vineyard; Intensive Agriculture; Field Crops
Commercial	Jail/Prison; Hotel/Motel (Low-Rise); Hotel/Motel (High-Rise); Resort; Rail Station/Transit Center; Parking Lot – Surface; Parking Lot – Structure; Park and Ride Lot; Wholesale Trade; Regional Shopping Center; Community Shopping Center; Neighborhood Shopping Center; Specialty Commercial; Automobile Dealership; Arterial Commercial; Service Station; Other Retail Trade and Strip Commercial; Office (High-Rise); Office (Low-Rise); Government Office/Civic Center; Cemetery; Religious Facility; Library; Post Office; Fire/Police Station; Mission; Other Public Services; UCSD/VA Hospital/Balboa Hospital; Hospital – General; Other Health Care; Tourist Attraction; Stadium/Arena; Racetrack; Golf Course Clubhouse; Convention Center; Marina; Casino; Residential Under Construction; Commercial Under Construction; Office Under Construction; Olympic Training Center; Other Recreation – High; Residential Recreation
Educational	SDSU/CSU San Marcos/UCSD; Other University or College; Junior College; Senior High School; Junior High School or Middle School; Elementary School; School District Office; Other School; School Under Construction
Industrial	Heavy Industry; Industrial Park; Light Industry – General; Warehousing; Public Storage; Extractive Industry; Junkyard/Dump/Landfill; Commercial Airport; Military Airport; General Aviation Airport; Airstrip; Communications and Utilities; Marine Terminal; Industrial Under Construction; Freeway
Transportation	Railroad Right of Way; Road Right of Way; Other Transportation; Road Under Construction; Freeway Under Construction
Mixed Use	Mixed Use
Residential: Multi-Family	Multi-Family Residential; Single Room Occupancy Units (SRO's); Multi-Family Residential Without Units; Mobile Home Park; Dormitory; Military Barracks; Monastery; Other Group Quarters Facility
Residential: Rural	Spaced Rural Residential
Residential: Single-Family	Single Family Residential; Single Family Detached; Single Family Detached; Single Family Multiple-Units; Single Family Residential Without Units
Open Space	Military Use; Military Training; Weapons Facility; Other Recreation – Low; Park – Active; Open Space Park or Preserve; Beach – Active; Beach – Passive; Landscape Open Space; Undevelopable Natural Area; Vacant and Undeveloped Land
Water	Water; Bay or Lagoon; Lake/Reservoir/Large Pond

These land use categories were applied in calculating land use acreages within the monitored drainage areas, HSAs, and the entire WMA. The acreages and percentages for the land use categories within the monitored outfall drainage areas are presented in Table 4-10, and these drainage areas are shown in Figure 4-2.

Table 4-10. Transitional Wet Weather MS4 Outfall Monitoring Stations - Drainage Area Land Use in the Santa Margarita River WMA

Drainage Area by Land Use Type	Santa Margarita River WMA			
	MS4-SMR-1		MS4-SMR-2	
	902.13		902.13	
	Area (acres)	%	Area (acres)	%
Commercial	94.1	13%	4.3	12%
Industrial	51.0	7%	0.6	2%
Mixed Use	-	-	-	-
Educational	27.0	4%	6.0	17%
Residential: Single-Family	287.5	41%	16.0	45%
Residential: Multi-Family	42.8	6%	-	-
Residential: Rural	41.0	6%	-	-
Transportation [(a)]	93.5	13%	7.5	21%
Open Space	48.5	7%	1.0	3%
Water [(b)]	-	-	-	-
Agriculture	12.1	2%	-	-
Total Drainage Area [(b)]	**697.4**	100%	**35.5**	100%

(a) For modeling purposes, transportation land uses were grouped with the prevailing land use represented.
(b) For modeling purposes, water was not included in the total land use acreage.

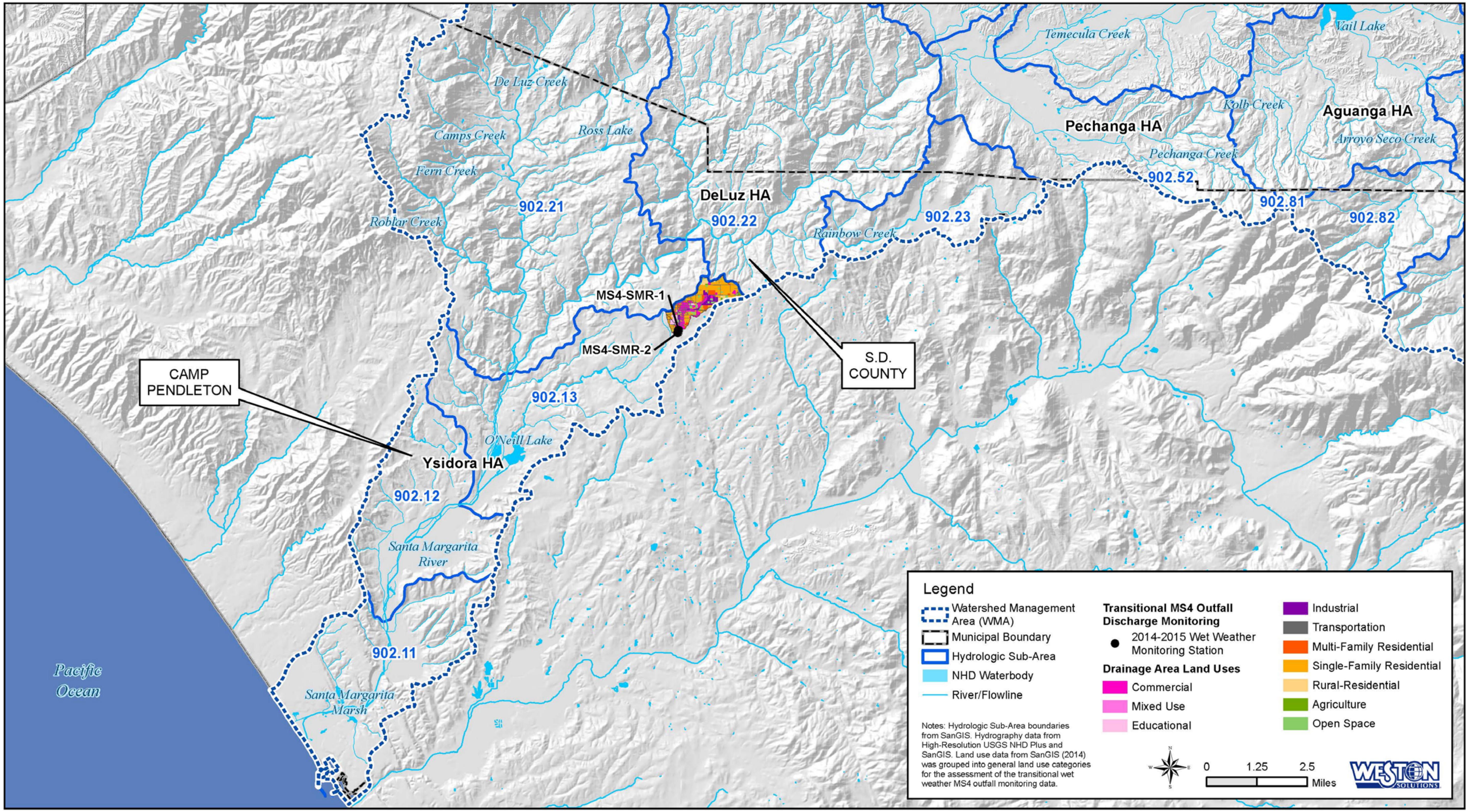


Figure 4-2. 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Monitoring Locations and Drainage Areas in the Santa Margarita River WMA

5.0 MONITORING RESULTS AND ASSESSMENT

5.1 Receiving Water

During the 2014-2015 monitoring year, data were collected and assessed in receiving waters in San Diego County northern WMAs, including Santa Margarita River, in accordance with the transitional and long-term monitoring requirements of the 2013 Permit. While the transitional monitoring program only required two monitoring events per station, a third monitoring event was also completed at the LTMS to satisfy the 2013 Permit requirement of completing at least three monitoring events at the LTMS during the Permit term. The MLS location is shown on Figure 4-1 in Section 4.1. Hydrographs and flow data for the MLS are provided in Appendix D, and load tables are provided in Appendix E. Historical MLS receiving water data tables are provided in Appendix F.

5.1.1 MLS Dry Weather Results

Monitoring at SMR-MLS-2 (LTMS) was conducted on September 10-11, 2014, January 7-8, 2015, and May 5-6, 2015. All three events were monitored under the long-term receiving water monitoring requirements of the 2013 Permit. In addition, the September and May events were monitored under the transitional monitoring requirements of the 2013 Permit. The constituent list for long-term monitoring is tailored towards issues in the watershed, as described in Section 4.1.3.

Table 5-1 summarizes the 2014-2015 monitoring year and historical exceedance rates (since 2010) for constituents measured above benchmarks during dry weather NPDES receiving water monitoring at SMR-MLS-2 (LTMS). Constituents without exceedances during the 2014-2015 monitoring year would also be included in this comparison table if the historical exceedance rate was ≥ 50%. Table 5-2 presents detailed results for the 2014-2015 monitoring year and also shows the receiving water – water quality benchmarks that were developed under the 2007 Permit (see Attachment B of Appendix A) and are being used to evaluate the monitoring data. Toxicity data collected under the long-term monitoring requirements of the 2013 Permit were analyzed using the TST (USEPA, 2010). Each toxicity test conducted for long-term monitoring received a Pass or Fail in accordance with the TST.

As shown in Table 5-2, concentrations of indicator bacteria, dissolved metals, organophosphorus pesticides, and pyrethroids were below dry weather benchmarks, and no toxicity was observed at SMR-MLS-2 (LTMS). Considering that the exceedance rate for one year of monitoring data (three data points per constituent) provides a limited view of sampling results at a site, examining historical data provides context for the most recent year's monitoring data results based on a larger sample size and period of record. As shown in Table 5-1, concentrations of total nitrogen and TDS were measured above benchmarks during the 2014-2015 monitoring year and historically. Detailed historical results tables are presented in Appendix F. In addition, a few constituents measured for the first time during the 2014-2015 monitoring year at SMR-MLS-2 (LTMS) under the long-term monitoring requirements of the 2013 Permit had concentrations above benchmarks, including sulfate, total iron, and total manganese

Table 5-1. Summary of 2014-2015 and Historical Exceedance Rates during Dry Weather in the Santa Margarita River WMA

Constituent	SMR-MLS-2 (LTMS - 902.21) Exceedance Rate	
	2014-2015 (n=3)	Historical (n=4)
Total Nitrogen	33%	25%
Sulfate**	100%	NA
Total Dissolved Solids (TDS)	100%	100%
Iron, Total**	33%	NA
Manganese, Total**	33%	NA

**2014-2015 was the first year of monitoring for this constituent.
NA –Not analyzed.

Table 5-2. 2014-2015 Dry Weather Receiving Water Monitoring Results for the Santa Margarita River WMA

Permit Requirement	Analyte	Units	Water Quality Benchmark	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	SMR WMA % of Samples Above Benchmark (Transitional Monitoring)	SMR WMA % of Samples Above Benchmark (Long Term Monitoring)
					SMR-MLS-2 (LTMS - 902.21)				
					9/10/2014-9/11/2014	1/7/2015-1/8/2015	5/5/2015-5/6/2015		
Physical Chemistry									
2013	Dissolved Oxygen	mg/L	<6.0	1. Basin Plan	6.92	10.43	7.64	NR	0%
2007, 2013	pH	pH Units	6.5-9.0	1. Basin Plan	7.56	7.3	7.55	0%	0%
2007, 2013	Specific Conductivity	µS/cm	NA		1,293	1,412	1,416	-	-
2007, 2013	Temperature	Celsius	NA		23.17	12.13	19.05	-	-
2007, 2013	Turbidity	NTU	20	1. Basin Plan	1.2	0.9	0.6	0%	0%
Bacteriological									
2007, 2013	*Enterococcus*	MPN/100 mL	151 (a)	1. Basin Plan	≤110AE	40	70	0%	0%
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan	20	40	110	0%	0%
2007, 2013	Total Coliform	MPN/100 mL	NA		490	2,400	500	-	-
Nutrients									
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.10	<0.10	<0.10	0%	0%
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.063J	3.2	0.51	0%	0%
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.028J	0.017J	<0.10	0%	0%
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.16	0.18	0.14	-	-
2007, 2013	Total Nitrogen (calc)	mg/L	1	1. Basin Plan	0.251	**3.397**	0.65	0%	33%
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.015	NR	0.01	0%	NR
2013	Orthophosphate	mg/L	NA		0.014	AE	0.012	NR	-
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.026	0.036	0.019	0%	0%
General Chemistry									
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2.0	NR	<2.0	0%	NR
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	12	NR	11	0%	NR
2007, 2013	Dissolved Organic Carbon	mg/L	NA		3.2	4	3.7	-	-
2007, 2013	Total Organic Carbon	mg/L	NA		3.3	4.2	3.1	-	-
2007	Oil & Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5.0	NR	<5.0	0%	NR
2013	Sulfate	mg/L	250	1. Basin Plan	**290**	**330**	**330**	NR	100%
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.038J	0.06	0.032J	0%	0%
2007, 2013	Total Dissolved Solids	mg/L	750	1. Basin Plan	**860**	**1,000**	**950**	100%	100%
2007, 2013	Total Suspended Solids	mg/L	58	4. MSGP 2015, 1. Basin Plan	6	3	2	0%	0%
2007, 2013	Total Hardness	mg/L	NA		426	542	481	-	-
Total Metals									
2007	Antimony	mg/L	0.006 (c)	1. Basin Plan	0.000088J	NR	0.000045J	0%	NR
2007, 2013	Arsenic	mg/L	0.01 (c)	1. Basin Plan	0.0014	0.0014	0.0012	0%	0%
2007, 2013	Cadmium	mg/L	0.005 (c)	1. Basin Plan	<0.00010	<0.00010	<0.00010	0%	0%
2007, 2013	Chromium	mg/L	0.05 (c)	1. Basin Plan	0.00031	0.00012J	0.00013J	0%	0%
2013	Chromium, Trivalent	mg/L	NA		<0.00050	<0.00020	<0.00020	NR	-
2013	Chromium, Hexavalent	mg/L	0.010 (c)	1. Basin Plan	0.000053J	0.000095	0.000084	NR	0%
2007, 2013	Copper	mg/L	1.0 (c)		0.00067	0.0013	0.00088	0%	0%
2013	Iron	mg/L	0.3	1. Basin Plan	**0.39**	0.13	0.15	NR	33%
2007, 2013	Lead	mg/L	NA		0.000085J	0.000067J	0.000058J	0%	-
2013	Manganese	mg/L	0.05	1. Basin Plan	**0.063**	0.034	0.049	NR	33%

Table 5-2. 2014-2015 Dry Weather Receiving Water Monitoring Results for the Santa Margarita River WMA

Permit Requirement	Analyte	Units	Water Quality Benchmark	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	SMR WMA % of Samples Above Benchmark (Transitional Monitoring)	SMR WMA % of Samples Above Benchmark (Long Term Monitoring)
					SMR-MLS-2 (LTMS - 902.21)				
					9/10/2014-9/11/2014	1/7/2015-1/8/2015	5/5/2015-5/6/2015		
2013	Mercury	mg/L	0.002 (c)	1. Basin Plan	0.000026J	0.0000040J	<0.000050	NR	0%
2007, 2013	Nickel	mg/L	0.1 (c)	1. Basin Plan	0.00075J	0.001	0.00068J	0%	0%
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.00043	0.0012	0.00053	0%	0%
2013	Silver	mg/L	0.1 (c)	1. Basin Plan	<0.00020	<0.00020	<0.00020	NR	0%
2013	Thallium	mg/L	0.002 (c)	1. Basin Plan	<0.00020	<0.00020	<0.00020	NR	0%
2007, 2013	Zinc	mg/L	5.0 (c)	1. Basin Plan	0.0018J	0.0030J	<0.0050	0%	0%
Dissolved Metals									
2007	Antimony	mg/L	0.006	1. Basin Plan	0.000086J	NR	0.000095J	0%	NR
2007, 2013	Arsenic	mg/L	0.15	16. 40 CFR 131.38	0.0011	0.0013	0.0012	0%	0%
2007, 2013	Cadmium	mg/L	(d)	16. 40 CFR 131.38	<0.00010	<0.00010	<0.00010	0%	0%
2007, 2013	Chromium	mg/L	(d)	16. 40 CFR 131.38	0.000086J	0.000047J	<0.00020	0%	0%
2013	Chromium, Trivalent	mg/L	(d)	16. 40 CFR 131.38	AE	AE	<0.0002	NR	0%
2013	Chromium, Hexavalent	mg/L	0.011	16. 40 CFR 131.38	AE	AE	0.000076	NR	0%
2007, 2013	Copper	mg/L	(d)	16. 40 CFR 131.38	0.00048J	0.0012	0.00092	0%	0%
2013	Iron	mg/L	NA		0.027	0.0077J	0.039	NR	-
2007, 2013	Lead	mg/L	(d)	16. 40 CFR 131.38	<0.00020	<0.00020	0.000045J	0%	0%
2013	Manganese	mg/L	NA		0.012	0.018	0.04	NR	-
2013	Mercury	mg/L	NA		0.000015J	<0.000050	<0.000050	NR	-
2007, 2013	Nickel	mg/L	(d)	16. 40 CFR 131.38	0.00065J	0.00092	0.00067J	0%	0%
2007, 2013	Selenium	mg/L	NA		0.00035J	0.0012	0.00058	-	-
2013	Silver	mg/L	(d)	16. 40 CFR 131.38	<0.00020	<0.00020	<0.00020	NR	0%
2013	Thallium	mg/L	NA		<0.00020	<0.00020	<0.00020	NR	-
2007, 2013	Zinc	mg/L	(d)	16. 40 CFR 131.38	0.0011J	0.0013J	0.0012J	0%	0%
Organophosphorus Pesticides									
2013	Azinphos methyl (Guthion)	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Bolstar	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2007, 2013	Chlorpyrifos	µg/L	0.014 (chronic)	12. CA Dept. of Fish & Game, 2000	<0.010	<0.010	<0.010	0%	0%
2013	Coumaphos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Demeton-o	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Demeton-s	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2007, 2013	Diazinon	µg/L	0.05 (chronic)	12. CA Dept. of Fish & Game, 2000, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.010	<0.010	<0.010	0%	0%
2013	Dichlorvos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Dimethoate	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Disulfoton	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Ethoprop	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Ethyl parathion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Fensulfothion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Fenthion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2007, 2013	Malathion	µg/L	0.1 (chronic)	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.010	<0.010	<0.010	0%	0%
2013	Merphos	µg/L	NA		<0.010	<0.010	<0.010	NR	-

Table 5-2. 2014-2015 Dry Weather Receiving Water Monitoring Results for the Santa Margarita River WMA

Permit Requirement	Analyte	Units	Water Quality Benchmark	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	SMR WMA % of Samples Above Benchmark (Transitional Monitoring)	SMR WMA % of Samples Above Benchmark (Long Term Monitoring)
					SMR-MLS-2 (LTMS - 902.21)				
					9/10/2014-9/11/2014	1/7/2015-1/8/2015	5/5/2015-5/6/2015		
2013	Methyl parathion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Mevinphos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Naled	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Phorate	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Ronnel	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Stirophos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Tokuthion (Prothiofos)	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Trichloronate	µg/L	NA		<0.010	<0.010	<0.010	NR	-
Pyrethroids									
2013	Allethrin	µg/L	NA		<0.002	<0.002	<0.002	NR	-
2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	<0.002	<0.002	<0.002	NR	0%
2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	NR	0%
2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	NR	0%
2013	Cypermethrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	NR	0%
2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002	<0.002	NR	-
2013	Deltamethrin/Tralomethrin	µg/L	NA		<0.002	<0.002	<0.002	NR	-
2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	NR	0%
2013	Fenvalerate	µg/L	NA		<0.002	<0.002	<0.002	NR	-
2013	Fluvalinate	µg/L	NA		<0.002	<0.002	<0.002	NR	-
2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.01	<0.01	<0.01	NR	0%
2013	Prallethrin	µg/L	NA		<0.002	<0.002	<0.002	NR	-
2013	Resmethrin	µg/L	NA		<0.01	<0.01	<0.01	NR	-
Toxicity									
2007, 2013	*Ceriodaphnia* 96-hr survival	LC_{50} (%)	>100		>100	NR	>100	0%	NR
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	NR	100	0%	NR
2013	*Ceriodaphnia* 7-day survival	TST	Pass/Fail		Pass	Pass	Pass	NR	0%
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	NR	100	0%	NR
2013	*Ceriodaphnia* 7-day reproduction	TST	Pass/Fail		Pass	Pass	Pass	NR	0%
2007	*Hyalella* 96-hr survival	LC_{50} (%)	>100		>100	NR	>100	0%	NR
2007, 2013	*Selenastrum* 96-hr growth	NOEC (%)	100		100	NR	100	0%	NR
2013	*Selenastrum* 96-hr growth	TST	Pass/Fail		Pass	Pass	Pass	NR	0%
2013	*Pimephales* 7-day survival	TST	Pass/Fail		Pass	Pass	Pass	NR	0%
2013	*Pimephales* 7-day biomass	TST	Pass/Fail		Pass	Pass	Pass	NR	0%

NA - No criterion or published value was available or applicable to the matrix or program.
NR -Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long-term monitoring (RWQCB Order No. R9-2013-0001).
(a) Water Quality Benchmark for *Enterococcus* is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Water Quality Benchmark is the criterion maximum concentration (CMC) and criterion continuous concentration (CCC) based on pH and water temperature when applicable as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for total metals is based on the MUN beneficial as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(d) Water Quality Benchmark for dissolved metal fractions is based on total hardness and is calculated as described by 40 CFR Part 131.38 (May 18, 2000). The Criterion Maximum Concentration (CMC) was used.
< - Results are less than the reporting limit.
(-) Unable to calculate because there is no criterion or published value available for the analyte.
J - Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
AE - Analysis error.
Values with **red bold font and shading** do not meet Water Quality Benchmarks.
Sources - Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Results from trash assessments conducted during dry weather in the Santa Margarita River WMA are presented in Table 5-3. Each of the three assessments of SMR-MLS-2 was rated as Optimal. No assessments were rated as Suboptimal, Marginal, Submarginal, or Poor, and no threats to human health or aquatic health were observed. A table summarizing the results of trash assessments conducted at receiving water stations in the Santa Margarita River WMA is provided in Appendix G.

Table 5-3. 2014-2015 Dry Weather Trash Assessment Summary for the Santa Margarita River WMA

Station	Trash Rating	Number of Assessments	Human Health Threat	Aquatic Health Threat
SMR-MLS-2 (902.21)	Optimal	3	0	0

5.1.1.1 Dry Weather Trend Analysis

Provision D.4.a.(2)(d) of the 2013 Permit requires the identification of short and/or long-term improvements or degradation of critical beneficial uses. Analyzing trends is also useful for drawing meaningful conclusions from a larger data set as opposed to considering only one monitoring year of data. Dry weather trends were assessed using the three monitoring years of available dry weather data for SMR-MLS-2, which is the minimum required for trend analysis. Scatterplots depicting the data collected for each of the significant ($p < 0.05$) trends are summarized in Table 5-4 and presented in Figure 5-1, where the x-axis shows the sample date (year) and the y-axis shows measured values.

Table 5-4. Dry Weather Receiving Water Trend Results for the Santa Margarita River WMA

Station	Dry	
	Increasing	Decreasing
SMR-MLS-2 (LTMS)	None	Biochemical Oxygen Demand, Dissolved Antimony, Dissolved Phosphorus

To account for differences in reporting limits in historical data, constituent concentrations below reporting limits were standardized to a value close to zero to avoid falsely identifying trends based on changing reporting limits. Trends were not analyzed for constituents with greater than 50% non-detect results. Sen’s Slope estimates are shown on the scatterplots for constituents with less than 15% non-detect results. A negative Sen’s Slope indicates a decreasing trend and a positive Sen’s Slope indicates an increasing trend. As shown in Table 5-4 and Figure 5-1, all of the trends observed in the Santa Margarita River WMA were decreasing trends and were below benchmarks.

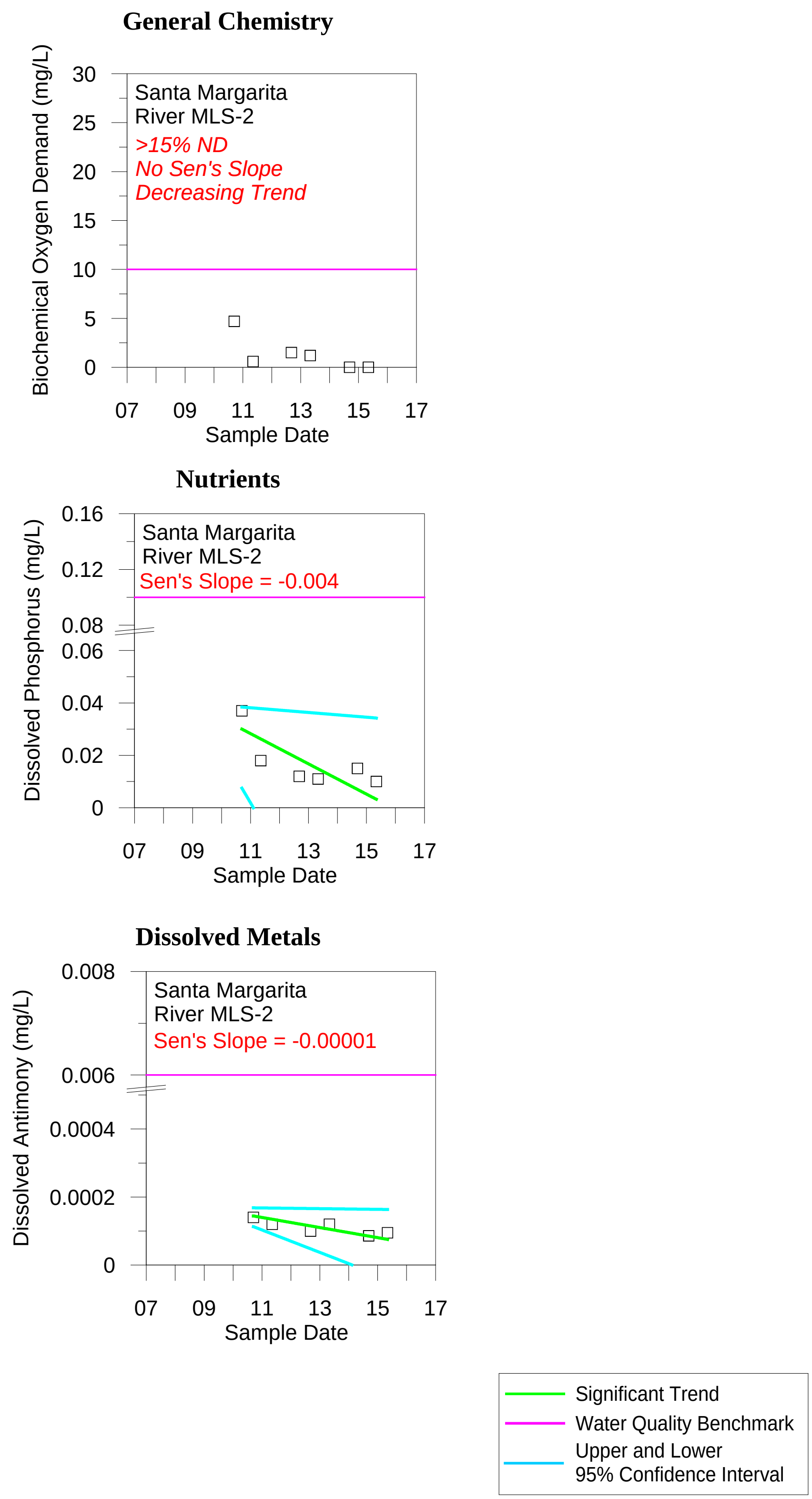


Figure 5-1. Dry Weather Data with Significant Trends ($p < 0.05$) for the Santa Margarita River WMA

5.1.2 MLS Wet Weather Results

The location of SMR-MLS-2 (LTMS) is shown on Figure 4-1 in Section 4.1. Monitoring was conducted on November 1, 2014, December 2-4, 2014, and March 1-2, 2015. All three events were monitored under the long-term receiving water monitoring requirements of the 2013 Permit. In addition, the November and March events were monitored under the transitional monitoring requirements of the 2013 Permit. The constituent list for long-term monitoring is tailored towards issues in the watershed, as described in Section 4.1.3. The rainfall statistics for each event, based on a rain gauge installed at the station, are presented in Table 5-5.

Table 5-5. 2014-2015 Rainfall and Runoff Statistics for Monitored Storm Events for the Santa Margarita River WMA

Site	Date	Total Rain (in)	Duration (hours)	Intensity (in/hour)	Antecedent Dry Days	Event Volume (cf)	Peak Flow (cfs)
SMR-MLS-2	11/1/2014	0.47	1.83	0.26	71	2,631,249	22.1
	12/2/2014	2.79	40.83	0.07	29	74,908,058	1,240.3
	3/1/2015	0.50	3.5	0.14	5	8,329,392	47.5

in – inches cf – cubic feet cfs – cubic feet per second

Table 5-6 summarizes the 2014-2015 monitoring year and historical (since 2008) exceedance rates for wet weather (October 1, 2014 to April 30, 2015) NPDES receiving water monitoring at SMR-MLS-2 (LTMS). Constituents without exceedances during the 2014-2015 monitoring year are also included in this comparison table if the historical exceedance rate was ≥ 50%. Table 5-7 presents detailed results for the 2014-2015 monitoring year and also shows the receiving water – water quality benchmarks that were developed under the 2007 Permit and are being used to evaluate the monitoring data. Toxicity data collected under the long-term monitoring requirements of the 2013 Permit were analyzed using the TST (USEPA, 2010). Each toxicity test conducted for long-term monitoring received a Pass or Fail in accordance with the TST.

As shown in Table 5-7, concentrations of nutrients, dissolved metals, and organophosphorus pesticides were below wet weather benchmarks and no toxicity to *Ceriodaphnia*, *Hyalella*, or *Pimephales* was observed at SMR-MLS-2 (LTMS). Considering that the exceedance rate for one year of monitoring data (three data points per constituent) provides a limited view of sampling results at the site, examining historical data provides context for the most recent year's monitoring data results based on a larger sample size and period of record. As shown in Table 5-6, concentrations of fecal coliform, TDS, total suspended solids (TSS), and bifenthrin were measured above benchmarks during the 2014-2015 monitoring year and historically. Turbidity values, historically measured above benchmarks in 60% of samples from this site, were below benchmarks during the 2014-2015 monitoring year. Detailed historical results tables are presented in Appendix F. In addition, constituents analyzed for the first time during the 2014-2015 monitoring year under the long-term monitoring requirements of the 2013 Permit which had concentrations above benchmarks at SMR-MLS-2 (LTMS) included sulfate, total iron, total manganese, and toxicity to *Selenastrum* (based on the TST).

Table 5-6. Summary of 2014-2015 and Historical Exceedance Rates during Wet Weather in the Santa Margarita River WMA

Constituent or Test	SMR-MLS-2 (LTMS - 902.21) Exceedance Rate	
	2014-2015 (n=3)*	Historical (n=5)
Turbidity	0%	60%
Fecal Coliform	67%	100%
Sulfate**	50%	NA
Total Dissolved Solids (TDS)	100%	60%
Total Suspended Solids (TSS)	33%	40%
Iron, Total**	67%	NA
Manganese, Total**	33%	NA
Bifenthrin	33%	20%
Selenastrum growth (2013 Permit)**	33%	NA

* n=2 for sulfate for 2014-2015 data.
**2014-2015 was the first year of monitoring for this constituent.
NA –Not analyzed.

Table 5-7. 2014-2015 Wet Weather Receiving Water Monitoring Results for the Santa Margarita River WMA

Permit Requirement	Analyte	Units	Water Quality Benchmark	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	SMR WMA % of Samples Above Benchmark (Transitional Monitoring)	SMR WMA % of Samples Above Benchmark (Long Term Monitoring)
					SMR-MLS-2 (LTMS - 902.21)				
					11/1/2014	12/2/2014-12/4/2014	3/1/2015-3/2/2015		
Physical Chemistry									
2013	Dissolved Oxygen	mg/L	<6.0	1. Basin Plan	8.38	9.12	9.45	NR	0%
2007, 2013	pH	pH Units	6.5-9.0	1. Basin Plan	7.68	7.76	8.46	0%	0%
2007, 2013	Specific Conductivity	µS/cm	NA		1363	1259	1378	-	-
2007, 2013	Temperature	Celsius	NA		17.42	15.05	13.59	-	-
2007, 2013	Turbidity	NTU	20	1. Basin Plan	1.1	14.8	2.4	0%	0%
Bacteriological									
2007, 2013	*Enterococcus*	MPN/100 mL	NA		90	270	90,000	-	-
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan	170	**5,000**	**30,000**	50%	33%
2007, 2013	Total Coliform	MPN/100 mL	NA		1,400	5,000	70,000	-	-
Nutrients									
2007, 2013	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	<0.10	<0.10	<0.10	0%	0%
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.74	4.1	2.9	0%	0%
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.015J	0.045J	0.026J	0%	0%
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.25	3.2	0.25	-	-
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.016	NR	0.025	0%	NR
2013	Orthophosphate	mg/L	NA		0.015	0.065	0.026	NR	-
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.026	0.51	0.056	0%	0%
General Chemistry									
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeely (1979)	2.3	NR	<2.0	0%	NR
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	7.5	NR	22	0%	NR
2007, 2013	Dissolved Organic Carbon	mg/L	NA		3.6	10	3.5	-	-
2007, 2013	Total Organic Carbon	mg/L	NA		3.7	11	3.7	-	-
2007	Oil & Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5.0	NR	<5.0	0%	NR
2013	Sulfate	mg/L	250	1. Basin Plan	AE	**290**	250	NR	50%
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.044J	0.040J	0.035J	0%	0%
2007, 2013	Total Dissolved Solids	mg/L	750	1. Basin Plan	**900**	**830**	**810**	100%	100%
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015 , 1. Basin Plan	3	**340**	15	0%	33%
2007, 2013	Total Hardness	mg/L	NA		467	476	398	-	-
Total Metals									
2007	Antimony	mg/L	NA		0.00011J	NR	0.00028J	-	NR
2007, 2013	Arsenic	mg/L	NA		0.0011	0.0065	0.0022	-	-
2007, 2013	Cadmium	mg/L	NA		<0.00010	0.00021	<0.00010	-	-
2007, 2013	Chromium	mg/L	NA		0.00011J	0.016	0.00084	-	-
2007, 2013	Copper	mg/L	NA		0.00068	0.021	0.0024	-	-
2013	Iron	mg/L	0.3	1. Basin Plan	0.16	**16**	**0.69**	NR	67%
2007, 2013	Lead	mg/L	NA		0.000077J	0.0049	0.00021	-	-
2013	Manganese	mg/L	0.05	1. Basin Plan	0.031	**0.43**	0.039	NR	33%
2013	Mercury	mg/L	NA		<0.000050H	<0.000050	0.0000050J	NR	-
2007, 2013	Nickel	mg/L	NA		0.00061J	0.01	0.0028	-	-

Table 5-7. 2014-2015 Wet Weather Receiving Water Monitoring Results for the Santa Margarita River WMA

Permit Requirement	Analyte	Units	Water Quality Benchmark	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	SMR WMA % of Samples Above Benchmark (Transitional Monitoring)	SMR WMA % of Samples Above Benchmark (Long Term Monitoring)
					SMR-MLS-2 (LTMS - 902.21)				
					11/1/2014	12/2/2014-12/4/2014	3/1/2015-3/2/2015		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.00068	0.0031	0.0017	0%	0%
2013	Thallium	mg/L	NA		<0.00020	0.00019J	0.000023J	NR	-
2007, 2013	Zinc	mg/L	NA		0.0016J	0.05	0.0030J	-	-
Dissolved Metals									
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00013J	NR	0.00022J	0%	NR
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0011	0.0015	0.0017	0%	0%
2007, 2013	Cadmium	mg/L	(b)	16. 40 CFR 131.38	0.000034J	0.000020J	<0.00010	0%	0%
2007, 2013	Chromium	mg/L	(b)	16. 40 CFR 131.38	0.000053J	0.00011J	0.00013J	0%	0%
2007, 2013	Copper	mg/L	(b)	16. 40 CFR 131.38	0.00092	0.0019	0.0014	0%	0%
2013	Iron	mg/L	NA		0.043	0.058	0.018	NR	-
2007, 2013	Lead	mg/L	(b)	16. 40 CFR 131.38	<0.00020	0.000024J	<0.00020	0%	0%
2013	Manganese	mg/L	NA		0.0027	0.0035	0.0044	NR	-
2013	Mercury	mg/L	NA		<0.000050H	<0.000050	0.0000080J	NR	-
2007, 2013	Nickel	mg/L	(b)	16. 40 CFR 131.38	0.002	0.0028	0.0019	0%	0%
2007, 2013	Selenium	mg/L	NA		0.0013	0.0015	0.0014	-	-
2013	Thallium	mg/L	NA		<0.00020	<0.00020	<0.00020	NR	-
2007, 2013	Zinc	mg/L	(b)	16. 40 CFR 131.38	0.0013J	0.0025J	0.0014J	0%	0%
Organophosphorus Pesticides									
2013	Azinphos methyl (Guthion)	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Bolstar	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2007, 2013	Chlorpyrifos	µg/L	0.02 (acute)	12. CA Dept. of Fish & Game, 2000	<0.010	<0.010	<0.010	0%	0%
2013	Coumaphos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Demeton-o	µg/L	NA		<0.010	<0.010	<0.010BS-L	NR	-
2013	Demeton-s	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2007, 2013	Diazinon	µg/L	0.08 (acute)	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.010BS-L	<0.010	<0.010	0%	0%
2013	Dichlorvos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Dimethoate	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Disulfoton	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Ethoprop	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Ethyl parathion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Fensulfothion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Fenthion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2007, 2013	Malathion	µg/L	0.43 (acute)	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.010	0.014	<0.010	0%	0%
2013	Merphos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Methyl parathion	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Mevinphos	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Naled	µg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Phorate	µg/L	NA		<0.010	<0.010	<0.010	NR	-

Table 5-7. 2014-2015 Wet Weather Receiving Water Monitoring Results for the Santa Margarita River WMA

Permit Requirement	Analyte	Units	Water Quality Benchmark	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	SMR WMA % of Samples Above Benchmark (Transitional Monitoring)	SMR WMA % of Samples Above Benchmark (Long Term Monitoring)
					SMR-MLS-2 (LTMS - 902.21)				
					11/1/2014	12/2/2014-12/4/2014	3/1/2015-3/2/2015		
2013	Ronnel	μg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Stirophos	μg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Tokuthion (Prothiofos)	μg/L	NA		<0.010	<0.010	<0.010	NR	-
2013	Trichloronate	μg/L	NA		<0.010	<0.010	<0.010	NR	-
Pyrethroids									
2007, 2013	Allethrin	μg/L	NA		<0.002	<0.002	<0.002	-	-
2007, 2013	Bifenthrin	μg/L	0.0093	15. Anderson et al., 2006	<0.002	**0.0185**	<0.002	0%	33%
2007, 2013	Cyfluthrin	μg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	0%	0%
2007, 2013	Cyhalothrin, Total Lambda	μg/L	0.2	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	0%	0%
2007, 2013	Cypermethrin	μg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	0%	0%
2007, 2013	Danitol (Fenpropathrin)	μg/L	NA		<0.002	0.005	<0.002	-	-
2007, 2013	Deltamethrin/Tralomethrin	μg/L	NA		<0.002	<0.002	<0.002	-	-
2007, 2013	Esfenvalerate	μg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002	<0.002	0%	0%
2007, 2013	Fenvalerate	μg/L	NA		<0.002	<0.002	<0.002	-	-
2007, 2013	Fluvalinate	μg/L	NA		<0.002	0.0032	<0.002	-	-
2007, 2013	Permethrin	μg/L	0.021	15. Anderson et al., 2006	<0.01	<0.01	<0.01	0%	0%
2007, 2013	Prallethrin	μg/L	NA		<0.002	<0.002	<0.002	-	-
2007, 2013	Resmethrin	μg/L	NA		<0.01	<0.01	<0.01	-	-
Toxicity									
2007	*Ceriodaphnia* 96-hr survival	LC_{50} (%)	>100		>100	NR	>100	0%	NR
2007	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	NR	100	0%	NR
2013	*Ceriodaphnia* 7-day survival	TST	Pass/Fail		Pass	Pass	Pass	NR	0%
2007	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	NR	100	0%	NR
2013	*Ceriodaphnia* 7-day reproduction	TST	Pass/Fail		Pass	Pass	Pass	NR	0%
2007	*Hyalella* 96-hr survival	LC_{50} (%)	>100		>100	NR	>100	0%	NR
2007	*Selenastrum* 96-hr growth	NOEC (%)	100		100	NR	100	0%	NR
2013	*Selenastrum* 96-hr growth	TST	Pass/Fail		Pass	**Fail**	Pass	NR	33%
2013	*Pimephales* 7-day survival	TST	Pass/Fail		Pass	Pass	Pass	NR	0%
2013	*Pimephales* 7-day biomass	TST	Pass/Fail		Pass	Pass	Pass	NR	0%

NA - No criterion or published value was available or applicable to the matrix or program.
NR - Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long-term monitoring (RWQCB Order No. R9-2013-0001).
(a) Water Quality Benchmark is the criterion maximum concentration (CMC) which is based on pH and water temperature (when applicable) 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 for dissolved metal fractions is based on total hardness and is calculated as described by 40 CFR Part 131.38 (May 18, 2000). The CMC was used.
< - Results are less than the reporting limit.
(-) Unable to calculate because there is no criterion or published value available for the analyte.
J - Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
AE - Analysis error.
BS-L - Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
H - Sample analyzed and/or extracted past the recommended holding time.
Values with **red bold font and shading** do not meet Water Quality Benchmarks.
Sources - Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Results from trash assessments conducted during wet weather in the Santa Margarita River WMA are presented in Table 5-8. All three assessments of SMR-MLS-2 were rated as Optimal. No assessments were rated as Suboptimal, Marginal, Submarginal, or Poor, and no threats to human health or aquatic health were observed. A table summarizing the results of trash assessments conducted at receiving water stations in the Santa Margarita River WMA is provided in Appendix G.

Table 5-8. 2014-2015 Wet Weather Trash Assessment Summary for the Santa Margarita River WMA

Station	Trash Rating	Number of Assessments	Human Health Threat	Aquatic Health Threat
SMR-MLS-2 (902.21)	Optimal	3	0	0

5.1.2.1 Wet Weather Trend Analysis

Provision D.4.a.(2)(d) of the 2013 Permit requires the identification of short and/or long-term improvements or degradation of critical beneficial uses. Analyzing trends is also useful for drawing meaningful conclusions from a larger data set as opposed to considering only one monitoring year of data. Wet weather trends were assessed using the four years of wet weather receiving water data collected at SMR-MLS-2. Scatterplots depicting the data collected for each of the significant ($p < 0.05$) trends are summarized in Table 5-9 and presented in Figure 5-2, where the x-axis shows the sample date (year) and the y-axis shows measured values.

Table 5-9. Wet Weather Receiving Water Trend Results for the Santa Margarita River WMA

Station	Wet	
	Increasing	Decreasing
SMR-MLS-2 (LTMS)	Conductivity, Dissolved Selenium, Surfactants (MBAS)	Ammonia as N, Biochemical Oxygen Demand, Dissolved Organic Carbon, Dissolved Phosphorus, Total Cadmium, Turbidity

To account for differences in reporting limits in historical data, constituent concentrations below reporting limits were standardized to a value close to zero to avoid falsely identifying trends based on changing reporting limits. Trends were not analyzed for constituents with greater than 50% non-detect results. Sen's Slope estimates are shown on the scatterplots for constituents with less than 15% non-detect results. A negative Sen's Slope indicates a decreasing trend and a positive Sen's Slope indicates an increasing trend. As shown in Figure 5-2, there were no increasing trends identified with concentrations above a benchmark. Turbidity has significantly decreased below the benchmark since receiving water monitoring at SMR-MLS-2 began. Historical data for SMR-MLS-2 (Appendix F) shows that turbidity concentrations had frequently been above the benchmark at this station prior to the 2014-2015 monitoring year. In the case of ammonia as N, the benchmark is variable depending on the pH and temperature of the sample. Ammonia as N was identified as a decreasing trend at SMR-MLS-2 (LTMS), and has historically been below the benchmark (Appendix F). The remaining constituents with wet weather trends are below the benchmarks and decreasing or do not have applicable benchmarks.

General Chemistry

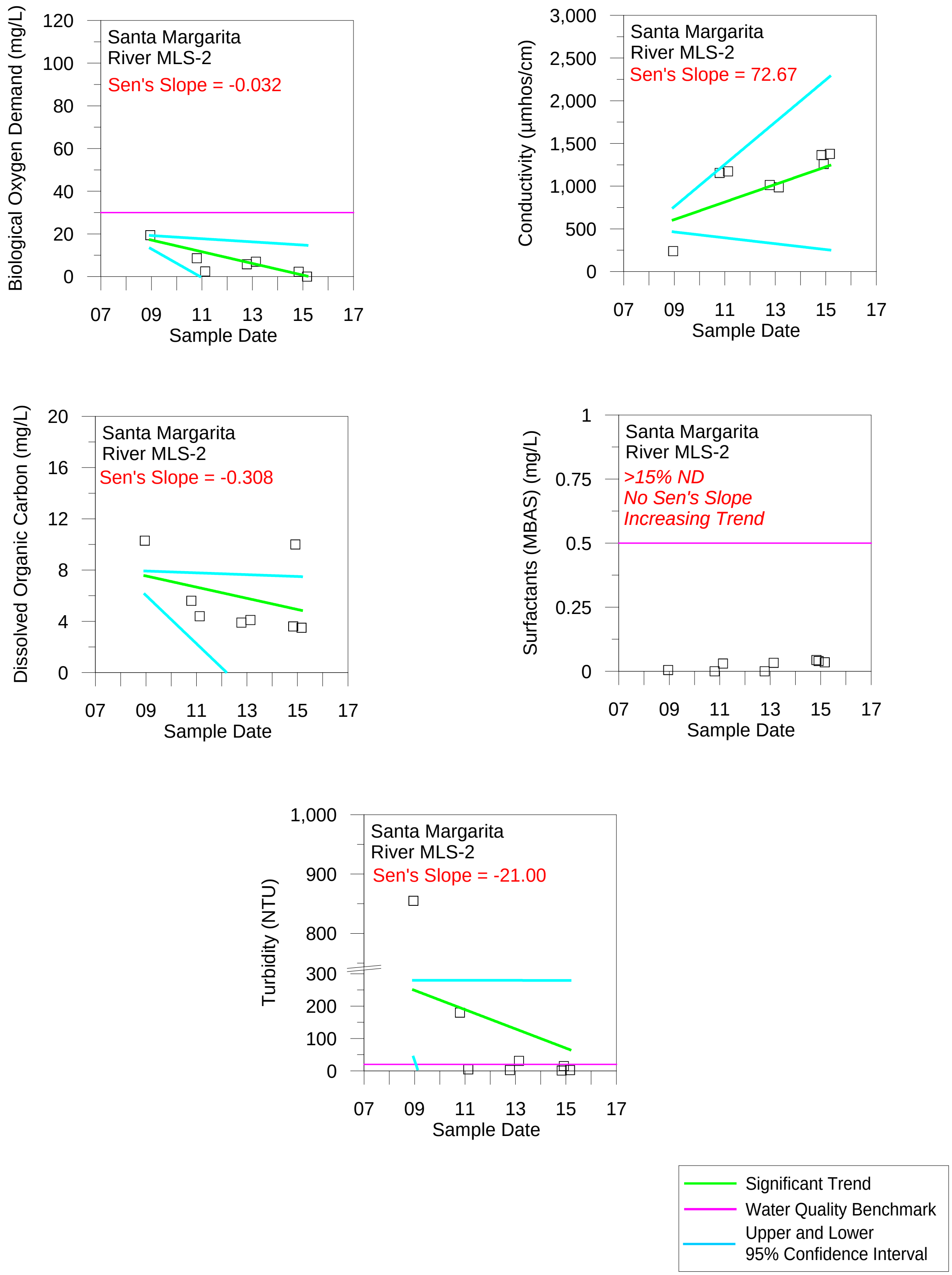
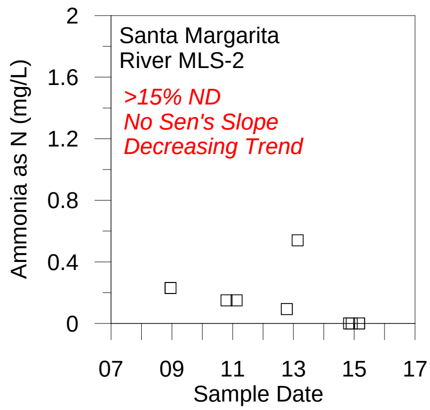
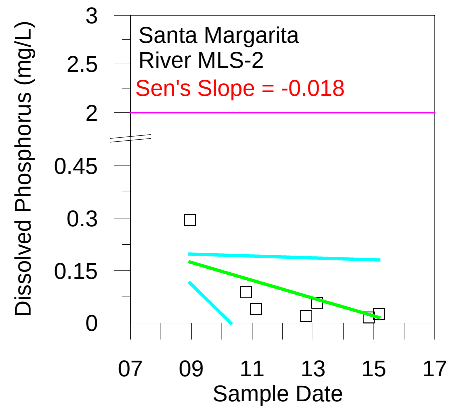


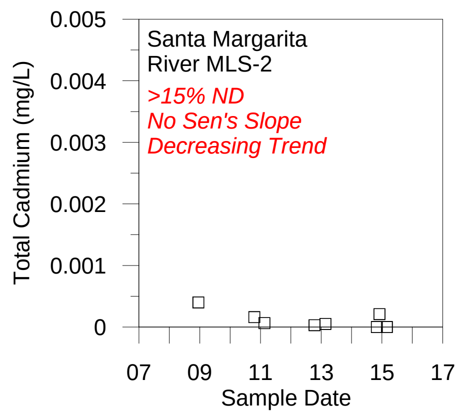
Figure 5-2. Wet Weather Data with Significant Trends (p < 0.05) for the Santa Margarita River WMA

Nutrients

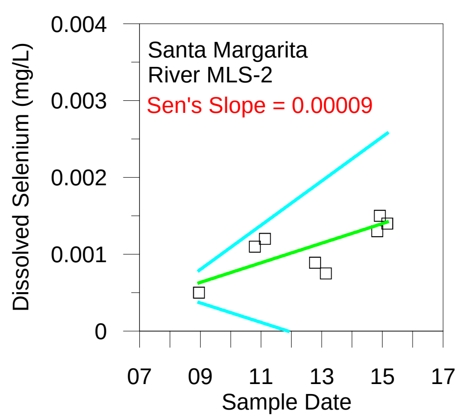




Total Metals



Dissolved Metals



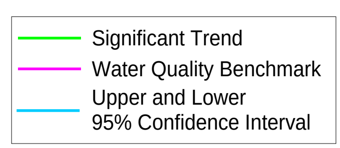


Figure 5-2. Wet Weather Data with Significant Trends ($p < 0.05$) for the Santa Margarita River WMA (con't)

5.1.3 Post-Storm Synthetic Pyrethroid Monitoring

Post-storm synthetic pyrethroid sediment sampling was conducted during the 2014-2015 monitoring year in accordance with the transitional monitoring requirements of the 2013 Permit. Results are summarized in Table 5-10. Sampling at SMR-MLS-2 occurred on November 6-7, 2014. All synthetic pyrethroid concentrations were below detection limits.

Table 5-10. 2014-2015 Post-Storm Sediment Pyrethroid Monitoring Results for the Santa Margarita River WMA

Analyte	Units	Sediment Benchmarks*	Benchmark References	SMR-MLS-2
				11/6/2014 - 11/7/2014
Particle Size				
Clay	%			1.41
Gravel	%			30.90
Sand	%			67.17
Silt	%			0.52
General Chemistry				
Percent Solids	% Dry Weight			85.1
Total Organic Carbon	% Dry Weight			0.08
Pyrethroids				
Allethrin	ng/dry g	NA		<0.5
Bifenthrin	ng/dry g	3.0-8.2	Amweg et al., 2005	<0.5
Cyfluthrin	ng/dry g	12.5-14.9	Amweg et al., 2005	<0.5
Cypermethrin	ng/dry g	3.6/18/23	Maund et al., 2002	<0.5
Danitol (Fenpropathrin)	ng/dry g	NA		<0.5
Deltamethrin/Tralomethrin	ng/dry g	NA		<0.5
Esfenvalerate	ng/dry g	10.4-48.3	Amweg et al., 2005	<0.5
Fenvalerate	ng/dry g	NA		<0.5
Fluvalinate	ng/dry g	NA		<0.5
L-Cyhalothrin	ng/dry g	5.2-6.0	Amweg et al., 2005	<0.5
Permethrin	ng/dry g	57-112	Amweg et al., 2005	<5
Prallethrin	ng/dry g	NA		<0.5
Resmethrin	ng/dry g	NA		<5

*Note: The lowest value presented in the ranges was used for conservative purposes.
<-Results less than the method detection limit.
NA indicates no criterion or published value was available or applicable to the matrix or program.
(-) Unable to calculate because there is no criterion or published value available for the analyte.

5.1.4 Hydromodification Monitoring at Long-term MLS

Provision D.1.c.(6) of the 2013 Permit requires that hydromodification monitoring be conducted during dry weather at long-term receiving water monitoring locations. During the 2014-2015 monitoring year, the long-term receiving water location at SMR-MLS-2 (LTMS) was monitored in accordance with this program. The MLS location is shown on Figure 4-1 in Section 4.1. The hydromodification assessment Reach locations are shown in Figure 5-3. There were no major MS4 outfall discharge points located near the hydromodification assessment domain of analysis. Reach 1 was located at SMR-MLS-2 (LTMS). Reach 2 was approximately 750 feet upstream of

Reach 1, and Reach 3 was approximately 1,500 feet downstream of Reach 1. Reach 3 coincided with the dry weather receiving water bioassessment monitoring site. Although the distance of Reach 2 was outside of the domain of analysis given in the SCCWRP channel assessment tool, the broader reach was used to capture a larger area of the receiving water channel. Channel accessibility and safety concerns were also factors in the placement of the monitored reaches.

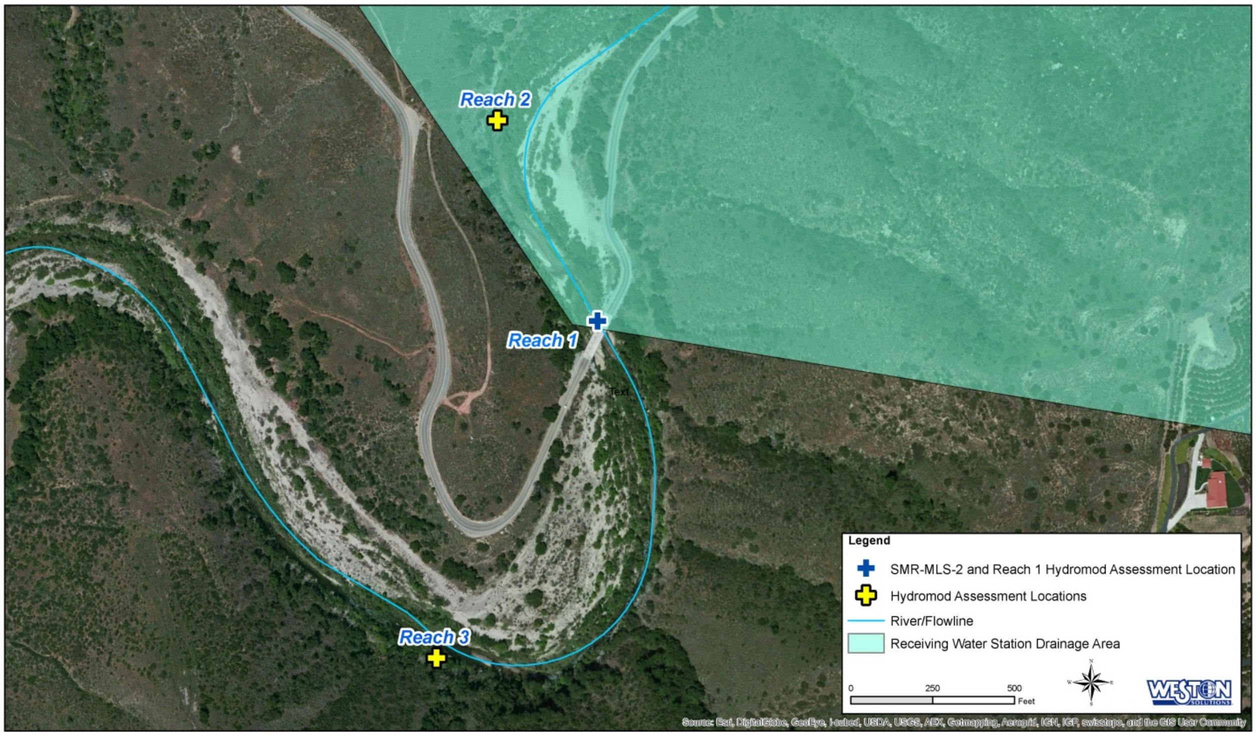


Figure 5-3. Hydromodification Monitoring Reach Locations at SMR-MLS-2 (LTMS)

The SCCWRP channel assessment tool was employed to perform a rapid assessment of the relative susceptibility of the monitored reaches to effects of hydromodification. The field screening tool uses a series of decision trees, checklists, and tables with calculations to arrive at determinations of vertical and lateral susceptibility. The results of this process for SMR-MLS-2 (LTMS) are presented in Table 5-11. The screening tool data and photographs are provided in Appendix H. The geomorphic assessment results indicated all reaches monitored in the receiving water channel near SMR-MLS-2 (LTMS) were in labile bed states with very high vertical susceptibilities (i.e., susceptibility of channel to deepening). The very high vertical susceptibility results from the SCCWRP channel assessment tool were driven by the sand dominated bed material, which has little resistant substrate. All reaches were located in armored bedrock or confined by hillslope which indicated low lateral susceptibilities. The geomorphic results indicate a low potential for changes to the lateral form or bank composition of the channel. Physical habitat quality results were assessed using CRAM (Collins et al, 2012) and are presented in Section 5.1.5.

The SCCWRP channel assessment tool is a rapid assessment of the relative susceptibility of a specific stream reach to effects of hydromodification and does not evaluate current conditions in terms of attribution to historic land-use practices. It should be noted that this tool assesses proximity to geomorphic thresholds delineated using field data from small watersheds in southern California and focused on small watersheds because the majority of the larger streams in the region have been substantially altered in form and/or flow (Bledsoe et al., 2010). The receiving water channel near SMR-MLS-2 (LTMS) is a low gradient reach near the base of the Santa Margarita watershed, with a drainage area of over 178,000 acres in size between the LTMS and Skinner Reservoir and Vail Lake. The SCCWRP channel assessment tool may need to be revised or a new tool may need to be developed to better assess large developed watersheds in order to make management decisions.

Table 5-11. Hydromodification Monitoring Summary for SMR-MLS-2 (LTMS)

Location	Description	Latitude	Longitude	d50 (mm)	Incision/ Braiding Risk	Vertical Susceptibility	Lateral Susceptibility
SMR-MLS-2 (LTMS) Reach 1	SMR-MLS-2 (LTMS) receiving water monitoring station	33.39814	-117.26273	2	>50%	Very High	Low
SMR-MLS-2 (LTMS) Reach 2	Approximately 750 feet upstream of SMR-MLS-2 (LTMS)	33.39981	-117.26375	2	>50%	Very High	Low
SMR-MLS-2 (LTMS) Reach 3	Approximately 1,500 feet downstream of SMR-MLS-2 (LTMS)	33.39531	-117.26431	2	>50%	Very High	Low

d50 – median grain size diameter

5.1.5 Bioassessment

Bioassessment monitoring in the Santa Margarita River WMA was conducted during the 2014-2015 monitoring period under the transitional and long-term receiving water monitoring requirements of the 2013 Permit and the SMC Regional Monitoring Program. Monitoring locations are shown on Figure 4-1 in Section 4.1. Results are summarized below and are presented in detail in Appendix I.

Bioassessment monitoring data collected from spring to summer of 2015 are presented in Table 5-12 (IBI and CSCI scores) and Table 5-13 (CRAM scores). The IBI scores at SMR-MLS-2 and SMR-WGR resulted in a rating of Poor and the scores at stations RBC-WGR and SC-SCD resulted in a rating of Fair. SMC locations resulted in a Very Poor rating for 902M20161, located in De Luz Creek, and a Fair rating for trend station 902WE0888, located in Rainbow Creek. Physical habitat quality as measured by CRAM scores was Low at the Rainbow Creek SMC trend station, High at SMR-MLS-2 and RBC-WGR, and in the upper range of Moderate at SC-SCD, SMR-WGR, and the De Luz Creek SMC station. CSCI values indicated biotic integrity that is Very Likely Altered at the Rainbow Creek SMC trend station, Likely Altered at SMR-MLS-2, Possibly Intact at the De Luz Creek SMC station, and Likely Intact at SMR-WGR, RBC-WGR, and SC-SCD. The CSCI has yet to be calibrated to determine the threshold at which significant impairment or alteration has occurred to the benthic community, but the scores may be used to rate sites relative to one another, with higher scores indicating higher biotic integrity.

The CSCI rated some bioassessment sites higher in quality than the IBI. The CSCI is composed of two equally-weighted indices of biological condition, the O/E ratio (a measure of taxonomic completeness) and the pMMI (a measure of ecological structure). In the O/E ratio (Observed Number of taxa/Expected number of taxa) the observed number of taxa is the number of individual taxa captured at a given site relative to the predicted (modeled) number of taxa expected to occur at that site. In Southern California the expected number of taxa predicted in the calculation of the CSCI is inherently lower than other regions in the state. As such, small changes in the number of observed taxa have a greater change on the O/E ratio in our region. The authors of the CSCI have acknowledged that in regions of relatively low expected taxa, the pMMI component of the CSCI score has greater sensitivity (Mazor et al., in press). This may explain the inconsistencies between the IBI and CSCI scores at these stations.

Chemistry data (Table 5-14) were collected at the two SMC stations. Results indicated that sulfate and total nitrogen concentrations were greater than their respective benchmarks at both locations. Chloride was above the benchmark at the De Luz Creek trend station and nitrate + nitrite as N and total phosphorus concentrations were above their respective benchmarks at the Rainbow Creek location. The total phosphorus concentration at the Rainbow Creek location was only slightly above the benchmark. All other constituent concentrations were below benchmarks, where applicable.

5.1.5.1 Index of Biotic Integrity Trends

A trend analysis of IBI scores was conducted for the NPDES bioassessment stations for the data collected during the late spring and early summer sampling period between 2001 and 2015. No statistically significant trends were identified for IBI in the Santa Margarita River WMA. The IBI is effective for broadly identifying impairment, and the boundary between Fair and Poor (i.e., an IBI score of 26) is considered the threshold for impairment. It must be noted that small differences in IBI scores are not significant and may be due to natural biological variability within a stream reach. Ode et al. (2005) determined that the minimum detectable difference between IBI scores is approximately nine points (on the 0–70 point scale). This implies that at least a nine-point difference between two stations’ scores is necessary to determine whether one is of significantly higher quality than the other.

Table 5-12. 2014-2015 IBI and CSCI Scores for the Santa Margarita River WMA (NPDES and SMC Program Monitoring)

Parameter		SMR-MLS-2 (LTMS - 902.21)	RBC-WGR (902.22)	SC-SCD (902.22)	SMR-WGR (902.22)	902WE0888 (902.21)	902M20161 (902.23)
		6/4/2015	**6/3/2015**	**6/4/2015**	**6/3/2015**	**6/16/2015**	**6/25/2015**
Total IBI Score		21	34	33	18	28	4
IBI Rating*		**Poor**	**Fair**	**Fair**	**Poor**	**Fair**	**Very Poor**
% CF+CG	IBI Metric value	71%	43%	85%	79%	22%	88%
	IBI score	7	10	3	5	10	3
% Non-Insect Taxa	IBI Metric value	45%	38%	23%	47%	32%	70%
	IBI score	1	3	6	0	4	0
% Tolerant Taxa	IBI Metric value	38%	31%	23%	37%	36%	50%
	IBI score	0	2	4	1	1	0
Coleoptera Taxa	IBI Metric value	0	0	4	0	3	0
	IBI score	0	0	7	0	5	0
Predator Taxa	IBI Metric value	11	8	9	9	7	2
	IBI score	8	5	6	6	4	0
% Intolerant Individuals	IBI Metric value	1%	37%	2%	1%	0%	0%
	IBI score	1	10	1	1	0	0
EPT Taxa	IBI Metric value	8	8	11	9	8	2
	IBI score	4	4	6	5	4	1
CSCI Score		0.75	0.99	1.08	0.97	0.85	0.47
CSCI Rating**		**Likely Altered**	**Likely Intact**	**Likely Intact**	**Likely Intact**	**Possibly Intact**	**Very Likely Altered**

* IBI Score of 0-13=Very Poor, 14-26=Poor, 27-40=Fair, 41-55=Good, 56-70=Very Good
** A CSCI score of ≥0.92=likely intact, 0.80 to 0.91=possibly intact, 0.63 to 0.79=likely altered, 0.00 to 0.62=very likely altered.
CF = collector filterer, CG = collector gatherer, EPT = ephemeroptera, plecoptera, and trichoptera

Table 5-13. 2014-2015 Physical Habitat Assessment CRAM Scores (NPDES and SMC Program Monitoring)

Parameter	SMR-MLS-2 (LTMS - 902.21)	SC-SCD (902.22)	RBC-WGR (902.23)	SMR-WGR (902.22)	902WE0888 (902.21)	902M20161 (902.23)
	6/4/2015	6/4/2015	6/3/2015	6/3/2015	6/16/2015	6/25/2015
Latitude	33.3953	33.42271	33.40773	33.41709	33.45432	33.41868
Longitude	-117.26413	-117.24916	-117.20246	-117.21176	-117.30237	-117.14384
Wetland Class	Non-confined	Confined	Confined	Non-confined	Non-confined	Confined
Overall Score	**78**	**72**	**81**	**72**	**71**	**31**
Buffer and Landscape Context	**24**	**21**	**24**	**23**	**20**	**6**
Landscape Connectivity	A	A	A	A	A	D
Percent of AA with Buffer	A	A	A	A	A	D
Average Buffer Width	A	C	A	B	D	D
Buffer Condition	A	B	A	A	A	D
Hydrology	**27**	**24**	**21**	**21**	**24**	**18**
Water Source	C	C	C	C	C	C
Hydroperiod or Channel Stability	B	B	B	B	A	C
Hydrologic Connectivity	A	B	C	C	C	C
Physical Structure	**18**	**12**	**18**	**15**	**15**	**6**
Structural Patch Richness	B	C	A	B	C	D
Topographic Complexity	B	C	C	C	B	D
Biotic Structure	**10**	**10**	**11**	**10**	**10**	**3**
Horizontal Interspersion and Zonation	C	B	B	C	B	D
Vertical Biotic Structure	C	A	A	B	C	D
Number of Plant Layers Present	A	A	A	A	A	D
Number of Co-dominant Species	B	B	B	B	B	D
Percent Invasion	B	B	A	B	B	D

CRAM score is 25-100; <50 = low, 50-75 = moderate, >75 = high

Submetric scores (bold text) are based on the individual metric score alternative states (A-D where A is the highest score for that category and D is the lowest) listed below a given submetric

AA – Assessment Area

Table 5-14. 2014-2015 SMC Program Chemistry Results for the Santa Margarita River WMA

Analyte	Units	Water Quality Benchmarks	Benchmark References	De Luz Creek 902.21	Rainbow Creek 902.23	SMR WMA 2014-2015 Exceedances
				902WE0888	902M20161	
				6/16/2015	6/25/2015	
Physical Chemistry						
Alkalinity	mg/L	NA		230	140	-
Specific Conductivity	µmhos/cm	NA		1,914	3,321	-
Dissolved Oxygen	mg/L	<6.0	1. Basin Plan	11.74	11.22	0%
pH	pH units	6.5-9.0	1. Basin Plan	8.06	7.61	0%
Salinity	PPT	NA		0.97	1.75	-
Turbidity	NTU	20	1. Basin Plan	7.8	4.2	0%
Water Temperature	Celsius	NA		22.49	22.68	-
Periphyton						
Ash-Free Dry Weight	g/m²	NA		27.763	44.242	-
Chlorophyll-a	mg/m²	NA		153	149.9	-
General Chemistry						
Chloride	mg/L	250	1. Basin Plan	**290**	200	50%
Sulfate	mg/L	250	1. Basin Plan	**380**	**430**	100%
Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	9	8	0%
Total Hardness	mg $CaCO_3$/L	NA		741	832	-
Nutrients						
Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	<0.048	<0.048	0%
Nitrate + Nitrite as N	mg/L	10	1. Basin Plan	3.9	**79**	50%
Orthophosphate as P	mg/L	NA		0.085	0.092	-
Total Kjeldahl Nitrogen	mg/L	NA		0.16	<0.05	-
Total Nitrogen	mg/L	1	1. Basin Plan	**4**	**79**	100%
Total Phosphorus	mg/L	0.1	1. Basin Plan	0.086	**0.11**	50%

<-Results less than the method detection limit.

NA indicates no criterion or published value was available or applicable to the matrix or program.

(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.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

5.2 Transitional MS4 Outfall Discharge Monitoring

5.2.1 MS4 Outfall Discharge Monitoring Station Inventory

During the 2013-2014 monitoring year, the County of San Diego completed the development of their inventory of major MS4 outfalls that discharge directly to a receiving water. No changes were made to the inventory during the 2014-2015 monitoring year. The information regarding these MS4 outfall stations in the Santa Margarita River WMA has been compiled in the General Site Description tab of Appendix J. The number of major outfalls is shown in Table 5-15 by HSA for the Santa Margarita River WMA, and the locations of these major outfalls within the WMA are shown in Figure 5-4. Many of the HSAs in the County's unincorporated area within the Santa Margarita River WMA have no major MS4 outfalls that discharge to a receiving water.

Table 5-15. Number of Major MS4 Outfalls by Copermittee and HSA for the Santa Margarita River WMA

Copermittee	HSA	Major MS4 Outfalls
County of San Diego	902.13	5
	902.23	5
GRAND TOTAL		**10**

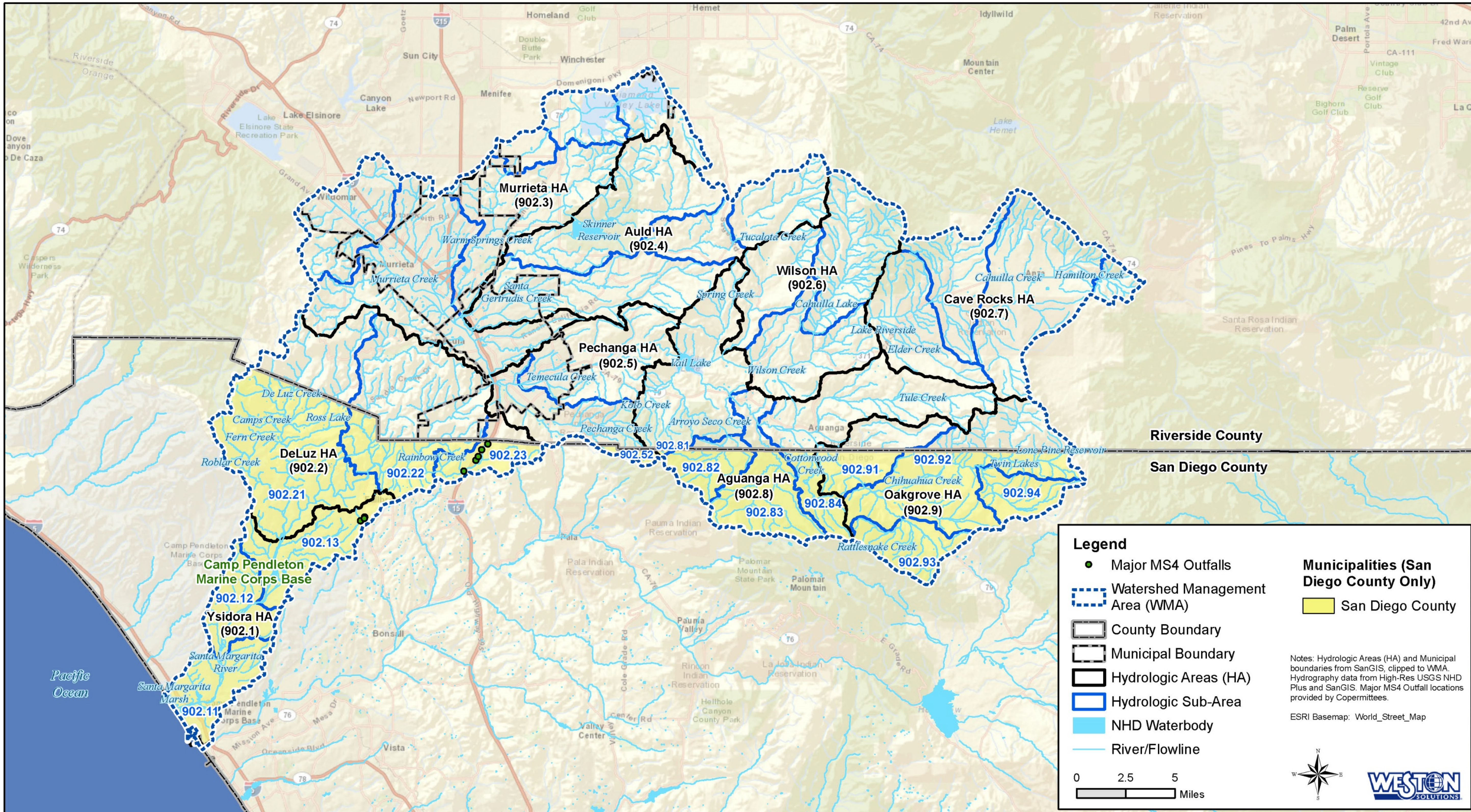


Figure 5-4. Major MS4 Outfall Inventory Station Locations in the Santa Margarita River WMA

5.2.2 Transitional Dry Weather MS4 Outfall Discharge Field Screening Monitoring

The Copermittees conducted transitional dry weather MS4 outfall discharge field screening monitoring during the 2014-2015 monitoring year, which included recording the visual field observations listed in Table D.5 of Provision D. These records are provided in the Visual Observation tab of Appendix J for the WMA. The frequency of monitoring was determined by Provision D.2.(a). Copermittees with less than 125 major MS4 outfalls within a WMA were required to visit at least 80% of the outfalls twice per year during dry weather conditions, and those with 125 outfalls or more (but less than or equal to 500) within the WMA were required to visit all outfalls at least once annually during dry weather conditions. Within the Santa Margarita River WMA, the County of San Diego has 10 major MS4 outfalls that discharge to a receiving water, and conducted a total of 20 dry weather field visits to these MS4 outfall stations during the 2014-2015 monitoring year.

The County of San Diego recorded numerous visual observations regarding outfall and flow characteristics including flow conditions (flowing, ponded, dry or tidal), whether or not the flow reached the receiving water, whether or not there was a non-storm water flow source, potential non-storm water sources, if the flow source was eliminated, evidence of obvious IC/ID, whether trash was present and relative amount, and if there was evidence of illegal dumping (see Appendix J). The field screening trash assessment results are summarized in Table 5-16 below. There was a low presence of trash at all but one of the outfalls assessed.

Table 5-16. Dry Weather MS4 Field Screening Trash Assessments for the Santa Margarita River WMA

Copermittee	HSA	No Trash Present	Trash Present		
			Low (<50 pieces)	Medium (50 to 400 pieces)	High (>400 pieces)
County of San Diego	902.13	0	10	0	0
	902.23	0	9	1	0
SUB-TOTAL		**0**	**19**	**1**	**0**
GRAND TOTAL		**0**	**19**	**1**	**0**

A summary of the flow conditions (i.e., flowing, ponded, dry, or tidal) at the outfall stations during the 2014-2015 field visits is shown in Figure 5-5, where the stacked bar shows the number of observations in each flow category. There were four observations in which the MS4 outfall visited was flowing during transitional dry weather MS4 outfall discharge field screening in the Santa Margarita River WMA. A summary of the flow estimations for these observations (n=4), in gallons per minute (gpm), is presented in Figure 5-6.

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.

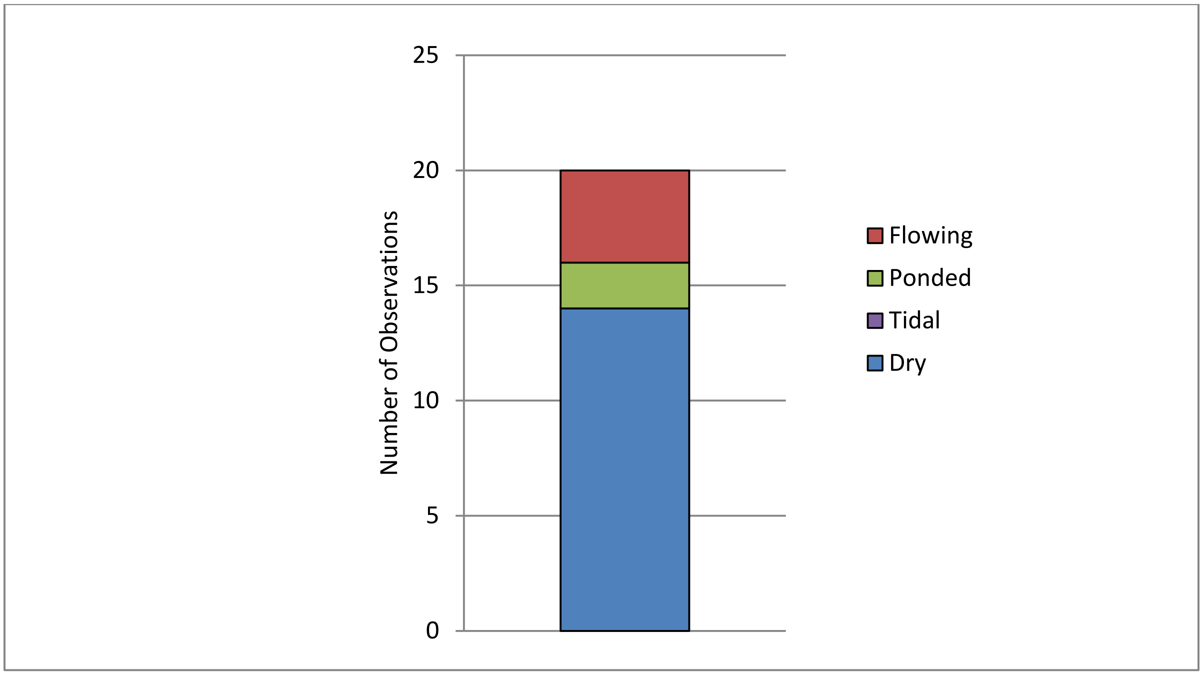


Figure 5-5. Dry Weather Field Screening Flow Observations at MS4 Outfalls in the Santa Margarita River WMA

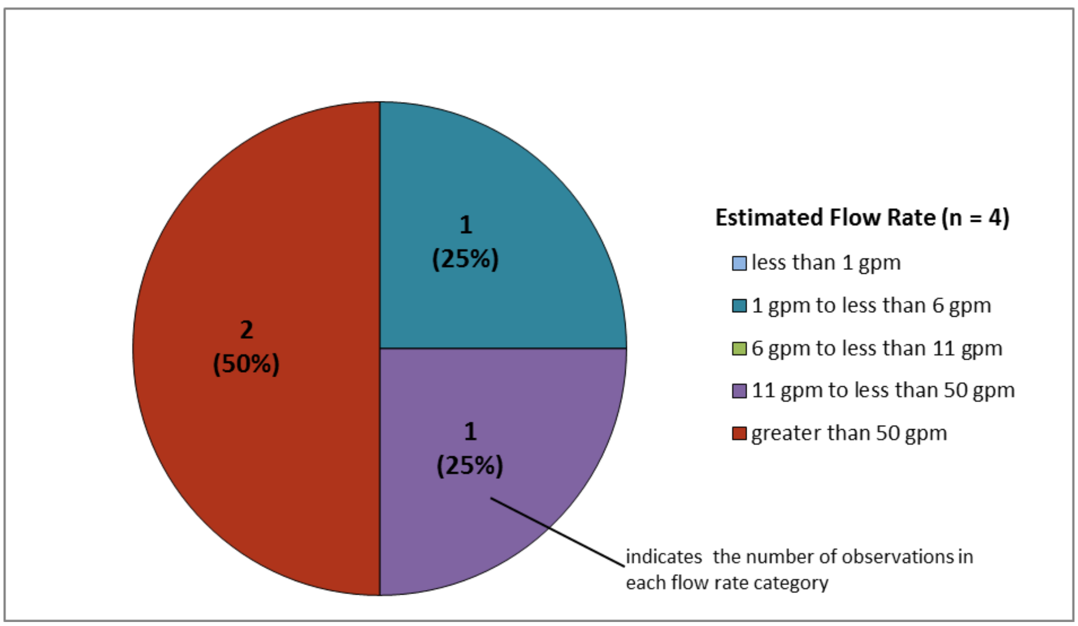


Figure 5-6. Outfall Flow Rate Estimations in the Santa Margarita River WMA

Based on these field screening visits and historical data as needed and available, the County of San Diego determined the flow status of each major MS4 outfall as persistent, transient, dry, tidal, or undetermined. The numbers of MS4 outfalls in each category are shown by HSA in Table 5-17, and the flow determinations are shown for the MS4 outfalls in Figure 5-7. Per the 2013 Permit, flow is defined as the presence of flowing, ponded or pooled water, and persistent flow is defined as the presence of flowing, pooled, or ponded water more than 72 hours after a measureable rainfall event of 0.1 inch or greater during three consecutive monitoring and/or inspection events. All other flowing, pooled, or ponded water is considered transient. For this assessment, MS4 outfalls with flowing, ponded or pooled water observed during the three most recent visits were identified as having persistent flow. Sites were identified as having transient flow if they were dry during one or two of three visits or, for those sites with only two visits, one of two visits. Outfalls considered undetermined were of two categories: (1) sites with two visits that had flowing, ponded or pooled water and no historical data, and therefore required additional visits to make a determination as to whether flow is transient or persistent, or (2) sites with only one visit and no historical data. Dry site categories included those dry for the last three or more consecutive visits, or dry for the last two consecutive visits if only two observations were available. During the 2013-2014 monitoring year, the County of San Diego identified four outfalls in the Upper Ysidora HSA as persistent and one outfall as dry and in the Vallecitos HSA, all five monitored outfalls were identified as dry (2 visits) (WESTON, 2015). As shown in Table 5-17, all major outfalls in the Santa Margarita River WMA have now been visited frequently enough to be identified as persistent, transient, or dry (≥3 visits).

Table 5-17. Transitional Dry Weather MS4 Outfall Flow Determinations

Copermittee	HSA	Persistent	Transient	Dry (≥3 visits)	Grand Total
County of San Diego	902.13	3	1	1	5
	902.23	0	0	5	5
GRAND TOTAL		**3**	**1**	**6**	**10**

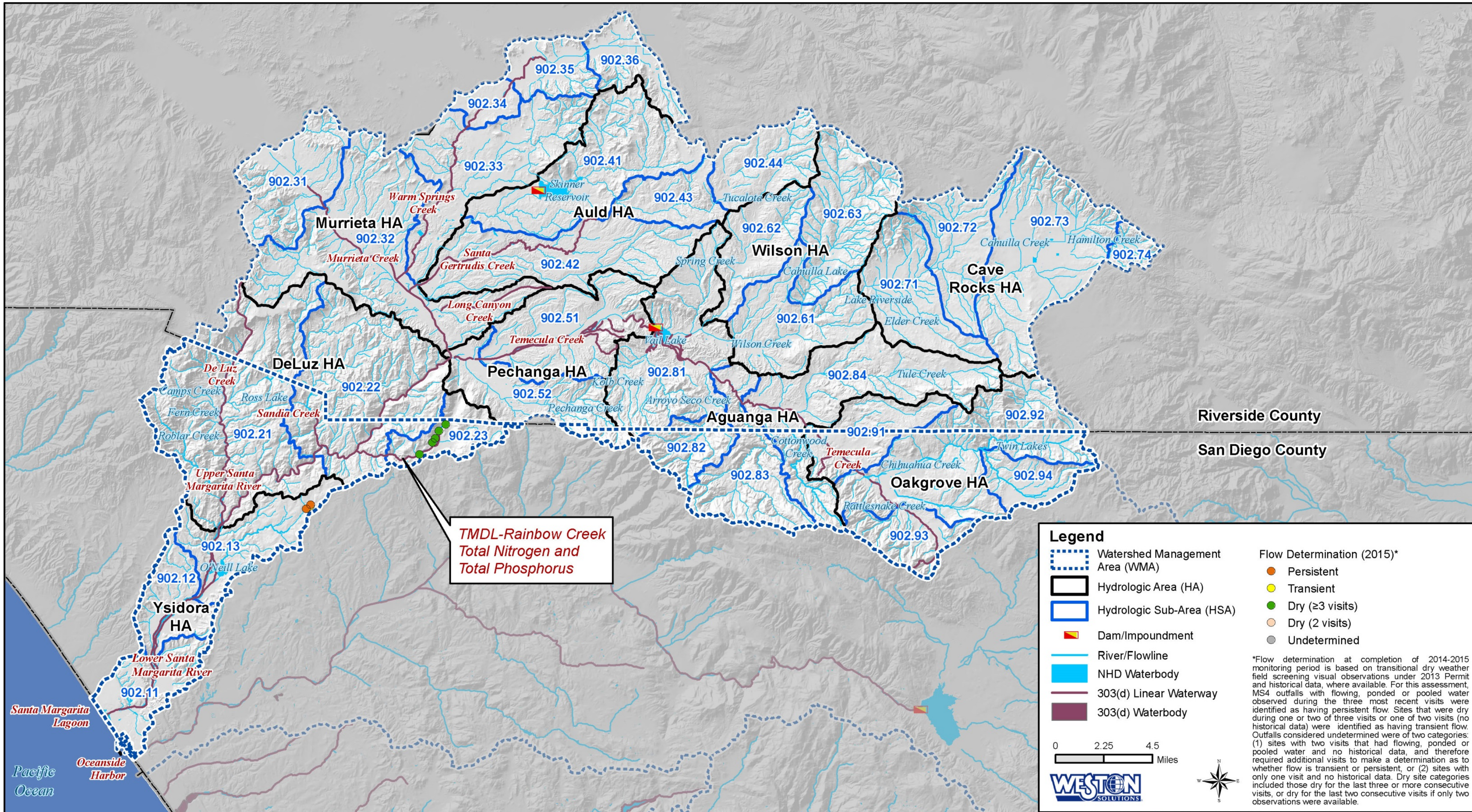


Figure 5-7. Transitional Dry Weather MS4 Outfall Field Screening Locations with Flow Determinations for the Santa Margarita River WMA

5.2.3 Transitional Dry Weather MS4 Outfall Discharge Assessments

In accordance with the 2013 Permit, assessment of the transitional dry weather MS4 outfall field screening monitoring includes the following:

- Identification of known and suspected controllable sources (e.g. facilities, areas, land uses, pollutant generating activities) of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area;
- Identification of sources of transient and persistent flows within the Copermittee's jurisdiction in the Watershed Management Area that have been reduced or eliminated; and
- Identification of modifications to the field screening monitoring locations and frequencies for the MS4 outfalls in its inventory necessary to identify and eliminate sources of persistent flow non-storm water discharges.

During transitional dry weather MS4 outfall field screening, the County of San Diego did not identify any controllable sources of persistent or transient flow in the Santa Margarita River WMA. In the four cases where flow was observed but the source was not directly observed or otherwise definitively identified, the County of San Diego identified irrigation runoff as a potential or suspected controllable source. The County also identified groundwater seepage as a suspected uncontrollable source at three of the sites.

During the majority of the 2014-2015 monitoring year, Copermittees continued to implement IC/ID investigations and non-storm water discharge prohibitions in accordance with Provision E (second paragraph) of the 2007 Permit and Provision E.1.b of the 2013 Permit. During this time, Copermittees worked with water districts to address irrigation runoff through water conservation programs, consisting of outreach and enforcement, typically through drought ordinances or other prohibitions of wasting water, where necessary. With the adoption of the new Jurisdictional Runoff Management Programs (JRMP) toward the end of the 2014-2015 fiscal year, Copermittees also established legal authority to prohibit irrigation runoff as an illicit discharge. In accordance with updated JRMPs, Copermittees are implementing programs to eliminate irrigation runoff. Because the fiscal year ends June 30, while the monitoring year ends September 30, the irrigation runoff prohibition was in effect for a limited portion of the 2014-2015 monitoring year for most Copermittees. The 2015-2016 monitoring year will be the first monitoring year in which an irrigation runoff prohibition was in place for the entire year.

5.2.4 Transitional Wet Weather MS4 Outfall Discharge Monitoring

Transitional wet weather MS4 outfall discharge monitoring was conducted at two locations in the Santa Margarita River WMA. Both outfalls were within the Upper Ysidora HSA (902.13) and were unchanged since the first transitional monitoring year. Monitoring locations are shown on Figure 4-2 in Section 4.7.4. Sampling was conducted at MS4-SMR-1 on November 1, 2014 and at MS4-SMR-2 on December 2, 2014. The 2013 Permit transitional MS4 monitoring requirement that at least 10% of samples be collected during the first wet weather event of the season, including one station within each WMA, was met. Rainfall statistics for the monitored event at each outfall are presented in Table 5-18. Analytical results are summarized in Table 5-19. Constituents monitored included general and physical chemical constituents, bacteriological indicators, nutrients, total and dissolved metals, and the organophosphorus pesticide chlorpyrifos. Transitional wet weather MS4 flow data are presented in Appendix K.

Table 5-18. 2014-2015 Rainfall and Runoff Statistics for Monitored Wet Weather MS4 Outfall Discharge Monitoring Events for the Santa Margarita River WMA

Date	Site	Total Rain (in)	Duration (hours)	Intensity (in/hour)	Antecedent Dry Days	Event Volume (cf)	Peak Flow (cfs)
11/1/2014	MS4-SMR-1	0.49	3.76	0.13	71	429,066	88.3
12/2/2014	MS4-SMR-2	0.28	6.28	0.04	29	10,356	2.4

in – inches cf – cubic feet cfs – cubic feet per second

At the outfalls sampled in the Santa Margarita River WMA, total and dissolved metals concentrations were generally low. Chlorpyrifos concentrations were also low (at MS4-SMR-2) or below the detection limit (at MS4-SMR-1). Indicator bacteria concentrations were elevated, and higher at MS4-SMR-1 for fecal and total coliform and at MS4-SMR-2 for *Enterococcus*. Nutrient concentrations were also generally higher at MS4-SMR-1 than MS4-SMR-2.

Table 5-19. 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Monitoring Analytical Results for the Santa Margarita River WMA

Analyte	Units	MS4-SMR-1 (902.13)	MS4-SMR-2 (902.13)
		11/1/2014	12/2/2014
Physical Chemistry			
Dissolved Oxygen	mg/L	9.6	9.41
pH	pH units	7.76	7.63
Salinity	PPT	0.08	0.02
Specific Conductivity	µS/cm	165	55
Temperature	Celsius	15.01	16.41
Turbidity	NTU	68.6	128.4
Bacteriological			
Enterococcus	MPN/100 mL	30,000	160,000
Fecal Coliform	MPN/100 mL	50,000	30,000
Total Coliform	MPN/100 mL	220,000	160,000
General Chemistry			
Ammonia as N	mg/L	0.67	0.69
Dissolved Organic Carbon	mg/L	33	26
Nitrate as N	mg/L	1.7	1.1
Nitrite as N	mg/L	0.056J	0.068J
Orthophosphate	mg/L	0.48	0.46
Sulfate	mg/L	47	17
Surfactants (MBAS)	mg/L	0.065	0.56
Total Dissolved Solids	mg/L	310	130
Total Hardness	mg/L	165	56.4
Total Kjeldahl Nitrogen	mg/L	6.6	3.7
Total Organic Carbon	mg/L	38	39

Table 5-19. 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Monitoring Analytical Results for the Santa Margarita River WMA

Analyte	Units	MS4-SMR-1 (902.13)	MS4-SMR-2 (902.13)
		11/1/2014	12/2/2014
Total Phosphorus	mg/L	1.7	0.74
Total Suspended Solids	mg/L	1200	110
Total Metals			
Arsenic	mg/L	0.0079	0.002
Cadmium	mg/L	0.00094	0.00024
Chromium	mg/L	0.022	0.0048
Copper	mg/L	0.1	0.041
Iron	mg/L	68	5.1
Lead	mg/L	0.054	0.01
Manganese	mg/L	1.2	0.12
Nickel	mg/L	0.019	0.0076
Selenium	mg/L	0.0015	0.00059
Thallium	mg/L	0.0007	0.000063J
Zinc	mg/L	0.59	0.26
Dissolved Metals			
Arsenic	mg/L	0.0012	0.0014
Cadmium	mg/L	0.000040J	0.000036J
Chromium	mg/L	0.00054	0.0012
Copper	mg/L	0.0099	0.0066
Iron	mg/L	0.18	0.63
Lead	mg/L	0.00038	0.00053
Manganese	mg/L	0.36	0.079
Nickel	mg/L	0.005	0.0047
Selenium	mg/L	0.00022J	0.00021J
Thallium	mg/L	<0.00020	<0.00020
Zinc	mg/L	0.05	0.041
Organophosphorus Pesticides			
Chlorpyrifos	µg/L	<0.010	0.015

< - Results are less than the reporting limit.
J - Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

5.2.5 Transitional Wet Weather MS4 Outfall Discharge Assessment

This section covers the assessment required for the data collected under the transitional wet weather MS4 outfall discharge monitoring program presented in Section 5.2.4. In accordance with Provision D.4.b.(2)(b) of the 2013 Permit, the Copermittees must analyze the monitoring data, and utilize a watershed model or other method to calculate or estimate the following for each monitoring year:

> *(b) Based on the transitional wet weather MS4 outfall discharge monitoring required pursuant to Provision D.2.a.(3) the Copermittees must assess and report the following:*

(i) *The Copermittees must analyze the monitoring data collected pursuant to Provision D.2.a.(3), and utilize a watershed model or other method, to calculate or estimate the following for each monitoring year:*

[a] The average storm water runoff coefficient for each land use type within the Watershed Management Area;
[b] The volume of storm water and pollutant loads discharged from each of the Copermittee's monitored MS4 outfalls in its jurisdiction to receiving waters within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch;
[c] The total flow volume and pollutant loadings discharged from the Copermittee's jurisdiction within the Watershed Management Area over the course of the wet season, extrapolated from the data produced from the monitored MS4 outfalls; and
[d] The percent contribution of storm water volumes and pollutant loads discharged from each land use type within each hydrologic subarea with a major MS4 outfall to receiving waters or within each major MS4 outfall to receiving waters in the Copermittee's jurisdiction within the Watershed Management Area for each storm event with measurable rainfall greater than 0.1 inch.

(ii) *Identify modifications to the wet weather MS4 outfall discharge monitoring locations and frequencies necessary to identify pollutants in storm water discharges from the MS4s in the Watershed Management Area pursuant to Provision D.2.c.(1)* (RWQCB, 2013).

Along with the results, this section provides a description of the general approach used to address the assessment requirements including the calculation of runoff coefficients, runoff volumes, and pollutant loads. As more data are collected and incorporated into the assessment, runoff coefficients and constituent concentrations will be increasingly representative of actual conditions. These methods are described in greater detail in the Transitional Wet Weather MS4 Monitoring Workplan (Appendix B). Detailed results are presented in Appendix L.

5.2.5.1 Provision D.4.b.(2)(b)(i)[a]

The average storm water runoff coefficients (Runoff "C") for the land use types within the WMA were calculated based on the data collected through monitoring MS4 outfalls within the WMA during both the 2013-2014 and 2014-2015 wet weather seasons, building on the data collected during the first transitional monitoring year (2013-2014). These flow monitoring results were combined with measured rainfall data and outfall drainage area hydrologic parameters (land use types and area) to determine WMA average land use Runoff "C" values. The monitored outfall drainage areas with corresponding land uses are shown in Figure 4-2, and the quantity (area and percentage) of each land use type by HSA is presented in Table 4-10.

In order to calculate the average Runoff "C" for each land use type within the WMA, the first step was to calculate the Runoff "C" value for each land use type within the drainage area to each monitored MS4 outfall. The Agriculture and Open Space land use types were also subdivided based on the hydrologic soil type (e.g., soil type A, B, C, or D). A comparison between the measured Runoff "C" (obtained from monitoring) and typical Runoff "C" associated with various land use types was performed to estimate the outfall land use Runoff "C" values. The measured Runoff "C" value for each outfall was calculated based on measured storm water volume, measured rainfall, and drainage area acreage, and the results are shown in Table 5-20. Typical Runoff "C" values for each land use assessed were obtained from the *San Diego County Hydrology Manual* (County of San Diego Dept. of Public Works Flood Control Section, 2003) (HM). A composite outfall HM Runoff "C" value was calculated for each monitored MS4 outfall drainage area based on the HM land use Runoff "C" values and the associated outfall drainage area land use quantities. This outfall HM Runoff "C" value was then compared to the outfall measured Runoff "C" value to calculate a correction factor for each monitored MS4 outfall. The outfall-specific correction factor was applied to the individual HM land use Runoff "C" values in order to calculate the various specific land use Runoff "C" values for the applicable monitored outfall.

The land use Runoff "C" values for outfalls monitored within the WMA during both the 2013-2014 and 2014-2015 monitoring years were used to calculate the WMA individual land use Runoff "C" values. This was accomplished for each land use type assessed by calculating an area-weighted average of the monitored MS4 outfall land use Runoff "C" values. The WMA average Runoff "C" values were used for WMA and HSA level storm water volume calculations for each jurisdiction. The WMA average Calc. Runoff "C" values that address assessment requirement D.4.b.(2)(b)(i)[a] are provided in Table 5-21 as Calc. Runoff "C" along with the HM Runoff "C" for comparison. The WMA-calculated Runoff "C" values are also shown in Appendix L as these values are key parameters used in calculating the results shown in that appendix.

For additional information related to methods, including applicable equations, see the Transitional Wet Weather MS4 Monitoring Workplan, provided in Appendix B.

5.2.5.2 Provision D.4.b.(2)(b)(i)[b]

For each storm event with measurable rainfall of greater than 0.1 inch, the volume of storm water runoff and pollutant load discharged to a receiving water from each of the monitored MS4 outfalls within a Copermittee's jurisdiction was estimated. For each storm greater than 0.1 inch, the average of the measured Runoff "C" values for the applicable monitored MS4 outfall was used to compute volume, and the event volumes were summed to obtain the wet season storm water volume. Pollutant loads were calculated based on 2014-2015 chemistry results and 2014-2015 calculated wet season storm water volume for each outfall. The wet season annual storm water runoff volumes and pollutant loads for the monitored MS4 outfalls are shown in Table 5-20.

For additional information related to methods, including applicable equations, see the Transitional Wet Weather MS4 Monitoring Workplan, provided in Appendix B.

Table 5-20. 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Calculated Annual Pollutant Loads for Monitored Outfalls in the Santa Margarita River WMA

Analyte	Units	MS4-SMR-1 (902.13)	MS4-SMR-2 (902.13)
Area	ac	697.4	35.5
Qualifying Measured Rainfall	in	7.98	7.98
Measured Outfall Runoff "C"		0.216	0.198
Annual Volume	cf	4,363,603	203,612
Bacteriological			
Enterococcus	MPN	3.71E+13	9.23E+12
Fecal Coliform	MPN	6.18E+13	1.73E+12
Total Coliform	MPN	2.72E+14	9.23E+12
General Chemistry			
Ammonia as N[1]	lbs	182.5	8.8
Dissolved Organic Carbon	lbs	8,989.5	330.5
Nitrate as N	lbs	463.1	14.0
Nitrite as N	lbs	15.3	0.9
Orthophosphate	lbs	130.8	5.8
Sulfate	lbs	12,803.2	216.1
Surfactants (MBAS)	lbs	17.7	7.1
Total Dissolved Solids	lbs	84,446.4	1,652.4
Total Hardness	lbs	44,947.3	716.9
Total Kjeldahl Nitrogen	lbs	1,797.9	47.0
Total Organic Carbon	lbs	10,351.5	495.7
Total Phosphorus	lbs	463.1	9.4
Total Suspended Solids	lbs	326,889.3	1,398.2
Total Metals			
Arsenic	lbs	2.1520	0.0254
Cadmium	lbs	0.2561	0.0031
Chromium	lbs	5.9930	0.0610
Copper	lbs	27.2408	0.5211
Iron	lbs	18,523.725	64.826
Lead	lbs	14.7100	0.1271
Manganese	lbs	326.889	1.525
Nickel	lbs	5.176	0.0966
Selenium	lbs	0.4086	0.0075
Thallium[1]	lbs	0.1907	0.0008
Zinc	lbs	160.721	3.305
Dissolved Metals			
Arsenic	lbs	0.3269	0.0178
Cadmium[1]	lbs	0.0109	0.0005
Chromium	lbs	0.1471	0.0153
Copper	lbs	2.697	0.0839
Iron	lbs	49.033	8.0079
Lead	lbs	0.1035	0.0067
Manganese	lbs	98.067	1.0042
Nickel	lbs	1.362	0.0597

Table 5-20. 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Calculated Annual Pollutant Loads for Monitored Outfalls in the Santa Margarita River WMA

Analyte	Units	MS4-SMR-1 (902.13)	MS4-SMR-2 (902.13)
Selenium	lbs	0.0599	0.0027
Thallium[1]	lbs	0.0272	0.0013
Zinc	lbs	13.620	0.5211
Organophosphorus Pesticides[2]			
Chlorpyrifos	lbs	ND	ND

ac – acres in – inches cf – cubic feet MPN – most probable number lbs – pounds ND – not detected

Note 1: Where chemistry results were less than the RL, for load calculations purposes half the RL value was used for this constituent. Please refer to the 2014-2015 Transitional Wet Weather MS4 Outfall Discharge Monitoring Results Table for ND results.

Note 2: Where chemistry results were less than the RL, load calculation are considered zero and listed as ND for applicable organophosphorus pesticides.

5.2.5.3 Provision D.4.b.(2)(b)(i)[c]

In order to evaluate the total flow volume from a Copermittee's jurisdiction within the WMA over the course of the wet season, data were extrapolated from monitored outfalls. The computed WMA land use Runoff "C" value (Calc. Runoff "C"), calculated as previously discussed, was used to calculate the WMA total volume of runoff for each rain event greater than 0.1 inch for each land use type. The total jurisdictional WMA volume was determined by the summation of the calculated volumes for each land use type. The total jurisdictional WMA storm water volume for each Copermittee is shown in Appendix L.

To evaluate the total pollutant loads from a Copermittee's jurisdiction within the WMA over the course of the wet season, calculations similar to those used to determine the land use Runoff "C" values were performed in order to determine land use type specific EMC values for the monitored outfalls and then extrapolate those monitored outfall results to calculate WMA EMC values. First, published typical EMCs for the land use types assessed were obtained, and for each outfall a calculated EMC (or comingled EMC) was determined for each constituent based on the typical land use EMCs and a weighted average of the outfall land uses areas and land use Runoff "C" values. Next, the calculated EMC (based on typical values) was compared to the measured EMC, and a correction factor was calculated for each constituent. Then, the outfall constituent specific correction factor was applied to each land use typical EMC in order to calculate the outfall specific land use EMC values. Finally, the specific land use EMC values for outfalls monitored within the WMA during both the 2013-2014 and 2014-2015 monitoring years were extrapolated to calculate the WMA individual land use EMC values by calculating the area-weighted and Runoff "C"-weighted average of the monitored outfall specific land use EMC values. These WMA specific land use EMC values, which were used for WMA and HSA level storm water pollutant load calculations for each jurisdiction, are provided in Table 5-21.

Pollutant loads for each land use type were calculated based on the total 2014-2015 wet season WMA land use specific runoff volumes and WMA individual land use EMC values, which were based upon information from the 2013-2014 and 2014-2015 monitoring years, as described above. These loads were summed to determine the total WMA pollutant loading for a jurisdiction. These results are shown in Appendix L. Note that the pollutant loads from each

Copermittee were estimated based on the WMA area of that jurisdiction excluding federal, state, and tribal lands. Copermittee land area within the HSAs that do not have a major outfall are included in the total WMA pollutant loading estimates for Provision D.4.b.(2)(b)(i)[c]. However, these HSAs are excluded in the assessment provided for Provision D.4.b.(2)(b)(i)[d] as described below.

It should be noted that the Runoff “C” values typically vary fairly widely depending on the storm size with lower Runoff “C” values associated with smaller storm sizes. The pre-storm antecedent moisture condition may also significantly affect the measured Runoff “C”. This is an inherent error when using Runoff “C” values to estimate runoff volumes. The methods employed for this assessment used an average of measured Runoff “C” values collected over two monitoring seasons, where applicable, in order to potentially reduce these errors (i.e., one monitored event may have been large while the other small). Therefore, the annual volumes used by this assessment are best estimates based on data from measured events and may not account for all variation in watershed hydrologic parameters.

For additional information related to methods, including applicable equations, see the Transitional Wet Weather MS4 Monitoring Workplan, provided in Appendix B. One deviation from the referenced Work Plan is that typical EMC literature values were obtained from the Appendix 3C of the *San Diego River WMA Water Quality Improvement Plan* (Larry Walker et al., 2015).

Table 5-21. Land Use EMC Summary Based on Compilation of 2013-2015 MS4 Monitored Outfalls within the Santa Margarita River WMA

Land Use Type	Agriculture -A[1,2]	Agriculture -B[2]	Agriculture -C[2,3]	Agriculture -D[2]	Commercial	Educational	Industrial	Mixed Use[4]	Multi-Family Residential	Open Space-A[2,5]	Open Space-B[2]	Open Space-C[2]	Open Space-D[2]	Rural-Residential	Single-Family Residential	Transpor-tation	Weighted Average EMC
2013-2014 Total Monitored Outfall Area (acres)	0.0	6.2	0.0	6.0	102.5	28.9	51.6	0.0	42.8	0.0	32.0	3.4	14.1	41.0	303.5	101.0	733.0
2014-2015 Total Monitored Outfall Area (acres)	0.0	6.2	0.0	6.0	102.5	28.9	51.6	0.0	42.8	0.0	32.0	3.4	14.1	41.0	303.5	101.0	733.0
H.M. Runoff "C"	0.2	0.25	0.3	0.35	0.82	0.58	0.87	0.66	0.6	0.2	0.25	0.3	0.35	0.41	0.49	0.71	0.582
Calc. Runoff "C"	0.093	0.093	0.130	0.130	0.304	0.211	0.323	0.263	0.223	0.093	0.093	0.112	0.130	0.153	0.181	0.262	0.215
Bacteriological (MPN/100 mL)																	
Enterococcus	7.91E+04	7.91E+04	7.91E+04	7.91E+04	7.75E+04	3.54E+04	4.14E+04	4.65E+04	1.55E+04	3.39E+03	3.39E+03	3.15E+03	3.19E+03	1.40E+04	5.30E+04	1.03E+04	4.35E+04
Fecal Coliform	1.71E+05	1.71E+05	1.71E+05	1.71E+05	1.48E+05	8.82E+04	9.10E+04	9.07E+04	3.34E+04	9.60E+03	9.60E+03	9.29E+03	9.40E+03	3.55E+04	9.59E+04	2.71E+04	8.55E+04
Total Coliform	5.90E+05	5.90E+05	5.90E+05	5.90E+05	5.01E+05	1.82E+05	2.97E+05	3.08E+05	1.15E+05	2.42E+04	2.42E+04	2.42E+04	2.45E+04	1.06E+05	3.30E+05	6.65E+04	2.81E+05
General Chemistry (mg/L)																	
Ammonia as N	3.71	3.71	3.72	3.72	2.68	0.81	1.34	1.90	1.13	0.24	0.24	0.25	0.25	0.51	1.08	0.80	1.341
Dissolved Organic Carbon	99.38	99.38	99.52	99.52	83.71	31.71	51.24	51.59	19.46	4.69	4.69	4.76	4.81	19.32	54.48	12.45	47.22
Nitrate as N	62.67	62.67	62.78	62.78	0.99	1.04	1.58	1.87	2.75	2.11	2.11	2.13	2.14	2.29	2.17	1.32	2.25
Nitrite as N	2.221	2.221	2.226	2.226	0.036	0.039	0.056	0.067	0.098	0.076	0.076	0.075	0.076	0.080	0.077	0.048	0.080
Orthophosphate	16.905	16.905	16.933	16.933	0.270	0.298	0.428	0.507	0.743	0.575	0.575	0.574	0.576	0.625	0.605	0.363	0.615
Sulfate	1,981.77	1,981.77	1,986.25	1,986.25	31.26	32.41	49.94	59.18	87.11	66.63	66.63	67.17	67.56	70.54	65.07	41.44	69.61
Surfactants (MBAS)	22.4209	22.4209	22.5334	22.5334	0.3582	0.3875	0.5673	0.6726	0.9871	0.7595	0.7595	0.7568	0.7664	0.6612	0.5509	0.4775	0.7213
Total Dissolved Solids	10,762.6	10,762.6	10,779.6	10,779.6	169.7	176.2	271.2	321.3	472.9	361.9	361.9	365.2	366.6	399.2	378.2	225.2	387.3
Total Hardness	5,024.6	5,024.6	5,029.9	5,029.9	79.1	81.9	126.5	149.9	220.7	168.9	168.9	170.6	171.1	192.3	185.1	105.0	183.9
Total Kjeldahl Nitrogen	21.16	21.16	21.17	21.17	9.75	4.45	8.25	7.48	5.20	2.73	2.73	2.77	2.78	7.10	7.44	5.13	7.29
Total Organic Carbon	108.17	108.17	108.31	108.31	91.78	32.37	55.21	56.48	21.18	4.77	4.77	4.83	4.89	20.29	60.13	12.76	51.50
Total Phosphorus	10.93	10.93	10.93	10.93	1.08	1.25	1.42	0.92	0.75	0.39	0.39	0.39	0.39	4.30	1.50	2.15	1.62
Total Suspended Solids	4,560.7	4,560.7	4,555.9	4,555.9	297.7	395.0	991.8	239.9	182.0	970.1	970.1	990.4	987.8	11,049.0	548.0	338.8	947.1
Total Metals (mg/L)																	
Arsenic	0.0164	0.0164	0.0164	0.0164	0.0075	0.0033	0.0108	0.0050	0.0024	0.0016	0.0016	0.0016	0.0016	0.0108	0.0068	0.0048	0.0067
Cadmium	0.0020	0.0020	0.0020	0.0020	0.0009	0.0004	0.0013	0.0006	0.0003	0.0002	0.0002	0.0002	0.0002	0.0013	0.0008	0.0006	0.0008
Chromium	0.0447	0.0447	0.0446	0.0446	0.0205	0.0091	0.0296	0.0136	0.0067	0.0044	0.0044	0.0044	0.0044	0.0299	0.0185	0.0130	0.0183
Copper	0.2801	0.2801	0.2802	0.2802	0.1356	0.0354	0.1368	0.0847	0.0339	0.0293	0.0293	0.0297	0.0297	0.0275	0.0663	0.1412	0.0959
Iron	130.0546	130.0546	129.8993	129.8993	59.7178	26.2017	87.0878	39.5416	19.3655	12.6111	12.6111	12.9425	12.9039	90.6190	53.5734	37.3186	53.2574
Lead	0.1088	0.1088	0.1087	0.1087	0.0501	0.0222	0.0723	0.0331	0.0162	0.0106	0.0106	0.0108	0.0108	0.0733	0.0450	0.0318	0.0446
Manganese	2.5572	2.5572	2.5559	2.5559	1.1630	0.4964	1.6799	0.7720	0.3809	0.2487	0.2487	0.2542	0.2539	1.6620	1.0451	0.7395	1.0342
Nickel	0.0484	0.0484	0.0484	0.0484	0.0218	0.0092	0.0309	0.0145	0.0072	0.0047	0.0047	0.0048	0.0048	0.0282	0.0196	0.0142	0.0193
Selenium	0.0034	0.0034	0.0034	0.0034	0.0016	0.0007	0.0022	0.0010	0.0005	0.0003	0.0003	0.0003	0.0003	0.0021	0.0014	0.0010	0.0014
Thallium	0.0013	0.0013	0.0013	0.0013	0.0006	0.0003	0.0009	0.0004	0.0002	0.0001	0.0001	0.0001	0.0001	0.0009	0.0006	0.0004	0.0006
Zinc	0.6337	0.6337	0.6337	0.6337	0.9702	0.3373	1.0384	0.6294	0.2885	0.0599	0.0599	0.0606	0.0607	0.0954	0.3043	0.6544	0.5589
Dissolved Metals (mg/L)																	
Arsenic	0.0021	0.0021	0.0021	0.0021	0.0014	0.0007	0.0018	0.0010	0.0007	0.0001	0.0001	0.0001	0.0001	0.0004	0.0010	0.0029	0.0014
Cadmium	0.000090	0.000090	0.000090	0.000090	0.000057	0.000033	0.000073	0.000044	0.000030	0.000002	0.000002	0.000002	0.000002	0.000018	0.000041	0.000127	0.000059
Chromium	0.00141	0.00141	0.00141	0.00141	0.00089	0.00055	0.00112	0.00068	0.00046	0.00004	0.00004	0.00004	0.00004	0.00029	0.00065	0.00202	0.00093
Copper	0.0282	0.0282	0.0282	0.0282	0.0172	0.0106	0.0220	0.0132	0.0093	0.0007	0.0007	0.0007	0.0008	0.0059	0.0125	0.0390	0.0181
Iron	0.3282	0.3282	0.3286	0.3286	0.2278	0.1264	0.2808	0.1679	0.1080	0.0090	0.0090	0.0087	0.0088	0.0658	0.1632	0.5018	0.2329
Lead	0.00107	0.00107	0.00107	0.00107	0.00066	0.00040	0.00084	0.00051	0.00035	0.00003	0.00003	0.00003	0.00003	0.00022	0.00048	0.00149	0.00069
Manganese	0.5250	0.5250	0.5251	0.5251	0.3533	0.1372	0.4614	0.2630	0.1727	0.0137	0.0137	0.0140	0.0140	0.1023	0.2455	0.7123	0.3484
Nickel	0.0121	0.0121	0.0121	0.0121	0.0075	0.0043	0.0096	0.0058	0.0040	0.0003	0.0003	0.0003	0.0003	0.0025	0.0054	0.0167	0.0078

Table 5-21. Land Use EMC Summary Based on Compilation of 2013-2015 MS4 Monitored Outfalls within the Santa Margarita River WMA

Land Use Type	Agriculture -A[1,2]	Agriculture -B[2]	Agriculture -C[2,3]	Agriculture -D[2]	Commercial	Educational	Industrial	Mixed Use[4]	Multi-Family Residential	Open Space-A[2,5]	Open Space-B[2]	Open Space-C[2]	Open Space-D[2]	Rural-Residential	Single-Family Residential	Transpor-tation	Weighted Average EMC
Selenium	0.00056	0.00056	0.00056	0.00056	0.00035	0.00021	0.00045	0.00027	0.00019	0.00001	0.00001	0.00001	0.00002	0.00012	0.00025	0.00079	0.00037
Thallium	0.000145	0.000145	0.000145	0.000145	0.000101	0.000045	0.000129	0.000074	0.000048	0.000004	0.000004	0.000004	0.000004	0.000028	0.000070	0.000208	0.000100
Zinc	0.0322	0.0322	0.0323	0.0323	0.1423	0.0536	0.2737	0.1023	0.0623	0.0222	0.0222	0.0224	0.0226	0.0184	0.0283	0.1715	0.1032
Organophosphorus Pesticides (µg/L)																	
Chlorpyrifos	0.00000	0.00000	0.00000	0.00000	0.00027	0.00203	0.00026	0.00014	0.00000	0.00064	0.00064	0.00000	0.00000	0.00000	0.00063	0.00056	0.00048

Note 1: Runoff "C" and EMC values based on Santa Margarita River WMA monitored outfalls data for Agriculture-B land use type. A,B,C, and D refer to hydrologic soil type.

Note 2: Agriculture and Open Space land use types were divided into subgroups based on hydrologic soil type. See http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ny/soils/?cid=nrcs144p2_027279 for more information on hydrologic soil types.

Note 3: Runoff "C" and EMC values based on Santa Margarita River WMA monitored outfalls data for Agriculture-D land use type.

Note 4: Runoff "C" and EMC values based on Santa Margarita River WMA monitored outfalls data for Commercial and Multi-Family Residential land use types (averaged).

Note 5: Runoff "C" and EMC values based on Santa Margarita River WMA monitored outfalls data for Open Space-B land use type.

5.2.5.4 Provision D.4.b.(2)(b)(i)[d]

For each storm event with measurable rainfall of greater than 0.1 inch, the percent contribution of storm water volumes and pollutant loads discharged from each land use type within each HSA with a major MS4 outfall to receiving waters or within each major MS4 outfall to receiving waters in the Copermittee's jurisdiction was evaluated. A GIS-based analysis was performed to determine the number of major MS4 outfalls for each jurisdiction within each HSA in which the jurisdiction resides. Table 5-22 presents the land acres (excluding federal, state, and tribal lands) and number of major MS4 outfalls for each Copermittee within each HSA. Several Copermittees have land acres within an HSA for which they have no major MS4 outfall. The total land acres of the jurisdiction have been compared to the jurisdiction's total acreage for the individual HSAs with major MS4 outfalls to provide a percentage of acres based on HSAs with major MS4 outfalls.

Similar to the approach described to evaluate the total flow volume and pollutant loading from a Copermittee's jurisdiction within the WMA over the course of the wet season, MS4 pollutant loading for each of the land use types was calculated for each HSA within the WMA using WMA runoff coefficient values and EMC values. For those HSAs in which a Copermittee has a major MS4 outfall, the quantities of storm water volumes and pollutant loads discharged from each land use type are shown by Copermittee along with the percent contribution, in comparison with the applicable jurisdiction WMA values, of storm water volume and pollutant loads as required by Provision D.4.b.(2)(b)(i)[d]. These result tables are provided in Appendix L.

Table 5-22. Number of Major MS4 Outfalls by Copermittee and HSA

WMA	HSA	County of San Diego	
		Major MS4 Outfalls	Land Acres
SANTA MARGARITA RIVER	902.11	0	57.4
	902.12	0	-
	902.13	5	1,241.5
	902.21	0	13,244.7
	902.22	0	8,533.3
	902.23	5	4,162.3
	902.52	0	60.7
	902.81	0	-
	902.82	0	395.2
	902.83	0	1,166.2
	902.84	0	272.9
	902.91	0	2,956.4
	902.92	0	3,669.3
	902.93	0	2,263.4
	902.94	0	2,512.3
Total Land Acres by Jurisdiction			40,535.6
Acres based on HSAs with Major MS4 Outfalls			5,403.8
%Acres based on HSAs with Major MS4 Outfalls			13%

For additional information related to methods, including applicable equations, see the Transitional Wet Weather MS4 Monitoring Workplan, provided in Appendix B.

5.2.5.5 Provision D.4.b.(2)(b)(ii) - Stations Locations and Frequencies Assessment

The 2013 Permit allow the Copermittees to adjust their wet weather MS4 outfall discharge monitoring locations and frequencies as necessary, provided that the number of stations is at least that required by Provision D.2.a.(3)(a) and each station is monitored at least once annually. In compliance with Provision D.4.b.(2)(b)(ii), the wet weather MS4 outfall discharge monitoring locations and frequencies were evaluated in order to identify recommended modifications that may be considered for implementation in the future. The purpose of the identified recommendations is to improve the effectiveness of the MS4 monitoring and assessment program at meeting the intended permit goals, which is interpreted to be the collection of storm water data though wet weather monitoring that enables an accurate quantification of storm water volume and pollutant loads from the various individual land use types within the WMA. These recommendations should be considered, and where practical and feasible, be implemented in future MS4 wet weather monitoring.

As part of the evaluation of locations, a review of the collective land use data associated with monitored MS4 outfall drainage areas was conducted to determine if the WMA contains any categories of land use types not represented within the monitored MS4 outfall drainage areas. The drainage areas associated with the wet weather MS4 outfall discharge monitoring stations are presented in Figure 4-2 and the acreage and percentages of the various land uses characterizing them are summarized in Table 4-10 (Section 4.7.4.2). A review of this data was conducted after the 2013-2014 monitoring year. The results and recommendations were presented in the first TMAR submitted under the 2013 Permit (WESTON, 2015) and remain unchanged since the monitored wet weather MS4 outfalls were the same during the second transitional monitoring year. It was determined that the distribution of land use types within the drainage areas associated with the monitored outfalls closely resembles that of the WMA, although it would be useful to monitor a higher percentage of Agricultural and Rural-Residential land use types, if feasible. A more detailed discussion is provided in the first TMAR (WESTON, 2015).

The evaluation of monitoring frequency included a review of the monitoring data to determine how well the data from each outfall single storm event monitored represented the wet weather conditions on an annual basis. The 2014-2015 wet season (October through April) total precipitation, as measured by Fallbrook Alert station, was 7.58 inches, which is below the official (Lindbergh Field) average October to April rainfall of about 9.38 inches. The precipitation that did fall in the region generally occurred during rainfall events of less than an inch, with the exception of three larger (generally one to one and a half inches) events in portions of the County that occurred in December (two larger events) and March (one larger event). The storm events monitored in the Santa Margarita River WMA were small to average events with rainfall totaling approximately a quarter to a half inch during each event. However, monitoring of small to average events alone may not be representative of average wet season precipitation in the region. Therefore, it is recommended that for outfall locations where monitoring will be repeated in the future that, if possible, average (greater than 0.5 inches) to larger (greater than 1 inch) forecasted storm events be monitored at least once during the 2013 Permit period. This is more applicable to locations such as MS4-SMR-1 where measured Runoff “C” values were less than the Hydrology Manual calculated values, which are based on very large storm events. This is less applicable for sites that showed a good response to precipitation marked by higher measured Runoff "C" values (greater than 0.25). The distribution of storm sizes and frequencies for future monitoring should be proportional to runoff volumes associated with various storm event size based on an assessment of historic rain data (e.g., if the majority of the storm water volume discharged at a location is from storm events between 0.25 and 0.75 inches, criteria may include collecting the majority of data on storm events between 0.25 and 0.75 inches but may also include the collection of data, to lesser extent, during smaller and larger storms).

5.3 California Environmental Data Exchange Network Data Upload and Retrieval

Provision F.4.a.(6) of the 2013 Permit requires that monitoring data collected pursuant to Provision D (Monitoring and Assessment Program Requirements) must be uploaded to the California Environmental Data Exchange Network (CEDEN), a central location for finding and sharing information about California's waterbodies. CEDEN aggregates water quality, aquatic habitat, and wildlife health data and makes them accessible in downloadable forms at www.ceden.org.

Data in the CEDEN are searchable by date and by location, project, station, or parameter using the "Find Data" functionality of the CEDEN website. The data from the San Diego Region Copermittee Program can be retrieved by identifying the Program as "National Pollutant Discharge Elimination System (NPDES) Program" and Project as "San Diego Region NPDES", which is the parent Project name. Within this overall retrieval, the specific datasets described in this TMAR can be identified using the project names listed in Table 5-23. Data are limited to those parameters that are currently storable in CEDEN. Data collected during the 2014-2015 monitoring year will be available from CEDEN in 2016 in accordance with the 2013 Permit.

Table 5-23. Project Names for CEDEN Data Retrieval

Project Code	Project Name
MS4_DW_OFS_T	Dry Weather MS4 Outfall Field Screening
MS4_WW_OFM_T	Wet Weather MS4 Outfall Monitoring
NPDES_BA	NPDES Bioassessment
NPDES_RWM	NPDES Receiving Water Monitoring
PSSPM	Post-Storm Sediment Pyrethroid Monitoring

5.4 Regional Clearinghouse

In accordance with Provision F.4 of the 2013 Permit and in addition to the data uploaded to CEDEN, the Copermittees develop, update, and maintain an internet-based Regional Clearinghouse. The Regional Clearinghouse is available to the public and includes each WMA's WQIP (except the Santa Margarita River WMA), annual reports, Jurisdictional Runoff Management Program documents for each Copermittee, best management practice (BMP) design manuals for each Copermittee, special study results, and GIS data used to develop maps generated and maintained by the Copermittees for these documents. The Regional Clearinghouse also includes contact information for each Copermittee and for reporting non-stormwater and illicit discharges for each Copermittee, information regarding public participation in programs that may result in water quality improvements, regional monitoring program reports, and regional monitoring and assessment reports. For San Diego County watersheds, this Regional Clearinghouse is accessed at www.projectcleanwater.org.

6.0 DISCUSSION AND CONCLUSIONS

Data collected during the 2014-2015 monitoring year in the Santa Margarita River WMA are reported in this TMAR, the second under the transitional requirements of the 2013 Permit. Transitional monitoring will continue during the development of the WQIP for the Santa Margarita River WMA. Much of the same monitoring is expected to be included in the WQIP MAP, with tailoring to fit the program as justified.

During the 2014-2015 monitoring year, the Copermittees accomplished the following receiving water and urban runoff monitoring elements within the WMA in accordance with the transitional and long-term monitoring requirements of the 2013 Permit:

- Wet and dry weather receiving water monitoring at one MLS (LTMS) location.
- Post-storm synthetic pyrethroid sediment monitoring at one MLS (LTMS) location.
- Bioassessment monitoring at one MLS (LTMS) location and Reference Stations.
- Participation in the 2015 SMC Regional Monitoring Program.
- MS4 outfall discharge monitoring stations inventory refinement.
- Transitional dry weather MS4 outfall discharge field screening.
- Transitional wet weather MS4 outfall discharge monitoring.

2014-2015 Monitoring Year Data Assessments

In this second TMAR, similar to the first TMAR, receiving water monitoring data were assessed using existing water quality benchmarks developed under the 2007 Permit given that the WQIP and associated numeric goals for the Santa Margarita River WMA have not yet been developed. After the WQIP is developed and accepted, comparisons to numeric goals and assessments of critical beneficial uses in accordance with the WQIP can be accomplished, and these data can be considered in the adaptive management approach of the WQIP process.

Following the assessment methodology outlined in the first TMAR, three assessments that can be provided by this TMAR, prior to the completion and acceptance of the WQIP, include:

1. ***Evaluation of the status and trends of receiving water quality conditions in coastal waters; enclosed bays, harbors, estuaries, and lagoons; and streams during wet and dry weather.*** This was accomplished by conducting receiving water monitoring, comparing results to receiving water – water quality benchmarks, and a trend analysis. In addition, the SMC Regional Monitoring Program has been refined to address data gaps and continue to detect changes in conditions over time at trend sites. Receiving water data and trend analysis results were also evaluated in relation to water quality challenges in the WMA.

   The majority of constituents analyzed in receiving waters of the Santa Margarita River WMA during both wet and dry weather were below applicable benchmarks. The constituents most frequently measured above benchmarks were sulfate and TDS during dry weather, and fecal coliform, TDS, and total iron during wet weather. Considering that the exceedance rate for one year of monitoring data (three data points per constituent) provides a limited view of sampling results at a site, examining historical data (since

2008 for wet weather and since 2010 for dry weather) provides context for the most recent year's monitoring data results based on a larger sample size and period of record. The constituents measured above benchmarks during 2014-2015 at SMR-MLS-2 were generally measured above benchmarks historically (Section 5.1.1 (dry weather), Section 5.1.2 (wet weather), and Appendix F). One exception is turbidity values, which were below the benchmark during the 2014-2015 monitoring year but have a historical exceedance ratio of 60% during wet weather. While the exceedance rate for one year of monitoring data (three data points) provides limited information, a significant decreasing trend has been identified for turbidity during wet weather (Table 6-1).

Of the constituents measured above benchmarks at SMR-MLS-2 (LTMS), fecal coliform and nitrogen are included on the 303(d) List for the Santa Margarita River (where SMR-MLS-2 is located). The 303(d) List also includes toxicity in the Upper Santa Margarita River, and toxicity to *Selenastrum* growth was observed during one wet weather event. Several constituents included on the 303(d) List for the Santa Margarita River were measured below benchmarks at SMR-MLS-2 (LTMS) during the 2014-2015 monitoring year, including *Enterococcus* and phosphorus. Of note, dissolved phosphorus has been identified as a decreasing trend (Table 6-1).

Analyzing trends is another method for drawing meaningful conclusions from a larger data set as opposed to considering only one monitoring year of data. A summary of the statistically significant receiving water trends in relation to water quality challenges in the Santa Margarita River WMA is presented in Table 6-1 below. Trends for each constituent were assessed using three years of monitoring data for dry weather and four years for wet weather. No increasing trends were identified that are associated with water quality challenges. Phosphorus is included on the 303(d) List for the Upper and Lower Santa Margarita River segments, and dissolved phosphorus was identified as significantly decreasing during both dry and wet weather at SMR-MLS-2 (LTMS). Total and dissolved phosphorus concentrations were below benchmarks during dry and wet weather monitoring at SMR-MLS-2. Turbidity values, identified as significantly decreasing, had frequently been above the benchmark at this station prior to the 2014-2015 monitoring year. In addition to the trends shown in Table 6-1, a trend analysis of IBI scores was conducted for NPDES bioassessment stations, and no statistically significant trend for IBI was identified for SMR-MLS-2 (LTMS).

Table 6-1. Trends in Relation to Water Quality Challenges in the Santa Margarita River WMA

Station	Increasing	Decreasing
SMR-MLS-2 (LTMS)	**Dry (Three Years of Data)**	
	None	Biochemical Oxygen Demand, Dissolved Antimony, <u>Dissolved Phosphorus</u>
	Wet (Four Years of Data)	
	Conductivity, Dissolved Selenium, Surfactants (MBAS)	Ammonia as N, Biochemical Oxygen Demand, Dissolved Organic Carbon, <u>Dissolved Phosphorus</u>, Total Cadmium, Turbidity

<u>Underlined text</u> – constituent is included on the 303(d) List for a waterbody associated with the receiving water station.

SMC Regional Monitoring Program dry weather receiving water data indicated that chloride, sulfate, and total nitrogen were above benchmarks at the De Luz Creek location, and sulfate, nitrate + nitrite as N, total nitrogen, and total phosphorus were above benchmarks at the Rainbow Creek location. De Luz Creek is included on the 303(d) List for sulfate and nitrogen. Rainbow Creek is included for sulfate, and has a TMDL for total nitrogen and total phosphorus. Bioassessment data at the SMC locations indicated a Fair IBI score, Possibly Intact biotic integrity based on the CSCI, and Moderate physical habitat quality based on the CRAM at the De Luz Creek location, and a Very Poor IBI score, Very Likely Altered biotic integrity, and Low physical habitat quality at the Rainbow Creek location.

2. ***Evaluation of the MS4 outfall discharge field screening program results for dry weather, with a focus on identification of persistent and transient flows and sources of non-storm water discharges.*** With the addition of the 2014-2015 monitoring year's dry weather field screening data, Copermittees can more definitively identify outfalls with dry weather persistent and transient flows to receiving waters, and distinguish from outfalls that are consistently dry, for prioritization of efforts. In addition, further progress was made towards identifying known and suspected sources of flows, for prioritization of investigation and elimination. The associated assessment is provided in Section 5.2.3. Irrigation runoff was the most frequently identified source of non-storm water flows. In accordance with updated JRMPs, Copermittees are implementing programs to eliminate irrigation runoff.

3. ***Evaluation of the wet weather monitoring MS4 outfall discharge results including extrapolation of storm water volumes and pollutant loads to the land use types within the WMA.*** As a result of 2014-2015 wet weather monitoring at two MS4 outfalls in the Santa Margarita River WMA, Copermittees developed a more robust data set for the land-use based assessment of wet weather MS4 outfall discharge. In this second transitional monitoring year, water quality and flow data were collected for two outfalls monitored during both years. Annual storm water runoff volumes and pollutant loads were again calculated for monitored sites, building upon the data collected during the first transitional monitoring year (2013-2014). Further, the land use based EMCs were refined based on the two years of monitoring data for extrapolation of pollutant loads from each jurisdiction. As more data are collected and incorporated into the assessment, runoff coefficients and constituent concentrations will become increasingly representative of existing conditions. The associated assessment is provided in Section 5.2.5.

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Attachment B

County of San Diego FY 2014-15 Transitional JRMP Annual Report

SARAH E. AGHASSI
DEPUTY CHIEF ADMINISTRATIVE OFFICER

County of San Diego

LAND USE AND ENVIRONMENT GROUP
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October 30, 2015

Mr. David Gibson
California Regional Water Quality Control Board
San Diego Region 9
2375 Northside Drive, Suite 100
San Diego, CA 92108

Dear Mr. Gibson:

FY 2014-15 TRANSITIONAL JRMP ANNUAL REPORT SUBMITTAL

The County of San Diego (County) is pleased to submit the attached Transitional Jurisdictional Runoff Management Program (JRMP) Annual Report for Fiscal Year (FY) 2014-15. This submittal is comprised of the following:

- Summary of Jurisdictional Runoff Management Program Annual Report Form (Attachment D of Order No. R9-2013-0001)
- Spreadsheet of watershed-specific reporting data for each of the eight Watershed Management Areas in which the County is a responsible party (Attachment D items IV through VII)
- FY 2014-15 Fiscal Analysis

We hope this submittal meets your expectations and look forward to continued interaction with you and your staff. If you have any questions or require additional information, please contact Todd Snyder, Program Manager, at (858) 694-3672.

Sincerely,

Sarah Aghassi

SARAH E. AGHASSI
Deputy Chief Administrative Officer

Attachments: FY 2014-15 Transitional JRMP Annual Report

ATTACHMENT D

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM
ANNUAL REPORT FORM

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JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM ANNUAL REPORT FORM

FY 2014-2015

I. COPERMITTEE INFORMATION

I.A Copermittee Name: County of San Diego (PIN 255223)

I.B Copermittee Primary Contact Name: Todd Snyder

I.C Copermittee Primary Contact Information:

Address: 5510 Overland Avenue, Suite 410
City: San Diego County: San Diego State: California Zip: 92123
Telephone: (858) 694-3672 Fax: (858) 495-5623 Email:Todd.Snyder@sdcounty.ca.gov

II. LEGAL AUTHORITY

II.A Has the Copermittee established adequate legal authority within its jurisdiction to control pollutant discharges into and from its MS4 that complies with Order No. R9-2013-0001?	YES ☒ NO ☐
II.B A Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative has certified that the Copermittee obtained and maintains adequate legal authority?	YES ☒ NO ☐

III. JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM DOCUMENT UPDATE

III.A Was an update of the jurisdictional runoff management program document required or recommended by the San Diego Water Board?	YES ☒ NO ☐
III.B If YES to the question above, did the Copermittee update its jurisdictional runoff management program document and make it available on the Regional Clearinghouse?	YES ☒ NO ☐

IV. ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM

IV.A Has the Copermittee implemented a program to actively detect and eliminate illicit discharges and connections to its MS4 that complies with Order No. R9-2013-0001?	YES ☒ NO ☐

IV.B.1 Number of non-storm water discharges reported by the public	385
IV.B.2 Number of non-storm water discharges detected by Copermittee staff or contractors	84
IV.B.3 Number of non-storm water discharges investigated by the Copermittee	469
IV.B.4 Number of sources of non-storm water discharges identified	104
IV.B.5 Number of non-storm water discharges eliminated	101
IV.B.6 Number of sources of illicit discharges or connections identified	80
IV.B.7 Number of illicit discharges or connections eliminated	77
IV.B.8 Number of enforcement actions issued	76
IV.B.9 Number of escalated enforcement actions issued	0

V. DEVELOPMENT PLANNING PROGRAM

V.A Has the Copermittee implemented a development planning program that complies with Order No. R9-2013-0001?	YES ☒ NO ☐
V.B Was an update to the BMP Design Manual required or recommended by the San Diego Water Board?	YES ☒ NO ☐
V.C If YES to the question above, did the Copermittee update its BMP Design Manual and make it available on the Regional Clearinghouse?	YES ☒ NO ☐

V.D.1 Number of proposed development projects in review	549
V.D.2 Number of Priority Development Projects in review	226
V.D.3 Number of Priority Development Projects approved	64
V.D.4 Number of approved Priority Development Projects exempt from any BMP requirements	0
V.D.5 Number of approved Priority Development Projects allowed alternative compliance	0
V.D.6 Number of Priority Development Projects granted occupancy	89

V.E.1 Number of completed Priority Development Projects in inventory	343
V.E.2 Number of high priority Priority Development Project structural BMP inspections	359
V.E.3 Number of Priority Development Project structural BMP violations	77
V.E.4 Number of enforcement actions issued	77
V.E.5 Number of escalated enforcement actions issued	0

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM
ANNUAL REPORT FORM
FY 2014-2015

VI. CONSTRUCTION MANAGEMENT PROGRAM	
VI. A Has the Copermittee implemented a construction management program that complies with Order No. R9-2013-0001?	YES ☒ NO ☐
VI.B.1 Number of construction sites in inventory	4,198
VI.B.2 Number of active construction sites in inventory	2,945
VI.B.3 Number of inactive construction sites in inventory	1
VI.B.4 Number of construction sites closed/completed during reporting period	1,252
VI.B.5 Number of construction site inspections	19,850
VI.B.6 Number of construction site violations	327
VI.B.7 Number of enforcement actions issued	480
VI.B.8 Number of escalated enforcement actions issued	0

VII. EXISTING DEVELOPMENT MANAGEMENT PROGRAM				
VII.A Has the Copermittee implemented an existing development management program that complies with Order No. R9-2013-0001?	YES ☒ NO ☐			
	Municipal	Commercial	Industrial	Residential
VII.B.1 Number of facilities or areas in inventory	a. 270	b. 1836	c. 157	d.110
VII.B.2 Number of existing development inspections	a. 1820	b. 919	c. 111	d.0
VII.B.3 Number of follow-up inspections	a. 13	b. 210	c. 34	d.0
VII.B.4 Number of violations	a. 29	b. 418	c. 65	d.0
VII.B.5 Number of enforcement actions issued	a. 13	b. 197	c. 30	d.0
VII.B.6 Number of escalated enforcement actions issued	a.0	b.0	c.0	d.0

VIII. PUBLIC EDUCATION AND PARTICIPATION	
VIII.A Has the Copermittee implemented a public education program component that complies with Order No. R9-2013-0001?	YES ☒ NO ☐
VIII.B Has the Copermittee implemented a public participation program component that complies with Order No. R9-2013-0001?	YES ☒ NO ☐

IX. FISCAL ANALYSIS	
Has the Copermittee attached to this form a summary of its fiscal analysis that complies with Order No. R9-2013-0001?	YES ☒ NO ☐

X. CERTIFICATION

I [☐ Principal Executive Officer ☐ Ranking Elected Official ☒ Duly Authorized Representative] certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sarah Aghassi
Signature

10/30/15
Date

SARAH E. AGHASSI
Print Name

LAND USE AND ENVIRONMENT GROUP
DEPUTY CHIEF ADMINISTRATIVE OFFICER
Title

(619) 531-5451
Telephone Number

SARAH.AGHASSI@SDCOUNTY.CA.GOV
Email

ATTACHMENT D.1

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM ANNUAL REPORT FORM BY WATERSHED

JRMP ANNUAL REPORT ATTACHMENT D by WATERSHED

Fiscal Year 2014-2015

			SANTA MARGARITA *(902.00)	SAN LUIS REY *(903.00)	CARLSBAD *(904.00)	SAN DIEGUITO *(905.00)	PENASQUITOS *(906.00)	SAN DIEGO RIVER *(907.00)	SAN DIEGO BAY *(908.00, 909.00, 910.00)	TIJUANA RIVER *(911.00)	JURISDICTION TOTALS
IV.	**ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM**										
IV.B.1	Number of non-storm water discharges reported by the public		17	66	48	29	15	99	101	10	385
IV.B.2	Number of non-storm water discharges detected by Copermittee staff or contractors		0	5	12	14	1	31	21	0	84
IV.B.3	Number of non-storm water discharges investigated by the Copermittee		17	71	60	43	16	130	122	10	469
IV.B.4	Number of sources of non-storm water discharges identified		5	15	13	3	0	28	38	2	104
IV.B.5	Number of non-storm water discharges eliminated		5	15	10	3	0	28	38	2	101
IV.B.6	Number of sources of illicit discharges or connections identified		4	12	13	3	0	26	22	0	80
IV.B.7	Number of illicit discharges or connections eliminated		4	12	10	3	0	26	22	0	77
IV.B.8	Number of enforcement actions issued		4	15	10	2	0	22	21	2	76
IV.B.9	Number of escalated enforcement actions issued		0	0	0	0	0	0	0	0	0
V.	**DEVELOPMENT PLANNING PROGRAM**										
V.D.1	Number of proposed development projects in review		11	130	67	100	0	109	107	25	549
V.D.2	Number of Priority Development Projects in review		0	65	20	46	0	50	31	14	226
V.D.3	Number of Priority Development Projects approved		2	7	6	11	0	19	15	4	64
V.D.4	Number of approved Priority Development Projects exempt from any BMP requirements		0	0	0	0	0	0	0	0	0
V.D.5	Number of approved Priority Development Projects allowed alternative compliance		0	0	0	0	0	0	0	0	0
V.D.6	Number of Priority Development Projects granted occupancy		4	17	9	21	4	16	11	7	89
V.E.1	Number of completed Priority Development Projects in inventory		10	81	48	85	0	44	64	11	343
V.E.2	Number of high priority Priority Development Project structural BMP inspections		3	51	72	82	0	55	69	27	359
V.E.3	Number of Priority Development Project structural BMP violations		0	10	21	20	0	8	6	12	77
V.E.4	Number of enforcement actions issued		0	10	21	20	0	8	6	12	77
V.E.5	Number of escalated enforcement actions issued		0	0	0	0	0	0	0	0	0
VI.	**CONSTRUCTION MANAGEMENT PROGRAM**										
VI.B.1	Number of construction sites in inventory		105	885	529	999	3	712	868	97	4198
VI.B.2	Number of active construction sites in inventory		69	603	380	700	3	504	619	67	2945
VI.B.3	Number of inactive construction sites in inventory		0	0	1	0	0	0	0	0	1
VI.B.4	Number of construction sites closed/completed during reporting period		36	282	148	299	0	208	249	30	1252
VI.B.5	Number of construction site inspections		402	3324	3895	4492	61	3408	3959	309	19850
VI.B.6	Number of construction site violations		5	21	28	28	0	87	155	3	327
VI.B.7	Number of enforcement actions issued		6	25	38	35	0	130	242	4	480
VI.B.8	Number of escalated enforcement actions issued		0	0	0	0	0	0	0	0	0
VII.	**EXISTING DEVELOPMENT MANAGEMENT PROGRAM**										
VII.B.1	Number of facilities or areas in inventory	a. Municipal	8	27	28	36	4	62	81	24	270
		b. Commercial	162	328	203	217	1	477	421	27	1836
		c. Industrial	15	4	12	22	0	69	34	1	157
		d. Residential	12	11	11	22	1	15	21	17	110
VII.B.2	Number of existing development inspections	a. Municipal	42	193	274	252	18	549	368	124	1820
		b. Commercial	59	123	102	80	0	223	308	24	919
		c. Industrial	8	6	8	10	0	46	33	0	111
		d. Residential	0	0	0	0	0	0	0	0	0
VII.B.3	Number of follow-up inspections	a. Municipal	0	0	3	3	0	3	3	1	13
		b. Commercial	13	22	16	25	0	34	92	8	210
		c. Industrial	3	3	3	2	0	7	16	0	34
		d. Residential	0	0	0	0	0	0	0	0	0
VII.B.4	Number of violations	a. Municipal	0	2	3	10	0	4	7	3	29
		b. Commercial	31	42	20	55	0	51	199	20	418
		c. Industrial	12	16	1	2	0	9	25	0	65
		d. Residential	0	0	0	0	0	0	0	0	0
VII.B.5	Number of enforcement actions issued	a. Municipal	0	1	2	2	0	1	3	2	11
		b. Commercial	12	18	14	27	0	33	86	7	197
		c. Industrial	4	3	1	1	0	6	15	0	30
		d. Residential	0	0	0	0	0	0	0	0	0
VII.B.6	Number of escalated enforcement actions issued	a. Municipal	0	0	0	0	0	0	0	0	0
		b. Commercial	0	0	0	0	0	0	0	0	0
		c. Industrial	0	0	0	0	0	0	0	0	0
		d. Residential	0	0	0	0	0	0	0	0	0

ATTACHMENT D.2

JURISDICTIONAL RUNOFF MANAGEMENT PROGRAM ANNUAL REPORT FISCAL ANALYSIS

FISCAL ANALYSIS COMPONENT

1.1. Introduction

This section presents an estimated annual budget for the County's runoff management programs for FY 2014-15.

1.2. Fiscal Analysis Methods

This section continues to utilize the methodologies and standards established in *Fiscal Analysis Method* submitted by the Copermittees in January 2009.

1.3. Fiscal Analysis Results

As shown the County estimated its total FY 2014-15 expenditures at $28,867,398. This fiscal analysis addresses each of the County's Runoff Management Program elements (jurisdictional, watershed, and regional activities) for the current reporting period (FY 2014-15). Expenditures are described by department and major program area. They represent an estimate of the expenditures that the County incurred in meeting its compliance obligations for FY 2014-15. They should not be interpreted as either budgeted or actual expenditures. Because stormwater program expenditures are distributed throughout a considerable number of County programs, a single consolidated "budget" does not exist for the program as a whole. As such, these figures should be considered best estimates of stormwater-related expenditures.

1.3.1 Expenditures

1.3.1.1. Jurisdictional

Table 1.1 presents the County's estimated jurisdictional expenditures for FY 2014-15.

Table 1.1 – Estimated Jurisdictional Expenditures for FY 2014-15

	Jurisdictional Worksheet Component		Explanation/Notes
1	**ADMINISTRATION**	**$5,399,660**	These costs correspond to the DPW WPP development, administrative oversight, and assessment of the County's stormwater programs. The WPP is responsible for the development of new and augmented County stormwater programs, regulatory reporting, and program assessment. Some administrative costs are associated with other specific functions shown below, but are included here because they could not be separated out.
2	**DEVELOPMENT PLANNING**	**$1,433,347**	
A	**Land Use Planning**	$0	Expenditures not reported for FY 2014-15; included in other elements.
B	**Environmental Review**	$0	Expenditures not reported for FY 2014-15; included in other elements.
C	**Development Project Approval and Verification**	**$1,433,347**	
C1	**Public Projects (CIP)**	$1,165,341	
	Project Planning and Engineering	$1,115,591	Costs include: preparing and reviewing plans and specifications for stormwater

Table 1.1 – Estimated Jurisdictional Expenditures for FY 2014-15

	Jurisdictional Worksheet Component		Explanation/Notes
	Compliance Inspection and Enforcement	$0	BMPs, and SWPPP/WPCP review. These costs apply to DPW, DPR, and DGS.
	BMP Implementation	$49,750	
C2	**Private Projects**	$268,006	
	Permitting and Licensing	$268,006	This cost covers DPW and PDS plan reviews at permitted sites. Total costs are estimated as fixed percentages of annual plan-checking fees.
3	**CONSTRUCTION**	**$5,032,519**	
A	**Public Projects (CIP)**	$3,405,039	Costs include: BMP compliance inspections during construction, and implementation of construction phase BMPs. These costs apply to DPW, DPR, and DGS.
	Compliance Inspection and Enforcement	$1,944,310	
	BMP Implementation	$1,460,729	
B	**Private Projects** **Combined totals for DPW PDCI and PDS Building**	$1,627,480	
	Compliance Inspection and Enforcement	$1,627,480	This cost primarily covers DPW and PDS construction inspections at permitted sites. Total costs are estimated as fixed percentages of inspection program fees.
4	**MUNICIPAL**	**$8,826,071**	
A	**Administration**	$217,538	Expenditures associated with the administrative oversight of the stormwater programs, regulatory reporting, and program assessment of municipal facilities by the DPW - Watershed Protection Program.

Table 1.1 – Estimated Jurisdictional Expenditures for FY 2014-15

	Jurisdictional Worksheet Component		Explanation/Notes
B	**Streets, Roads, and Highways Element**	$2,299,899	
	Administration	$296,814	Founded road operations activities include: culvert inspections and cleaning; increased culvert waste disposal costs, street sweeping, installation and maintenance of BMPs and road structures, and the placement of additional controls. 10% of the Maintenance and Inspections and BMP Implementation is reported as Administration cost.
	Maintenance Inspections	$1,927,528	
	BMP Implementation	$75,557	
	Other	$0	
C	**MS4 Element**	$2,800,000	
	Administration	$1,500,000	The combined costs shown here apply across (1) DPW Flood Control -- conversion of existing concrete lined channels to natural bottom channels, updating flood control master plans, increased maintenance of flood control systems, and construction and maintenance of regional treatment BMPs; and (2) DPW Flood Control MS4 Operation & Maintenance -- maintenance on flood control facilities throughout the unincorporated areas of the County, exclusive of facilities within road rights-of-way (included in 4.B above). Other includes the cost of disposal of debris removed from MS4.
	Maintenance Inspections	$750,000	
	BMP Implementation	$500,000	
	Other	$50,000	
D	**Solid Waste Facilities Element**	$325,791	
	Administration	$45,643	Costs include Regional Board stormwater permit fees, consultant costs associated with stormwater upgrade and repair projects, and office staff time.
	Maintenance Inspections	$16,313	Costs include staff time to perform site inspections.
	BMP Implementation	$77,939	Costs include stormwater consultant site inspections, sampling/testing and BMP materials.
	Other (construction)	$185,896	Drainage improvement projects and BMP site maintenance projects.

Table 1.1 – Estimated Jurisdictional Expenditures for FY 2014-15

	Jurisdictional Worksheet Component		Explanation/Notes
E	**Wastewater Facilities Element**	$335,000	
	Administration	$10,000	This includes costs associated with JRMP report, the sanitary sewer system and facilities including: pump stations, sewage treatment plants and Spring Valley Operations facility. Also includes the cost of BMP design, acquisition, maintenance and monitoring, for wastewater Capital Improvement Projects, and Major maintenance projects, and at various wastewater facilities.
	Maintenance Inspections	$225,000	
	BMP Implementation	$100,000	
	Other	$0	
F	**Road Stations Element**	$984,613	
	Administration	$89,509	This includes DPW road station operations related to Permit compliance. The Administration cost is determined as 10% of the total costs of maintenance and Inspections and BMP Implementation as reported by the DPW Roads Divisions.
	Maintenance Inspections	$855,683	
	BMP Implementation	$39,421	
	Other	$0	
G	**Fleet Maintenance Element**	$119,937	
	Administration	$51,000	This includes costs associated with operation of the County's fleet maintenance and fueling facilities.
	Maintenance Inspections	$62,000	
	BMP Implementation	$6,937	
	Other	$0	
H	**Municipal Airfields Element**	$166,269	These costs involve site inspections, annual reporting, and maintenance of BMPs at airports, including oversight of tenant operations. The BMP implementation item includes Palomar asphalt cap repairs.
	Administration	$5,000	
	Maintenance Inspections	$80,000	

Table 1.1 – Estimated Jurisdictional Expenditures for FY 2014-15

	Jurisdictional Worksheet Component		Explanation/Notes
	Compliance Inspection and Enforcement	$0	
	BMP Implementation	$81,269	
	Other (sampling and analysis)	$0	
I	**Parks & Recreational Facilities Element**	$1,116,026	
	Administration	$117,828	This includes: coordinating all training requirements, preparing and reviewing reports, and overseeing the overall implementation of the stormwater program for DPR.
	BMP Implementation	$901,457	This includes costs associated with implementation of BMPs at County parks.
	Compliance Inspection and Enforcement	$96,742	Costs are for DPR enforcement of stormwater requirements at County parks.
	Other	$0	
J	**Office Buildings & Other Municipal Facilities Element**	$340,830	
	Administration	$0	DGS conducts a variety of storm water activities including: inspections and clean-up of County-owned, occupied, and leased facilities and vacant lands; maintenance and signage of storm drain inlet inserts and trash dumpsters; placement of inlet filters; maintenance of coverage and containment improvements for on-site supplies and materials; parking lot sweeping and controlled parking lot power washing; and application of erosion and sediment control measures. These costs are exclusive of fleet maintenance and fueling operations.
	Maintenance Inspections	$232,490	
	BMP Implementation	$108,340	
	Other	$0	

Table 1.1 – Estimated Jurisdictional Expenditures for FY 2014-15

	Jurisdictional Worksheet Component		Explanation/Notes
	Management of Pesticides, Herbicides, & Fertilizers	$120,168	
	Administration	$120,168	Integrated Pest Control Program within the Department of Agriculture, Weights and Measures (AWM) performs eradication and control of invasive weeds. This program also provides weed control on roadsides, airports, flood control channels, sewage treatment plants and inactive landfills. It also provides structural pest control to facilities owned and operated by the county.
	Maintenance Inspections		
	BMP Implementation		
	Other		
5	**INDUSTRIAL and COMMERCIAL**	**$1,296,798**	
	Administration	$243,631	DPW and AWM conduct inspections of a variety of businesses in the unincorporated County, provide regulatory oversight of mobile businesses, and conduct follow-up and enforcement of stormwater violations.
	Compliance Inspection and Enforcement	$813,816	
	Educational Outreach	$239,351	
	Other expenditures	$0	
6	**RESIDENTIAL**	**$1,191,881**	
	Compliance Inspection and Enforcement	$650,409	DPW conducts complaint investigations for residential sources in the unincorporated County, and conduct follow-up and enforcement of stormwater violations. DPW also operates a regional hotline.
	Educational Outreach	$541,472	Several County departments coordinate and provide outreach to the residential sector and schoolchildren in support of Permit Section D.5 requirements. Costs reported here correspond to DPW only. Funded activities include developing pollution prevention content and providing direct outreach to various target audiences within the general residential and schoolchildren target audiences.

Table 1.1 – Estimated Jurisdictional Expenditures for FY 2014-15

	Jurisdictional Worksheet Component		Explanation/Notes
7	**IDDE**	**$304,205**	
		$304,205	DPW conducts monitoring programs, assesses scientific data, and provides technical and scientific support to other County program staff. They also provide support for all technical and scientific aspects of JRMP development and implementation. These costs are exclusive of the regional monitoring program which is addressed separately under regional costs.
8	**EDUCATION**	**$0**	Education costs are included in other sections as applicable.
9	**PUBLIC PARTICIPATION**	**$0**	Public participation costs are included in other sections as applicable.
10	**SPECIAL INVESTIGATIONS**	**$0**	Expenditures not reported for FY 2014-15.
11	**NON-EMERGENCY FIREFIGHTING**	**$0**	Expenditures not reported for FY 2014-15.
		$23,484,481	

1.3.1.2 Watershed

Table 1.2 presents the County's estimated watershed expenditures for FY 2014-15.

Table 1.2 – Estimated Watershed Expenditures for FY 2014-15

	Santa Margarita WMA	San Luis Rey WMA	Carlsbad WMA	San Dieguito WMA	Peñasquitos WMA	San Diego River WMA	San Diego Bay WMA	Tijuana WMA
Administration	$60,000	$60,000	$80,000	$11,000	$11,000	$80,000	$30,000	$58,000
Cost Share Contribution	$0	$0	$46,205	$146,006	$20,162	$0	$7,256	$55,208
Watershed Activities	$100,569	$200,533	$0	$0	$0	$308,495	$3,590	$0
Other	$0	$0	$0	$0	$0	$0	$0	$0
Total Estimated Watershed Costs	**$160,569**	**$260,533**	**$104,440**	**$157,006**	**$31,162**	**$388,495**	**$132,612**	**$96,511**

1.3.1.3 Regional

Table 1.3 presents the County's estimated regional expenditures for FY 2014-15. This includes only those expenditures associated with the Copermittees' adopted Regional Budget and Work Plan. Other costs associated with regional participation (meeting attendance, etc.) are included within the jurisdictional expenditures presented above.

Table 1.3 – Estimated Regional Expenditures for FY 2014-15

Regional Programs	County Costs
Administration	$0
Cost Share Contribution	$4,051,589
Regional Activities	$0
Other	$0
Total Estimated Regional Costs	**$4,051,589**

1.3.1.4 Total Expenditures

Table 1.4 presents the County's total estimated expenditures for FY 2014-15 (jurisdictional, watershed, and regional).

Table 1.4 – Total Estimated County Expenditures for FY 2014-15

Component / Sub-component	Estimated Expenditures
Jurisdictional	
Administration	$5,339,660
Development Planning	$1,433,347
Construction	$5,032,519
Municipal	$8,826,071
Industrial And Commercial	$1,296,798
Residential	$1,191,881
IDDE	$304,205
Education	$0
Public Participation	$0
Special Investigations	$0
Non-emergency Firefighting	$0
Jurisdictional Total	**$23,484,481**
Watershed	
Santa Margarita WMA	$160.569
San Luis Rey WMA	$260,533
Carlsbad WMA	$104,440
San Dieguito WMA	$157,006
Peñasquitos WMA	$31,162
San Diego River WMA	$388,495
San Diego Bay WMA	$132,612
Tijuana WMA	$96,511
Watershed Total	**$1,331,328**
Regional	**$4,051,589**

Total Estimated County Costs ***$28,867,398***

1.3.2 Funding Source

Table 1.5 shows the major sources of funding for the County's urban runoff management programs in FY 2014-15, and describes the legal restrictions applicable to the use of each.

Table 1.5 – Legal Restrictions on the Use of Program Funding

Funding Source	Legal Restrictions
General Fund	There are no restrictions on the use of general fund for County water quality programs and activities except that they must be used only for the purposes for which they are budgeted and allocated by the County Board of Supervisors.
Flood Control District Fees	Revenue generated from these fees must be expended for activities related to flood and storm management.
Developer Deposits / Permit Fees	Deposits / fees may be used only to fund activities related to the work for which the permits are issued.
Gas Tax	Gas Tax is collected by the state and allocated to local government for transportation-related work including maintenance of existing transportation systems and construction of new transportation facilities. These funds may not be used for other purposes.
Sanitary District Fees	Sanitary District Fees are used for work related to the maintenance of sewer lines, pump stations, force mains, and several treatment plants that serve the unincorporated areas. They may be used only for such maintenance-related purposes within the respective sewer district for which they are collected.
Other Funding Sources	Other funding sources collectively account for a relatively small portion of ongoing expenditures. However, all funding for the County's stormwater compliance programs is expended within applicable legal restrictions and limitations.

1.4. Conclusions and Recommendations

The figures presented here are an estimate of the expenditures that the County incurred to meet its compliance obligations for FY 2014-15. For the reasons explained above, they should be considered only best estimates of stormwater-related expenditures.

Attachment C

Rainbow Creek Water Quality Monitoring Program Data Summary (July 2014 – September 2015)

Rainbow Creek TMDL Monitoring Program
Report for July 2014 through September 2015

Introduction

The Rainbow Creek monitoring program has been developed to provide water quality data in support of the *Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus in the Rainbow Creek Watershed*, San Diego County (http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/tmdls/rainbowcreek.shtml). The objective of this monitoring program is to characterize baseline conditions for nutrients in the Rainbow Creek watershed. In the present report, the following questions were addressed:

1. How do the mean concentrations, instantaneous loading and instantaneous flux of total nitrogen and total phosphorus vary among the sampling sites along the main stem of Rainbow Creek?

2. How do the mean concentrations, instantaneous loading and instantaneous flux of total nitrogen and total phosphorus vary among the sampling sites in the tributaries to Rainbow Creek?

3. Are there any significant trends in total nitrogen and total phosphorus concentrations in the Rainbow Creek main stem and tributaries over time?

Monitoring locations (Figure 1; Table 2) included those identified as "strategic nodes" by the San Diego Regional Water Quality Control Board during the development of the TMDL technical report. This monitoring report satisfies the requirement of annual monitoring required by the TMDL and Attachment E of the California RWQCB NPDES Permit Order No. R9-2013-0001.

Methods

Data Collection

Sampling was conducted at 13 monitoring locations in Rainbow Creek and its tributaries. Table 2 presents sampling sites and monitoring frequencies. All samples were collected during dry weather i.e. at least 72 hours following any rain event with precipitation greater than or equal to 0.10 inches. *In-situ* physical measurements of pH, specific conductance, turbidity, dissolved oxygen, temperature, and salinity were collected using the Horiba U-10 multimeter probe. On each sampling occasion, a hand-held flow meter or the floating object technique was used to measure current velocity that was then multiplied by the approximate channel width and depth to estimate instantaneous flow rate. Water quality samples were also collected and taken to the laboratory to test for nitrate as N, nitrite as N, total Kjeldahl nitrogen (TKN), ammonia, ortho-phosphate as P, total phosphate as P, total dissolved solids (TDS), total iron, and sulfate. Total nitrogen concentration was calculated for each sample by adding together the corresponding concentrations of TKN, nitrate as N and nitrite as N. Table 1 provides a summary of all parameters measured and the corresponding methods.

Table 1: Water Quality Parameters and Methods for Rainbow Creek Monitoring

Measured Parameter	*Field or Lab*	*Method*	*Reporting Limits*
Flow	Field	Flow Probe FP101/FP111	0.01 cfs
pH	Field	In-situ, Horiba U-10/U53	0.5 units
Temperature	Field	In-situ, Horiba U-10/U53	0.1 °C
Conductivity	Field	In-situ, Horiba U-10/U53	0.5 mS/cm
Dissolved Oxygen	Field	In-situ, Horiba U-10/U53	0.5 mg/L
Turbidity	Field	In-situ, Horiba U-10/U53	5 NTU
Ammonia	Lab	SM 4500 NH3 B,C	0.05 mg/L
Nitrate as N	Lab	SM 4500 NO3 E, EPA300.0,	0.05 mg/L
Nitrite as N	Lab	SM 4500 NO2 B, EPA 300.0	0.05 mg/L
Total Kjeldahl Nitrogen	Lab	SM 4500 N D C	0.5 mg/L
Total Nitrogen	Lab	By calculation	NA
Ortho-phosphate as P	Lab	SM 4500 P B E	0.05 mg/L
Total Phosphate as P	Lab	SM 4500 P	0.05 mg/L
Total Dissolved Solids	Lab	SM 2540 C	20 mg/L
Total Iron	Lab	EPA 200.7	0.1 mg/L
Sulfate	Lab	SM 4500 SO4 E	5 mg/L

Table 2: Sample Dates and Monitoring Locations

Site ID	**Monitoring Location**	**Jul 21**	**Aug 26**	**Sep 30**	**Oct 31**	**Nov 12**	**Dec 10 / 11**	**Jan 7 / 8**	**Feb 4 / 5**	**Mar 10 / 11**	**Apr 8 / 9**	**May 12 / 13**	**Jun 15 / 16**	**Jul 8 / 9**	**Aug 3 / 5**	**Sep 2 / 3**
RBC01	Rainbow Creek @ Jubilee Way	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
RBC02	Rainbow Creek @ Huffstatler Road	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
RBC04	Rainbow Creek @ Old Highway 395	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
RBC06	Rainbow Creek @ 2219 Willow Glen Road	F	F	F	F	F	F*	F*	F*	F*	F*	F*	F*	F*	F*	F*
RBC10	Rainbow Creek @ MWD Crossing	F	F	F	F	F	F*	F*	F*	F*	D*	D*	D*	D*	D*	D
SMG05	Rainbow Creek @ Willow Glen Road	F	F	F	F	F	F*	F*	F*	F*	F*	F*	F*	F*	F*	F*
SMG06	Rainbow Creek @ Stage Coach Lane	F	F	F	F	F	F*	F*	F*	F*	F*	F*	F*	F*	F*	F*
RVT02	Chica tributary @ 1st Street	D	D	D	D	D	P	F	P	F	P	P	D	D	D	D
HST01	Brow Ditch to Rainbow Creek @ Huffstatler Road	D	D	P	P	P	F	F	F	F	P	P	P	P	D	D
HST02	Brow Ditch to Rainbow Creek @ Huffstatler Road	D	D	D	D	D	F	F	F	F	P	P	P	D	D	D
MGT01	Margarita Glen Tributary to Rainbow	D	D	D	D	D	D*	D*	D*	D*	D*	D*	D*	D*	D*	D*

Site ID	Monitoring Location	Jul 21	Aug 26	Sep 30	Oct 31	Nov 12	Dec 10 / 11	Jan 7 / 8	Feb 4 / 5	Mar 10 / 11	Apr 8 / 9	May 12 / 13	Jun 15 / 16	Jul 8 / 9	Aug 3 / 5	Sep 2 / 3
	Creek															
RGT01	Rainbow Glen Tributary to Rainbow Creek	F	F	F	F	F	F*	F*	F*	F*	F*	F*	F*	F*	F*	F
WGT01	Willow Glen Tributary @ Willow Glen Road	F	F	F	F	F	F*	F*	F*	F*	F*	F*	F*	F*	F*	F*
VMT01	Via Milpas Tributary to Rainbow Creek	D	D	D	D	D	D*	D*	D*	D*	D*	D*	D*	D*	D*	D*

F – flowing water - sampling was conducted
P – ponded water – no sampling
D – dry/ no flowing or ponded water – no sampling
* - Site was sampled on the later of the two monthly monitoring rounds

Data Analysis

Data collected during from July 2014 through September 2015 were combined with all data collected since inception of the Rainbow Creek TMDL monitoring (in May 2003). Total nitrogen and total phosphorus concentrations (in mg/L), estimated loadings (in kg/yr) and estimated flux (in kg/yr/acre) were calculated for each sampling occasion. The values of discharge used to compute loadings and flux were calculated using instantaneous measurements of flow (by means of a hand-held flow meter) and estimates of channel width and depth at each site on each sampling occasion. Caution should be used in extrapolating instantaneous measurements of both concentration and flow to annual values. Additionally, the data set do not include samples collected during storm events.

Flux was calculated as a ratio of each loading value and a contributing watershed/ drainage area at each sampling site. For the tributaries, flux estimates facilitate comparisons among tributary drainage areas of varying sizes. For the main stem of Rainbow Creek, flux was calculated cumulatively with the drainage area increasing progressively at each downstream sampling site.

All data collected since May 2003 were grouped into “dry” and “wet” season categories based on the time of year and flow tiers as established in Appendix E of the Rainbow Creek TMDL Technical Report (CRWQCB, 2006). Dry season was defined as the time period from June through October. November through May was considered wet season. However, as mentioned above, regardless of season, all data were collected during dry weather only; i.e. three days or more following any rain event of more than 0.1 inches in precipitation.

Based on data collected in the Rainbow Creek subwatershed in 1989 through 2000, the Rainbow Creek TMDL Technical Report (CRWQCB, 2006) has identified three flow tiers: Low Flow for discharges lesser than 3 cfs, Mod-High Flows tier for discharges between 3 and 39 cfs, and Very High Flows tier for discharges exceeding 40 cfs. The report then utilized the flow tiers in the total nitrogen and total phosphorus TMDLs in Section 5.0 Loading Capacity and Linkage Analysis. To verify that the “dry” and “wet” season designations are appropriate for the present report, discharge rates from all sampling occasions were classified into their corresponding flow tiers and time of occurrence of the Very High and Mod-High Flows was noted. Since the TMDL excludes nutrient concentrations and loadings present during "Very High Flow" conditions, those data were excluded from the present analysis.

The data were further grouped by sampling site. Mean concentrations, loadings and flux of total nitrogen and total phosphorus were then calculated for each sampling site and season. For each mean, 95% confidence intervals were also calculated at $\alpha = 0.05$. The data were then represented graphically. It must be noted that the mean total nitrogen and total phosphorus concentrations, loadings and flux were calculated using laboratory data only, therefore bar graphs are more representative of data collected in 2006 through 2015 than in 2003 through 2005 when field test kits were usually used to estimate nutrient levels. This has also resulted in a reduced number of data points that could be included in the analysis (i.e. laboratory analysis for total nitrogen and total phosphorus were not performed for April-August and October 2004, and January-April and June-September 2005; total phosphorus data are not available for February-May 2006).

Total nitrogen and total phosphorus concentrations at all sampling locations were analyzed for trends. The analysis was performed using linear regression. The distributions of data points over time were then graphed and lines were fitted to the data (Figures in Attachment A). Line equations are also shown on the graphs. The graphs with downward sloping lines (negative slopes) indicate those sampling locations where negative trends were observed. Furthermore, r^2 values were calculated for each relationship and significance at $\alpha = 0.05$ was determined for each r^2 (Table 5). The r^2 values range from 0 to 1. The higher the value of r^2, the stronger the trend with no trend indicated where $r^2 = 0$ and all of the variation in data is explained by the linear relationship where $r^2 = 1$.

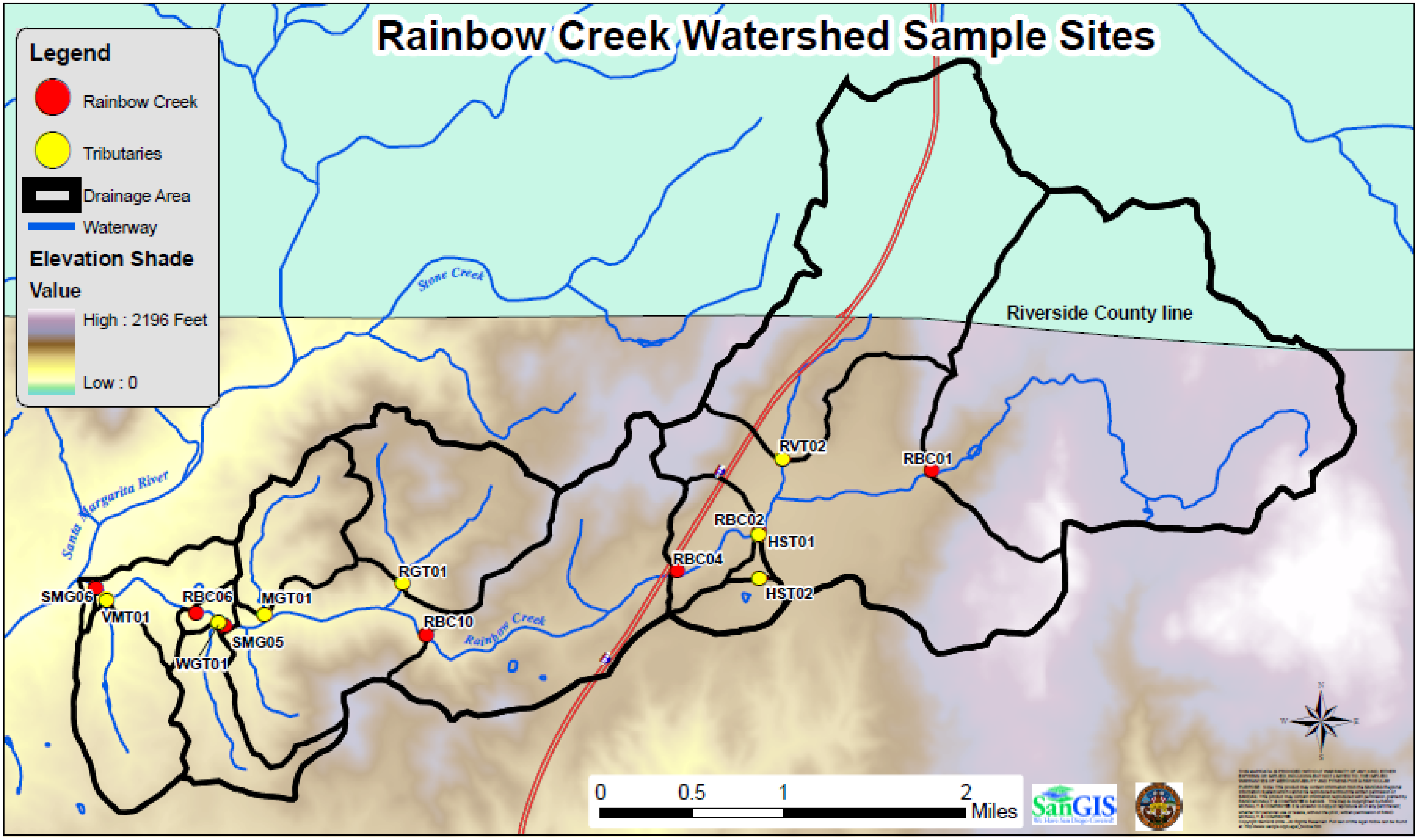


Figure 1: Monitoring Locations along Rainbow Creek and its Tributaries.

Results

All field and laboratory data collected from July 2014 through September 2015 are presented in Attachment 1. The data were combined with those of previous years for further analysis as presented in Tables 3, 4 and 5 and in Figure 2 below.

Data Categorization into the "Dry" and "Wet" Weather Conditions

Since May 2003, only one "Very High Flow" tier sample was collected and 100 out of 1424 sampling occasions when flow was observed exhibited Mod-High Flow conditions (discharge = 3-39 cfs). Those sites with their corresponding sample dates are shown in Table 3. The one Very High Flow occurred in March 2005, at the furthest downstream sampling site on the main stem of Rainbow Creek at Stage Coach Lane (SMG06). All, except one, Mod-High flows occurred during the months of November through May. This is in agreement with the data presented in Fig. E-1 of Appendix E of the Final Technical Report for the Total Nitrogen and Total Phosphorus Maximum Daily Loads for Rainbow Creek (CRWQCG, 2006).

Table 3: Discharge (cfs) higher than 3 cfs exhibited in the Rainbow Creek subwatershed from May, 2003 through September, 2015 (values presented are the 100 of a total of 1424 sampling occasions with flow).

Date	RBC01	RBC02	RBC04	RBC06	RBC10	RVT02	SMG05	SMG06
5/12/03								3.0
5/26/04								4.7
11/3/04		3.9		4.8			5.5	7.2
1/25/05	4.5	12.6					9.4	13.8
3/2/05	16.5	26.3				6.7	35.1	**40.5**
4/7/05		5.3						12.5
5/5/05							4.3	4.5
8/9/05								3.1
11/15/05								3.4
4/7/06			3.6	7.6	4.8		4.7	6.6
5/8/06				3.0				
3/8/07				4.7				
1/17/08					22.2			3.8
2/19/08		6.6	7.7	12.0	9.0		7.6	18.8
3/20/08		4.0	3.6	4.1				6.9
4/16/08				4.4			5.4	4.3
5/8/08								3.3
3/4/09								3.4
1/7/10				21.2	15.3		22.3	25.3
2/25/10			3.5		4.0			
2/26/10							5.4	3.4
3/11/10		4.1	4.8					
3/12/10				4.4	6.2		5.9	5.2
1/12/11	5.6	11.9	12.9		7.5			
1/13/11				11.9			10.6	16.2
2/14/11			4.9					
2/15/11				5.6			4.9	3.9
3/2/11	8.5	10.5	14.6		18.1			
3/3/11				23.0			21.7	34.9
4/6/11		3.2	8.8		5.8			
4/7/11				8.9			5.5	8.5
5/24/11					3.2			
9/28/11				3.3	3.9			
10/24/11		3.6	3.6		5.7		4.4	3.8
11/17/11				4.6	4.5		3.4	5.1
3/15/12								5.5
4/18/12					3.4			
4/19/12							3.2	
5/15/12								3.5
4/11/13				7.6				

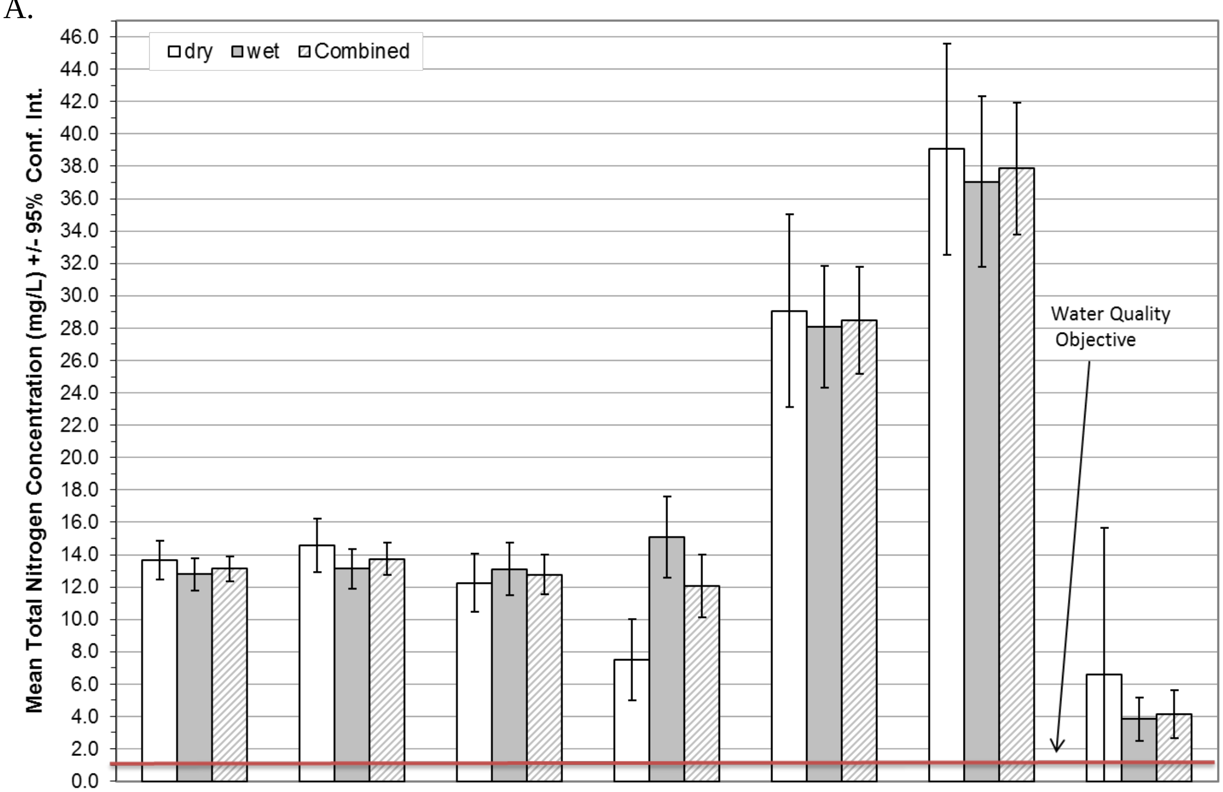
Table 4: Sample size (*n*), means and standard deviations (St. Dev.) of concentrations, loadings and flux for total nitrogen and total phosphorus calculated for each main stem sampling site for the dry, wet and combined seasons.

Main Stem Location	Season	Drainage Area (Acres)	Concentration (mg/L)						Loading (kg/year)						Flux (kg/yr/acre)					
			Total Nitrogen			Total Phoshorus			Total Nitrogen			Total Phoshorus			Total Nitrogen			Total Phoshorus		
			n	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.
RBC01	dry	1975	3	6.6	8.0	4	0.30	0.07	3	124	60	4	11	11	3	0.06	0.03	4	0.006	0.006
	wet		25	3.8	3.5	27	0.14	0.13	25	4,134	6,337	27	220	554	25	2.09	3.21	27	0.111	0.281
	Combined		28	4.1	4.0	31	0.16	0.13	28	3,704	6,106	31	193	521	28	1.88	3.09	31	0.098	0.264
RBC02	dry	4270	47	39.1	22.8	47	0.61	0.36	46	7,600	13,401	46	170	427	46	1.78	3.14	46	0.040	0.100
	wet		71	37.1	22.6	71	0.53	0.37	71	19,743	28,467	71	420	878	71	4.62	6.67	71	0.098	0.206
	Combined		118	37.9	22.6	118	0.56	0.36	117	14,969	24,375	117	322	742	117	3.51	5.71	117	0.075	0.174
RBC04	dry	4530	48	29.1	21.1	48	0.57	0.30	48	5,826	12,319	48	130	304	48	1.29	2.72	48	0.029	0.067
	wet		68	28.1	15.8	68	0.47	0.25	68	21,624	29,901	68	457	882	68	4.77	6.60	68	0.101	0.195
	Combined		116	28.5	18.1	116	0.51	0.27	116	15,087	25,377	116	322	719	116	3.33	5.60	116	0.071	0.159
RBC10	dry	5317	42	7.5	8.3	42	0.34	0.15	42	5,613	21,300	42	143	448	42	1.06	4.01	42	0.027	0.084
	wet		64	15.1	10.3	64	0.36	0.18	64	25,851	48,600	64	685	1,372	64	4.86	9.14	64	0.129	0.258
	Combined		106	12.1	10.2	106	0.35	0.17	106	17,832	41,149	106	470	1,131	106	3.35	7.74	106	0.088	0.213
SMG05	dry	6606	49	12.3	6.4	50	0.25	0.17	49	6,034	15,284	50	146	412	49	0.91	2.31	50	0.022	0.062
	wet		71	13.1	7.1	73	0.26	0.13	71	24,610	36,425	73	574	1,037	71	3.73	5.51	73	0.087	0.157
	Combined		120	12.8	6.8	123	0.25	0.15	120	17,025	30,964	123	400	864	120	2.58	4.69	123	0.061	0.131
RBC06	dry	6860	48	14.6	5.9	48	0.24	0.19	48	6,652	10,359	48	102	152	48	0.97	1.51	48	0.015	0.022
	wet		70	13.1	5.2	71	0.24	0.15	70	27,229	39,459	71	534	922	70	3.97	5.75	71	0.078	0.134
	Combined		118	13.7	5.5	119	0.24	0.16	118	18,858	32,625	119	360	747	118	2.75	4.76	119	0.052	0.109
SMG06	dry	7343	49	13.7	4.2	50	0.24	0.30	49	10,505	11,976	50	240	687	49	1.43	1.63	50	0.033	0.094
	wet		72	12.8	4.4	74	0.22	0.11	72	34,821	45,900	74	741	1,718	72	4.74	6.25	74	0.101	0.234
	Combined		121	13.1	4.3	124	0.23	0.21	121	24,974	38,047	124	539	1,414	121	3.40	5.18	124	0.073	0.193

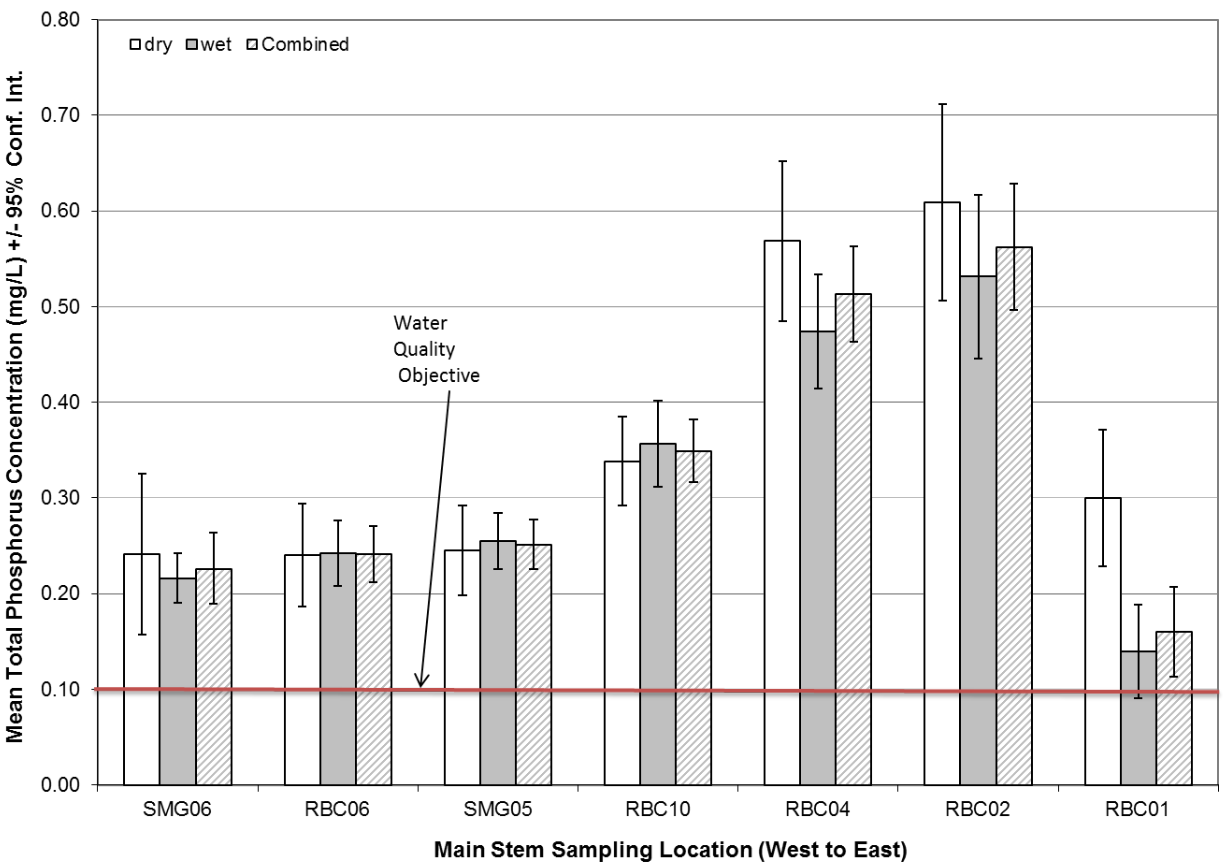
Table 5: Sample size (*n*), means and standard deviations (St. Dev.) of concentrations, loadings and flux for total nitrogen and total phosphorus calculated for each tributary sampling site for the dry, wet and combined seasons.

Tributary Location	Season	Drainage Area (Acres)	Concentration (mg/L)						Loading (kg/year)						Flux (kg/yr/acre)					
			Total Nitrogen			Total Phoshorus			Total Nitrogen			Total Phoshorus			Total Nitrogen			Total Phoshorus		
			n	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.	*n*	mean	St. Dev.
RVT02	dry	1239	36	25.0	13.8	36	0.69	0.19	31	1,637	2,416	31	48	76	31	1.32	1.95	31	0.039	0.061
	wet		54	22.2	13.1	53	0.55	0.29	48	2,636	2,955	47	84	143	48	2.13	2.39	47	0.068	0.115
	Combined		90	23.3	13.3	89	0.60	0.26	79	2,244	2,784	78	70	121	79	1.81	2.25	78	0.056	0.098
HST01	dry	99	15	12.8	10.7	16	0.54	0.48	15	289	535	16	5	7	15	2.92	5.40	16	0.052	0.072
	wet		55	15.8	7.5	56	0.54	0.34	54	765	1,205	55	18	25	54	7.73	12.17	55	0.178	0.256
	Combined		70	15.2	8.3	72	0.54	0.37	69	662	1,109	71	15	23	69	6.68	11.20	71	0.149	0.233
HST02	dry	83	11	22.4	7.8	11	0.29	0.26	11	180	337	11	3	5	11	2.18	4.08	11	0.035	0.066
	wet		42	25.0	7.2	42	0.62	0.59	42	939	1,678	42	16	21	42	11.37	20.31	42	0.188	0.250
	Combined		53	24.4	7.3	53	0.55	0.55	53	782	1,529	53	13	19	53	9.46	18.51	53	0.156	0.233
RGT01	dry	533	44	7.3	2.9	45	0.21	0.18	44	893	1,168	45	25	46	44	1.68	2.19	45	0.046	0.087
	wet		63	9.1	6.4	65	0.19	0.24	63	1,658	2,229	65	31	47	63	3.11	4.19	65	0.058	0.089
	Combined		107	8.4	5.3	110	0.20	0.22	107	1,343	1,898	110	28	47	107	2.52	3.56	110	0.053	0.088
MGT01	dry	270	22	19.6	5.5	22	0.17	0.21	22	610	1,168	22	5	8	22	2.26	4.33	22	0.017	0.028
	wet		43	17.8	4.7	44	0.24	0.24	43	1,034	1,390	44	14	27	43	3.83	5.15	44	0.052	0.102
	Combined		65	18.4	5.1	66	0.21	0.23	65	890	1,325	66	11	23	65	3.30	4.91	66	0.040	0.086
WGT01	dry	221	49	19.0	5.3	49	0.17	0.15	49	1,660	1,557	49	15	20	49	7.50	7.04	49	0.067	0.093
	wet		70	17.4	4.2	70	0.13	0.10	70	2,173	1,364	70	18	23	70	9.82	6.16	70	0.083	0.105
	Combined		119	18.1	4.7	119	0.15	0.12	119	1,961	1,462	119	17	22	119	8.86	6.61	119	0.076	0.100
VMT01	dry	324	27	14.0	2.0	28	0.16	0.15	27	1,374	1,253	28	24	57	27	4.24	3.87	28	0.075	0.176
	wet		47	13.4	4.0	49	0.15	0.12	47	2,145	2,129	49	23	31	47	6.62	6.57	49	0.072	0.096
	Combined		74	13.6	3.4	77	0.16	0.13	74	1,864	1,886	77	24	42	74	5.75	5.82	77	0.073	0.130

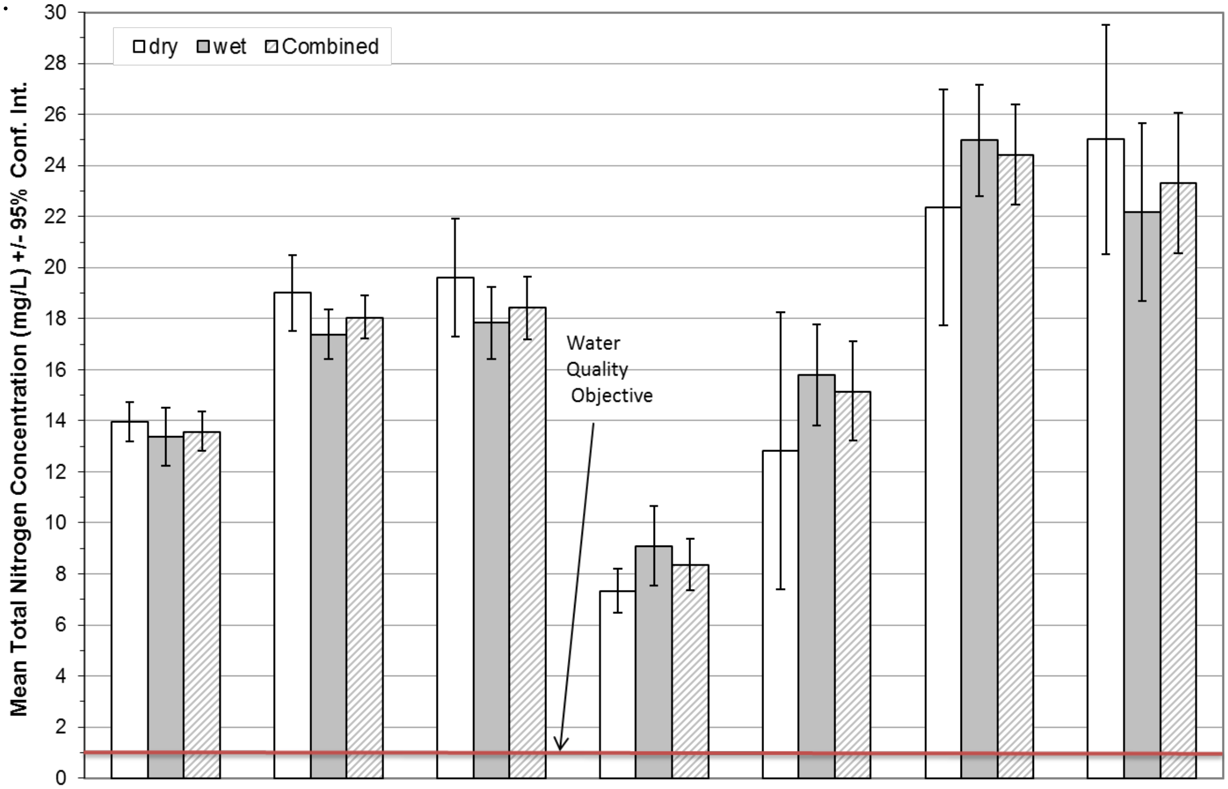
A.


dry
wet
Combined
Mean Total Nitrogen Concentration (mg/L) +/- 95% Conf. Int.
46.0
44.0
42.0
40.0
38.0
36.0
34.0
32.0
30.0
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Water Quality Objective

B.

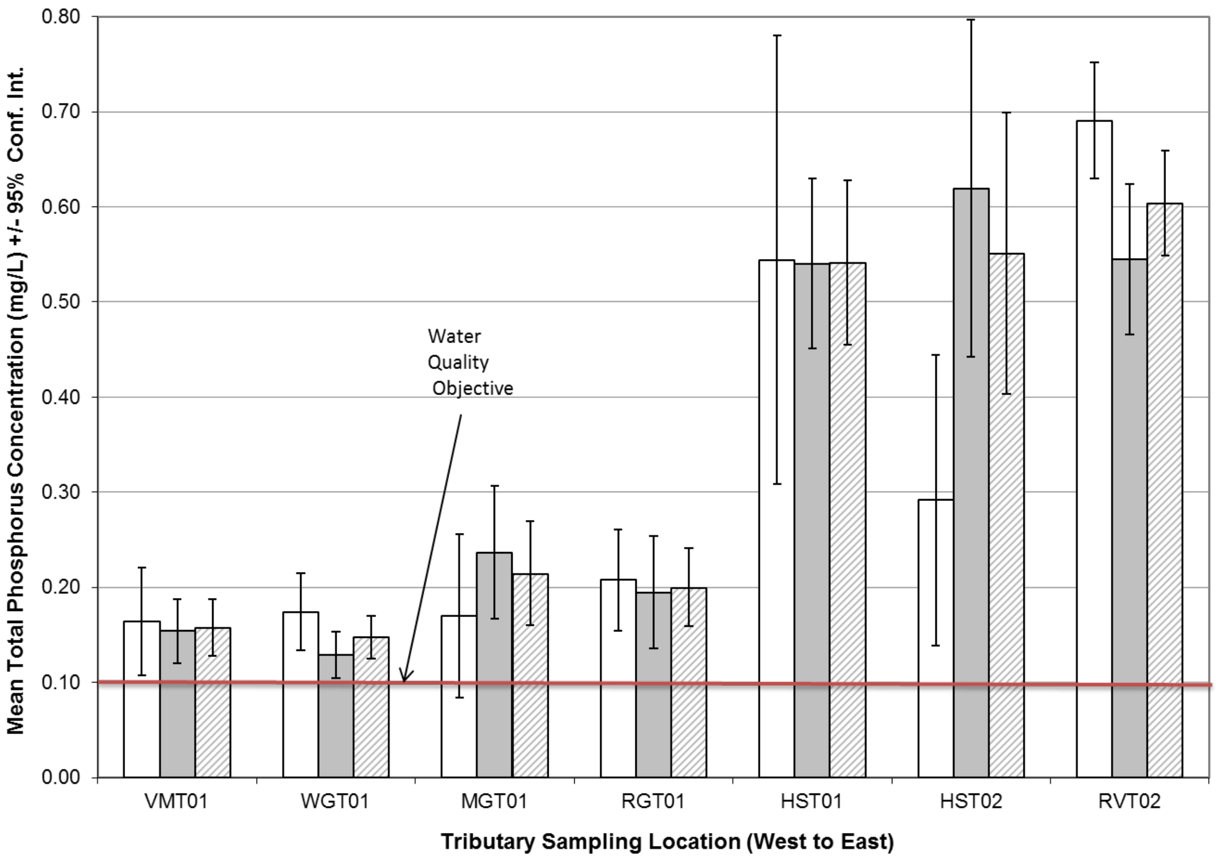

dry
wet
Combined
Mean Total Phosphorus Concentration (mg/L) +/- 95% Conf. Int.
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Water Quality Objective
SMG06
RBC06
SMG05
RBC10
RBC04
RBC02
RBC01
Main Stem Sampling Location (West to East)

C.



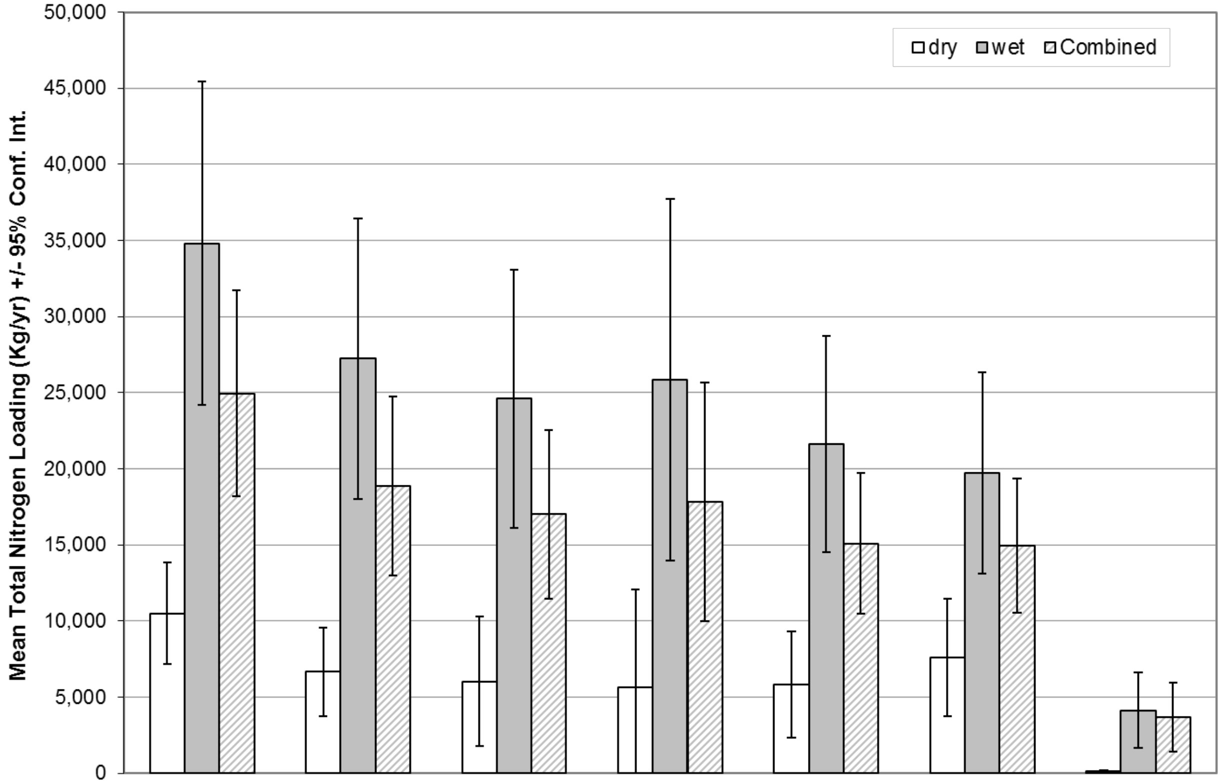
dry
wet
Combined
Mean Total Nitrogen Concentration (mg/L) +/- 95% Conf. Int.
Water Quality Objective
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30

D.



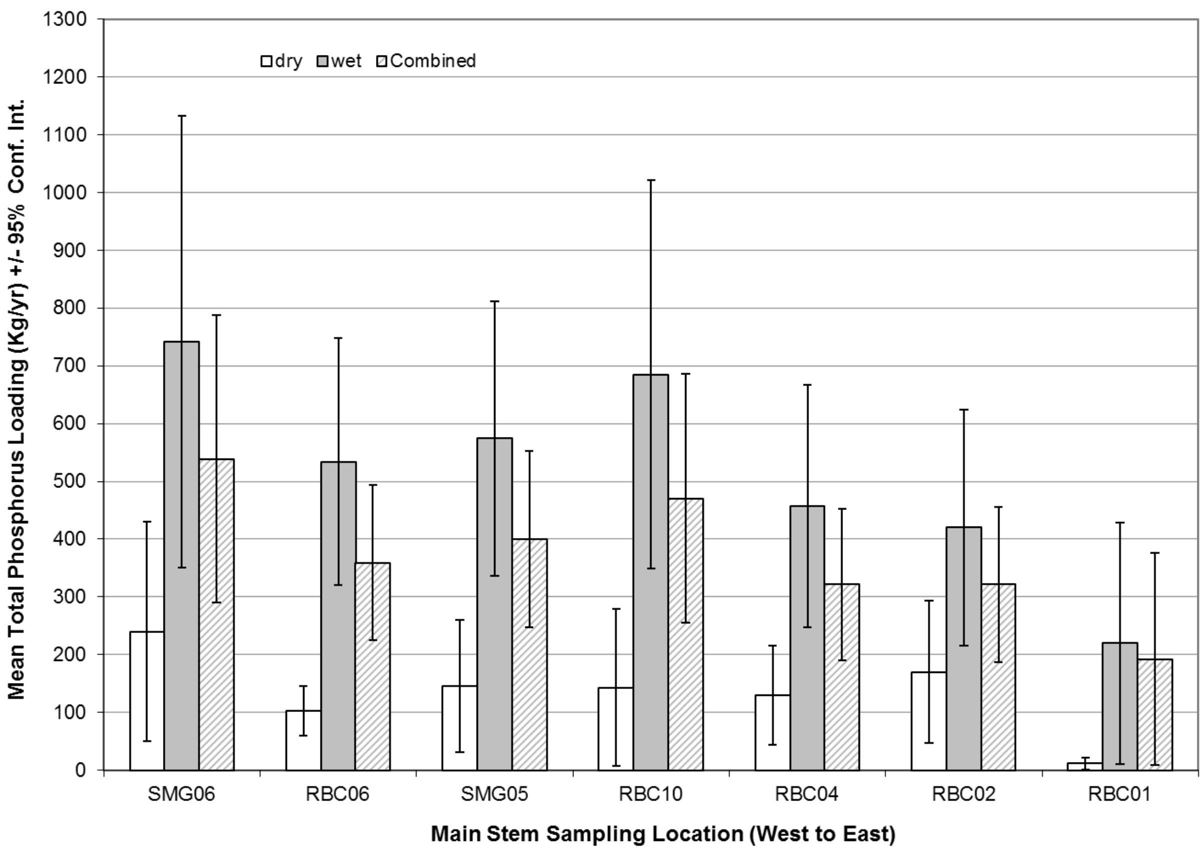
Mean Total Phosphorus Concentration (mg/L) +/- 95% Conf. Int.
Water Quality Objective
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
VMT01
WGT01
MGT01
RGT01
HST01
HST02
RVT02
Tributary Sampling Location (West to East)

E.



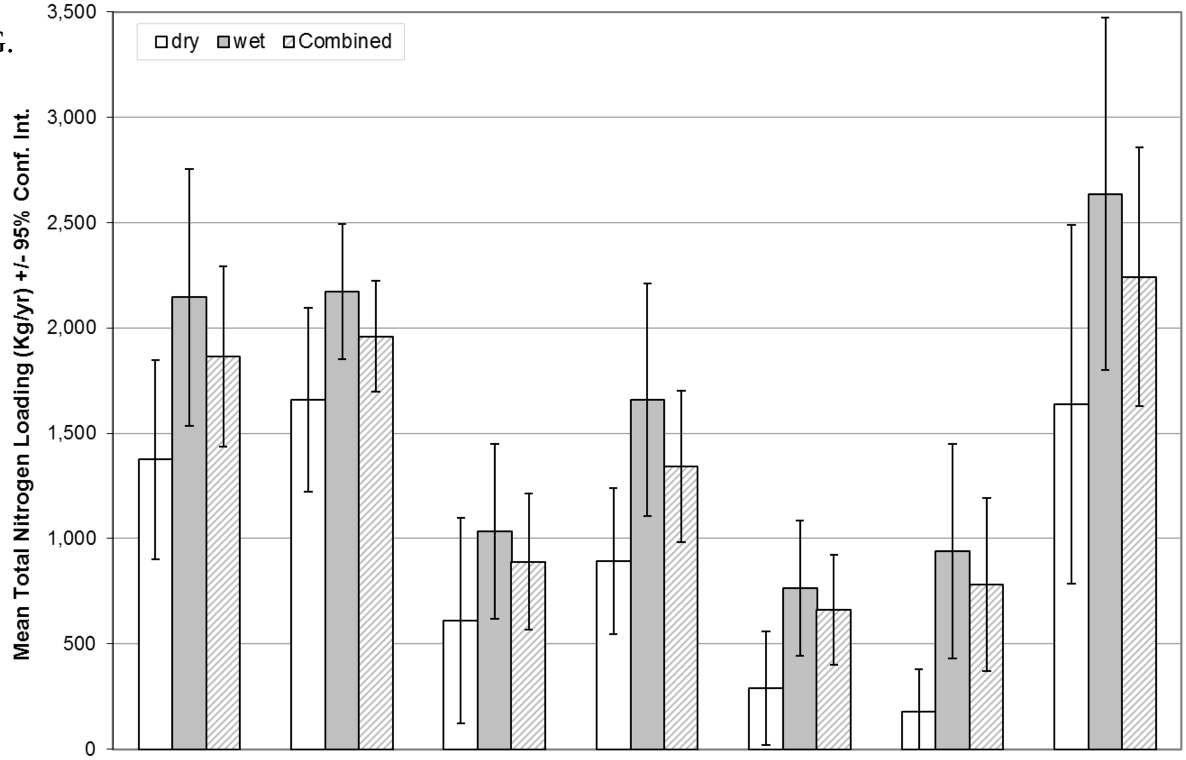
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Mean Total Nitrogen Loading (Kg/yr) +/- 95% Conf. Int.
dry
wet
Combined

F.



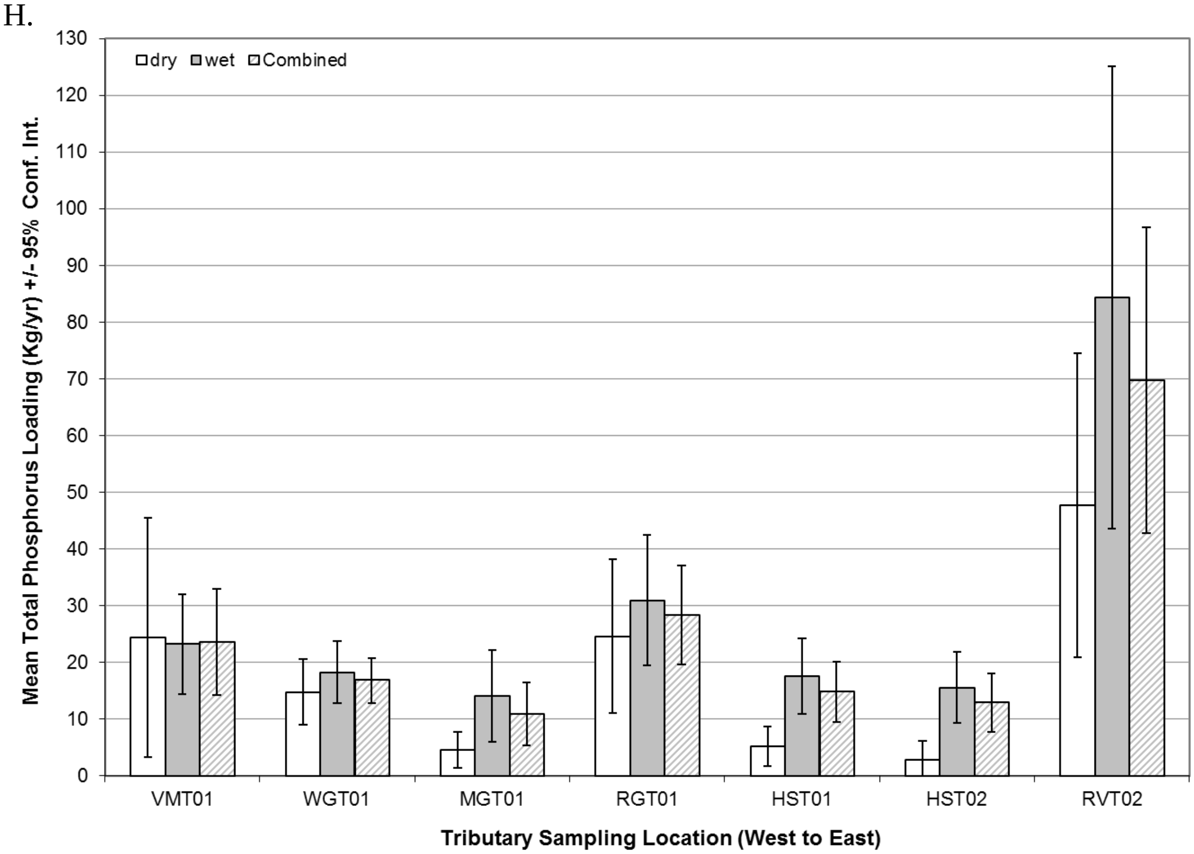
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Mean Total Phosphorus Loading (Kg/yr) +/- 95% Conf. Int.
dry
wet
Combined
SMG06
RBC06
SMG05
RBC10
RBC04
RBC02
RBC01
Main Stem Sampling Location (West to East)

G.



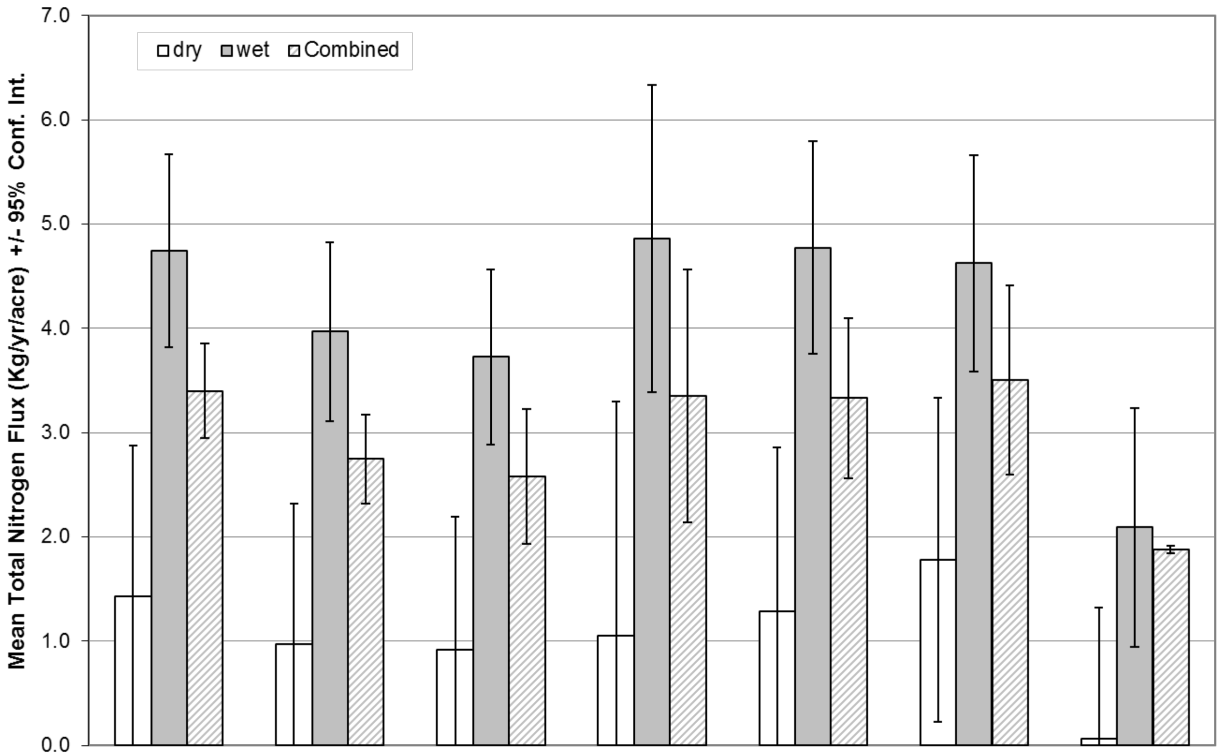
dry
wet
Combined
Mean Total Nitrogen Loading (Kg/yr) +/- 95% Conf. Int.
3,500
3,000
2,500
2,000
1,500
1,000
500
0

H.



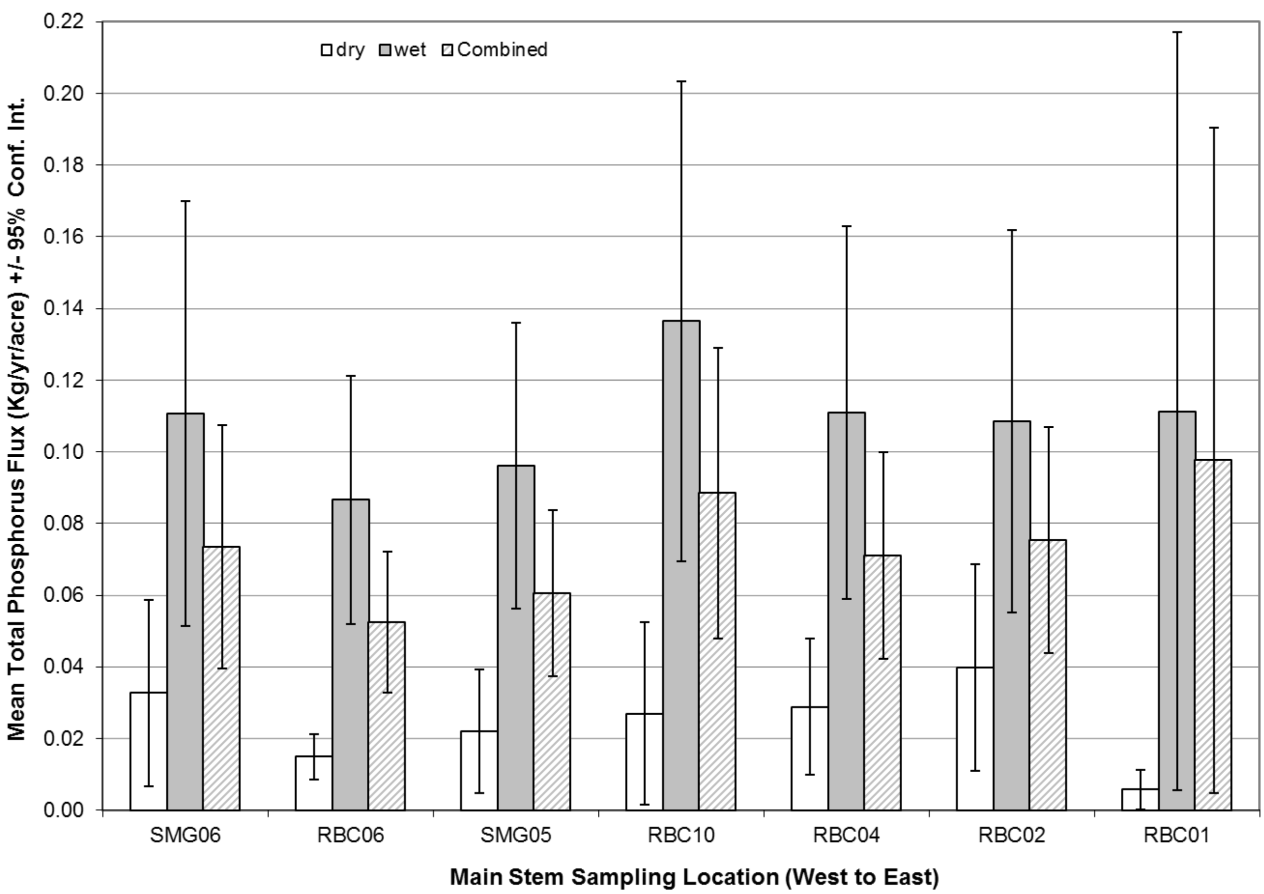
dry
wet
Combined
Mean Total Phosphorus Loading (Kg/yr) +/- 95% Conf. Int.
130
120
110
100
90
80
70
60
50
40
30
20
10
0
VMT01
WGT01
MGT01
RGT01
HST01
HST02
RVT02
Tributary Sampling Location (West to East)

I.



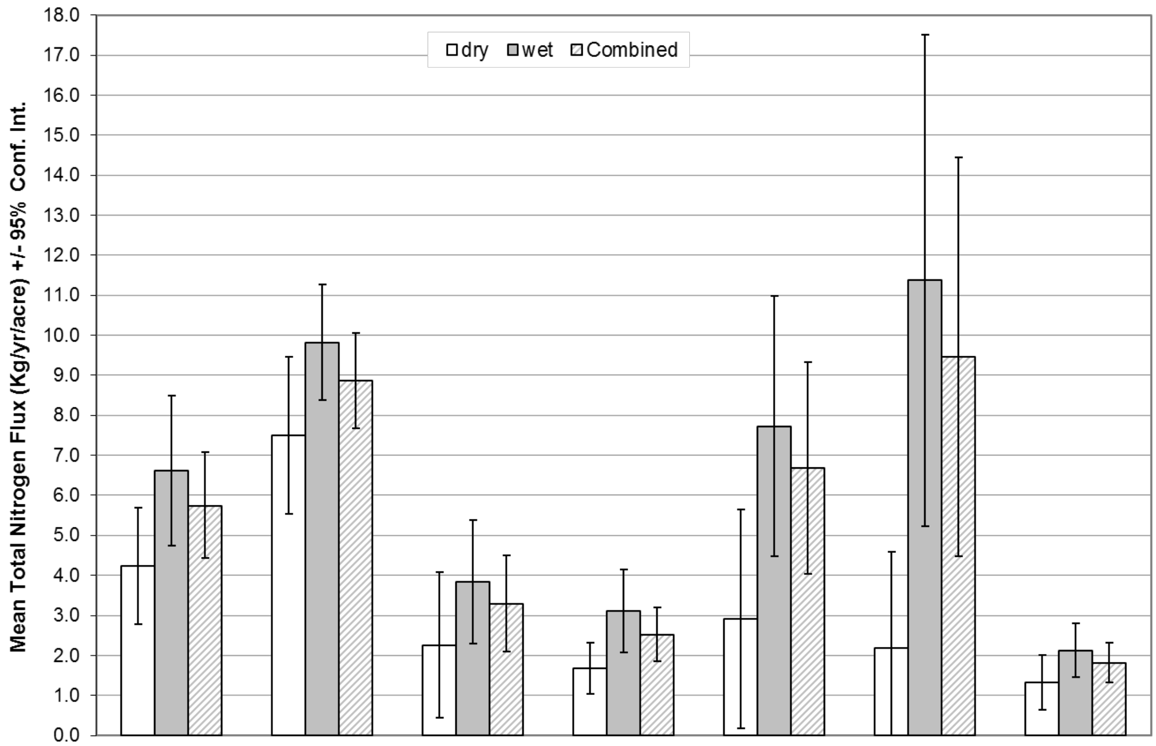
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
dry
wet
Combined
Mean Total Nitrogen Flux (Kg/yr/acre) +/- 95% Conf. Int.

J.



0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
dry
wet
Combined
Mean Total Phosphorus Flux (Kg/yr/acre) +/- 95% Conf. Int.
SMG06
RBC06
SMG05
RBC10
RBC04
RBC02
RBC01
Main Stem Sampling Location (West to East)

K.



L.

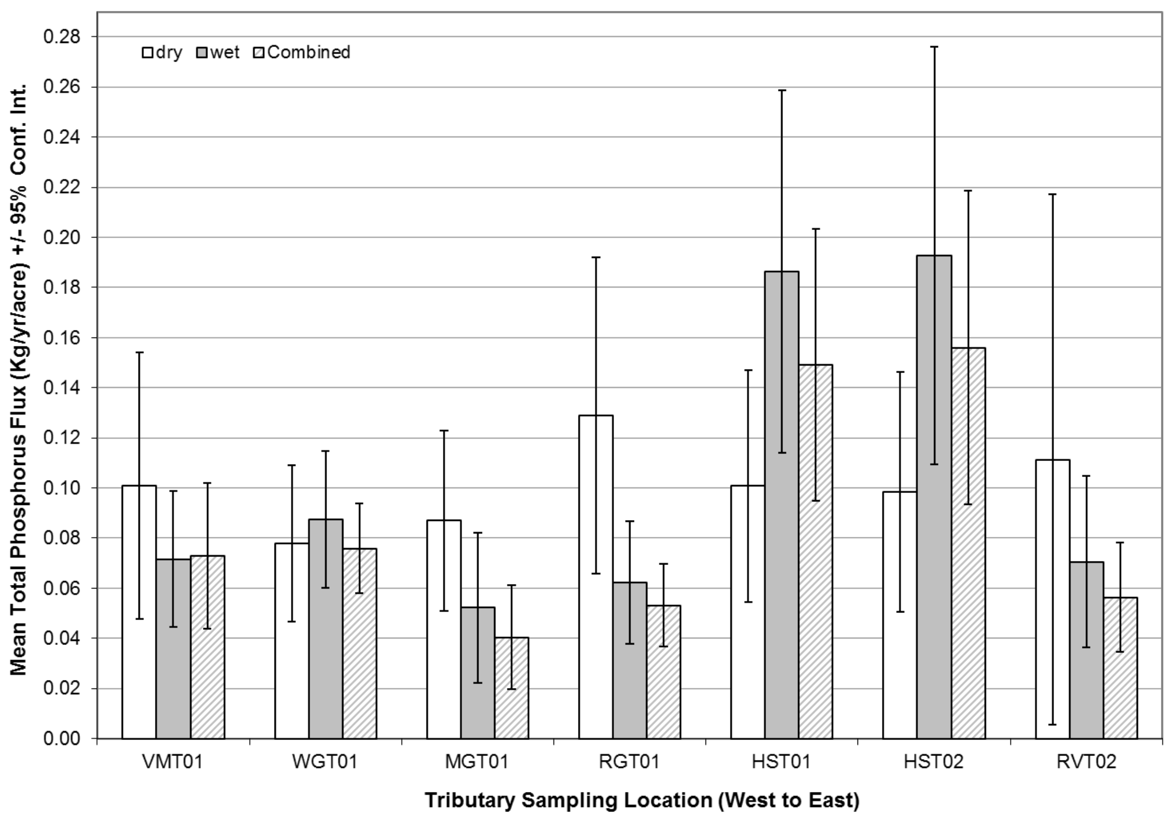


Figure 2: Mean concentrations, loadings and flux of total nitrogen and total phosphorus as measured along the main stem and the tributaries of Rainbow Creek for dry, wet (during non-storm events) and both seasons combined from May, 2003 through June, 2014.

For all data combined (from May 2003 through September 2015), sample sizes (n), means and standard deviations of concentrations, loadings and flux for total nitrogen and total phosphorus are presented by sampling location for the main stem of Rainbow Creek (Table 4) and the tributaries (Table 5). These statistics are presented for both dry and wet seasons separately and combined.

For greater ease of interpretation, the mean concentrations, loadings and flux were then graphed with their respective 95% confidence intervals (shown with the error bars) (Figure 2A-K). In Figure 2, the white bars indicate mean measurements taken during dry season, the grey bars correspond to those taken during wet season, and the striped bars designate means for both seasons combined. Sampling locations in Figure 2 are listed along the horizontal axis from the site furthest downstream to one furthest upstream. Separate bar graphs were prepared for locations along the Creek's main stem (Fig. 2A, B, E, F, I and J) and for its tributaries (Fig. 2C, D, G, H, K and L).

Nutrient Concentrations

Both along the main stem of Rainbow Creek and its tributaries, mean concentrations of total nitrogen and total phosphorus were not significantly different between the wet and the dry seasons with two exceptions: SMG10 had a significantly lower total N concentration during dry than during wet season and RBC01 had a significantly higher total phosphorus concentration during dry than during wet season.

For SMG10, the difference in mean total N concentration may be attributed to sampling bias resulting from the fact that, during the later sampling years (2012-2015), the site was ponded or dry more often during dry season than during the wet season. This resulted in the collection and analysis of only 12 dry season samples as opposed to almost twice as many (22 samples) wet season samples at SMG10 during 2012-2015 while the total nitrogen concentrations were significantly higher at SMG10 during those years than earlier. This sampling bias resulted in a higher mean nitrogen concentration for the wet season samples at SMG10.

RBC01 is located furthest upstream along the main stem of Rainbow Creek and has been dry on 78% of all sampling occasions during dry season. This resulted in a wet season sampling bias whereby 80% of samples analyzed for total P and total N were collected during wet season. Also, as no flowing water was observed at RBC01 year round since July 2011, the mean total P concentrations at RBC01 reflect conditions at the site only for the time prior to July 2011; a sampling bias toward earlier monitoring years.

Because, for most sampling locations, there was no significant differences between dry and wet season results and mean total N and total P concentrations for SMG10 and RBC01 were subject to sampling bias, the overall, combined dry and wet season data were used to further evaluate mean values and trends in total P and total N concentrations.

Main Stem Concentrations

As shown in Fig. 2A-B, the mean total nitrogen and total phosphorus concentrations at monitoring locations along the main stem of Rainbow Creek exceeded their corresponding Basin Plan numerical water quality objectives (NWQO) for biostimulatory substances for the protection of the COLD and WARM beneficial uses (NWQO for total nitrogen =1.0 mg/L; NWQO for total phosphorus = 0.1 mg/L).

The highest mean total nitrogen and total phosphorus concentrations along the main stem of Rainbow Creek were measured at Huffstatler Rd. (RBC02); Old Highway 395 (RBC04) had the second highest (Table 4, Fig. 2 A-B). Since the sampling sites in Fig.2 are arranged along the horizontal axis from West to East (from downstream up), this indicates that nutrients were added to the system downstream of Jubilee Way (RBC01) and upstream of MWD Crossing (RBC10). Also, the total phosphorus concentration at MWD Crossing (RBC10) was significantly higher than those measured at all main stem sites downstream (SMG05, RBC06, SMG06).

Tributary Concentrations

As shown in Fig. 2C-D, the mean total nitrogen and total phosphorus concentrations at all tributary sampling locations exceeded their corresponding Basin Plan objectives of 1.0 mg/L and 0.1 mg/L.

Rainbow Glen (RGT01) located just downstream of MWD Crossing (RBC10) had a total nitrogen concentration that was significantly lower than any of the remaining sampling sites (Fig. 2C). The highest mean total N and Total P concentrations were found at the Chica tributary (RVT02) and Brow Ditch (HST01 and HST02). These tributaries enter Rainbow Creek downstream of Jubilee Way (RBC01) and just upstream of Huffstatler Rd. (RBC02).

Instantaneous Nutrient Loadings

Mean nutrient loadings and 95% confidence intervals for each sampling location during wet, dry and both seasons combined are presented in Figure 2E-H. The loadings are only very rough estimates of true loadings since they are based on single instantaneous measurements of velocity (velocity measurements were averaged across the width of the channel as they were taken over a period of approximately 10-30 seconds per sampling occasion) and only rough estimates of the cross-sectional area (area calculated on each sampling occasion from one measurement of width multiplied by an average of a few measurements of depth throughout a single cross-section of the channel). It should also be realized that while for each tributary loading was measured close to the downstream end and is unique to that tributary, along the main stem of the Creek loading values reflect all nutrients added to/ removed from the Creek as it flows downstream.

Main Stem Instantaneous Loadings

Generally, along the main stem of Rainbow Creek, the mean total nitrogen and total phosphorus loadings were higher during the wet than during the dry season (Fig. 2E-F). For total nitrogen (Fig. 2E), these differences were statistically significant at all 7 locations sampled. For total phosphorus (Fig. 2F) the differences were statistically significant at 4 of the 7 locations including Old Highway 395 (RBC04), MWD Crossing (RBC10), Willow Glen Rd. (SMG05), and 2219 Willow Glen Rd. (RBC06).

As would be expected based on its location furthest upstream, Jubilee Way (RBC01) had the lowest mean nutrient loading. Just upstream of RBC01, at Huffstatler Rd. (RBC02), mean loading for both nutrients increased and remained high further down along the Creek as the loads are cumulative (Fig. 2E and F).

Tributary Instantaneous Loadings

For the tributaries, there were no significant differences in mean nutrient loadings between the seasons (Fig. 2G and H). One exception was the Brow Ditch (HST01 and HST02) where the mean wet season nutrient loadings were significantly higher than those for the dry season.

The highest mean loading for total phosphorus was found at Chica (RVT02). Mean loadings for total nitrogen were highest at Chica (RVT02) but also at Willow Glen (WGT01) and Via Milpas (VMT01), the two tributaries located furthest downstream. A high mean total nitrogen loading was also observed at Rainbow Glen tributary (RGT01). This suggests that nutrients, including total nitrogen and total phosphorus, were added to Rainbow Creek downstream of Jubilee Way (RBC01) and upstream of Huffstatler Rd. (RBC02) predominantly from the Chica tributary (RVT02). Further downstream Rainbow Glen (RGT01), Via Milpas (VMT01) and Willow Glen (WGT01) tributaries may have also contributed significant amounts of total nitrogen to the system. However, when the total nutrient loads discharged from the main stem sampling site located furthest downstream, SMG06 (total N = 24,974 kg/yr, total P = 9,747 kg/yr), are compared to combined loads from all the tributaries (total N = 539 kg/yr, total P = 177 kg/yr), nutrient loads from the tributaries constitute only 2% of the loads measured at SMG06.

Nutrient Flux

Mean nutrient flux +/- 95% confidence intervals for each sampling location during wet, dry and both seasons combined are presented in Figure 2I-L. The flux values were calculated from loadings (above) and they are therefore only very rough estimates of true flux. It should be noted that, while for each tributary flux was calculated for its unique drainage area, along the main stem of the Creek flux values are cumulative as nutrient loading changes and drainage area increases from upstream down.

Main Stem Flux

Nutrient flux was generally higher during wet than during dry season at all locations sampled (Figs. 2I and 2J). Total nitrogen flux values increased significantly downstream of Jubilee Way (RBC01).

Tributary Flux

With the exception of the Brow Ditch (HST01 and HST02), no significant seasonal differences in nutrient flux were found in any of the six tributaries (Fig. 2K and L). For the Brow Ditch, mean nutrient flux values were higher during the wet season. Total nitrogen flux was significantly higher at the Brow Ditch and at the Willow Glen Tributary (WGT01) and Via Milpas (VMT01) tributaries than at the remaining tributary sites. In addition, the total phosphorus flux for the Brow Ditch was higher than those of all other monitored tributaries (Fig. 2L).

Trend Analysis

As shown in Table 5 and in Attachment A, significant negative trends in total nitrogen and total phosphorus concentrations were evident at one sampling location along Rainbow Creek's main stem and in some of the tributaries. The statistically significant negative trend in total nitrogen concentration along the main stem was detected at Rainbow Creek at Jubilee Way (RBC01) but positive (increasing) trends) in total nitrogen concentration were detected at all remaining main stem sampling locations upstream of RBC01. For the tributaries, the most pronounced declining trend in total nitrogen concentration was found in Margarita Glen (MGT01), followed by the Via Milpas (VMT01). One of the tributaries, Chica (RVT02) had a significant positive (increasing) trend in total N concentration.

For total phosphorus concentrations, four sampling locations along the main stem had significant declining trends. These included sampling locations at Huffstatler Rd. (RBC02), Old Highway 395 (RBC04), Willow Glen Rd. (SMG05), and Stage Coach Lane (SMG06). There were no main stem locations with positive trends for total P concentrations. Two tributaries showed significant increasing trends in total P concentrations. These included the Brow Ditch at Huffstatler Road (HST01 and HST02), and the Willow Glen Tribuary (WGT01). One tributary, Chica (RVT02) has a significant negative trend in total P concentration.

Table 5. Results of trend analysis for total nitrogen and total phosphorus concentrations at different sampling locations along Rainbow Creek's main stem and tributaries. *Trend* – indicates positive or negative trend over time; r^2 is directly proportional to the fraction of the variability in the data that can be explained by the regression equation; values in bold indicate statistically significant r^2 at α = 0.05 (two-tailed).

Site ID	Total Nitrogen		Total Phosphate as P	
	Trend	r^2	Trend	r^2
Main Stem Locations				
RBC01	**-**	**0.23**	-	0.05
RBC02	**+**	**0.37**	**-**	**0.43**
RBC04	**+**	**0.44**	**-**	**0.24**
RBC10	**+**	**0.32**		0.00
SMG05	**+**	**0.15**	**-**	**0.08**
RBC06	**+**	**0.14**		0.00
SMG06	**+**	**0.04**	**-**	**0.04**
Tributary Locations				
RVT02	**+**	**0.09**	**-**	**0.05**
HST01	-	0.04	**+**	**0.22**
HST02	-	0.01	**+**	**0.24**
RGT01	+	0.01	+	0.01
MGT01	**-**	**0.37**	+	0.02
WGT01	**-**	**0.05**	**+**	**0.04**
VMT01	**-**	**0.15**		0.00

Conclusions

With respect to the first question of "*How do the mean concentrations, loading and flux of total nitrogen and total phosphorus vary among sampling sites along the main stem of Rainbow Creek?*" Mean concentrations of total nitrogen and total phosphorus significantly increased in the main stem of Rainbow Creek's from Jubilee Way (RBC01) located furthest upstream to 2219 Stage Coach Lane (RBC06) furthest downstream. Also, for both total nitrogen and total phosphorus, there was a significant increase in mean concentration just downstream of Jubilee Way (RBC01) and a significant decrease downstream of the Old Highway 395 (RBC04). This may suggest that nutrients were added to the system just downstream of Jubilee Way (RBC01) and upstream of Huffstatler Rd. (RBC02) and that there may have been some nutrient assimilation downstream of the Old Highway 395 (RBC04).

The estimated mean dry weather nutrient loading in Rainbow Creek increased from upstream to downstream. The mean loadings per year at the upstream-most location sampled (RBC01) were 3,704 kg for total nitrogen and 193 kg for total phosphorus; they were 24,974 kg for total nitrogen and 539 kg for total phosphorus at the mouth of Rainbow Creek (SMG06).

With respect to the second question of "*How do the mean concentrations, loading and flux of total nitrogen and total phosphorus vary among sampling sites in the tributaries of Rainbow Creek?*" All of the sampled tributaries exhibited mean dry weather total nitrogen and total phosphorus concentrations that exceeded their corresponding water quality objectives of 1 mg/L and 0.1 mg/L. This suggests that all tributaries in the current study contributed nutrients to Rainbow Creek. The Brow Ditch at Huffstatler Road (HST01 and HST02), Willow Glen (WGT01) and Via Milipas (VMT02) had mean total nitrogen flux values that were significantly higher than those of the three remaining tributaries making them noteworthy as potential sources of total nitrogen in the Creek. The Chica tributary (RVT02) had the highest mean total nitrogen and total phosphorus loadings but its total nitrogen flux was significantly lower than those of Via Milpas (VMT01), Brow Ditch (HST01), and Willow Glen (WGT01).

With respect to the third question of *"Are there any significant trends (positive or negative) in total nitrogen and total phosphorus concentrations in Rainbow Creek main stem and tributaries over time?"* Since sampling begun, in May 2003, through the end of June 2011, concentrations of total nitrogen and total phosphorus showed statistically significant decreases at all but two sampling locations along Rainbow Creek's main stem (WURMP 2011). During that time, significant negative trends in total nitrogen concentrations were also observed at four of the six tributary locations sampled; one of the six tributaries, RVT02, also showed a significant decrease in total phosphorus concentrations.

However, when data collected from July 2011 through the end of September 2015 were added to the analysis, all of the negative trends for total nitrogen concentrations along the main stem of Rainbow Creek have become significantly positive (Table 4; Attachment A). Only the upstream-most location (RBC01) continued to show a significant decreasing trend but RBC01 has bben dry since June 2011. For total phosphorus concentrations along the main stem, decreasing trends continued at RBC02, RBC04, SMG05 and SMG06. Three of the tributaries (MGT01, VMT01 and WGT01) still exhibited significant negative trends in total nitrogen concentrations but the Brow Ditch at Huffstatler Rd. (HST01 and HST02) now shows increasing concentrations of total phosphorus.

In conclusion, nutrient loads in Rainbow Creek generally increased downstream and all sampled tributaries contributed at least some nutrients to the Creek even though, for this dry weather only study, nutrient loads from the tributaries constituted only 2% of the loads measured at the downstream-most mainstem location, SMG06. Total nitrogen concentrations tended to increase over time in the main stem of the creek while total phosphorus concentrations generally decreased.

References

California Regional Water Quality Control Board (CRWQCB) San Diego Region Order No. R9-2013-0001 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. 2013. Attachment E pp. E9-E13: Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed.

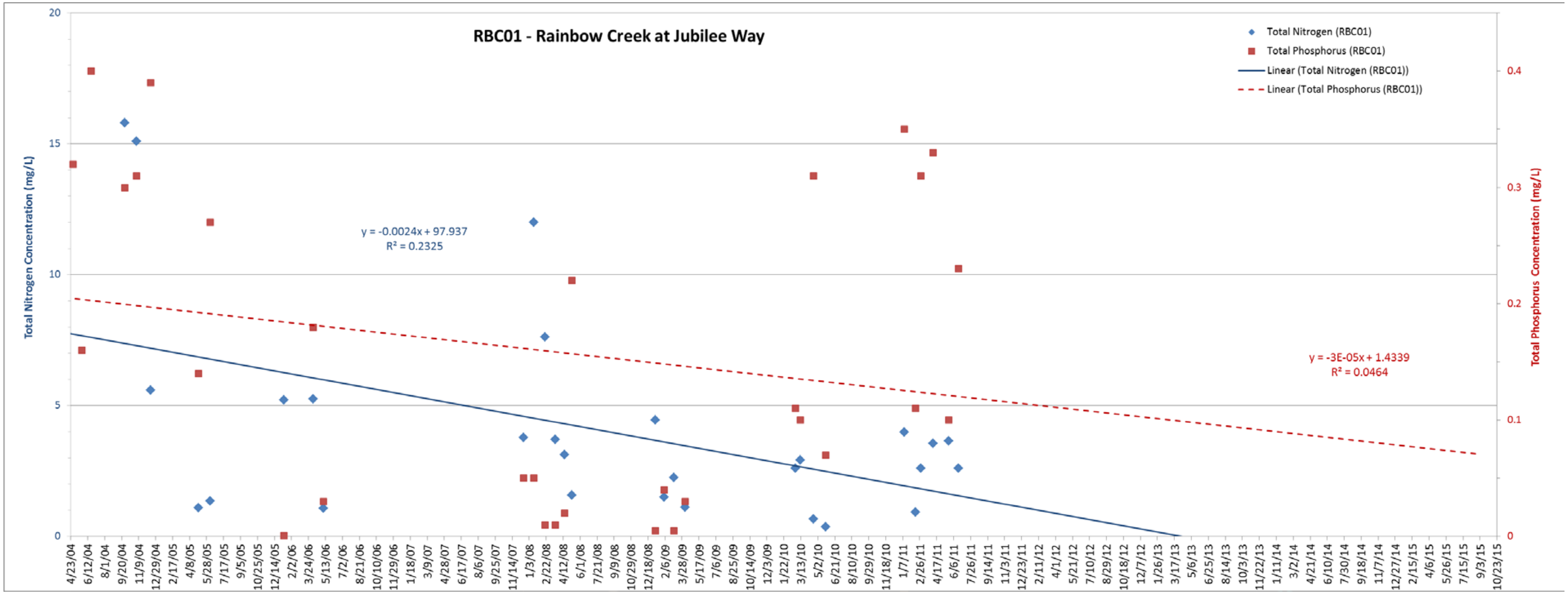
http://www.waterboards.ca.gov/rwqcb9/water_issues/programs/stormwater/docs/updates052313/2013-0523_Order_No._R9-2013-0001_COMPLETE.pdf

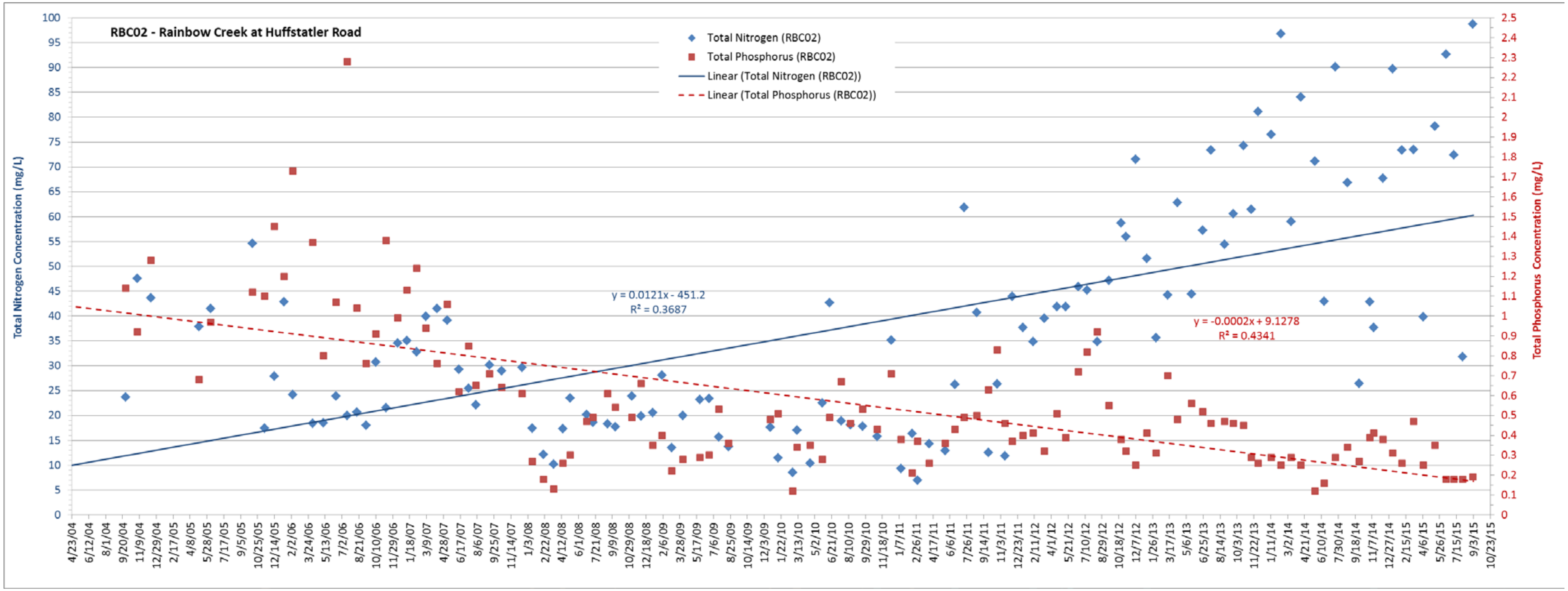
California Regional Water Quality Control Board (CRWQCB) San Diego Region. 2006. Resolution No. R9-2005-0036 Basin Plan Amendment and Final Technical Report for the Total Nitrogen and Total Phosphorus Maximum Daily Loads for Rainbow Creek. San Diego, California. http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/tmdls/rainbowcreek.shtml

WURMP 2011. Santa Margarita River Watershed Watershed Urban Runoff Management Plan (WURMP) Fiscal Year 2010-11 Annual Report. http://www.projectcleanwater.org/images/stories/Docs/Santa-Margarita/SMR_WURMP_FY1011AR.pdf

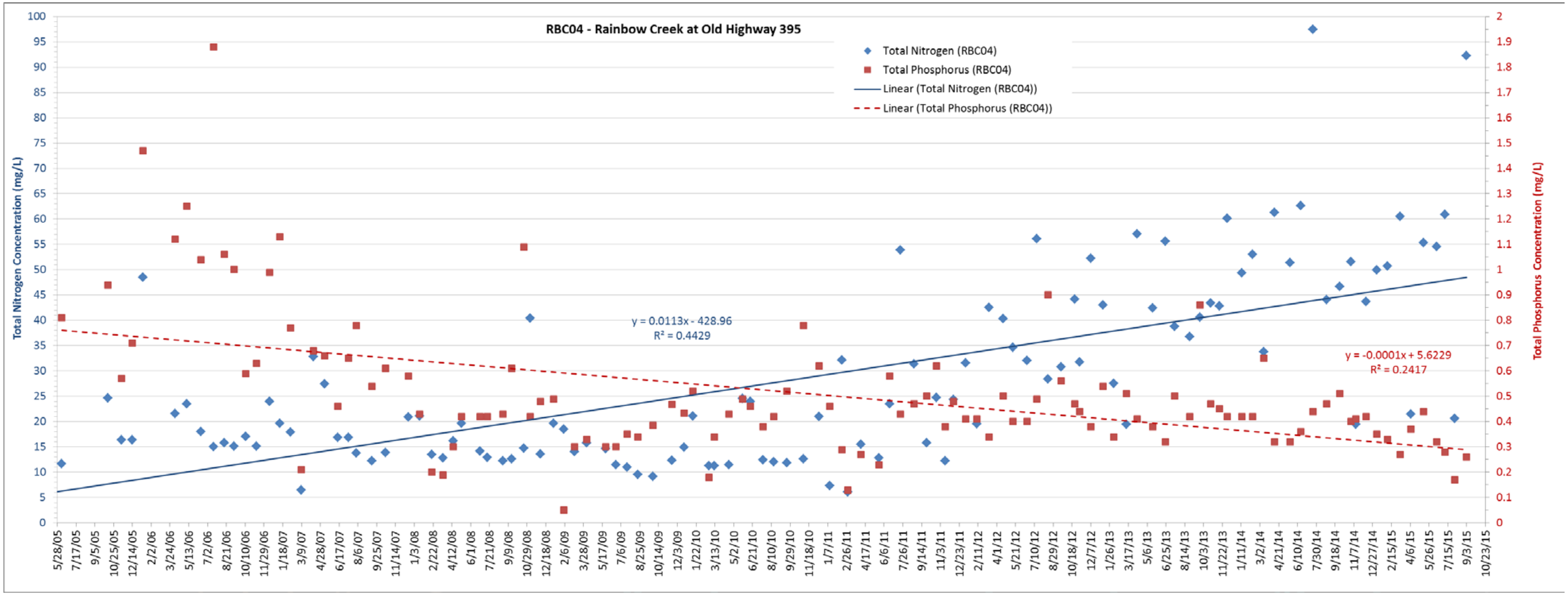
Attachment A

Distributions of total nitrogen concentrations (left axis; in blue) and total phosphate as P concentrations (right axis; in red) over the entire sampling period.
For each sampling location a line was fitted to the data; the line equations are also shown on the charts.

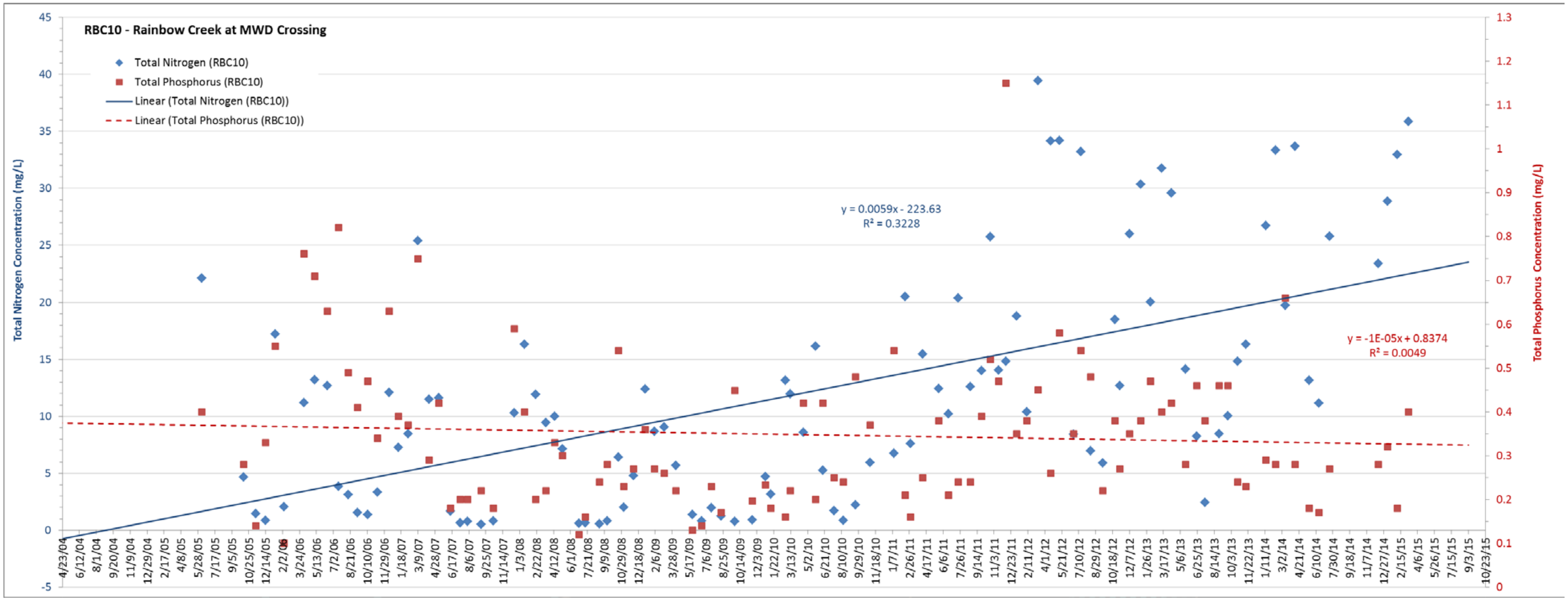

RBC01 - Rainbow Creek at Jubilee Way
Total Nitrogen (RBC01)
Total Phosphorus (RBC01)
Linear (Total Nitrogen (RBC01))
Linear (Total Phosphorus (RBC01))
y = -0.0024x + 97.937
R² = 0.2325
y = -3E-05x + 1.4339
R² = 0.0464
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)

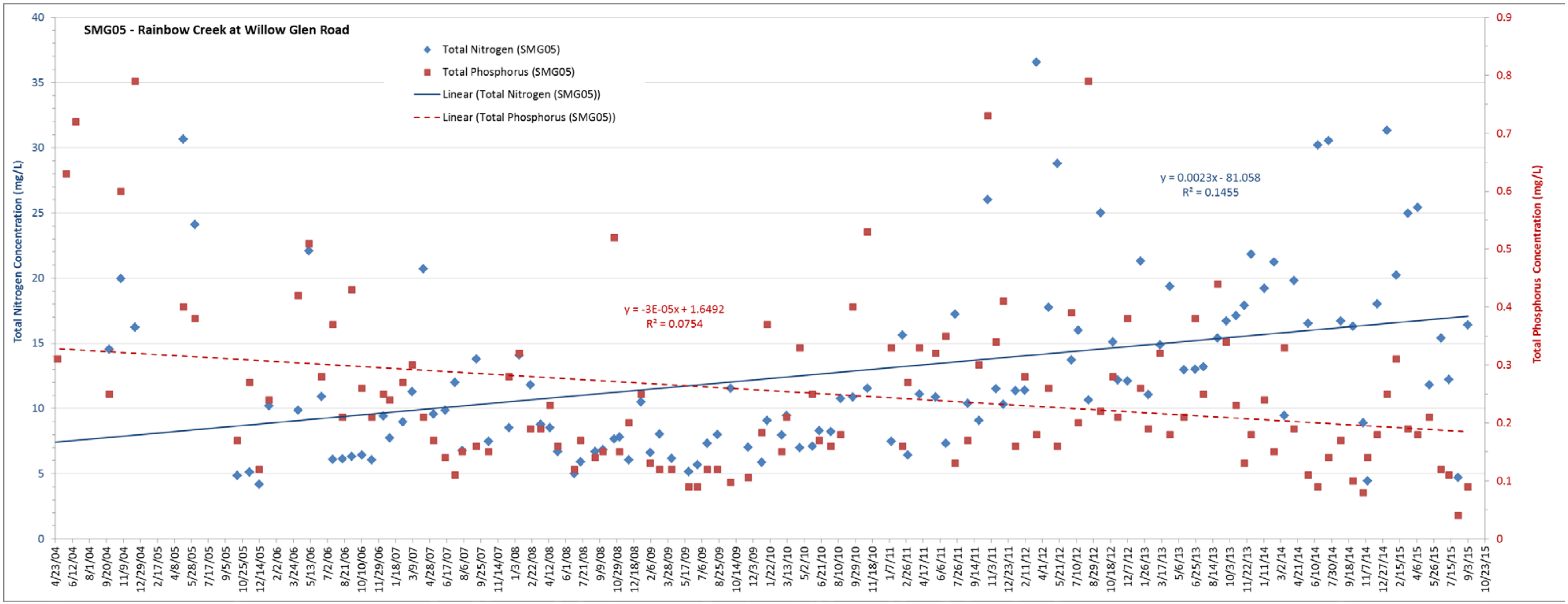


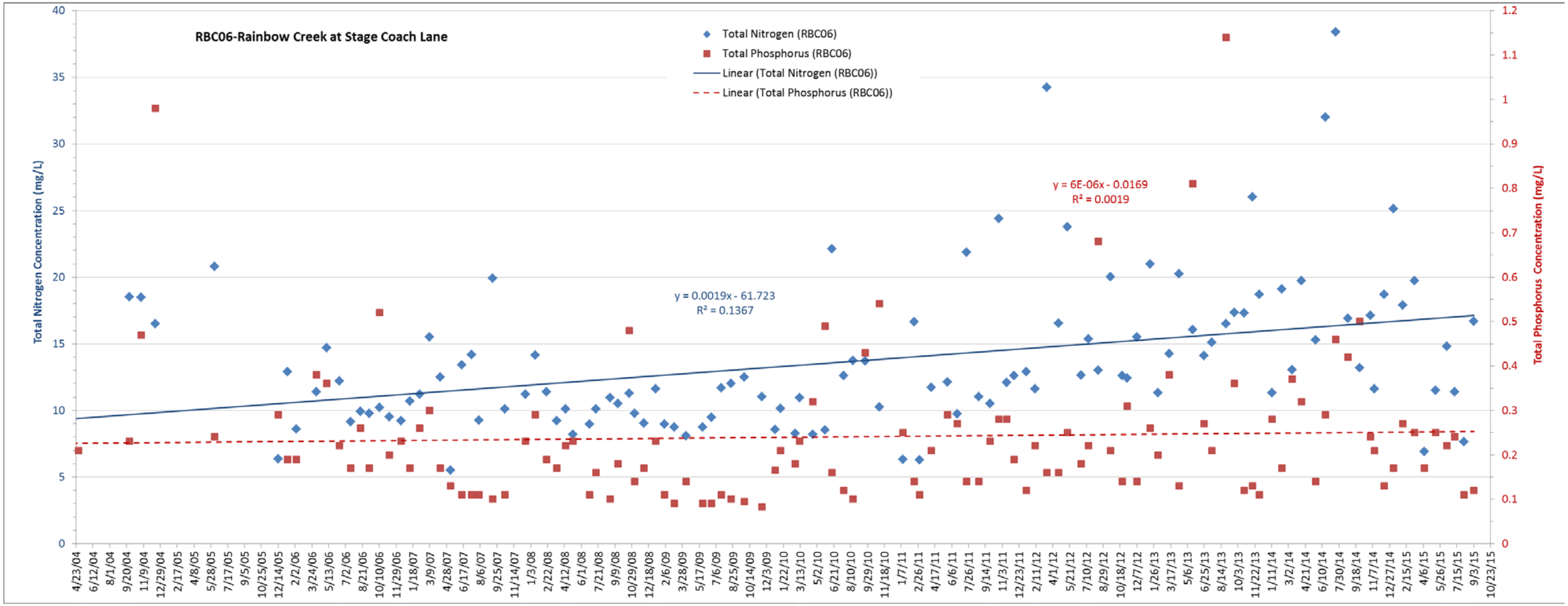
RBC02 - Rainbow Creek at Huffstatler Road
Total Nitrogen (RBC02)
Total Phosphorus (RBC02)
Linear (Total Nitrogen (RBC02))
Linear (Total Phosphorus (RBC02))
y = 0.0121x - 451.2
R² = 0.3687
y = -0.0002x + 9.1278
R² = 0.4341
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)



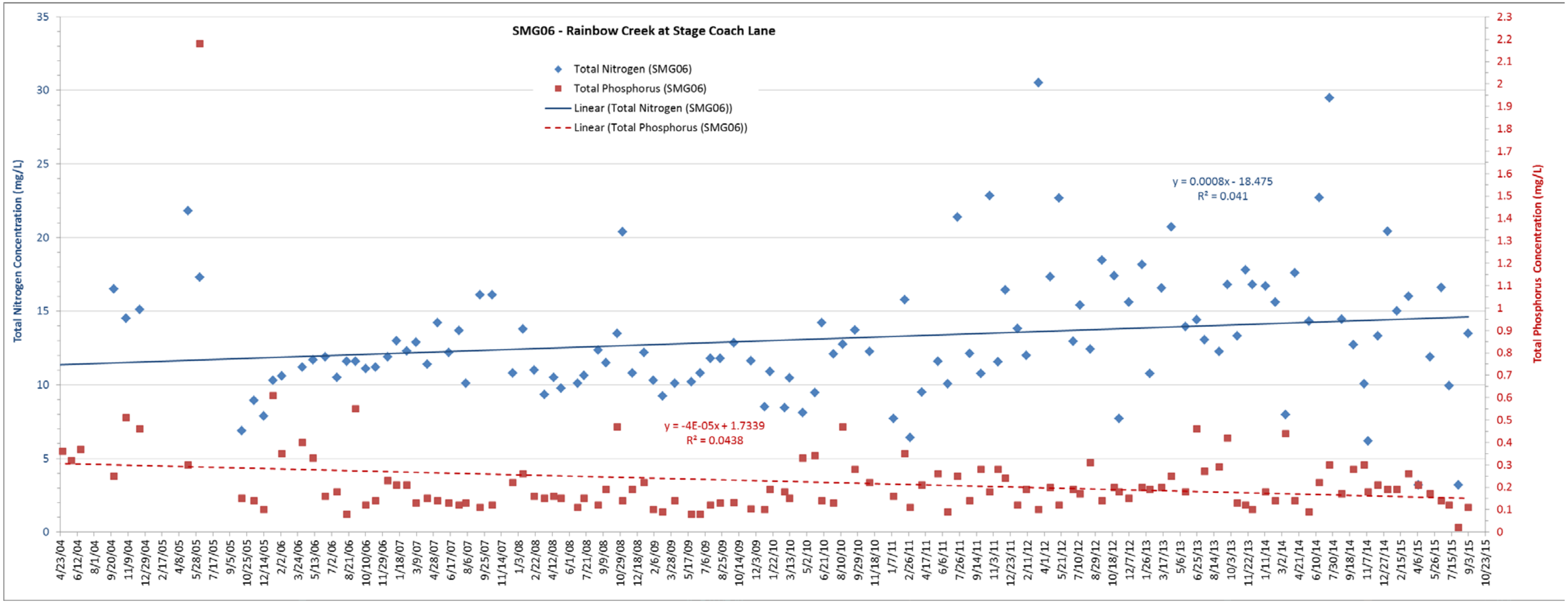
RBC04 - Rainbow Creek at Old Highway 395
Total Nitrogen (RBC04)
Total Phosphorus (RBC04)
Linear (Total Nitrogen (RBC04))
Linear (Total Phosphorus (RBC04))
y = 0.0113x - 428.96
R² = 0.4429
y = -0.0001x + 5.6229
R² = 0.2417
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)

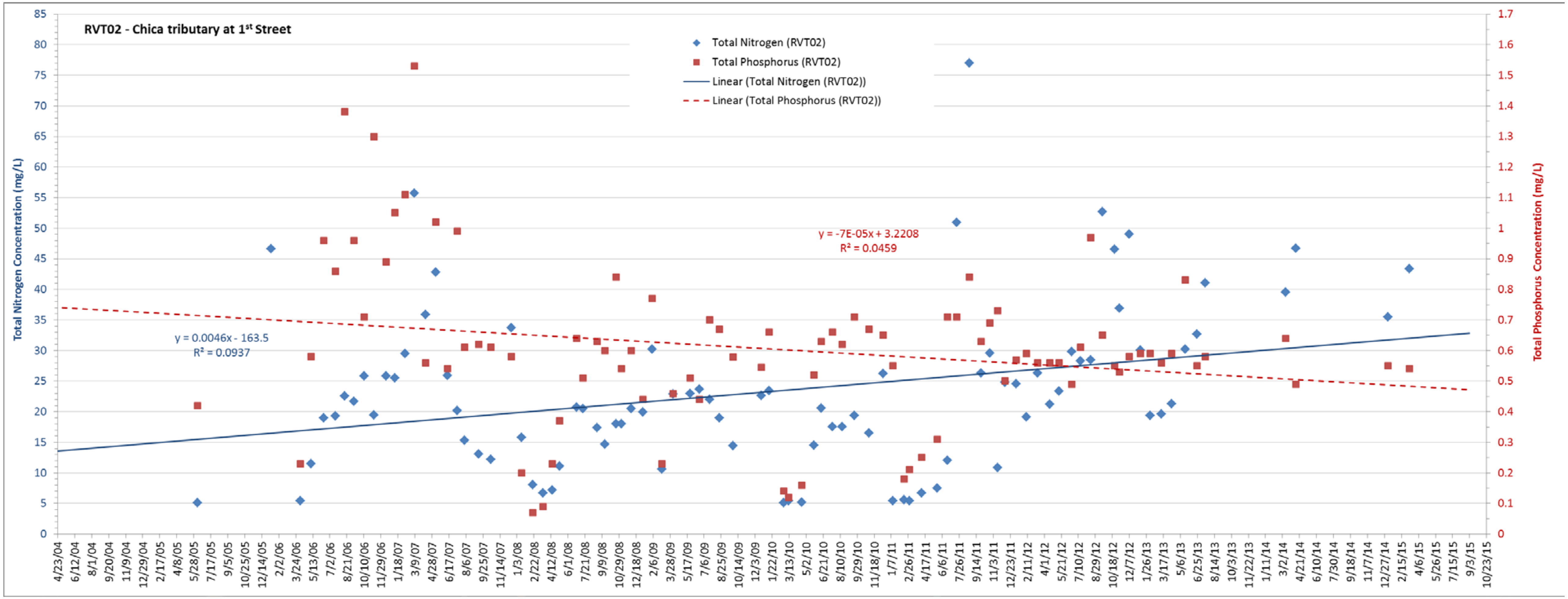

RBC10 - Rainbow Creek at MWD Crossing
Total Nitrogen (RBC10)
Total Phosphorus (RBC10)
Linear (Total Nitrogen (RBC10))
Linear (Total Phosphorus (RBC10))
y = 0.0059x - 223.63
R² = 0.3228
y = -1E-05x + 0.8374
R² = 0.0049
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)

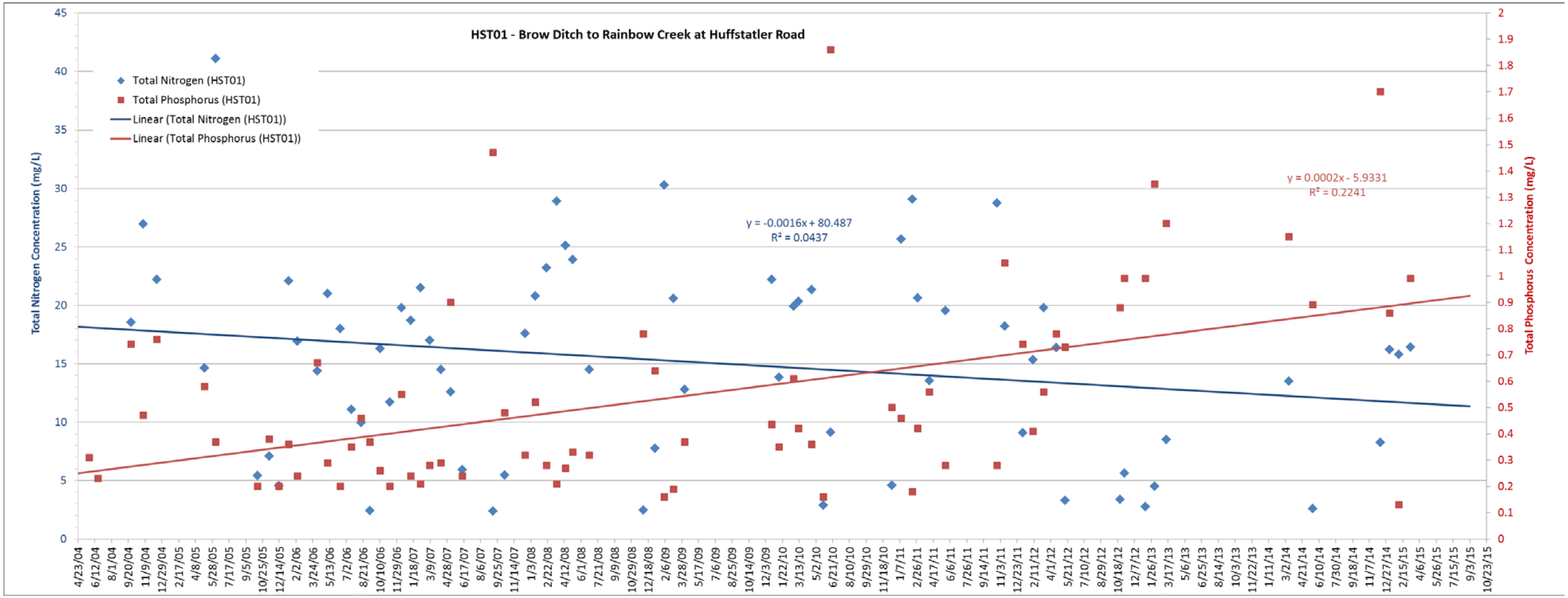

SMG05 - Rainbow Creek at Willow Glen Road
Total Nitrogen (SMG05)
Total Phosphorus (SMG05)
Linear (Total Nitrogen (SMG05))
Linear (Total Phosphorus (SMG05))
y = 0.0023x - 81.058
R² = 0.1455
y = -3E-05x + 1.6492
R² = 0.0754
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)



RBC06-Rainbow Creek at Stage Coach Lane
Total Nitrogen (RBC06)
Total Phosphorus (RBC06)
Linear (Total Nitrogen (RBC06))
Linear (Total Phosphorus (RBC06))
y = 0.0019x - 61.723
R² = 0.1367
y = 6E-06x - 0.0169
R² = 0.0019
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)


SMG06 - Rainbow Creek at Stage Coach Lane
Total Nitrogen (SMG06)
Total Phosphorus (SMG06)
Linear (Total Nitrogen (SMG06))
Linear (Total Phosphorus (SMG06))
y = 0.0008x - 18.475
R² = 0.041
y = -4E-05x + 1.7339
R² = 0.0438
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)


RVT02 - Chica tributary at 1st Street
Total Nitrogen (RVT02)
Total Phosphorus (RVT02)
Linear (Total Nitrogen (RVT02))
Linear (Total Phosphorus (RVT02))
y = 0.0046x - 163.5
R² = 0.0937
y = -7E-05x + 3.2208
R² = 0.0459
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)



HST01 - Brow Ditch to Rainbow Creek at Huffstatler Road
Total Nitrogen (HST01)
Total Phosphorus (HST01)
Linear (Total Nitrogen (HST01))
Linear (Total Phosphorus (HST01))
y = -0.0016x + 80.487
R² = 0.0437
y = 0.0002x - 5.9331
R² = 0.2241
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)
0
5
10
15
20
25
30
35
40
45
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
4/23/04
6/12/04
8/1/04
9/20/04
11/9/04
12/29/04
2/17/05
4/8/05
5/28/05
7/17/05
9/5/05
10/25/05
12/14/05
2/2/06
3/24/06
5/13/06
7/2/06
8/21/06
10/10/06
11/29/06
1/18/07
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4/28/07
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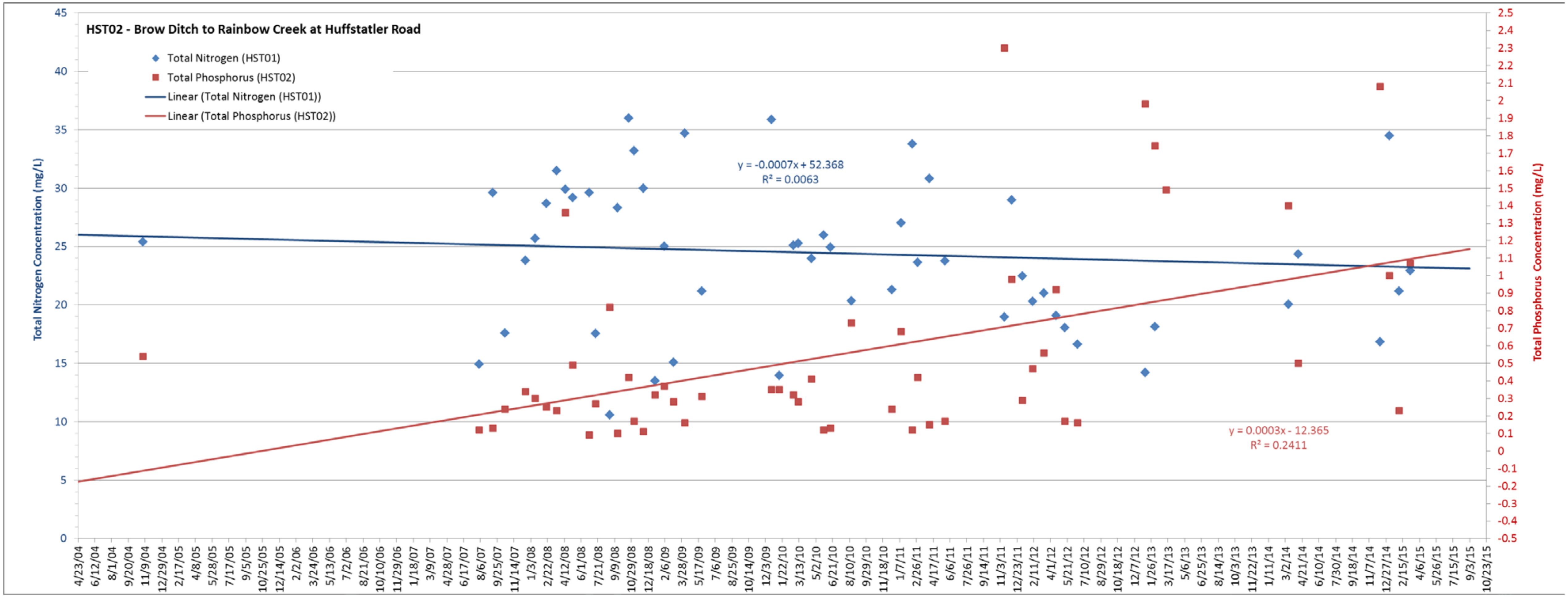
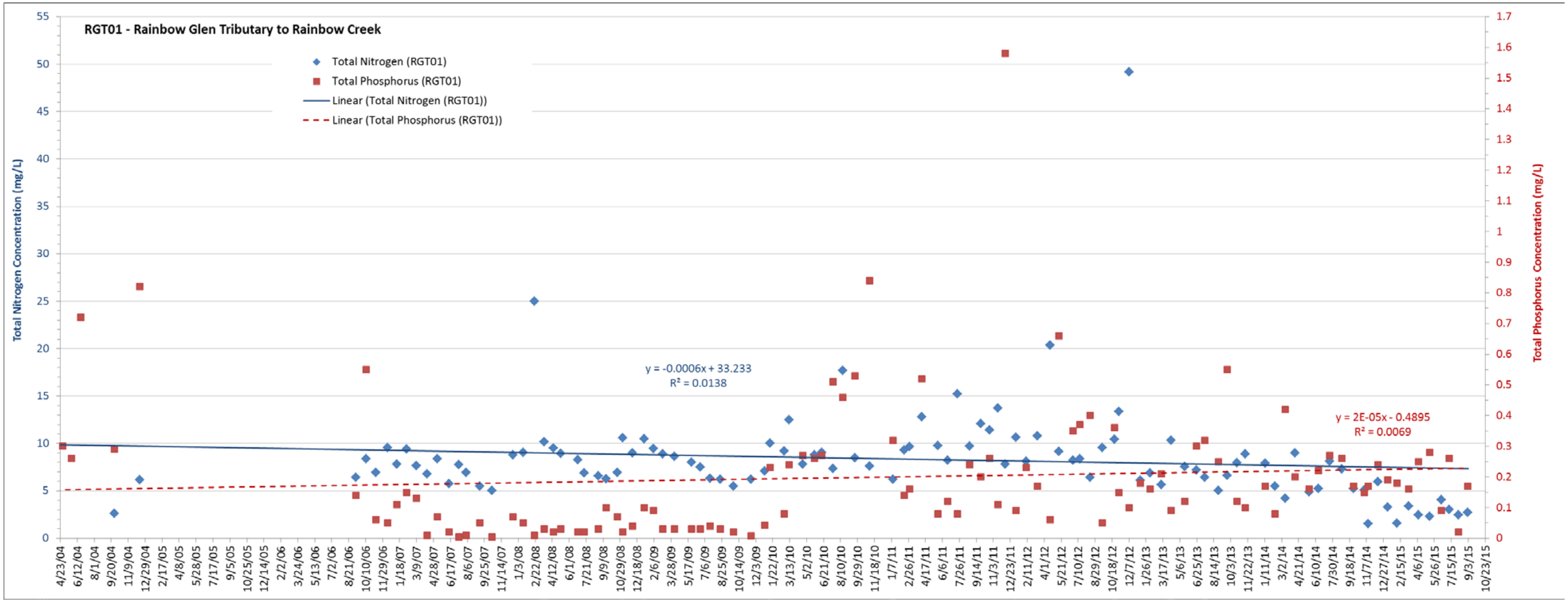
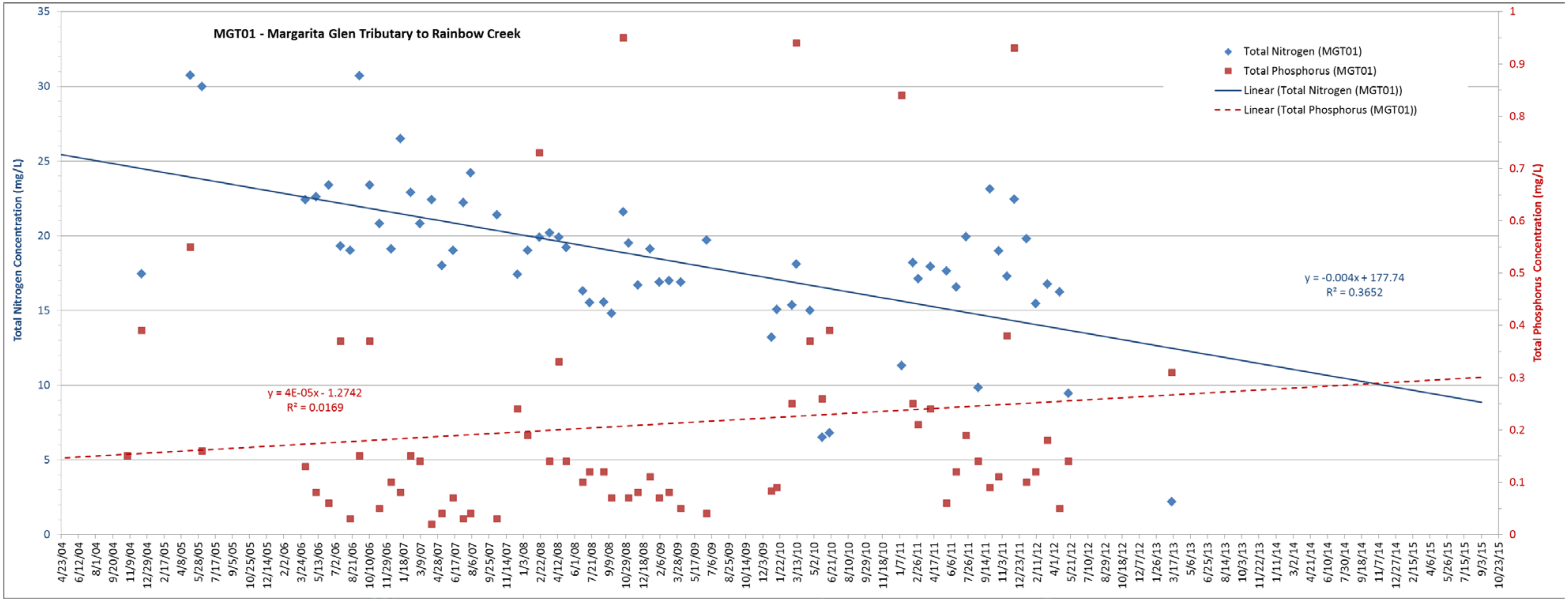
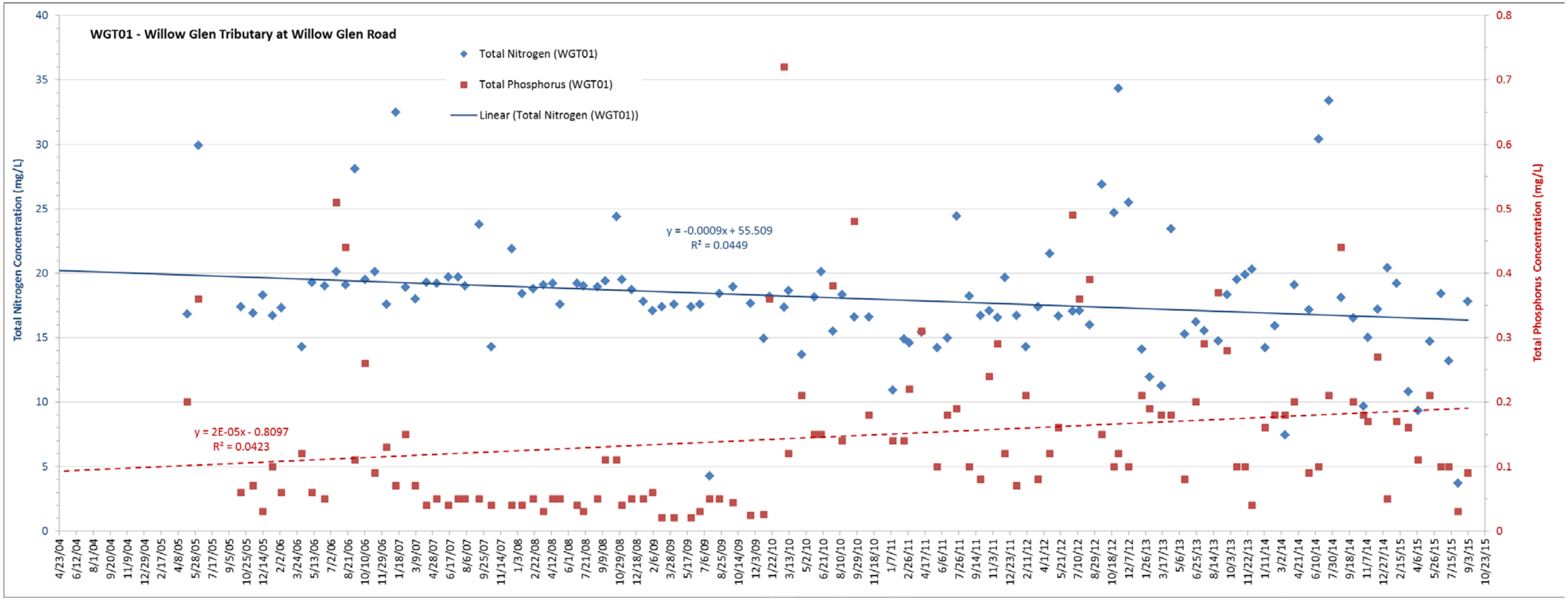
9/3/15
10/23/15

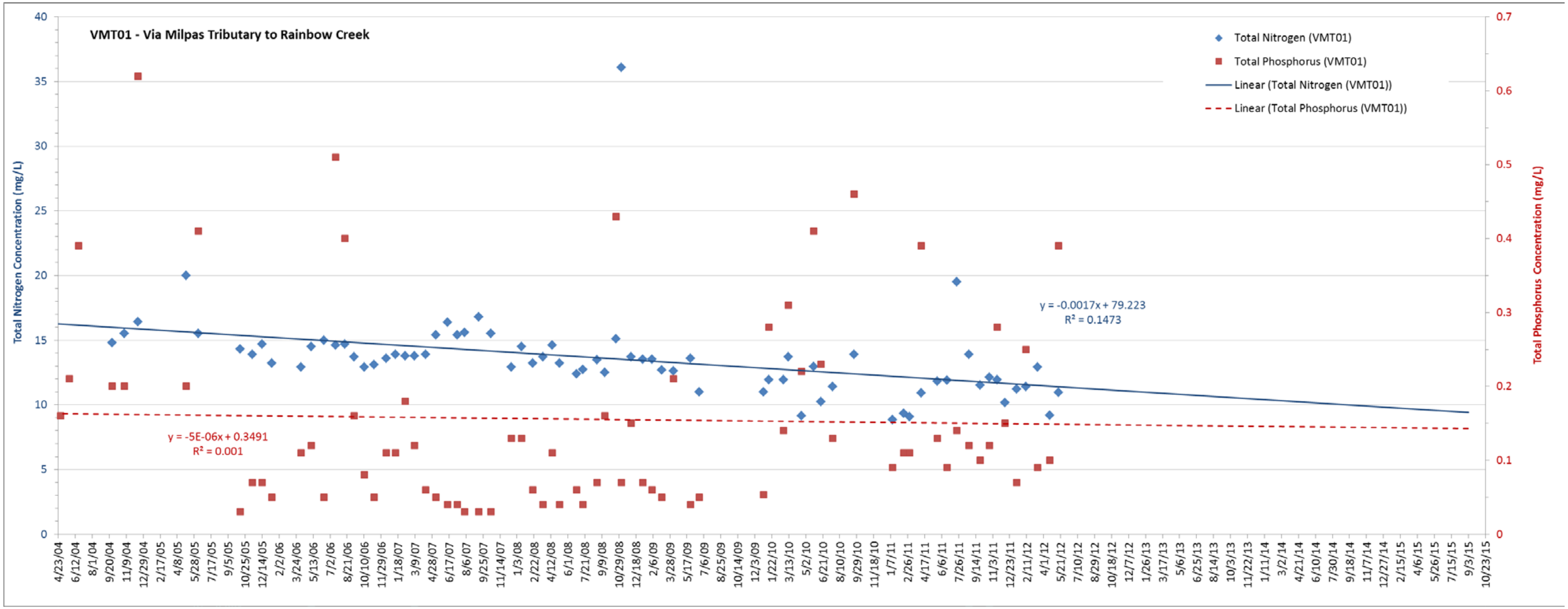

HST02 - Brow Ditch to Rainbow Creek at Huffstatler Road
Total Nitrogen (HST01)
Total Phosphorus (HST02)
Linear (Total Nitrogen (HST01))
Linear (Total Phosphorus (HST02))
y = -0.0007x + 52.368
R² = 0.0063
y = 0.0003x - 12.365
R² = 0.2411
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)


RGT01 - Rainbow Glen Tributary to Rainbow Creek
Total Nitrogen (RGT01)
Total Phosphorus (RGT01)
Linear (Total Nitrogen (RGT01))
Linear (Total Phosphorus (RGT01))
y = -0.0006x + 33.233
R² = 0.0138
y = 2E-05x - 0.4895
R² = 0.0069
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)


MGT01 - Margarita Glen Tributary to Rainbow Creek
Total Nitrogen (MGT01)
Total Phosphorus (MGT01)
Linear (Total Nitrogen (MGT01))
Linear (Total Phosphorus (MGT01))
y = -0.004x + 177.74
R² = 0.3652
y = 4E-05x - 1.2742
R² = 0.0169
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)



WGT01 - Willow Glen Tributary at Willow Glen Road
Total Nitrogen (WGT01)
Total Phosphorus (WGT01)
Linear (Total Nitrogen (WGT01))
y = -0.0009x + 55.509
R² = 0.0449
y = 2E-05x - 0.8097
R² = 0.0423
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)


VMT01 - Via Milpas Tributary to Rainbow Creek
Total Nitrogen (VMT01)
Total Phosphorus (VMT01)
Linear (Total Nitrogen (VMT01))
Linear (Total Phosphorus (VMT01))
y = -0.0017x + 79.223
R² = 0.1473
y = -5E-06x + 0.3491
R² = 0.001
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)

Attachment D

Rainbow Creek Dry Weather MS4 Outfall Monitoring Report (December 2015)

MS4 Outfall Monitoring at Rainbow Creek

Introduction and Regulatory Background

The San Diego County Department of Public Works, Watershed Protection Program developed a monitoring program to assess the contribution of urban runoff to the nutrient concentrations in Rainbow Creek. Total Maximum Daily Loads (TMDL) for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed have now been incorporated into the California Regional Water Quality Control Board (WQCB) San Diego Region Order No. R9-2013-0001 National Pollutant Discharge Elimination System (NPDES) Permit (MS4 Permit) in Attachment E, Provision 3. The MS4 Permit became effective on June 27, 2013. While the interim compliance dates have been set to December 31 of years 2009, 2013 and 2017, the final TMDL compliance date is December 31, 2021.

According to the Attachment E Provision 3.c.(2) of the MS4 Permit, interim compliance may be demonstrated by the following:

(a) Showing that there is no direct or indirect discharge from the Responsible Copermittee's MS4s to the receiving water; OR
(b) Showing no exceedances of the final receiving water limitations in the receiving water at, or downstream of the Responsible Copermittee’s MS4 outfalls; OR
(c) Showing no exceedances of the final effluent limitations at the Responsible Copermittee’s MS4 outfalls; OR
(d) Showing that the annual pollutant loads from given land uses discharging to and from the MS4s do not exceed the final effluent limitations OR
(e) Showing that the annual pollutant loads form given land uses discharging to and from the MS4s do not exceed the interim effluent limitations OR
(f) The Responsible Copermittee has submitted and is fully implementing a Water Quality Improvement Plan, accepted by the San Diego Water Board, which provides reasonable assurance that the interim TMDL compliance requirements will be achieved by the interim compliance dates.

Also, according to the Attachment E Provision 3.b.(3) of the MS4 Permit, final compliance may be demonstrated by one of the following:

(a) Showing that there is no direct or indirect discharge from the Responsible Copermittee’s MS4s to the receiving water; OR
(b) Showing no exceedances of the final receiving water limitations in the receiving water at, or downstream of the Responsible Copermittee’s MS4 outfalls; OR
(c) Showing no exceedances of the final effluent limitations at the Responsible Copermittee’s MS4 outfalls; OR
(d) Showing that the annual pollutant loads from given land uses discharging to and from the MS4s do not exceed the final effluent limitations OR
(e) The Responsible Copermittee implementing and including the specific requirements of Provision 3.b.(3)(e) of Attachment E to the MS4 Permit into their Water Quality Improvement Plan

This monitoring effort addresses the first of the interim compliance options (3.c.(2)(a)) and the first of the final compliance options (3.b.(3)(a)) with an intent to determine whether there are direct or indirect discharges from the County of San Diego’s storm drain outfalls to Rainbow Creek during dry weather. Furthermore, if discharges are found, it addresses the third of the interim compliance options (3.c.(2)(c)) and the third of the final compliance options (3.b.(3)(c)) through the collection of analytical samples where flows are found and analyzing those samples for total nitrogen and total phosphorus concentrations.

This monitoring was conducted during dry weather conditions (at least 72 hours following any rain event exceeding 0.1 inches in total daily precipitation) which, on the average, occur 90% of the time in the Rainbow Creek Watershed (National Oceanic and Atmospheric Administration, http://www.wrh.noaa.gov/).

Methods

All potential MS4 outfalls into Rainbow Creek were first identified through desktop analysis which was then followed by a detailed field reconnaissance whereby field crew identified specific locations of all outfalls and MS4 segments having potential of discharging into Rainbow Creek during dry weather. From January, 2013 through September, 2015, these locations included 11 new and 3 historical sites. The historical sites included one, SMG19, monitored under the dry weather monitoring program according 2007 NPDES Permit requirements and two, HST01 and HST02, monitored since 2005 as part of the 2010 Rainbow Creek TMDL Monitoring Plan (County of San Diego DPW WPP, 2010). A list and a map of these locations are presented below (Table 1 and Figure 1).

Table 1. List of Rainbow Creek MS4 Monitoring Locations (2013-2015)

Location Name	ID (Map)	New or Historical	Location	Latitude*	Longitude*
MS4-SMG-056	56	New	Outfall at Old Hwy. 395; 20' south of 2nd St.	33.41741	-117.15581
MS4-SMG-057	57	New	Outfall at Old Hwy. 395; 1,160' north of 2nd St.	33.42032	-117.15387
MS4-SMG-058	58	New	Outfall at Old Hwy. 395; 3,290' north of 2nd St.	33.42533	-117.15020
MS4-SMG-061	61	New	Outfall at Rainbow Valley Blvd.; 1,025' west of Old Hwy. 395	33.42957	-117.14476
MS4-SMG-063	63	New	Outfall at Rainbow Glen Rd.; 535' west of Rainbow Hills Rd. (Under Bridge)	33.40928	-117.16562
MS4-SMG-083	83	New	Channel 100' west of Canyon Heights Road on the north side of Rainbow Valley Blvd.	33.40860	-117.15458
MS4-SMG-084	84	New	Channels on both sides of Rainbow Valley Blvd. at 8th Street.	33.41012	-117.15127
MS4-SMG-085	85	New	Channel across from 2160 Rainbow Valley Blvd.	33.41166	-117.14760
MS4-SMG-086	86	New	Channel at 2526 Rainbow Valley Blvd.	33.41813	-117.14783
MS4-SMG-087/ SMG19	87	New	Channel at 2826 Rainbow Valley Blvd.	33.42356	-117.14336
MS4-SMG-088	88	New	Channel at Huffstatler Street and Second Street	33.41769	-117.15201
HST01	HST01	Historical	Brow Ditch to Rainbow Creek at Huffstatler Street	33.41526	-117.15204
HST02	HST02	Historical	Pipe from a nursery along Huffstatler Street	33.41174	-117.15196
SMG19	SMG 19	Historical	Open Channel at 2908 Rainbow Valley Rd.	33.42489	-117.14240

***** Coordinate System: NAD83

Since January, 2013, MS4-SMG-056, MS4-SMG-057, MS4-SMG-058, MS4-SMG-061, and MS4-SMG-063 were visited approximately quarterly. MS4-SMG-083, MS4-SMG-084, MS4-SMG-085, MS4-SMG-086, MS4-SMG-087 and MS4-SMG-088 were added to the program in September 2014 and, beginning in September 2014, all outfalls were monitored monthly. As mentioned above, HST01 and HST02 were visited monthly since 2004. SMG19 is a historical open channel location that had three events monitored in 2011 and 2012 and it is part of the same channel monitored in the current study at the MS4-SMG-087 sampling location.

As mentioned above, at all locations monitoring visits were conducted during dry weather (no daily precipitation greater than 0.1 inches within 72 hours prior to the visit). If flow was observed, a hand-held flow meter or the floating object technique was used to measure current velocity that was then multiplied by the approximate channel width and depth to estimate instantaneous flow rate in cubic feet per second (cfs). A Horiba mutimeter probe was used to collect *in-situ* measurements of pH, temperature, conductivity, dissolved oxygen and turbidity. Water quality samples were also collected and taken to the laboratory to test for nutrients including ammonia, nitrate as N, nitrite as N, total Kjeldahl nitrogen (TKN), ammonia, ortho-phosphate as P, and total phosphate as P. Total nitrogen concentration was calculated for each sample by adding together the corresponding concentrations of TKN, nitrate as N and nitrite as N. All water quality parameters and methods are summarized in Table 2 below. All field measurements, sample collection, and laboratory analysis, where applicable, were performed in accordance with the Quality Assurance Project Plan developed for the CWA 319(h) Grant Agreement No. 12-412-259 San Diego Region Nutrient Source Reduction Program in the Rainbow Creek Watershed Water Quality Monitoring (Rainbow Creek QAPP) (County of San Diego DPW WPP, 2013).

Table 2. Water Quality Parameters and Methods for Rainbow Creek MS4 Monitoring

Measured Parameter	*Field or Lab*	*Method*	*Reporting Limits*
Flow	Field	Flow Probe FP101/FP111	0.01 cfs
pH	Field	In-situ, Horiba U-10/U53	0.5 units
Temperature	Field	In-situ, Horiba U-10/U53	0.1 °C
Conductivity	Field	In-situ, Horiba U-10/U53	0.5 mS/cm
Dissolved Oxygen	Field	In-situ, Horiba U-10/U53	0.5 mg/L
Turbidity	Field	In-situ, Horiba U-10/U53	5 NTU
Ammonia	Lab	SM 4500 NH3 B,C	0.05 mg/L
Nitrate as N	Lab	SM 4500 NO3 E, EPA300.0,	0.05 mg/L
Nitrite as N	Lab	SM 4500 NO2 B, EPA 300.0	0.05 mg/L
Total Kjeldahl Nitrogen	Lab	SM 4500 N D C	0.5 mg/L
Total Nitrogen	Lab	By calculation	NA
Ortho-phosphate as P	Lab	SM 4500 P B E	0.05 mg/L
Total Phosphate as P	Lab	SM 4500 P	0.05 mg/L

Results

All data collected to data at MS4 outfalls at Rainbow Creek including measurements of discharge and total phosphorus and total nitrogen concentrations are summarized in Table 2. For the Brow Ditch at Huffstatler Street (HST01 and HST02), only data collected during 2013-2015 are shown in Table 2 while all total nitrogen and total phosphorus concentrations measured there since May, 2004 are presented in Figure 2.

With the exception of the Brow Ditch at Huffstatler Street (sampling locations HST01 and HST02), all monitoring locations were dry. For the Brow Ditch, both total nitrogen and total phosphorus concentrations were consistently above their respective water quality benchmarks of 1 mg/L (for total nitrogen) and 0.1 mg/L (for total phosphorus). According to the trend lines in Figures 2, Brow Ditch concentrations of total phosphorus generally increased over time while those of total nitrogen decreased over time. But, these trends were weak with r^2 values of 0.001 – 0.04 for total nitrogen and 0.22 - 0.24 for total phosphorus.

Conclusions

Sampling results presented herein indicate that, for 10 of 12 MS4 outfalls identified in the Rainbow Creek watershed to have a potential to discharge to Rainbow Creek, no flows are present during dry weather conditions based on observations at major outfalls conducted since February 2013 and monthly observations at all outfalls conducted since September 2014 (approximately 22 per outfall to date). The two exceptions include the outfall at Rainbow Glen Rd. (MS4-SMG-63) and Brow Ditch at Huffstatler Street (HST01 and HST02). Very low flow (0.000002 cfs) was observed at MS4-SMG-63 only on one of 22 sampling occasions; on September 2, 2015. In the Brow Ditch, flow was observed on 8 and standing water on 10 of the 33 sampling occasions since February, 2013 (Table 2). While we 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, future efforts to track and mitigate dry weather flows from the MS4 into Rainbow Creek should focus on the Brow Ditch location. During the current reporting period, a non-stormwater discharge into the Brow Ditch from a fruit packing operation was observed on February 23, 2015, and reported to the County of San Diego Agricultural Water Quality Section of the Department of Agriculture, Weights and Measures (see attachment). The discharge was addressed and mitigated as described in the attached report.

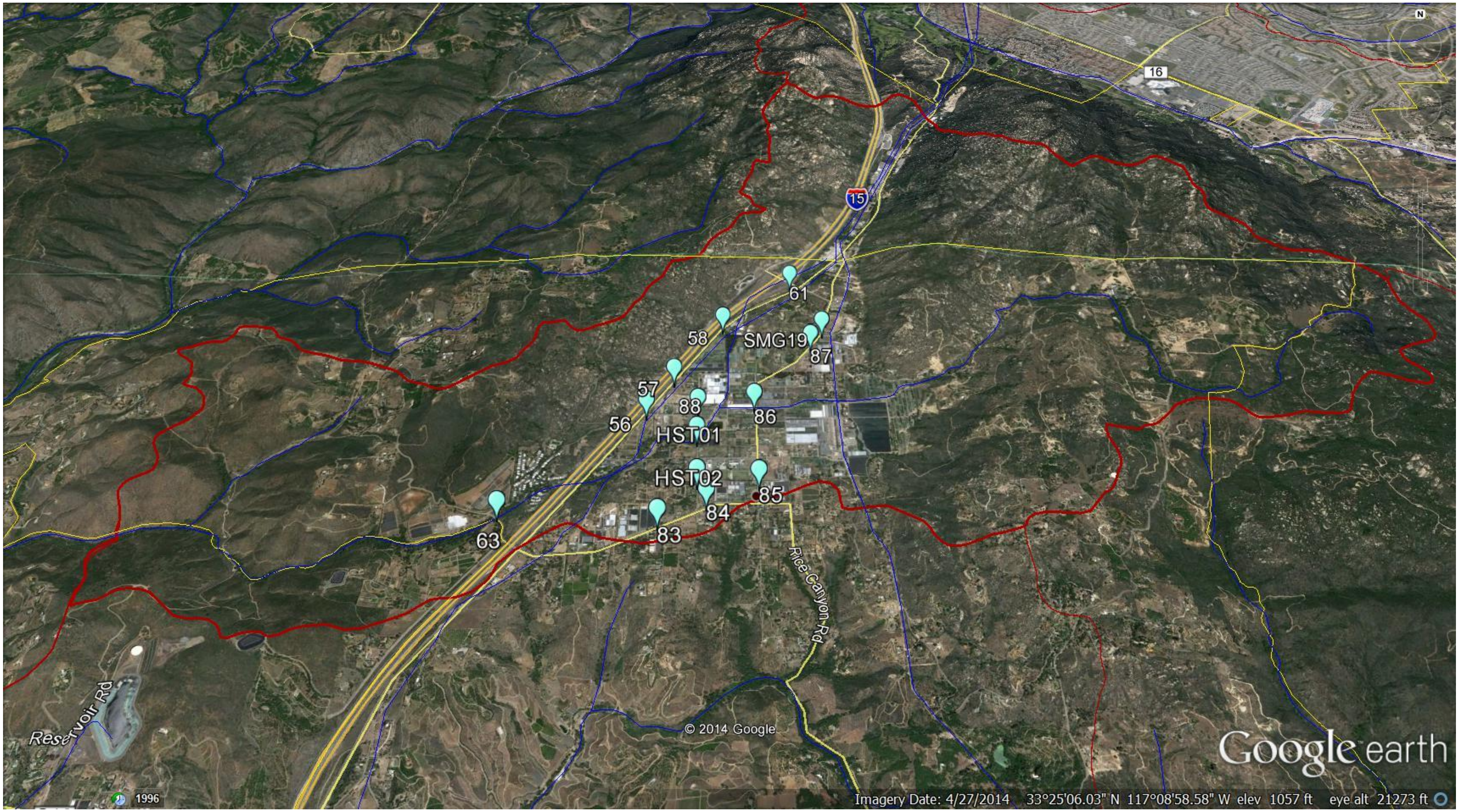


Figure 1. Rainbow Creek MS4 Sampling Locations 2013-2014.

Table 2. Flow and Nutrient Monitoring Results for the MS4 Outfall Locations Discharging Directly to Rainbow Creek

SiteID	Sample Date	Flow (cfs)*	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
HST01	1/9/2013	0.01	0.99	2.8
	2/6/2013	0.01	1.35	4.5
	3/12/2013	0.03	1.2	8.5
	4/10/2013	Ponded		
	5/21/2013	Dry		
	6/24/2013	Dry		
	7/18/2013	Dry		
	8/28/2013	Dry		
	9/23/2013	Dry		
	10/22/2013	Ponded		
	11/14/2013	Ponded		
	12/5/2013	Ponded		
	1/13/2014	Ponded		
	2/11/2014	Ponded		
	3/12/2014	0.01	1.15	13.5
	4/10/2014	Ponded		
	5/22/2014	Ponded		
	6/19/2014	Dry		
	7/21/2014	Dry		
	8/26/2014	Dry		
	9/30/2014	Ponded		
	10/31/2014	Ponded		
	11/12/2014	Ponded		
	12/10/14	0.0005	1.7	8.28
	01/07/15	0.018	0.86	16.21
	02/04/15	0.001	0.13	15.78
	03/10/15	0.012	0.99	16.4
	04/08/15	Ponded		
	05/12/15	Ponded		
	06/15/15	Ponded		
	07/08/15	Ponded		
	08/03/15	Dry		
	09/02/15	Dry		
HST02	1/9/2013	0.01	1.98	14.2
	2/6/2013	0.01	1.74	18.2
	3/12/2013	0.02	1.49	50.8
	4/10/2013	Ponded		
	5/21/2013	Ponded		
	6/24/2013	Dry		
	7/18/2013	Dry		

SiteID	Sample Date	Flow (cfs)*	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
	8/28/2013	Dry		
	9/23/2013	Dry		
	10/22/2013	Dry		
	11/14/2013	Dry		
	12/5/2013	Dry		
	1/13/2014	Dry		
	2/11/2014	Ponded		
	3/12/2014	0.02	1.4	20.1
	4/10/2014	0.01	0.5	24.4
	5/22/2014	Dry		
	6/19/2014	Dry		
	7/21/2014	Dry		
	8/26/2014	Dry		
	9/30/2014	Dry		
	10/31/2014	Dry		
	11/12/2014	Dry		
	12/10/14	0.009	2.08	16.84
	01/07/15	0.0168	1	34.51
	02/04/15	0.004	0.23	21.16
	03/10/15	0.015	1.07	22.93
	04/08/15	Ponded		
	05/12/15	Ponded		
	06/15/15	Ponded		
	07/08/15	Dry		
	08/03/15	Dry		
	09/02/15	Dry		
MS4-SMG-056	2/19/2013	Dry		
	7/17/2013	Dry		
	10/7/2013	Dry		
	1/9/2014	Dry		
	1/22/2014	Dry		
	4/7/2014	Dry		
	6/9/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		

SiteID	Sample Date	Flow (cfs)*	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
	8 /3/2015	Dry		
	9 /2/2015	Dry		
MS4-SMG-057	2/19/2013	Dry		
	7/17/2013	Dry		
	10/7/2013	Dry		
	1/9/2014	Dry		
	1/22/2014	Dry		
	4/7/2014	Dry		
	6/9/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8 /3/2015	Dry		
	9 /2/2015	Dry		
MS4-SMG-058	2/19/2013	Dry		
	7/17/2013	Dry		
	10/7/2013	Dry		
	1/9/2014	Dry		
	1/22/2014	Dry		
	4/7/2014	Dry		
	5/22/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8 /3/2015	Dry		
	9 /2/2015	Dry		
MS4-SMG-061	2/19/2013	Dry		
	7/17/2013	Dry		
	10/7/2013	Dry		

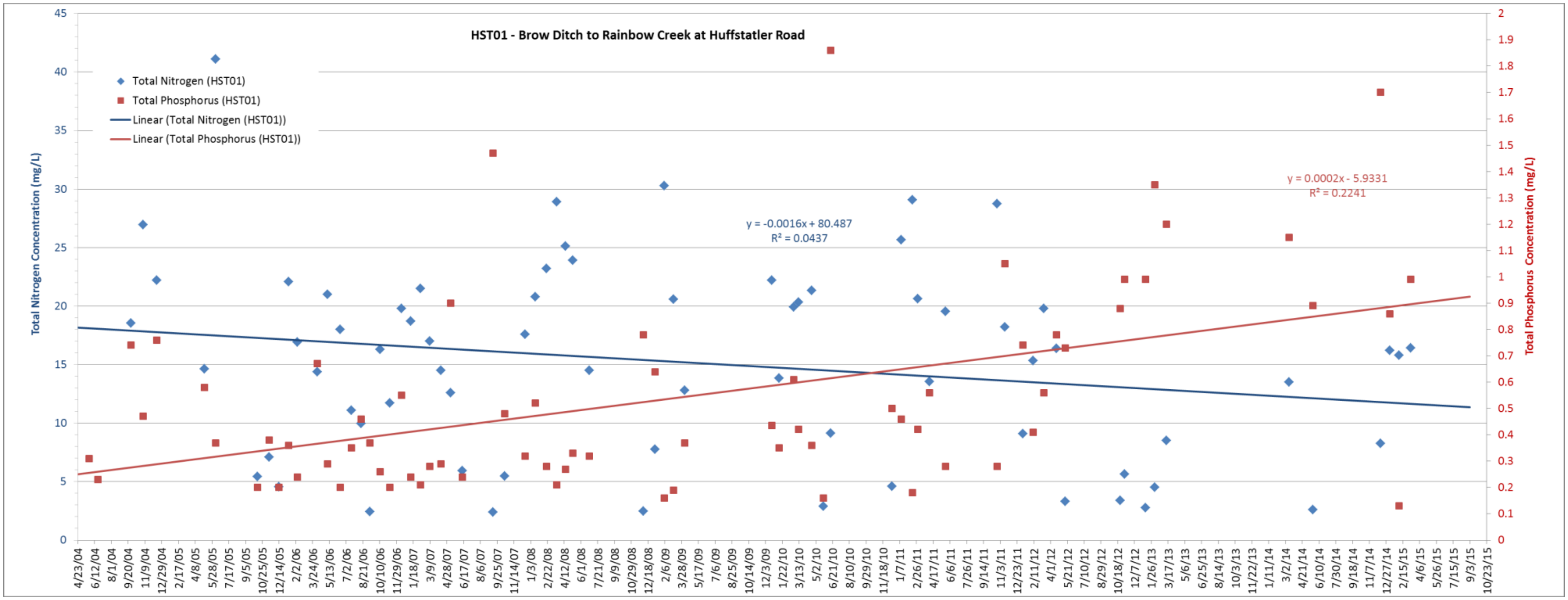
SiteID	Sample Date	Flow (cfs)*	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
	1/9/2014	Dry		
	1/22/2014	Dry		
	4/7/2014	Dry		
	6/9/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8 /3/2015	Dry		
	9 /2/2015	Dry		
MS4-SMG-063	7/15/2013	Dry		
	10/7/2013	Dry		
	1/9/2014	Dry		
	1/22/2014	Dry		
	4/7/2014	Dry		
	6/9/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8 /3/2015	Dry		
	9 /2/2015	0.01	0.97**	1.3***
MS4-SMG-083	9/30/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Ponded		
	5/12/2015	Dry		

SiteID	Sample Date	Flow (cfs)*	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
	6/15/2015	Dry		
	7/8/2015	Dry		
	8/3/2015	Dry		
	9/2/2015	Dry		
MS4-SMG-084	9/30/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8/3/2015	Dry		
	9/2/2015	Dry		
MS4-SMG-085	9/30/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8/3/2015	Dry		
	9/2/2015	Dry		
MS4-SMG-086	9/30/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Ponded		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8/3/2015	Dry		
	9/2/2015	Dry		

SiteID	Sample Date	Flow (cfs)*	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
SMG19 (Same as MS4-SMG-087)	7/18/2011	Dry		
	6/1/2012	Dry		
	6/4/2012	Dry		
MS4-SMG-087	9/30/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8/3/2015	Dry		
	9/2/2015	Dry		
MS4-SMG-088	9/30/2014	Dry		
	10/30/2014	Dry		
	11/7/2014	Dry		
	12/10/2014	Dry		
	1/7/2015	Dry		
	2/4/2015	Dry		
	3/10/2015	Dry		
	4/8/2015	Dry		
	5/12/2015	Dry		
	6/15/2015	Dry		
	7/8/2015	Dry		
	8/3/2015	Dry		
	9/2/2015	Dry		

*cfs – cubic feet per second
** Orthophosphate as P
*** Nitrite as N + Nitrate as N

A.



HST01 - Brow Ditch to Rainbow Creek at Huffstatler Road
Total Nitrogen (HST01)
Total Phosphorus (HST01)
Linear (Total Nitrogen (HST01))
Linear (Total Phosphorus (HST01))
Total Nitrogen Concentration (mg/L)
Total Phosphorus Concentration (mg/L)
y = -0.0016x + 80.487
R² = 0.0437
y = 0.0002x - 5.9331
R² = 0.2241

B.

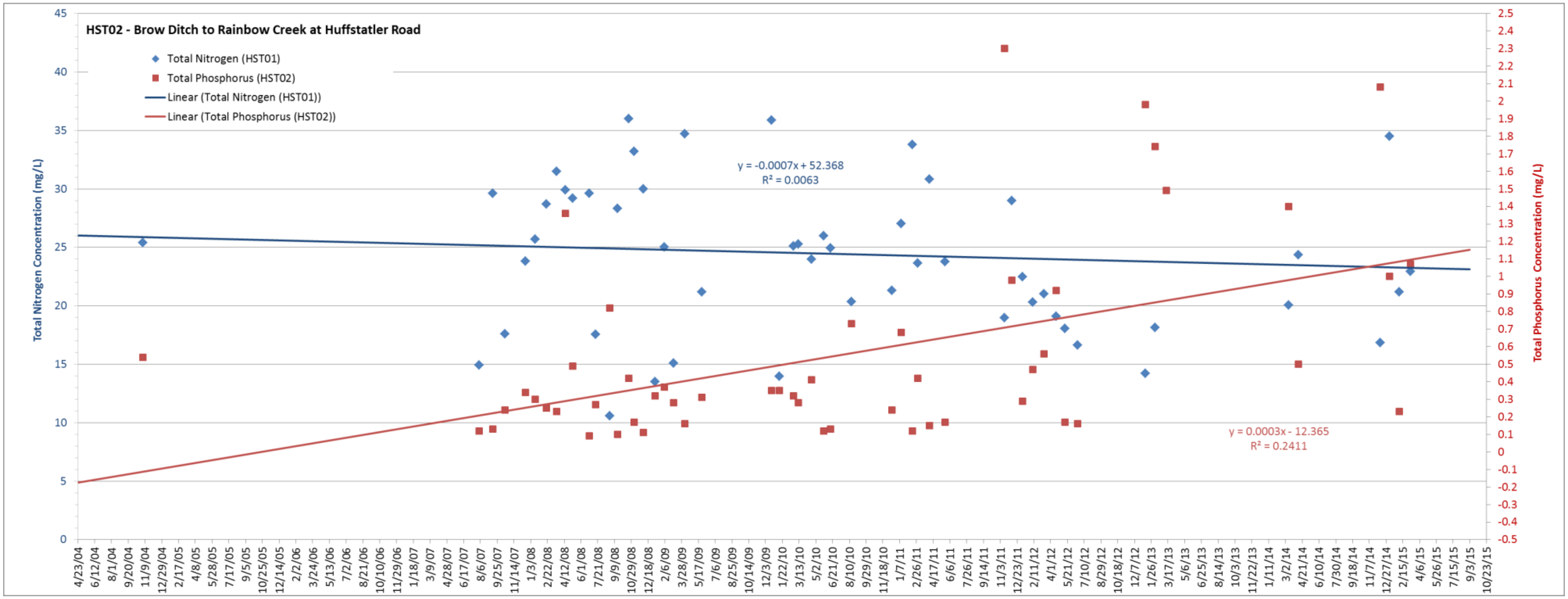


Figure 2. Sample concentrations of total nitrogen (blue diamonds) and total phosphorus (red squares) plotted against time for HST01 (A) HST02 (B) respectively. Trend lines and equations are included in corresponding colors.

This figure has been adopted from the Rainbow Creek TMDL Monitoring Report (Provided within this appendix to the current Transitional Monitoring and Assessment Report).

COUNTY OF SAN DIEGO Department of Agriculture, Weights & Measures	DATE OF ORIGINAL INCIDENT 02/23/2015	INSPECTION NUMBER AWM2015-WQC-00060	PAGE 1 of 2
Agricultural Water Quality Complaint/Referral [X] NARRATIVE CONTINUATION [ ] SUPPLEMENTAL REPORT [ ] OTHER	LOCATION/SUBJECT Rainbow Valley Orchards 5112 5th Street Fallbrook, CA 92028 (760) 728-2905		

INCIDENT

Rainbow Valley Orchards was observed discharging waste water from their fruit packing operation into the County storm drain.

VIOLATIONS FOUND

Maintaining a connection to the storm water conveyance system that discharges any matter other than stormwater is a violation of the County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance Sec. Sec. 67.804(b).

CONTACT LIST

Pat Raymond, Vice President
Rainbow Valley Orchards
5112 5th Street
Fallbrook, CA 92028
(760) 728-2905

INVESTIGATION

On February 23, 2015, AWM received a referral from the Department of Public Works (DPW) regarding a non-storm water discharge to the county storm drain coming from Rainbow Valley Orchards in Fallbrook (ATTACHMENT 1).

On the same day, Ryan Wann, Supervising Agricultural/Standards Inspector, and I visited Rainbow Valley Orchards (RVO), a fruit packing company, located at 5112 5th Street in Fallbrook (ATTACHMENT 2). We met with Pat Raymond, vice president of RVO. Mr. Raymond explained to us the business practices of the fruit packing operation. We observed a small, milk-colored discharge into the storm drain coming from a pipe connected to the facility. We brought the discharge to his attention. We asked him to acknowledge the inspection by signing the inspection form, but he refused.

On March 3, 2015, I met with Mr. Raymond at the facility, and he escorted me as I conducted my inspection. He stated the discharge we observed was the solution used to clean, wax, and brighten fruit. He explained that the solution was disposed by pumping it into a 275 gallon plastic tote. Once the tote was filled, it would be spread at the open space behind the property. The pump continued to discharge the solution as the tote was removed for disposal. He said that he would add another plastic tote to prevent gaps in collecting and disposing the solution.

On March 6, 2015, I did not observe a discharge from the facility.

<table>
<tr><td>COUNTY OF SAN DIEGO
Department of Agriculture, Weights & Measures</td><td>DATE OF ORIGINAL INCIDENT
02/23/2015</td><td>INSPECTION NUMBER
AWM2015-WQC-00060</td><td></td></tr>
<tr><td>Agricultural Water Quality Complaint/Referral
[X] NARRATIVE CONTINUATION
[ ] SUPPLEMENTAL REPORT
[ ] OTHER</td><td colspan="3">LOCATION/SUBJECT
Rainbow Valley Orchards
5112 5th Street
Fallbrook, CA 92028
(760) 728-2905</td></tr>
</table>

CONCLUSION

On February 23, 2015, Rainbow Valley Orchards was observed discharging a waste into the storm drain from a pipe connected to their facility. Maintaining a connection to the storm drain that discharges any matter other than stormwater constitutes a violation of the County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance section 67.804(b).

On March 6, 2015, the violation was corrected.

ATTACHMENTS

1. Email referral from Steven Di Donna, Watershed Specialist (2/23/2015)
2. Water Quality Compliance Inspection Report: AWM2015-WQC-00060

ATTACHMENT 2

COUNTY OF SAN DIEGO
DEPARTMENT OF AGRICULTURE
WEIGHTS & MEASURES
9325 Hazard Way, Suite 100
San Diego, CA 92123
Office 858-694-8980
Fax 858-467-9277
WEBSITE: www.sdcawm.org

WATER QUALITY COMPLIANCE INSPECTION

AWM2015-WQC-00060

FACILITY TYPE
- [ ] NUR/GH
- [ ] ANIMAL
- [ ] GOLF
- [ ] IRRIGATED AG
- [ ] CEM
- [ ] PCB
- [X] Other

INSPECTION TYPE
- [ ] ANNUAL
- [ ] REINSPECT
- [ ] DOCS RECD/REVD
- [X] COMPLAINT

"IF REINSPECTION" ORIG INSPECTION NO

BUSINESS NAME: COMPLAINT_RAINBOW VALLEY ORCHARDS_2015
STORMWATER REGISTRATION NO: 37SW0000-2015-03
PROPERTY LOCATION: 5127 5TH STREET, FALLBROOK CA 92028
TELEPHONE NUMBER: 760-728-2905
BUSINESS MAILING ADDRESS: 5112 5TH STREET, FALLBROOK CA 92028

HYDRO SUB-UNIT	# ACRES	# ANIMALS
902.33	1	

Site is within 200' of: Conveyance/MS4 [X] ESA [ ] 303D [ ] Waterbody [ ]

POLLUTION PREVENTION - REDUCE, REUSE, RECYCLE

- [ ] WATER
- [ ] METAL
- [ ] GREENWASTE
- [ ] MANURE
- [ ] CHEMICAL
- [ ] FERTILIZER
- [ ] PLASTIC
- [ ] ENERGY
- [ ] OILS
- [ ] ANTI-FREEZE

SKA

INSPECTION REQUIREMENTS

DISCHARGE PROHIBITIONS	Ordinance Section	Yes	No	N/A
Unauthorized Discharges Eliminated/Absent	67.804 (a)			X
Unauth. Connections Eliminated/Absent	67.804 (b)		X	
Litter Dumps & Stockpiles Properly Managed	67.804 (c)			X
Sediment Discharges Controlled	67.804 (d)			X
GENERAL REQUIREMENTS				
Eroded Soils Removed - Secured	67.806(a)(1)			X
Pollution Prevention Implemented	67.806(a)(2)			X
Unauthorized Connections Eliminated	67.806(a)(3)			X
Slopes Protected & Maintained	67.806(a)(4)			X
Materials & Wastes Properly Stored	67.806(a)(5)			X
Soil, Greenwaste, Compost Managed	67.806(a)(6)			X
Materials Used According to Label	67.806(a)(7)			X
Dry Cleanup Methods Used	67.806(a)(8)			X
BMPs Functioning & Maintained	67.806(b)			X

SWPPP REC'D: [ ]

BMPs - BUSINESS ACTIVITIES	Ordinance Section	Yes	No	N/A
Training Provided	67.808(a)(1)			X
Annual Review Completed	67.808(a)(3)			X
Housekeeping Conducted	67.808(a)(5)			X
Liquid Waste Managed	67.808(a)(6)			X
Spill Prevention Implemented	67.808(a)(7)(A)			X
HazMat Off Ground & Covered	67.808(a)(7)(B)			X
Secondary Containment Provided	67.808(a)(7)(B)			X
Trash & Livestock Areas Maintained	67.808(a)(7)(C)			X
Vehicles & Equipment Managed	67.808(a)(8)			X
Grounds, Parking, Roof BMPs in Place	67.808(a)(9)			X
Other				X

NOTICE OF VIOLATION: YES [X] NO [ ]

Correct Violations by:

CITATION TYPE: [X] N/A [ ] WARNING [ ] 1ST [ ] 2ND [ ] 3RD [ ] 4TH & SUBSEQUENT CITATIONS

INSPECTOR NOTES

Illicit connection on the county storm drain along 5th Street in Fallbrook, CA.

INSPECTION HOURS & FEES

0.0 @ [ ] $72 per hour INSPECTION [ ] $108 per hour RE-INSPECTION = $0.00

THE VIOLATIONS NOTED ABOVE REQUIRE YOUR IMMEDIATE ATTENTION. CONTINUED NON-COMPLIANCE MAY SUBJECT YOU TO PENALTIES AS PROVIDED FOR IN CHAPTER 1, DIVISION 8, OF TITLE 1 OF THE COUNTY CODE OF REGULATORY ORDINANCES. THESE AND FUTURE VIOLATIONS MAY RESULT IN LEGAL ACTION.

ACKNOWLEDGEMENT OF INSPECTION

INSPECTOR
PRINT: Nestor J Silva
SIGNATURE: Nestor Silva
INSP #: 72
TIME: 10:05:01
DATE INSPECTED OR DOCUMENTS REVIEWED: 02/23/2015

INSPECTION ACKNOWLEDGED BY
PRINT: Pat Raymond
SIGNATURE: Refused to sign
DATE ACKNOWLEDGED: 02/23/2015

References

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.

County of San Diego Department of Public Works Watershed Protection Program. 2013. Quality Assurance Project Plan for CWA 319(h) Grant Agreement No. 12-412-259 San Diego Region Nutrient Source Reduction Program in the Rainbow Creek Watershed Water Quality Monitoring.