

February 26, 2014

**VENTURA COUNTY AGRICULTURAL
IRRIGATED LANDS GROUP (VCAILG)**

2012-2013 Annual Monitoring Report

DRAFT

submitted to:

**LOS ANGELES REGIONAL WATER QUALITY
CONTROL BOARD**

prepared by:

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On behalf of the:

**VENTURA COUNTY AGRICULTURAL
IRRIGATED LANDS GROUP (VCAILG)**



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Acronyms

AMR	Annual Monitoring Report
BMP	Best Management Practice
CC	Calleguas Creek
CCW	Calleguas Creek Watershed
CCWTMP	Calleguas Creek Watershed TMDL Monitoring Program
DNQ	Detected Not Quantified
EST	Estimated
LA	Load Allocation
LARWQCB	Los Angeles Regional Water Quality Control Board (Regional Board)
MDL	Method Detection Limit
MRP	Monitoring and Reporting Plan
NA	Not Applicable
ND	Not Detected
NM	Not Measured
NOA	Notice of Applicability
NOI	Notice of Intent
NS	Not Sampled
OC	Organochlorine
OP	Organophosphorus
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Reporting Limit
SCR	Santa Clara River
SCRW	Santa Clara River Watershed
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
VCAILG	Ventura County Agricultural Irrigated Lands Group
VR	Ventura River
VRW	Ventura River Watershed
WQMP	Water Quality Management Plan

Executive Summary

This document serves as the 2012-2013 VCAILG Annual Monitoring Report (AMR). Information regarding the sampling performed by VCAILG, TMDL compliance, and member progress completing the education requirement are all contained herein.

Three VCAILG monitoring events were completed during the 2012-2013 monitoring year. Due to the dry conditions of the monitoring year, only one storm event was sampled. Additionally, fewer sites had flow during dry events than in previous monitoring years. With the support of BMP data gathered through the WQMP, this may prove to be the result of irrigation method upgrades and management, but that cannot be confirmed at this time.

Instances where exceedances occurred triggers the need to develop a WQMP; which will be submitted to the Regional Board May 26, 2014.

The following summary highlights compliance with standard water quality benchmarks.

- Six OC pesticides that have applicable water quality benchmarks have never been detected during VCAILG monitoring to date (Events 1-18). An additional four OC pesticides with benchmarks have only been detected a few times throughout the entire monitoring program considering all the sites. Though DDT and its breakdown products are often detected during wet weather, dry weather exceedances have greatly decreased and it is the breakdown products that are most common. This demonstrates the degradation of DDT in the environment and the minimization of transport during the irrigation season, over which farmers have some control.
- This is the second year of copper results. All freshwater sites continued to meet the copper benchmark. Two of the three sites where the saltwater benchmark applies exhibited exceedances.
- Regarding OP pesticides, the diazinon benchmark was not exceeded during this monitoring year. Three chlorpyrifos exceedances did occur during wet weather, but there was only a single dry weather exceedance.
- None of the sites exhibited significant toxicity; therefore, no TIEs were required during this monitoring year.
- Nitrate-N continues to be an issue at some monitoring locations (6 out of 15 VCAILG monitoring sites had exceedances). The Ammonia-N objective was only exceeded once when considering all sites and monitoring events.
- All samples were within the acceptable pH range. Temperature was always under the upper limit, where applicable. The dissolved oxygen benchmark was only exceeded once at a single site during the first dry event.
- Salts benchmarks were exceeded at three sites during the monitoring year.

During this monitoring year TMDL load allocation benchmarks were met at all applicable compliance sites or by completing required actions for the following TMDLs: Calleguas Creek Watershed and Mugu Lagoon OC Pesticides and PCBs TMDL, Calleguas Creek Watershed and Mugu Lagoon Toxicity, Chlorpyrifos, and Diazinon TMDL, Calleguas Creek Watershed Boron,

Chloride, Sulfate, and TDS (Salts) TMDL, Revolon Slough and Beardsley Wash Trash TMDL, Ventura River Estuary Trash TMDL, and Santa Clara River Estuary Toxaphene TMDL. Monitoring was performed in compliance with the Harbor Beaches of Ventura County Bacteria TMDL and the McGrath Lake PCBs, Pesticides, and Sediment Toxicity TMDL.

In addition to monitoring and reporting, VCAILG works with cooperating organizations and commodity groups to provide education opportunities for its members related to Conditional Waiver requirements, local water quality issues, and best management practices (BMPs) to improve farm water quality. Eight hours of education are required by the Conditional Waiver. During this monitoring year, thirty-three hours of classes qualified for education credit and an additional twenty-six hours have been offered since the end of the monitoring year to the present. To date, over forty-five education classes have been offered, adding up to 149 hours. At this time, 893 VCAILG members have fulfilled the eight hour requirement; 565 of those members have completed more than eight hours, totaling 12,263 hours of water quality education. Through monitoring, education, targeted outreach, and the implementation of BMPs, VCAILG is working with its members to improve water quality in agricultural areas of Ventura County.

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Introduction

On October 7, 2010 the Los Angeles Regional Water Quality Control Board (Regional Board) adopted a *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Los Angeles Region* (“Conditional Waiver”, Order No. R4-2010-0186). The purpose of the Conditional Waiver is to assess the effects of and control discharges from irrigated agricultural lands in Los Angeles and Ventura Counties, including irrigation return flows, flows from tile drains, and storm water runoff. These discharges can affect water quality by transporting nutrients, pesticides, sediment, salts, and other pollutants from cultivated fields into surface waters, potentially impairing designated beneficial uses. Owners and operators of agricultural lands in Ventura and Los Angeles Counties must comply with provisions contained in the Conditional Waiver or be regulated under other Regional Board programs.

The Conditional Waiver allows individual landowners and growers to comply with its provisions by working collectively as a Discharger Group, or as an individual. A Discharger Group is defined by the Conditional Waiver as “any group of dischargers and/or organizations that forms to comply with this Order. Discharger Groups can be, but are not limited to, organizations formed on a geographic basis or formed with other factors in common such as commodities.” The primary purpose of allowing Discharger Groups is to encourage collaboration on monitoring and reporting and to increase the effectiveness of management practices throughout a watershed to attain water quality standards. Those landowners and growers choosing to comply with the Conditional Waiver as a Discharger Group must signify by submitting a Group Notice of Intent and by developing a Discharger Group monitoring program.

To assist agricultural landowners and growers that farm within the boundaries of Ventura County, various agricultural organizations, water districts and individuals joined together to form the Ventura County Agricultural Irrigated Lands Group (VCAILG), which is intended to act as one unified “Discharger Group” for those agricultural landowners and growers that wish to participate. A Notice of Intent (NOI) to comply with the Conditional Waiver was submitted to the Regional Board by the VCAILG on April 7, 2011. The NOI included the VCAILG membership roster, as well as the required Quality Assurance Project Plan (QAPP) and Monitoring and Reporting Program Plan (MRP), which detail the water quality monitoring and reporting procedures being conducted in compliance with the terms of the Conditional Waiver. The Regional Board responded by issuing the Notice of Applicability (NOA) to the VCAILG on September 15, 2011, signifying the Regional Board’s approval of the VCAILG and its Monitoring Program.

This document serves as the second Annual Monitoring Report (AMR) summarizing data collected under the 2010 Conditional Waiver (Order No. R4-2010-0186). This report provides a detailed summary of activities of the VCAILG during 2012-2013, including administration of the VCAILG, an overview of farming in Ventura County, coursework offered to VCAILG members to fulfill the Conditional Waiver’s education requirement, a list of education hours completed to date by each member, and monitoring data collected during the wet and dry monitoring events conducted. Also included is a discussion of monitoring results that exceeded water quality benchmarks. In addition, a WQMP will be submitted by May 26, 2014 in response to water quality benchmark exceedances that occurred during the 2012-2013 monitoring year and will detail a plan to reduce water quality impacts from irrigated agricultural discharges.

Group Membership and Setting

The VCAILG was formed in 2006 to act as one unified “Discharger Group” in Ventura County for the purpose of compliance with the Conditional Waiver. VCAILG oversight is provided by an 18-member Steering Committee and a 7-member Executive Committee (also members of the Steering Committee). Steering Committee membership consists of agricultural organization representatives, agricultural water district representatives, landowners and growers from the three primary watersheds in Ventura County (Calleguas Creek, Santa Clara River, and Ventura River). Steering Committee membership also represents the major commodities grown in Ventura County (strawberries, nursery stock, citrus, vegetables, and avocados). The Steering Committee roster is presented in Table 1.

Table 1. VCAILG Steering Committee Membership

Member, Organization ¹	Crop(s) Represented	Watershed(s) Represented
Edgar Terry, Terry Farms, Inc. (Committee Chair)	Strawberries, Vegetables	Calleguas Creek, Santa Clara River
Steve Bachman, United Water District*	N/A	N/A
Jonathan Chase, Hailwood, Inc.	Strawberries, Vegetables	Calleguas Creek
Jerry Conrow, Ojai Basin GMA*	Citrus	Ventura River
Robert Crudup, Valley Crest Tree Company	Nursery Stock	Santa Clara River
Paul DeBusschere, DeBusschere Ranch	Strawberries, Avocados	Calleguas Creek
Mike Friel, Laguna Grove Service	Citrus	Calleguas Creek
Jesse Gomez, Newhall Land & Farming	Citrus, Hay, Nursery Stock, Vegetables, Sod, Pasture	Santa Clara River
Jurgen Gramckow, Southland Sod Farms	Sod, Hay, Oats, Vegetables	Calleguas Creek, Santa Clara River, Ventura River
Gus Gunderson, Limoneira Company	Avocado, Citrus	Santa Clara River
John Krist, Farm Bureau of Ventura County*	N/A	N/A
Jim Lloyd-Butler, Lloyd Butler Ranch	Avocado, Citrus	Calleguas Creek, Santa Clara River
John Mathews, Arnold, Bleuel, LaRochelle, et al.*	N/A	N/A
Doug O'Hara, Somis Pacific Ag Management Company	Avocado, Citrus	Calleguas Creek, Santa Clara River
Kelle Pistone, Assoc. of Water Agencies of Ventura County*	N/A	N/A
Rob Roy, Ventura County Agricultural Association*	N/A	N/A
Dave Souza, Pleasant Valley County Water District*	N/A	N/A
Craig Underwood, Underwood Ranches	Avocado, Citrus, Vegetables	Calleguas Creek, Santa Clara River

N/A = Not Applicable

1. An asterisk denotes Executive Committee membership

Because the VCAILG is an unincorporated organization, the Farm Bureau of Ventura County acts as the responsible entity for the collection of funds, contracting with consultants, and other fiscal and/or business matters that require an organization with some form of tax status; the Farm Bureau is a non-profit 501(c)(5) organization.

A list of VCAILG members and associated parcels is included as Appendix A. The membership list includes the following information:

- Landowner Name
- Mailing Address

- Parcel number(s)
- Irrigated acres per parcel
- Watershed associated with each parcel

Table 2 contains a summary of VCAILG membership statistics, including the number of landowners and parcels enrolled, as well as irrigated acreage enrolled in each watershed. All membership statistics represent group status in January of 2014. At that time, VCAILG represented 1,196 Ventura County agricultural landowners and 77,019 irrigated acres. According to the Ventura County Assessor’s records, there are an estimated 431 landowners not enrolled in VCAILG. Therefore, VCAILG represents 73.5 percent of agricultural landowners in Ventura County covering an estimated 85 percent of the irrigated acreage.

Table 2. VCAILG Membership Statistics as of January 2014

Watershed	Landowner Count	Parcel Count	Irrigated Acres
Calleguas Creek	539	1,143	41,124
Oxnard Coastal	55	107	3,953
Santa Clara River	485	1,094	27,044
Ventura River	172	308	4,898
<i>Total</i>	<i>1,251¹</i>	<i>2,652</i>	<i>77,019</i>

1. There are 1,196 unique landowners enrolled, a number of whom own property in more than one watershed.

IRRIGATED AGRICULTURE IN VENTURA COUNTY

Ventura County covers 1,843 square miles (approximately 1.2 million acres) with 43 miles of coastline (Figure 1). The Pacific Ocean forms its southwestern boundary, with Los Angeles County to the southeast, Kern County to the north and Santa Barbara County to the west. The Los Padres National Forest accounts for the northern half of the county, with residential, agricultural and business uses in the southern portion. According to the most recent Crop and Livestock Report, Ventura County has approximately 96,430 acres of irrigated cropland.¹ The Calleguas Creek Watershed contains the highest number of irrigated acres (roughly 48,000), followed by the Santa Clara River Watershed (approximately 32,000), Ventura River Watershed (approximately 6,500), and finally the Oxnard Plain Coastal Watershed (approximately 4,400).²

Agriculture is a major industry in Ventura County, generating over \$1.96 billion in gross sales for 2012. This gross value is up 1.6 percent from 2011.³ Table 3 lists the County’s ten leading crops in gross value for 2012.

¹ Ventura County Agricultural Commissioner. Ventura County Crop & Livestock Report 2012. July 30, 2013.

² Estimates of irrigated agricultural acreage by watershed are based on the VCAILG membership database and also includes estimated irrigated acreage for parcels not enrolled in VCAILG.

³ Ventura County Agricultural Commissioner. Ventura County Crop & Livestock Report 2012. July 30, 2013.

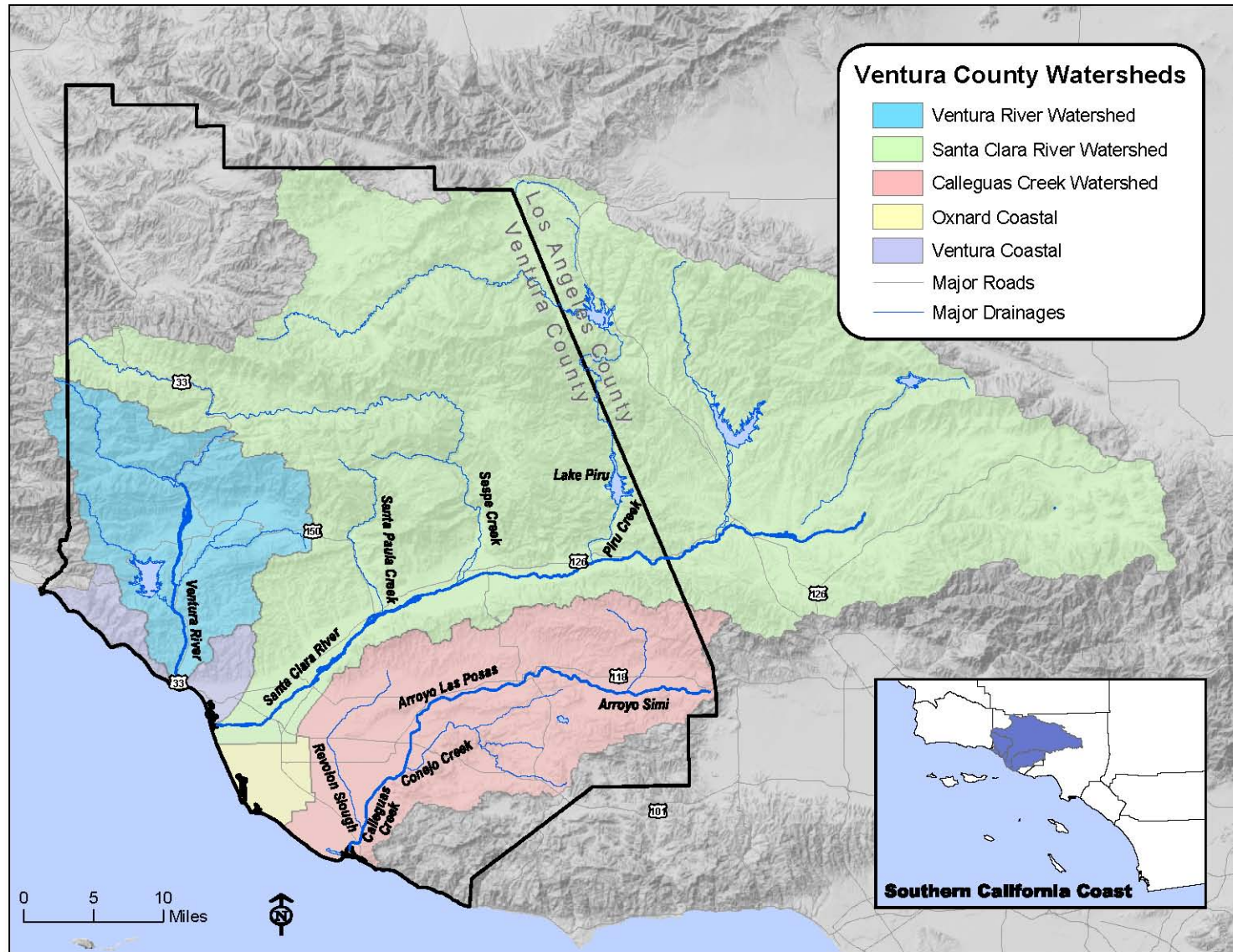


Figure 1. Ventura County Watersheds

Table 3. Ventura County's Leading Agricultural Commodities--2012

Commodity	Gross Value (\$)
1. Strawberries	691,303,000
2. Lemons	201,820,000
3. Raspberries	187,277,000
4. Nursery Stock	186,351,000
5. Celery	134,258,000
6. Avocados	113,315,000
7. Tomatoes	75,819,000
8. Peppers	48,395,000
9. Cut Flowers	46,829,000
10. Cilantro	23,438,000

Source: Ventura County Agricultural Commissioner. *County of Ventura Agricultural Crop & Livestock Report 2012*. July 30, 2013.

Characteristics of each of the three main watersheds in Ventura County are discussed in more detail below.

Calleguas Creek Watershed

The Calleguas Creek Watershed (Figure 2) is approximately 30 miles long, 14 miles wide, and drains an area of approximately 343 square miles or 219,520 acres. Cities within the watershed include Camarillo, Thousand Oaks, Moorpark, and Simi Valley. The main surface water system drains from the mountains in the northeast part of the watershed toward the southwest, where it flows through the Oxnard Plain before emptying into the Pacific Ocean through Mugu Lagoon. The main waterbodies in the watershed include Calleguas Creek, Revolon Slough, Beardsley Channel, Conejo Creek, Arroyo Santa Rosa, Arroyo Las Posas and Arroyo Simi. All of these waterbodies appear on the federal 303(d) list of impaired waterbodies, triggering the requirement to develop Total Maximum Daily Loads (TMDLs) for specified pollutants identified as causing impairments. Runoff from irrigated agricultural lands has been identified as one of the sources of these water quality impairments for specified pollutants. To date, TMDLs have been adopted for Nitrogen Compounds, Trash, Organochlorine Pesticides, Polychlorinated Biphenyls (PCBs) and Siltation, Toxicity, Metals and Selenium, and Salts.

Approximately 64,000 acres or 29 percent of land in the Calleguas Creek Watershed is used for agricultural purposes. Avocados and citrus crops such as lemons and oranges are typically grown in flat or gently sloping foothill areas in the watershed. Agricultural land located on the Oxnard Plain is planted predominately in a wide variety of truck crops, including strawberries, peppers, green beans, celery, and onions, as well as sod farms and nurseries. Many farms located in the watershed grow multiple crops during a single calendar year. This multi-cropping technique is most common in the lower parts of the watershed, adjacent to Revolon Slough and Lower Calleguas Creek.

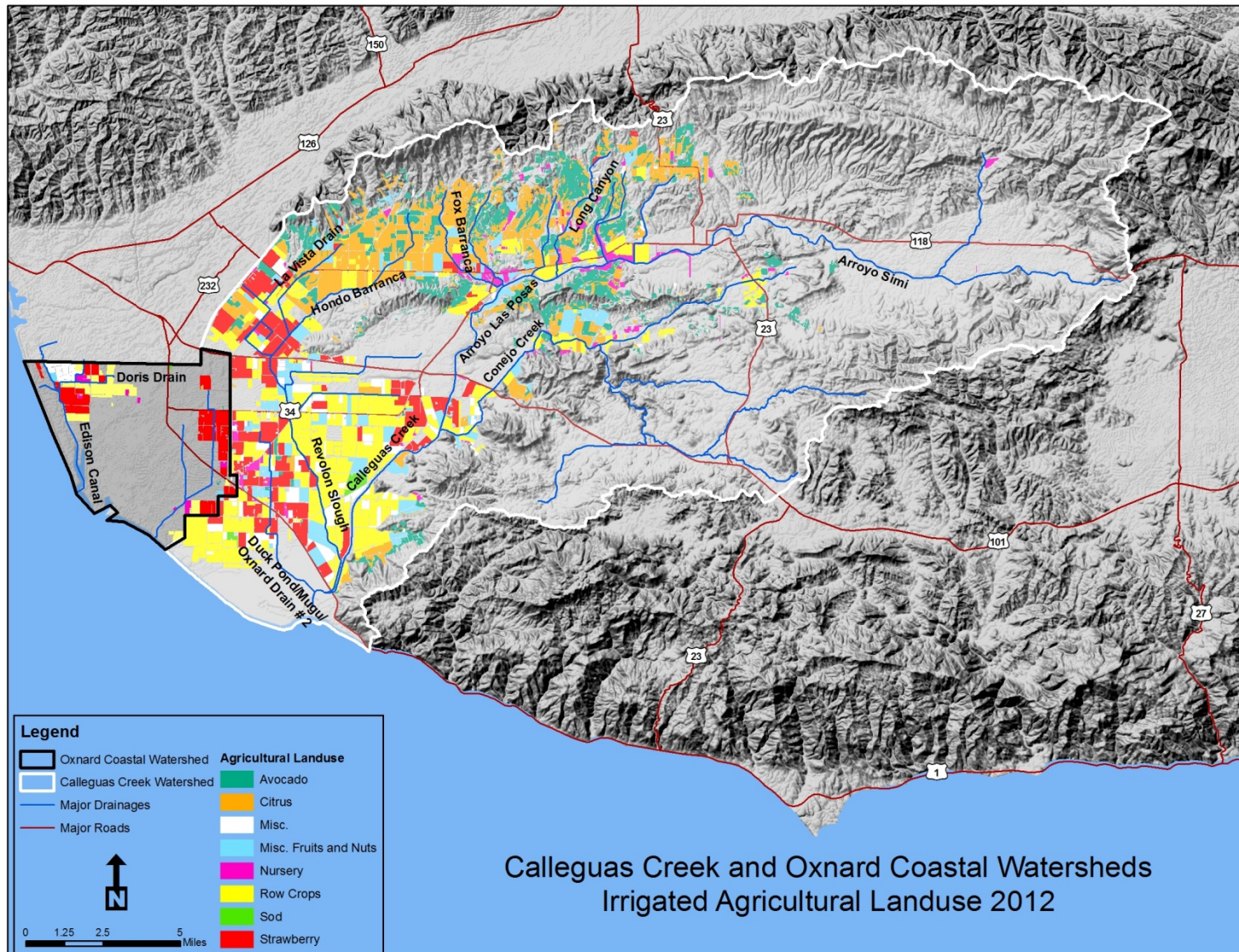


Figure 2. Calleguas Creek Watershed Agricultural Land Use

Santa Clara River Watershed

The Santa Clara River is the largest river system in southern California remaining in a relatively natural state. The river originates in the northern slope of the San Gabriel Mountains in Los Angeles County, traverses Ventura County, and flows into the Pacific Ocean halfway between the cities of San Buenaventura and Oxnard. The Santa Clara River and tributary system has a watershed area of about 1,634 square miles (Figure 3). Cities within the watershed include Ventura, Santa Paula, Fillmore, Piru, Santa Clarita, and Newhall. Major tributaries include Castaic Creek and San Francisquito Creek in Los Angeles County, and the Sespe, Piru, and Santa Paula Creeks in Ventura County. Approximately 40 percent of the watershed is located in Los Angeles County and 60 percent is in Ventura County. The most prevalent land use in the 500-year flood plain of the Santa Clara River is agriculture (62 percent), followed by industry (22 percent). Row crops and orchards are planted across the valley floor primarily in Ventura County and extend up adjacent slopes.

Several Santa Clara River reaches and tributaries appear on the federal 303(d) list of impaired waterbodies due to salts, nitrogen compounds, bacteria, and pesticides. TMDLs have been adopted for Nitrogen Compounds (upper and lower Santa Clara River reaches), Chloride (Reach 3) and Bacteria (Estuary and Reaches 3, 5, 6, and 7). A TMDL for toxaphene in the Santa Clara River Estuary was incorporated in the 2010 Conditional Waiver as a single regulatory action.

Just south of the mouth of the Santa Clara River lies a small coastal watershed that drains to McGrath Lake. A TMDL has been adopted to address pesticides and PCBs impairments in the lake. This TMDL targets properties within the Oxnard Coastal Watershed that drain to the Central Ditch at Harbor Boulevard (OXD_CENTR monitoring site).

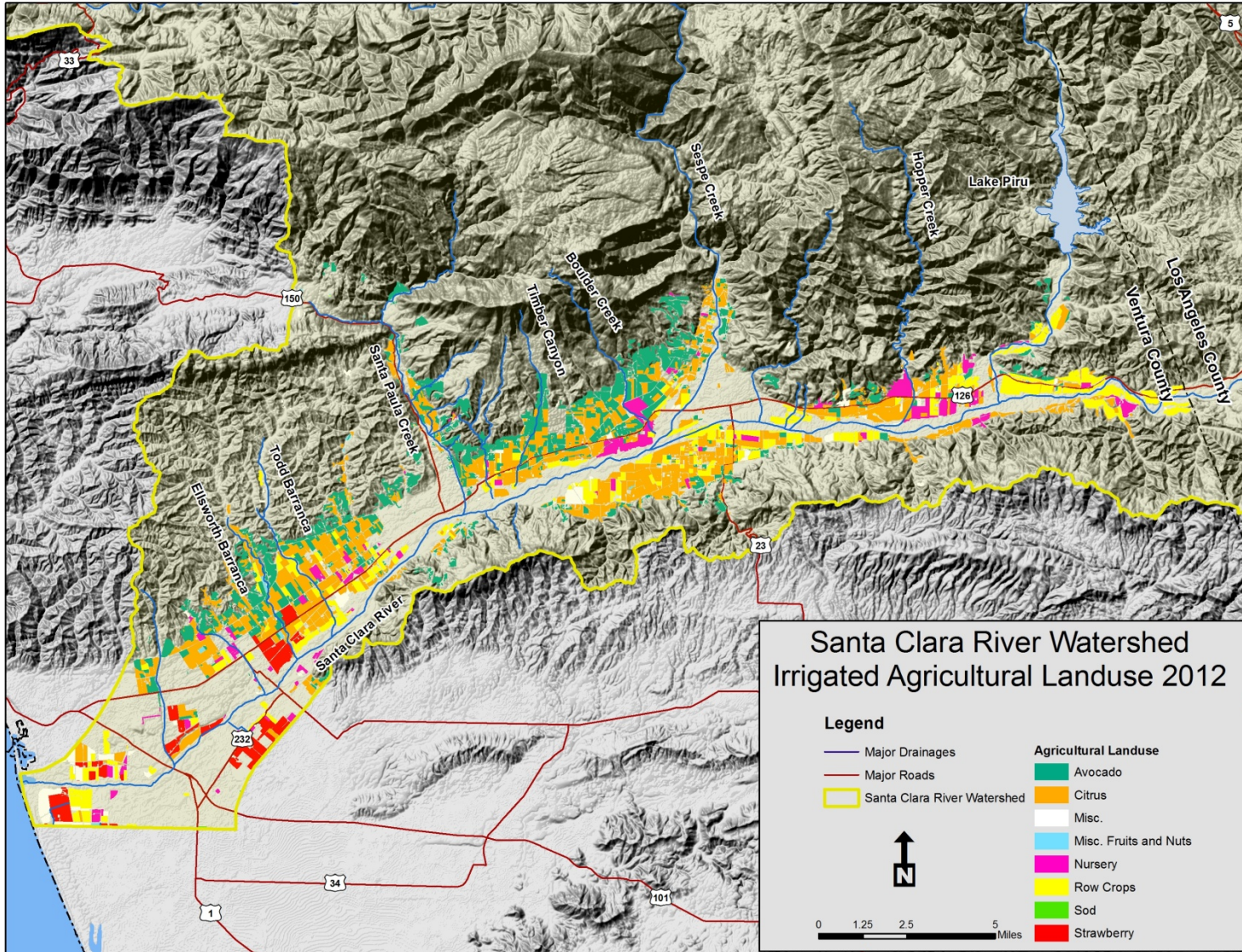


Figure 3. Santa Clara River Watershed Agricultural Land Use

Ventura River Watershed

The Ventura River and its tributaries drain a coastal watershed in western Ventura County. The watershed covers a fan-shaped area of 235 square miles, which is located within the western Transverse Ranges and is 31 miles long from upper Matilija Canyon to the Pacific Ocean (Figure 4). From the upper slopes of the Transverse Ranges, the surface water system in the Ventura River Watershed generally flows in a southerly direction to the estuary, located at the mouth of the Ventura River. Main tributaries in the watershed include Matilija Creek, Coyote Creek and San Antonio Creek. The City of Ojai and communities of Meiners Oaks, Oak View and Casitas Springs are located in the watershed, with surrounding suburban and agricultural areas comprising the Ventura River, Santa Ana, and Upper Ojai Valleys. Portions of the City of San Buenaventura border the lower reaches of the Ventura River. Irrigated agriculture constitutes approximately five percent of land uses in the watershed, with avocado and citrus as the predominant crops grown.

Several Ventura River reaches and tributaries appear on the federal 303(d) list of impaired waterbodies due to Algae/Eutrophic Conditions, Bacteria, Pumping/Water Diversion, and Trash. The Ventura River Estuary Trash TMDL became effective in 2008. A TMDL for algae, eutrophic conditions, and nutrients became effective in July 2013 (Algae TMDL). Upon approving the Algae TMDL, EPA determined that this TMDL addresses the same beneficial uses as those identified in the draft EPA TMDL for pumping and water diversion impairment listings. Therefore, a separate TMDL for pumping and water diversion will not be adopted.

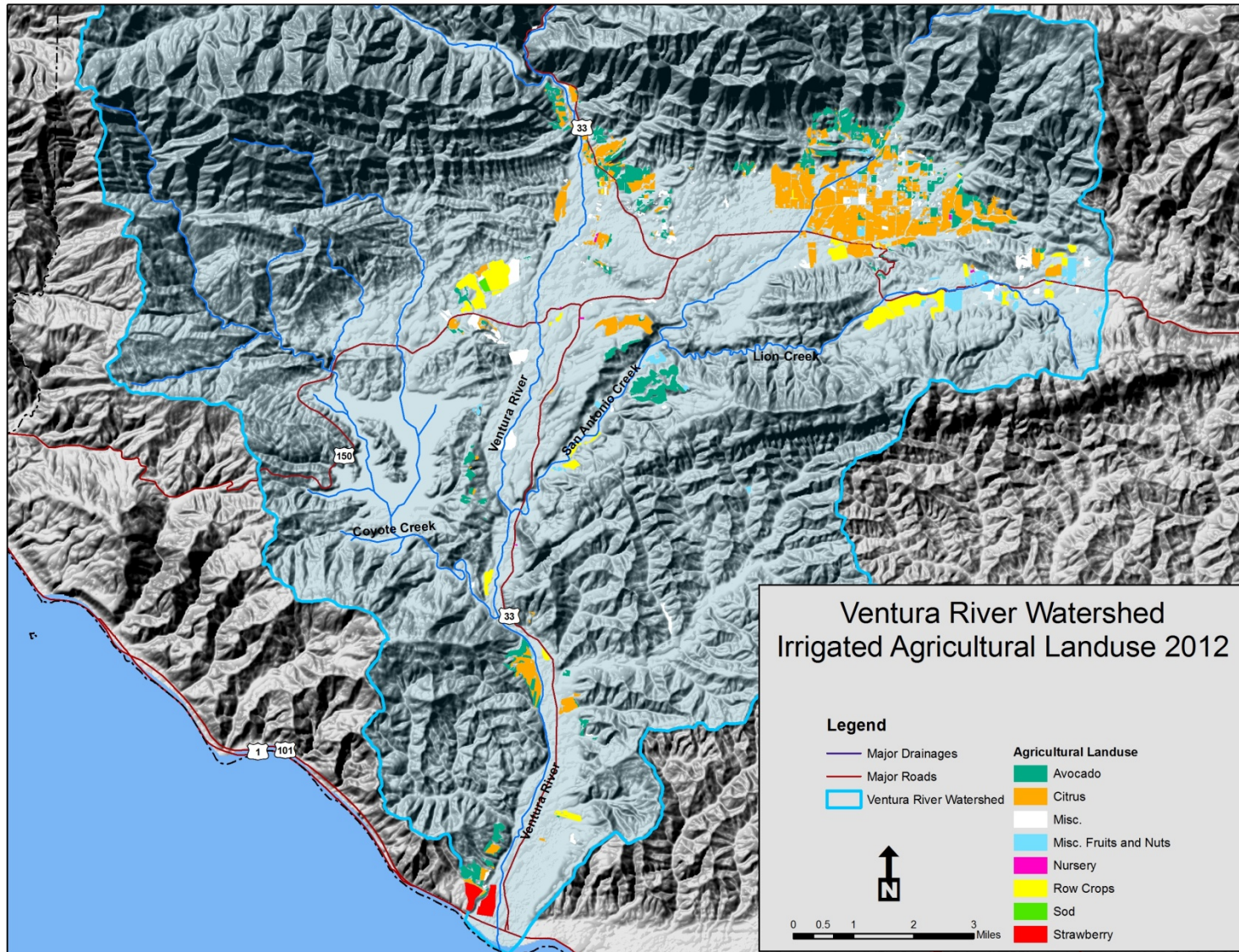


Figure 4. Ventura River Watershed Agricultural Land Use

VCAILG PARTICIPATION IN TMDLS

Within Ventura County, the VCAILG plays an active role in facilitating the participation of agriculture in TMDL development and implementation processes. Acting on behalf of its members, the VCAILG representatives participate in stakeholder meetings, provide comments, and contribute to cooperative agreements. For example, the VCAILG is a participant and funding partner of the Calleguas Creek Watershed TMDL implementation effort.

Effective TMDL monitoring requirements have been incorporated into the 2010 Conditional Waiver (Order No. R4-2010-0186). Therefore, the VCAILG will coordinate with established TMDL monitoring programs or conduct additional monitoring where necessary in order to meet TMDL requirements. Such TMDL data are included in this Annual Monitoring Report.

Water Quality Monitoring

MONITORING OBJECTIVES

The objectives of the VCAILGMP required under the Conditional Waiver include the following:

- Monitor the discharge of wastes in irrigation return flows, tile drains, stormwater, and waters of the state and identify waste sources;
- Where discharges of waste cause or contribute to exceedances of water quality benchmarks or cause pollutions or nuisance, submit a Water Quality Management Plan (WQMP) to implement targeted management practices to reduce or eliminate the discharge of waste;
- Report results and other required information on an annual basis; and
- Coordinate monitoring efforts with existing and future monitoring programs so that data generated are complementary and not duplicative (*e.g.*, coordinate monitoring sites and sampling events with the TMDL Monitoring Programs within Ventura County).

MONITORING SITE SELECTION

The first step toward fulfilling monitoring program objectives was selecting appropriate monitoring sites. Because the focus of the program is on impacts to surface waterbodies from discharges from irrigated agricultural lands, monitoring sites were selected to best characterize agricultural inputs and are generally located at the lower ends of mainstem tributaries or agricultural drainages in areas associated primarily with agricultural activity. A background (“BKGD”) site was chosen for one of the Santa Clara River Watershed sites in the natural area upstream. Calleguas Creek Watershed sites supplement monitoring performed under the Calleguas Creek Watershed TMDL Monitoring Program (CCWTMP) and retain consistency with previous VCAILG sampling. Monitoring sites in the Santa Clara River and Ventura River Watersheds were selected to continue building on existing data previously collected by VCAILG and meet TMDL requirements, where applicable.

The specific criteria for selection of monitoring sites are as follows:

- Land use (primarily agricultural drainages);
- Subwatershed representation;
- Acres of agricultural irrigated lands represented;
- Proximity to agricultural operations;

- Previous or existing monitoring locations under the *2005 Conditional Waiver* or TMDL monitoring programs;
- Drainage into waterbodies included on or proposed for the federal Clean Water Act 303(d) list of impaired waterbodies;
- Size and complexity of watershed;
- Size and flow of waterbodies; and,
- Safe access during dry and wet weather.

Table 4 lists monitoring sites selected in each watershed and associated global positioning system (GPS) coordinates for sampling Conditional Waiver Appendix 1, Table 1 constituents. Table 5 lists monitoring sites and GPS coordinates for effective TMDL monitoring locations. Figure 5 through Figure 11 show site locations for all monitoring sites within each watershed.

The format for the monitoring site ID/code is **XXXXA_YYYY_ZZZZ**, where:

- “XXX” is a 2- or 3-character code that identifies the mainstem receiving water reach (where applicable) into which the monitored waterbody drains;
- “A” identifies the monitored waterbody as an agricultural drain (D) or a tributary (T) to the receiving water;
- “YYYY” is a 3-, 4-, or 5-character abbreviation for the site location;
- “ZZZZ” is an optional 3-, 4-, or 5-character abbreviation that provides additional site location information (*e.g.*, “BKGD” indicates a background site).

Examples:

S03D_BARDS signifies that the monitoring site is an agricultural drain located in the Santa Clara River Watershed. The site is located along Bardsdale Avenue.

S04T_TAPO_BKGD signifies that this a background monitoring site located on Tapo Creek, which is a tributary to the Santa Clara River, Reach 4.

Table 4. VCAILGMP Monitoring Locations for Conditional Waiver Constituents

Watershed / Subwatershed	Station ID	Reach	Waterbody Type ¹	Station Location	GPS Coordinates ²	
					Latitude	Longitude
Calleguas Creek / Mugu Lagoon	01T_ODD3_ARN	1	T	Rio de Santa Clara/Oxnard Drain #3 at Arnold Rd.	34.123564	-119.156514
Calleguas Creek / Revolon Slough	04D_ETTG	4	D	Discharge to Revolon Slough at Etting Rd.	34.161797	-119.091419
	04D_LAS	4	D	Discharge to Revolon Slough at S. Las Posas Rd.	34.134208	-119.079767
Calleguas Creek / Beardsley Channel	05D_LAVD	5	T	La Vista Drain at La Vista Ave.	34.265950	-119.093589
	05T_HONDO	5	T	Hondo Barranca at Hwy. 118	34.263608	-119.057431
Calleguas Creek / Arroyo Las Posas	06T_LONG2	6	T	Long Canyon at Balcom Canyon Rd. crossing	34.281721	-118.958565
Oxnard Coastal	OXD_CENTR	--	D	Central Ditch at Harbor Blvd.	34.220555	-119.254983
Santa Clara River	S02T_ELLS	2	T	Ellsworth Barranca at Telegraph Rd.	34.306805	-119.141275
	S02T_TODD	2	T	Todd Barranca at Hwy. 126	34.313584	-119.117095
	S03T_TIMB	3	T	Timber Canyon at Hwy. 126	34.370172	-119.020939
	S03T_BOULD	3	T	Boulder Creek at Hwy. 126	34.389578	-118.958738
	S03D_BARDS	3	D	Discharge along Bardsdale Ave. upstream of confluence with Santa Clara River	34.371535	-118.964470
	S04T_TAPO	4	T	Tapo Canyon Creek	34.401717	-118.723706
	S04T_TAPO_BKGD	4	B	S04T_TAPO background site upstream of agricultural operations	34.387316	-118.7204509
Ventura River	VRT_THACH	--	T	Thacher Creek at Ojai Avenue	34.446719	-119.210893
	VRT_SANTO	--	T	San Antonio Creek at Grand Avenue	34.454455	-119.221723

1. T = Tributary to receiving water; D = agricultural Drain; B = Background site.

2. All GPS coordinates presented in decimal degrees latitude and longitude in North American Datum 1983 (NAD83).

Table 5. Monitoring Locations for Effective TMDLs

Watershed/ Subwatershed	Site ID	Reach	Waterbody Type ¹	Site Location	GPS Coordinates ²	
					Latitude	Longitude
Calleguas Creek/ Mugu Lagoon	01T_ODD2_DCH	1	T	Duck Pond/Oxnard Drain #2/Mugu Drain S. of Hueneme Rd.	34.1395	-119.1183
Calleguas Creek/ Calleguas Creek	02D_BROOM	2	D	Discharge to Calleguas Creek at Broome Ranch Rd.	34.1434	-119.0711
Calleguas Creek/ Revolon Slough	04D_WOOD	4	D	Agricultural drain on E. side of Wood Rd. N of Revolon	34.1707	-119.0960
	05D_SANT_VCWPD	5	D	Santa Clara Drain at VCWPD Gage #781	34.2425	-119.1114
Calleguas Creek/ Arroyo Las Posas	06T_FC_BR	6	T	Fox Canyon at Bradley Rd.	34.2646	-119.0115
Calleguas Creek/ Arroyo Simi	07D_HITCH_LEVEE_2	7	D	2 nd corrugated pipe discharging on N. site of Arroyo Simi flood control levee off of Hitch Blvd.	34.2714	-118.9205
Calleguas Creek/ Conejo Creek	9BD_GERRY	9B	D	Drain crossing Santa Rosa Rd. at Gerry Rd.	34.2369	-118.9473
Santa Clara River Estuary	S01D_MONAR	1	D	Drain entering SCR Estuary at Monarch Lane between Harbor Blvd. and Victoria Ave.	34.2333	-119.2413
Santa Clara River	S02T_ELLS	2	T	Ellsworth Barranca at Telegraph Rd.	34.3068	-119.1413
Oxnard Coastal	OXD_CENTR	--	D	Central Ditch at Harbor Blvd.	34.2206	-119.2550
Oxnard Coastal/ Channel Islands Harbor	CIHD_VICT	--	D	Discharge to Doris Drain at S. Victoria Ave.	34.2099	-119.2207

1. T = Tributary to receiving water; D = agricultural Drain

2. All GPS coordinates presented in decimal degrees latitude and longitude in North American Datum 1983 (NAD83).

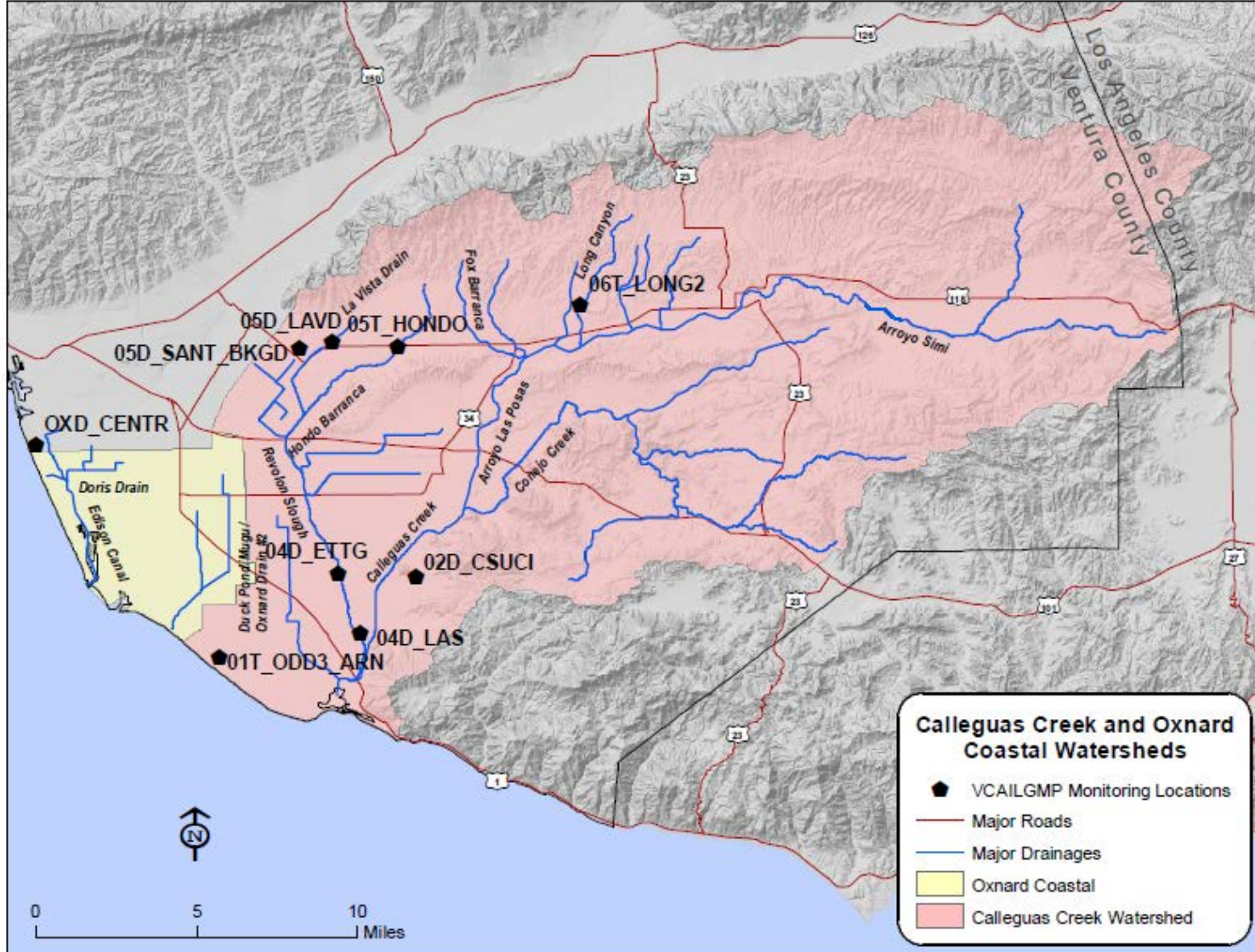


Figure 5. VCAILG Monitoring Sites in the Calleguas Creek/Oxnard Coastal Watersheds

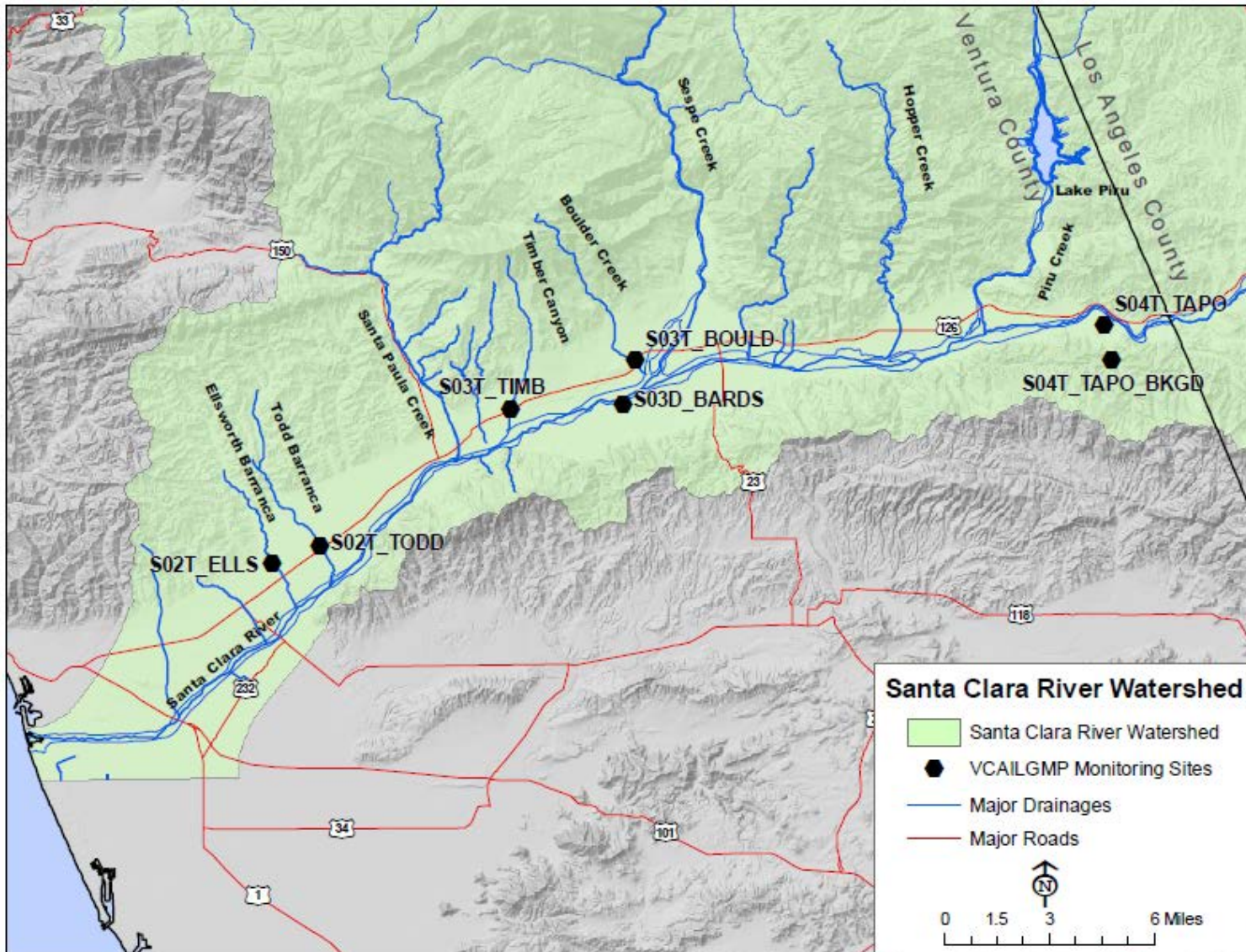


Figure 6. VCAILG Monitoring Sites Located in the Santa Clara River Watershed

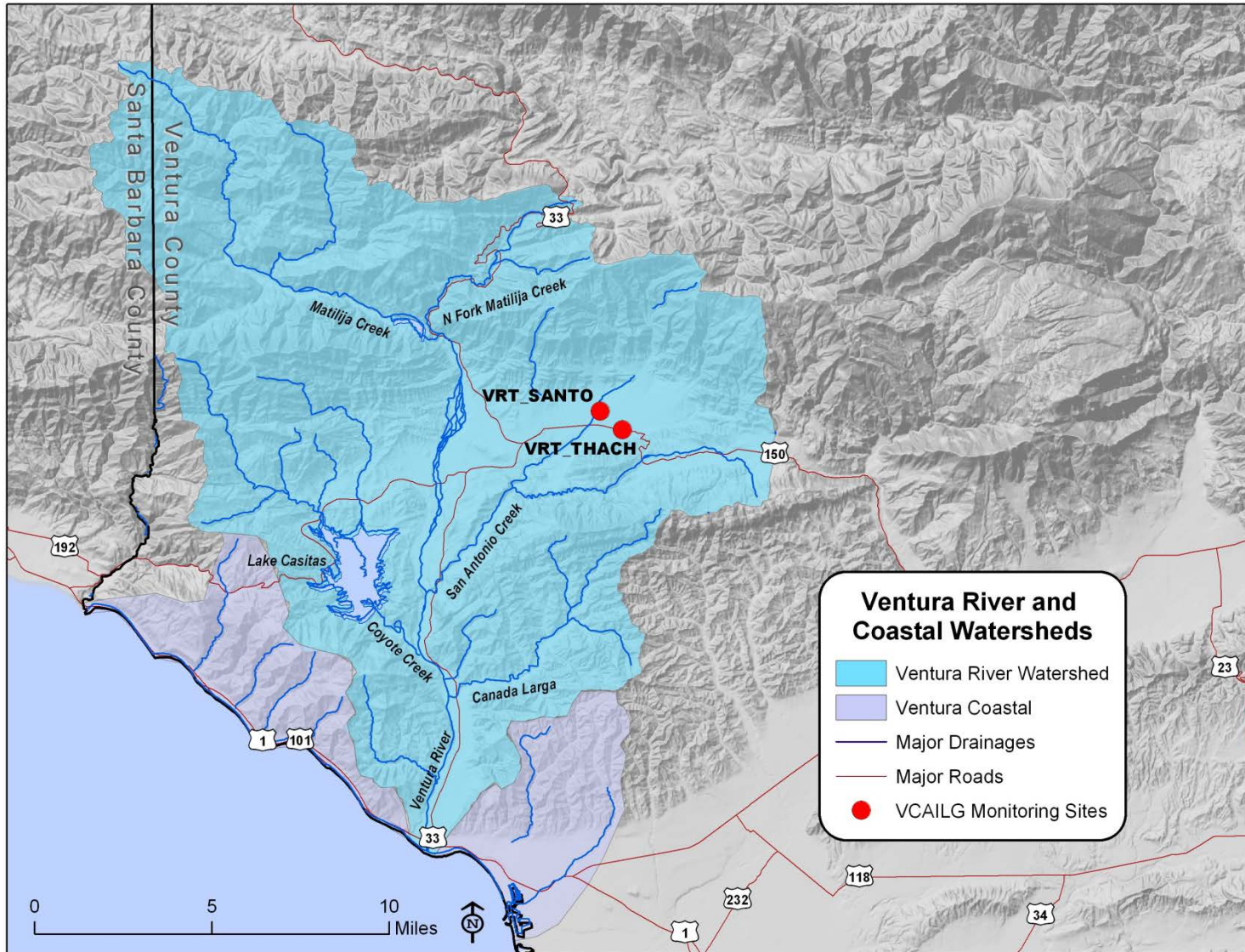


Figure 7. VCAILG Monitoring Sites Located in the Ventura River Watershed

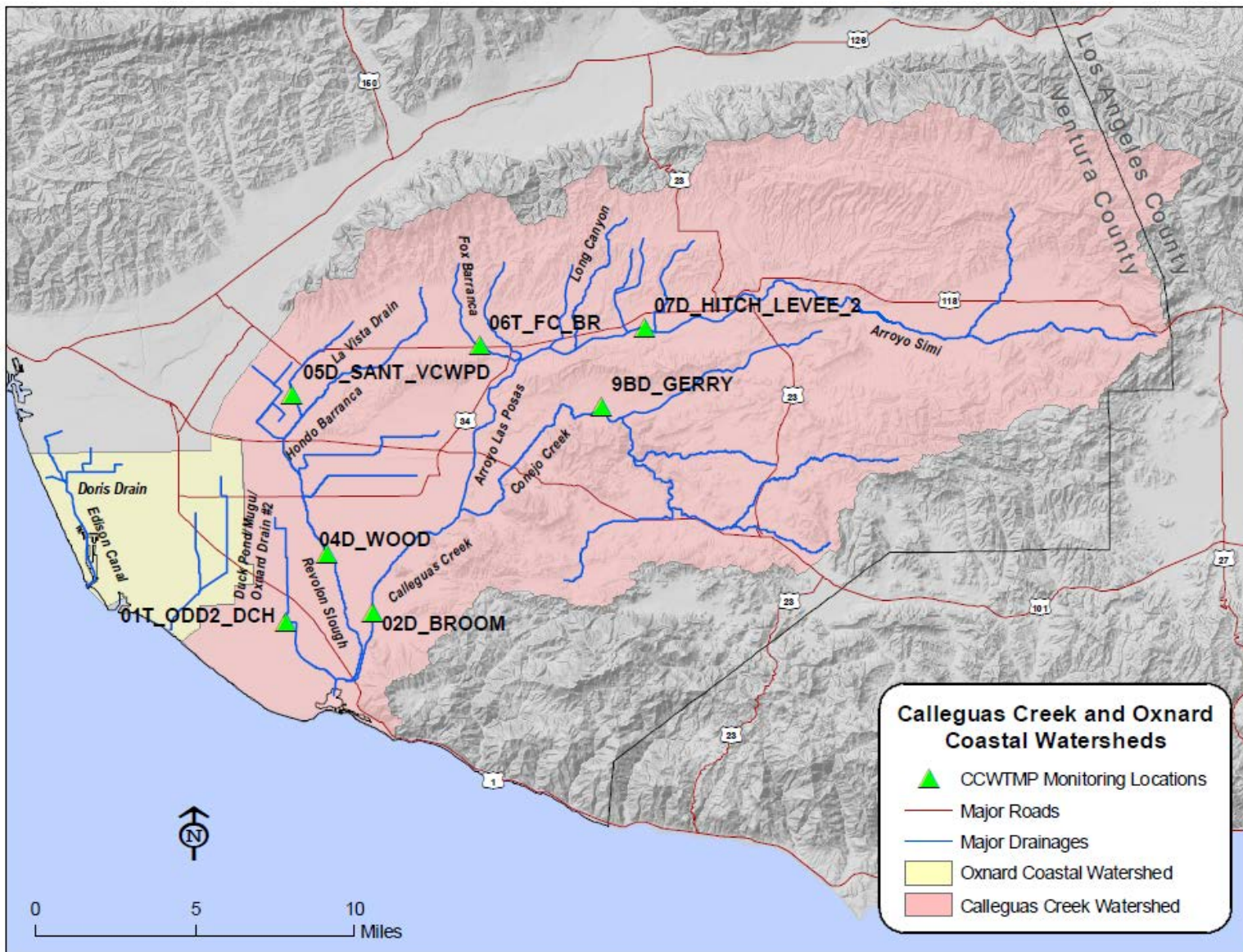


Figure 8. CCWTMP Monitoring Sites

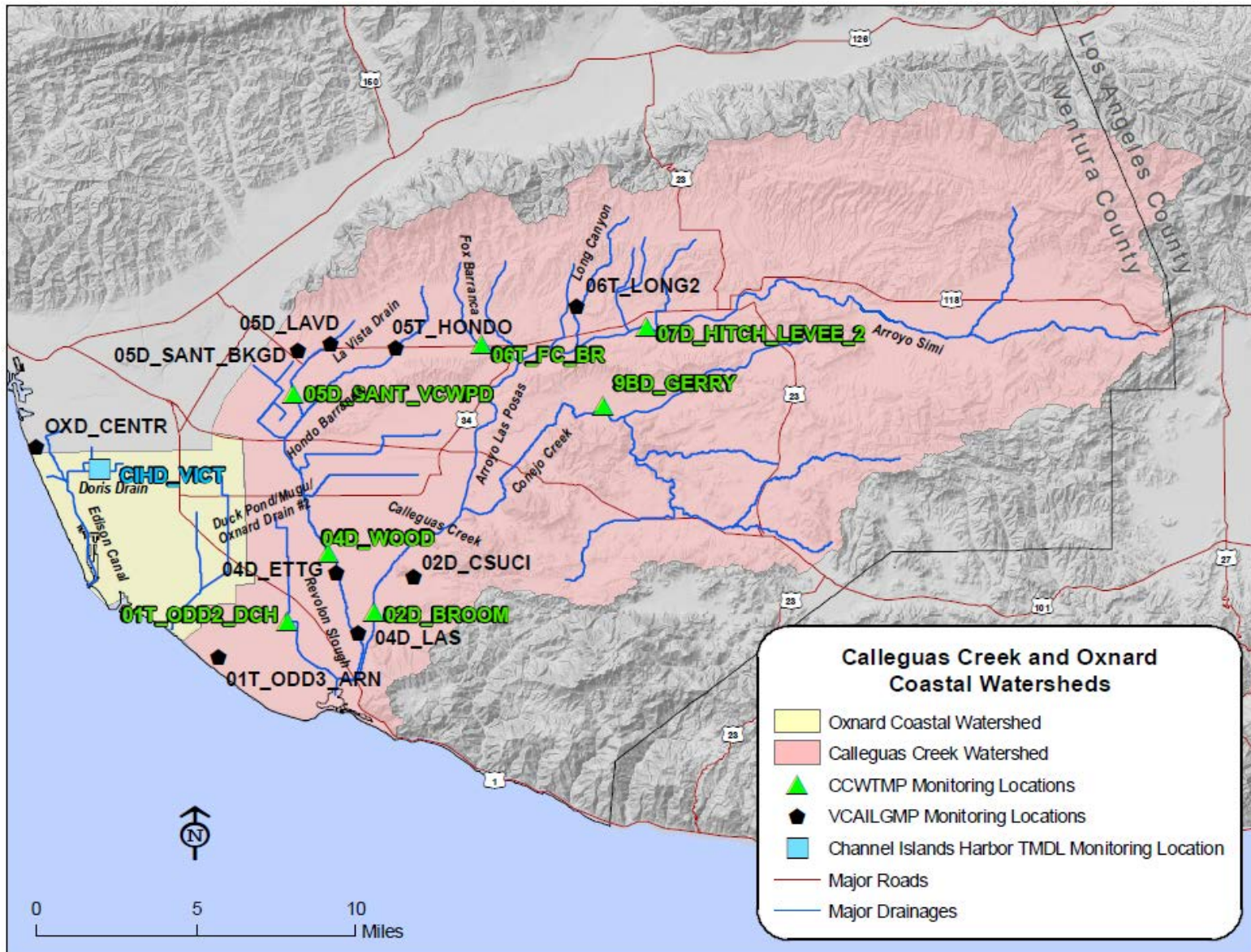


Figure 9. Calleguas Creek and Oxnard Coastal Watershed Monitoring Sites for All Programs

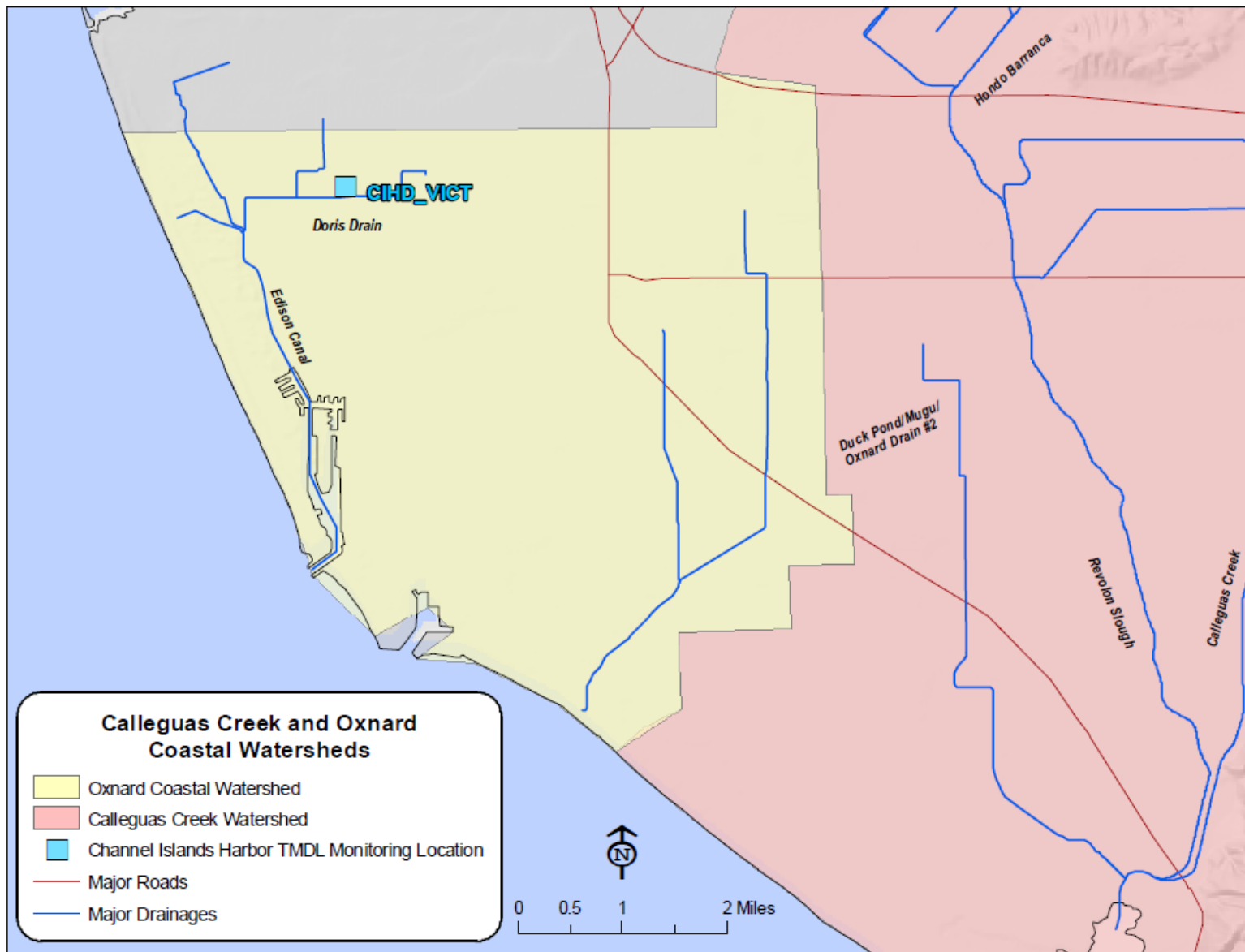


Figure 10. Channel Islands Harbor Bacteria TMDL Monitoring Site

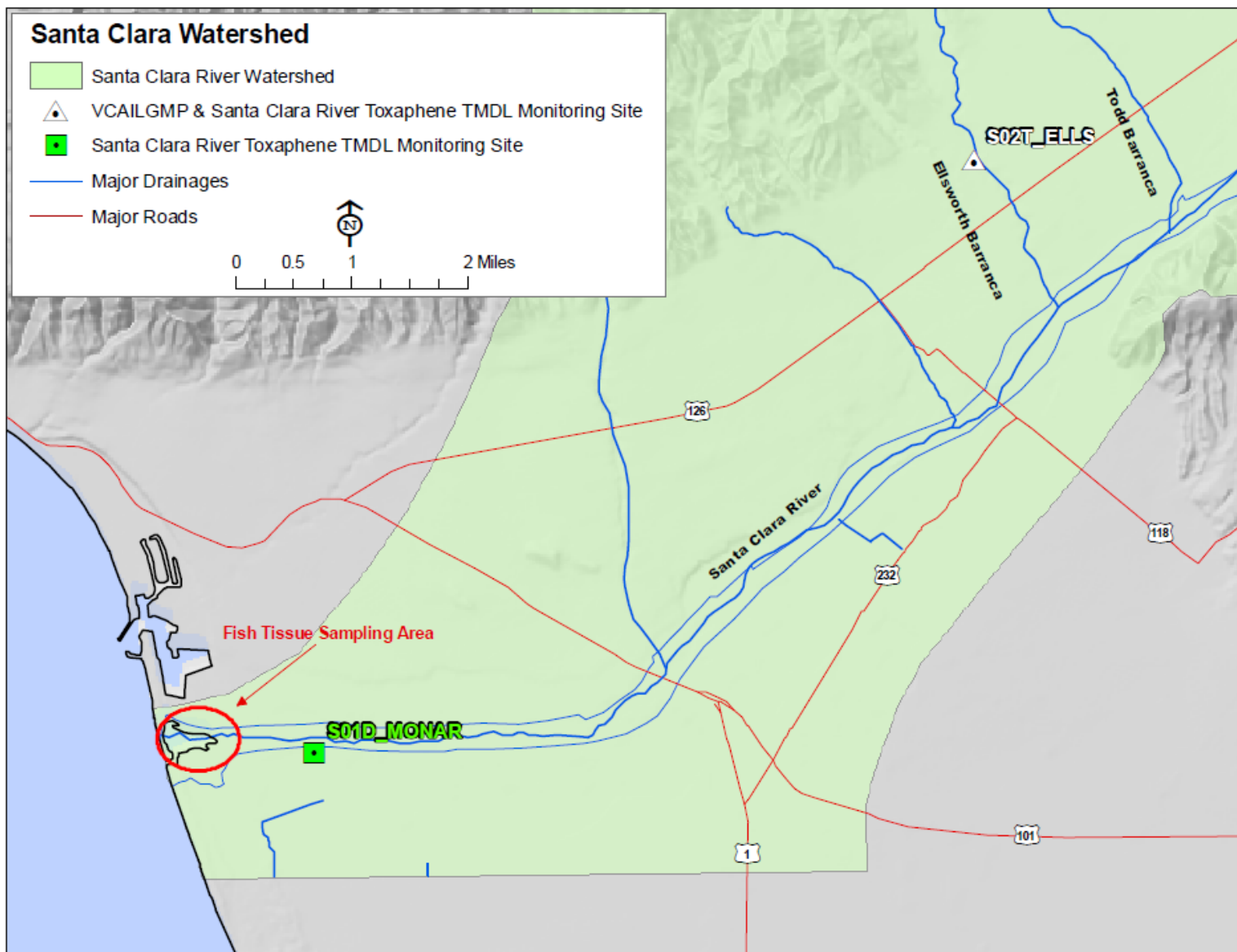


Figure 11. Santa Clara River Estuary Toxaphene TMDL Monitoring Sites

Table 6. Estimated Irrigated Acreage Represented at VCAILG Monitoring Sites

Station ID	Irrigated Agricultural Acreage ^{1,2}									Total Drainage Area Acres
	Row Crops	Cut Flowers	Citrus	Avocados	Other Tree Crops	Strawberries	Other Berries	Sod	Nursery	
01T_ODD3_ARN	867							540		800
04D_ETTG	2534		116			322	180			3,779
04D_LAS	779	17				137			8	1,339
05D_LAVD	7		202	159		51	181			877
05T_HONDO	8		1087	566	1		92		5	3,928
06T_LONG2	2	10	203	157		10	17		46	2,813
OXD_CENTR	337	85	13			273				1,243
S02T_ELLS	99		276	529	1	24	21			9,015
S02T_TODD	122	46	222	152						5,748
S03D_BARDS	39		705	92					17	2,214
S03T_BOULD	0		175	672					157	3,764
S03T_TIMB	18		104	421	2					2,183
S04T_TAPO	29		33						50	3,686
VRT_SANTO			285	242	13					7,220
VRT_THACH	6		630	158	9				3	6,003

1. Data Source Ventura County Agricultural Commissioner's Office
2. Some acreage is double or triple counted due to multi-cropping practices.

Table 7. Estimated Irrigated Acreage Represented at TMDL Monitoring Sites

Station ID ¹	Irrigated Agricultural Acreage ^{2, 3}									Total Drainage Area Acres
	Row Crops	Cut Flowers	Citrus	Avocados	Strawberries	Other Berries	Sod	Nursery	Other	
01T_ODD2_DCH	844	3	9		470		126	1	239	1,564
02D_BROOM	1,154	0	335	328		385		23	204	8,236
04D_WOOD	316				43	27			79	470
05D_SANT_VCWPD	285		404	174	2	71				1,154
06T_FC_BR	80	13	791	62	2	55		59	1	2,602
07D_HITCH_LEVEE_2	85							57		142
9BD_GERRY			32	86		120				447
S01D_MONAR	115				49				11	209
CIHD_VICT	168				73					99

1. Sites OXD_CENTR and S02T_ELLS are also monitored for specific TMDL constituents; their drainage area and crop type information is listed in the previous table.

2. Data Source Ventura County Agricultural Commissioner's Office

3. Some acreage is double or triple counted due to multi-cropping practices.

PARAMETERS MONITORED AND MONITORING FREQUENCY

Conditional Waiver Monitoring Constituents and Frequency

The Conditional Waiver specifies the constituents to be monitored during each monitoring event (Table 8) as well as the monitoring frequency. Per the Conditional Waiver, monitoring is required twice during the wet season and twice during the dry season. In addition, toxicity monitoring is required during one wet event and once during the dry season each year. The wet season is October 15th through May 15th and the dry season is from May 16th through October 14th. Wet season samples shall be collected within 24 hours of a storm occurring with precipitation totals greater than 0.5 inch. The initial dry weather monitoring event shall be completed after the application of pesticides or fertilizers during the period when irrigation is required.

In 2013, storm monitoring occurred on January 25th. Wet weather toxicity monitoring was completed during this event. No additional storms were sufficient to meet the QAPP criteria for sampling, therefore, a second set of wet weather samples were not collected. Most of the precipitation that fell during the year was in the form of fast moving, scattered showers. The annual rainfall was less than forty percent of normal on average for the monitoring area. Dry weather monitoring occurred on August 16, 2012 and May 21, 2013. A scheduling mistake occurred and dry weather toxicity was not monitored during year 2. To make up for this oversight, dry weather toxicity samples have or will be collected during both year 3 dry weather events (August 22, 2013 and May 2014). Approval from Regional Board staff to make this adjustment to the monitoring schedule was received via email on November 20, 2013.

The two background sites located in the Calleguas Creek Watershed (02D_CSUCI and 05D_SANT_BKGD) were visited for sampling during this monitoring year, but did not have flow present during any of the events. It was recommended that these sites be removed from the monitoring program in the 2012 VCAILG AMR. With the change approved and no samples having been collected, these two sites are not summarized or discussed in this report; nor will they be in future AMRs.

Table 9 provides a summary of monitoring sites and constituents that were monitored during the wet and dry weather monitoring events in 2012 and 2013. Field measurements were also collected at the sites where samples were collected.

Table 8. Constituents and Monitoring Frequency for the VCAILGMP

Constituent	Frequency ¹
Field Measurements	
Flow, pH, Temperature, Dissolved Oxygen, Turbidity, Conductivity	
General Water Quality Constituents (GWQC)	
Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Hardness, Chloride, Sulfate	
Nutrients	
Total Ammonia-N, Nitrate-N, Phosphate	2 dry events; 2 wet events
Pesticides	
Organochlorine Pesticides ² , Organophosphorus Pesticides ³ , Pyrethroid Pesticides ⁴	
Metals	
Dissolved Copper, Total Copper	
Trash	
Trash observations	
Aquatic Chronic Toxicity	1 wet event; second dry event

1. The "wet" season is defined as October 15th through May 15th; the "dry" season is defined as May 16th through October 14th each year.
2. Organochlorine Pesticides include: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, adrin, BHC-alpha, BHC-beta, BHC-delta, BHC-gamma, chlordane-alpha, chlordane-gamma, dieldrin, endosulfan sulfate, endosulfan I, endosulfan II, endrin, endrin aldehyde, endrin ketone, and toxaphene.
3. Organophosphorus Pesticides include: bolstar, chlorpyrifos, demeton, diazinon, dichlorvos, disulfoton, ethoprop, fenchlorphos, fensulfothion, fenthion, malathion, merphos, methyl parathion, mevinphos, phorate, tetrachlorvinphos, tokuthion, and trichloronate.
4. Pyrethroid Pesticides include: allethrin, bifenthrin, cyfluthrin, cypermethrin, danitol, deltamethrin, esfenvalerate, fenvalerate, lambda-cyhalothrin, permethrin, and prallethrin.

Table 9. VCAILG Sites Monitored and Constituents Sampled in 2012-2013

Watershed / Subwatershed	Site ID	Reach	Yearly Events ¹		
			Dry 8/28/12	Wet 1/25/13	Dry 5/21/13
Calleguas Creek / Mugu Lagoon	01T_ODD3_ARN	1	WQ	WQ, TOX	WQ
Calleguas Creek / Revolon Slough	04D_ETTG	4	WQ	WQ	WQ
	04D_LAS	4	WQ	WQ	WQ
Calleguas Creek / Beardsley Channel	05D_LAVD	5	WQ	WQ, TOX	WQ ²
	05T_HONDO	5	WQ ²	WQ, TOX ²	WQ ²
Calleguas Creek / Arroyo Las Posas	06T_LONG2	6	WQ ²	WQ, TOX ²	WQ ²
Oxnard Coastal	OXD_CENTR	--	WQ	WQ	WQ
	S02T_ELLS	2	WQ	WQ, TOX ²	WQ ²
Santa Clara River	S02T_TODD	2	WQ	WQ, TOX	WQ
	S03T_TIMB	3	WQ ²	WQ, TOX ²	WQ ²
	S03T_BOULD	3	WQ ²	WQ, TOX ²	WQ ²
	S03D_BARDS	3	WQ ²	WQ ²	WQ ²
	S04T_TAPO	4	WQ	WQ, TOX	WQ
	S04T_TAPO_BKGD	4	WQ ²	WQ ³	WQ ²
Ventura River	VRT_THACH	--	WQ ²	WQ, TOX ²	WQ ²
	VRT_SANTO	--	WQ ²	WQ, TOX ²	WQ ²

TOX = Toxicity

WQ = All water quality constituents listed in Table 7, excluding toxicity, which is noted separately

1. Toxicity testing was performed during the storm event. As described in previous text, toxicity samples have or will be collected during both year 3 dry events.
2. Site not sampled due to insufficient flow/dry conditions.
3. Site was inaccessible due to mud.

TMDL Monitoring Constituents and Frequency

Monitoring for TMDL compliance is either prescribed in the adopted Basin Plan Amendment, or performed according to a TMDL Monitoring Plan, approved by the Regional Board Executive Officer. The following tables summarize the TMDL monitoring that was performed under the VCAILGMP. When appropriate, TMDL monitoring events were conducted at the same time as Conditional Waiver monitoring.

Calleguas Creek Watershed TMDL monitoring was completed per the CCWTMP QAPP and monitoring approach for the Calleguas Creek Watershed Salts TMDL. The *Calleguas Creek Watershed TMDL Compliance Monitoring Program Fifth Year Annual Monitoring Report* describes the TMDL monitoring program and results in detail.⁴ All efforts have been made to coordinate the VCAILG and CCWTMP monitoring programs when timing sampling events. CCWTMP monitoring is conducted quarterly with an additional two storm events each year. As with the VCAILGMP, only one storm event was sampled during the 2012-2013 monitoring year for the CCWTMP.

Table 10. Constituents and Frequency for TMDL Monitoring Performed Under the VCAILGMP

Site ID	Constituent ¹	Frequency
S01D_MONAR	Field Measurements TSS, toxaphene, chlordane, dieldrin (water)	2 dry events; 2 wet events
	Field Measurements Toxaphene, chlordane, dieldrin (filtered sediment)	2 wet events
S02T_ELLS	Toxaphene, chlordane, dieldrin (filtered sediment) ²	2 wet events
Santa Clara River Estuary	Toxaphene, chlordane, dieldrin (fish tissue)	Every three years
CIHD_VICT	Field Measurements <i>E. coli</i> , enterococcus, total coliform, fecal coliform	2 dry events; 2 wet events
OXD_CENTR	Total organic carbon, total PCBs (water)	2 dry events; 2 wet events ²
	Total organic carbon, total PCBs, DDT and derivatives, dieldrin, total chlordane (sediment)	Once after 1 st rain event; once after the wet season ²

1. This table only lists constituents necessary for data comparison with TMDL load allocations that are not already collected at the specified site as part of the Table 8 VCAILGMP sampling.
2. TMDL monitoring at OXD_CENTR is for compliance with the McGrath Lake TMDL, which became effective after the adoption of the Conditional Waiver. Monitoring was conducted according to the September 21, 2012 conditional approval letter of the MRP and QAPP for the McGrath Lake TMDL Phase 1 Monitoring Program.

⁴ Larry Walker Associates. 2014. Calleguas Creek Watershed TMDL Compliance Monitoring Program Fifth Year Annual Monitoring Report. February 26, 2014.

Table 11. TMDL Sites Monitored and Constituents Sampled in 2012-2013

TMDL	Site ID	Yearly Events			
		Dry 8/28/12	Wet 1/25/13	Post-Rain ¹ 2/4/13	Dry 5/21/13
Santa Clara River Estuary Toxaphene TMDL	S01D_MONAR	OC-W TSS	OC-W OC-S TSS		OC-W TSS ²
	S02T_ELLS	OC-W TSS	OC-W OC-S TSS ²		OC-W TSS ²
	Santa Clara River Estuary	Frequency is every three years. Fish collection not required this monitoring year			
Channel Islands Harbor Bacteria TMDL	CIHD_VICT	Bact ²	Bact ²		Bact ²
McGrath Lake PCBs, Pesticides and Sediment Toxicity TMDL	OXD_CENTR	OC-PCB-W TOC TSS	OC-PCB-W TOC TSS	OC-PCB-S TOC	OC-PCB-W OC-PCB-S TOC TSS

OC-W = OC pesticides toxaphene, chlordane, and dieldrin in water

OC-S = OC pesticides toxaphene, chlordane, and dieldrin in filtered sediment

Bact = *E. coli*, enterococcus, total coliform, fecal coliform

OC-PCB-W = OC pesticides chlordane, dieldrin, DDT and derivatives, total PCBs in water

OC-PCB-S = OC pesticides chlordane, dieldrin, DDT and derivatives, total PCBs in sediment

TOC = Total Organic Carbon

TSS = Total Suspended Solids

1. Event specific to monitoring sediment for the McGrath Lake TMDL.

2. Site not sampled due to insufficient flow/dry conditions.

SAMPLING METHODS

The VCAILG QAPP contains requirements for sampling procedures that are designed to ensure that high-quality data are generated through the VCAILGMP. Field crews are trained to adhere strictly to standard operating procedures for all aspects of monitoring, including use of sample containers that are appropriate to each constituent or constituent group analyzed, avoiding potential sources of contamination, and accurately completing field log sheets and chain-of-custody forms, to name a few examples.

Samples collected during the wet event in January were collected either by the direct immersion technique or by using a secondary container; filled sample containers were immediately put on ice in an ice chest. A secondary container is always used at 01T_ODD3_ARN, where a grab pole with a secured secondary container must be used to reach out into the channel. Notes regarding sample bottle fill method and sample collection depth can be found in the field log sheets (Appendix B). Flow measurements were performed according to the standard operating procedure included in Appendix C-1 of the QAPP using either current-meter or float measurements. During wet events, the float method of measuring flow is most practical. At some sites, channel depth was estimated using a reference photo, painted gauge, or other appropriate tool. Estimated flows are qualified as such in the field data (Appendix C) and site summary tables. *Flow estimates made during the wet event, therefore, should be regarded as gross estimates and used with discretion.*

During the wet event, samples taken from 01T_ODD3_ARN were collected using intermediate containers. Intermediate containers were used to fill toxicity bottles at some sites; all other samples were collected by direct immersion. For the dry weather events, intermediate containers were used at 01T_ODD3_ARN both events and 05D_LAVD during the August 2012 event. Sediment collection at OXD_CENTR was performed using a scoop to fill the sample containers. Flow measurements were made according to the standard operating procedure included in Appendix C-1 of the QAPP, as previously noted.

During all monitoring events, a Hydrolab MS5 Data Sonde was used to measure a number of parameters in situ, including temperature, pH, dissolved oxygen, conductivity, and turbidity. Data and information collected at each monitoring site were recorded on a field log sheet. The completed field log sheets for each event are included with this Annual Report as Appendix B, which is included on the Annual Report Data CD. Information recorded on the field log sheet at each monitoring site includes the following:

- Field crew initials;
- Date and time samples were collected;
- Water quality results for constituents measured using field probes (pH, temperature, conductivity, etc.);
- Measurements supporting flow calculations (channel width, depth, water velocity);
- Observations regarding the weather, water color and odor, contact and non-contact recreation, instream activity, the presence of foreign matter, trash counts and types, wildlife, etc.;
- Vegetation and channel substrate (*i.e.*, concrete, cobble, sand, etc.) observations.

Information entered on field log sheets is ultimately entered into the VCAILGMP database for reporting. Field data are included with this Annual Report in Appendix C, which can be found on the Annual Report Data CD. Photo documentation of each monitoring site for all four events is also included on the Annual Report Data CD as Appendix D.

Samples were transported back to FGL Environmental Laboratory in Santa Paula, where chain-of-custody documentation was completed and toxicity samples were prepared for overnight delivery to Pacific EcoRisk (toxicity testing laboratory). A courier picked up the samples to be analyzed at Physis Environmental Laboratories and delivered them according to the requirements of the QAPP.

The completed Chain-of-Custody (COC) forms are included this Annual Report as Appendix E; also included on the Annual Report Data CD.

ANALYTICAL METHODS

Table 12 provides a summary of analytical methods used by contract laboratories for analyzing samples collected for Conditional Waiver constituents during the 2012 to 2013 monitoring year. Table 14 lists analytical methods for TMDL constituents monitored as part of the VCAILGMP. Refer to the CCWTMP QAPP for methods used on samples collected at CCW agricultural land use sites.

Table 12. Analytical Methods for Conditional Waiver Constituents

Constituent	Analytical Method
Aquatic Chronic Toxicity ¹	
<i>Ceriodaphnia dubia</i> (water flea) ²	EPA-821-R-02-013 and EPA 600-4-91-002
<i>Pimephales promelas</i> (fathead minnow) ³	
<i>Selenastrum capricornutum</i> (green algae) ⁴	
General Water Quality Constituents (WQ)	
Flow, pH, Temperature, Dissolved Oxygen, Conductivity, Turbidity	Field Measurement
Total Dissolved Solids (TDS)	SM 2540C
Total Suspended Solids (TSS)	SM 2540D
Chloride	EPA 300.0
Sulfate	EPA 300.0
Hardness	SM 2340B
Nutrients	
Total Ammonia-N	SM 4500-NH ₃ F
Nitrate-N	EPA 300.0
Phosphate (Total Orthophosphate as P)	SM4500-PE
Metals	
Total and Dissolved Copper	EPA 200.8
Organic Constituents ⁵	
Organochlorine Pesticides ⁶	EPA 625
Organophosphorus Pesticides	EPA 625
Pyrethroid Pesticides	8270C (NCI)

1. Chronic toxicity tests were performed on three species for the first toxicity monitoring event where water was present at each particular site, after which the most sensitive species was selected for use in subsequent monitoring events.
2. If sample conductivity exceeded 3000 uS/cm, *Hyalella azteca* was used for toxicity testing.
3. If sample conductivity exceeded 3000 uS/cm, *Menidia beryllina* was used for toxicity testing.
4. If sample conductivity exceeded 3000 uS/cm, *Thalassiosira pseudonana* was used for toxicity testing.
5. See Table 8 for the list of constituents in each pesticide group.
6. Toxaphene is analyzed using NCI/GCMS.

Table 13. TMDL Analytical Methods for Laboratory Analyses Performed Under the VCAILGMP

Constituent ¹	Analytical Method
OC Pesticides (filtered sediment)	EPA 8270C
OC Pesticides (fish tissue)	EPA 8280C
<i>E. coli</i>	9223B
Enterococcus	Indexx Enterolert
Total coliform	9221B
Fecal coliform	9221E
Total organic carbon (TOC) (water)	5310C
PCBs (water)	EPA 625
Total organic carbon (TOC) (sediment)	EPA 9060A
OC Pesticides (sediment)	EPA 8270C
PCBs (sediment)	EPA 8270C

1. Listed constituents are those that are required by a TMDL and not already listed in the previous table.

STANDARD WATER QUALITY BENCHMARKS

The Conditional Waiver requires that if monitoring data exceeds applicable benchmarks, a WQMP designed to reduce pollutant loading to surface waters must be developed to address those exceedances. This section presents the water quality benchmarks as specified in the Conditional Waiver (R4-2010-0186) used to evaluate monitoring data collected at VCAILG monitoring sites in 2012 through 2013. Benchmarks used for determining exceedances of the standard water quality benchmarks include numeric and narrative water quality objectives contained in Appendix 2 of the Conditional Waiver, which consist of narrative and numeric Basin Plan objectives and water quality standards from the California Toxics Rule (CTR). In instances where the Conditional Waiver references the Basin Plan or CTR, without specifying a benchmark number, the lowest applicable number was selected for each watershed. The Conditional Waiver also includes effective TMDL load allocations (LAs) as water quality benchmarks. Following the compilation of standard water quality benchmarks, VCAILG monitoring sites, and corresponding monitoring data, a section evaluating TMDL LAs attainment at the TMDL monitoring locations.

Several of the narrative water quality objectives contained in the Basin Plan specify that discharges of wastes to receiving waters cannot alter “natural” or “ambient” conditions above or below a stated level. Many of the VCAILG monitoring sites are located on agricultural drains that discharge to receiving waters. Because “natural” and “ambient” conditions have not been established in receiving waters or are non-existent on agricultural drains and ephemeral streams, monitoring data from sites located on agricultural drains are evaluated based on the assumption that if benchmarks are not exceeded in the agricultural drain, it is unlikely that the discharge from that drain will cause benchmark exceedances in the receiving water.

Table 14. Standard Water Quality Benchmarks Derived From Narrative Objectives and Toxicity

Constituent	Watershed ¹	Narrative Objective ²	Applicable Benchmark
pH	CC, OXD, SCR, VR	The pH of inland surface waters shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed by more than 0.5 pH units from natural conditions as a result of waste discharges.	6.5 ≤ pH ≤ 8.5 Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
Temperature	CC, OXD, SCR, VR	For waters designated WARM, water temperature shall not be altered by more than 5°F above the natural temperature. At no time shall WARM-designated waters be raised above 80°F as a result of waste discharges.	WARM: ≤ 80°F Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
	SCR, VR	For waters designated COLD, water temperature shall not be altered by more than 5°F above the natural temperature.	COLD: No numeric benchmark. Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
Dissolved Oxygen	OXD	No single dissolved oxygen determination shall be less than 5 mg/L, except when natural conditions cause lesser concentrations.	≥ 5 mg/L
	CC, SCR, VR	The dissolved oxygen content of all surface waters designated as WARM shall not be depressed below 5 mg/L as a result of waste discharges.	WARM: ≥ 5 mg/L
	SCR, VR	The dissolved oxygen content of all surface waters designated as COLD and SPWN shall not be depressed below 7 mg/L as a result of waste discharges.	COLD, SPWN: ≥ 7 mg/L
Turbidity	CC, OXD, SCR, VR	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in natural turbidity attributable to controllable water quality factors shall not exceed the following limits: <ul style="list-style-type: none"> ▪ Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20%; ▪ Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%. 	No numeric benchmarks. Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
Biostimulatory Substances	CC, OXD, SCR, VR	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.	No numeric benchmarks. Waterbody-specific benchmarks for nutrients are listed in Table 16.
Total Suspended Solids (TSS)	CC, OXD, SCR, VR	Wastes shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.	No numeric benchmarks.
Pesticides	CC, OXD, SCR, VR	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.	No numeric benchmarks. Applicable benchmarks for specific pesticides are listed in Tables 18, 19, and 20.
Toxicity	CC, OXD, SCR, VR	All waters shall be free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal or aquatic life. There shall be no chronic toxicity in ambient waters outside mixing zones.	≤ 1.0 TUC ³ Benchmarks for specific potentially toxic constituents are listed in Tables 16 through 20.

1. CC = Calleguas Creek Watershed OXD = Oxnard Coastal Watershed SCR = Santa Clara River Watershed VR = Ventura River Watershed

2. Source: Water Quality Control Plan, Los Angeles Region (Basin Plan), 1994.

3. Source: "Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands," Order No. R4-2010-0186, Los Angeles Regional Water Quality Control Board, adopted October 7, 2010.

Table 15. Standard Water Quality Benchmarks for Salts and Nutrients (Basin Plan Table 3-8 Numeric Water Quality Objectives)

Watershed / Reach	Reach Description	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Nitrogen (mg/L)	Ammonia ¹ (mg/L)	Phosphate (mg/L)
CC below Potrero Rd.	-----	-----	-----	-----	10 ²	pH, temperature dependent	-----
CC above Potrero Rd.	-----	150	250	850	10 ³	pH, temperature dependent	-----
OXD	-----	-----	-----	-----	10 ²	pH, temperature dependent	-----
SCR Reach 1	Tidally-influenced mouth of Santa Clara River upstream to 101 Bridge	-----	-----	-----	10 ²	pH, temperature dependent	-----
SCR Reach 2	Upstream of Hwy 101 Bridge to Freeman Diversion	150	600	1200	10 ²	pH, temperature dependent	-----
SCR Reach 3	Upstream of Freeman Diversion to A Street Bridge in Fillmore	100 ⁴	650	1300	5 ³	pH, temperature dependent	-----
SCR Reach 4	Upstream of A Street Bridge in Fillmore to Blue Cut Gaging Station	100	600	1300	5 ³	pH, temperature dependent	-----
VR Reach 4	Between Camino Cielo Rd. and Casitas Vista Rd.	60	300	800	5 ³	pH, temperature dependent	-----

Watersheds: CC = Calleguas Creek OXD = Oxnard Coastal SCR = Santa Clara River VR = Ventura River

1. Ammonia benchmarks are based on 1) freshwater ammonia objectives as calculated according to LARWQCB Resolutions 2002-011 and 2005-014, and 2) saltwater ammonia objectives as calculated according to LARWQCB Resolution 2004-022. Ammonia objectives are calculated based on the pH and temperature of the receiving water measured at the time of sample collection for ammonia analysis. Ammonia objectives used as benchmarks are chronic, 30-day averages.
2. There is no site-specific nitrogen objective in the Basin Plan (Table 3-8) applicable to this reach. The Basin Plan objective of 10 mg/L Nitrate-N was used for comparison with VCAILG data collected at monitoring sites in this reach.
3. The Nitrogen benchmark listed is as Nitrate-N plus Nitrite-N.
4. The 100 mg/L benchmark for chloride is the revised water quality objective adopted by the Regional Board in Resolution 2003-015.

Table 16. Standard Water Quality Benchmarks for Copper

Constituent	Freshwater ^{1, 2}		Brackish or Saltwater ¹	
	Benchmark (µg/L)	Benchmark Source	Benchmark (µg/L)	Benchmark Source
Copper	$= 0.96e^{[0.8545(\ln hardness)+(-1.702)]}$	CTR CCC ³	3.1	CTR CCC ³

1. Freshwater benchmark applies to discharges to waters with salinities <1 ppt at least 95% of the time. Saltwater benchmark applies when salinities are ≥10 ppt at least 95% of the time. For discharges between these categories, or tidally influenced freshwater that supports EST beneficial uses, the lower criteria of the two shall be used; which is the saltwater benchmark.
2. As per footnote “m” to the Table in Paragraph (b)(1) of the CTR; “The freshwater criteria for metals are expressed in terms of the dissolved fraction of the metal in the water column.” In instances where the measured hardness is >400 mg/L as CaCO₃, a hardness of 400 is used to calculate the benchmark. This was done in accordance with CTR §31692, f. Hardness.
3. CTR = California Toxics Rule (USEPA, May 18, 2000).
CCC = Criteria Continuous Concentration

Table 17. Standard Water Quality Benchmarks for Organochlorine Pesticides

Constituent	CC Watershed		OXD, SCR Watersheds		VR Watershed	
	Benchmark (ug/L)	Benchmark Source ¹	Benchmark (ug/L)	Benchmark Source ¹	Benchmark (ug/L)	Benchmark Source ¹
Aldrin	0.00014	CTR HHO	0.00014	CTR HHO	0.00013	CTR HHWO
Alpha-BHC	0.013	CTR HHO	0.013	CTR HHO	0.0039	CTR HHWO
Beta-BHC	0.046	CTR HHO	0.046	CTR HHO	0.014	CTR HHWO
Gamma-BHC (Lindane)	0.063	CTR HHO	0.063	CTR HHO	0.019	CTR HHWO
Delta-BHC	-----	-----	-----	-----	-----	-----
Chlordane-alpha	-----	-----	-----	-----	-----	-----
Chlordane-gamma	-----	-----	-----	-----	-----	-----
Chlordane, sum	0.00059	CTR HHO	0.00059	CTR HHO	0.00059	CTR HHO
2,4'-DDD	-----	-----	-----	-----	-----	-----
2,4'-DDE	-----	-----	-----	-----	-----	-----
2,4'-DDT	-----	-----	-----	-----	-----	-----
4,4'-DDD	0.00084	CTR HHO	0.00084	CTR HHO	0.00084	CTR HHO
4,4'-DDE	0.00059	CTR HHO	0.00059	CTR HHO	0.00059	CTR HHWO
4,4'-DDT	0.00059	CTR HHO	0.00059	CTR HHO	0.00059	CTR HHWO
Dieldrin	0.00014	CTR HHO	0.00014	CTR HHO	0.00014	CTR HHWO
Endosulfan I	0.056	CTR AFWC	0.056	CTR AFWC	0.056	CTR AFWC
Endosulfan II	0.056	CTR AFWC	0.056	CTR AFWC	0.056	CTR AFWC
Endosulfan Sulfate	240	CTR HHO	240	CTR HHO	110	CTR HHWO
Endrin	0.036	CTR AFWC	0.036	CTR AFWC	0.036	CTR AFWC
Endrin Aldehyde	0.81	CTR HHO	0.81	CTR HHO	0.76	CTR HHWO
Endrin Ketone	-----	-----	-----	-----	-----	-----
Toxaphene	0.00075	CTR HHO	0.00075	CTR HHO	0.00075	CTR HHO

Watersheds: CC = Calleguas Creek OXD = Oxnard Coastal SCR = Santa Clara River VR = Ventura River

1. CTR = California Toxics Rule (USEPA, May 18, 2000).

HHO = Human Health for Consumption of Organisms Only (30-day average)

HHWO = Human Health for Consumption of Water and Organisms (MUN-designation) (30-day average)

FWC = Aquatic Life, Freshwater Chronic (4-day average)

Table 18. Standard Water Quality Benchmarks for Organophosphorus Pesticides

Constituent	CC, OXD, SCR, VR Watersheds
	Benchmark (ug/L) ¹
Bolstar	-----
Chlorpyrifos	0.025
Demeton	-----
Diazinon	0.10
Dichlorvos	-----
Disulfoton	-----
Ethoprop	-----
Fenchlorophos	-----
Fensulfothion	-----
Fenthion	-----
Malathion	-----
Merphos	-----
Methyl Parathion	-----
Mevinphos	-----
Phorate	-----
Tetrachlorvinphos	-----
Tokuthion	-----
Trichloronate	-----

Watersheds: CC = Calleguas Creek OXD = Oxnard Coastal SCR = Santa Clara River VR = Ventura River
 1. Benchmarks are from Appendix 2 of the Conditional Waiver

Table 19. Standard Water Quality Benchmarks for Pyrethroid Pesticides

Constituent	CC, OXD, SCR, VR Watersheds
	Benchmark (ug/L) ¹
Allethrin	-----
Bifenthrin	-----
Cyfluthrin	-----
L-Cyhalothrin	-----
Cypermethrin	-----
Danitol	-----
Deltamethrin	-----
Esfenvalerate	-----
Fenvalerate	-----
Permethrin	-----
Prallethrin	-----

Watersheds: CC = Calleguas Creek OXD = Oxnard Coastal SCR = Santa Clara River VR = Ventura River
 1. There currently are no Conditional Waiver benchmarks in effect for these watersheds.

WATER QUALITY MONITORING RESULTS

This section contains a summary of water quality monitoring data collected at VCAILG sites where flow was present during the four monitoring events conducted in 2012. Information presented for each VCAILG monitoring site includes the receiving water of the drainage monitored, a site location map, a site photo, and a narrative summary of which events were monitored, exceedances (if any) of standard water quality benchmarks, and unusual occurrences (if any) from each event. The predominant crop type(s) potentially contributing to the flow at each monitoring site is also noted in this section; this information is also listed in Table 6. All constituents listed in Appendix 2 of the Conditional Waiver are included in the data tables for each site. Additional constituents are listed only if they have been detected at a particular site. Non-detect data is included with all of the water quality monitoring data for 2012 as Appendix F on the Annual Report Data CD. All hard copy laboratory reports are also included on the Data CD. Results summarized in this section are compared with Conditional Waiver standard water quality benchmarks from Appendix 2 and specified in Table 14 through Table 19 where applicable, all exceedances are indicated in **bold type** in the data tables.

Data reported by the laboratory in units of ng/L were converted to $\mu\text{g/L}$ for comparison with benchmarks expressed in units of $\mu\text{g/L}$. Results reported by the laboratory as “Total Orthophosphate as P” were converted to “Total Orthophosphate” by multiplying the result by the molecular weight of phosphate (95 g/mol) and dividing the product by the molecular weight of phosphorus (31 g/mole). The converted result is reported as “Total Orthophosphate” on data tables presented in this section. The electronic data file remains unconverted and is labeled “Total Orthophosphate-P.”

Results of toxicity tests conducted in 2012 are discussed separately in a subsequent section.

All analyses included in this report were conducted at a laboratory certified for such analyses by the California Department of Health Services – Environmental Laboratory Accreditation Program (ELAP) or the National Environmental Laboratory Accreditation Program (NELAP), and in accordance with current USEPA guidance procedures, or as specified in this Monitoring Program.

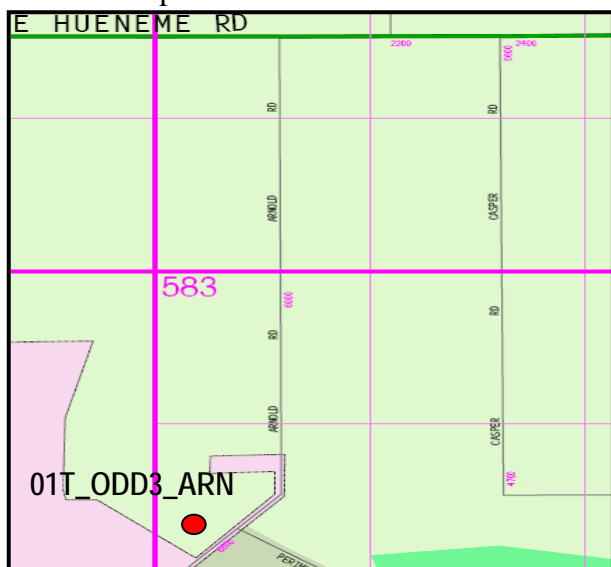
Calleguas Creek Watershed

The Calleguas Creek Watershed contains eight VCAILG monitoring sites. In addition to the sites located on agricultural drains (6 sites), there are two background sites that are monitored under the VCAILGMP. Monitoring sites are discussed below in order of the Calleguas Creek reach into which they drain.

01T_ODD3_ARN

Rio de Santa Clara / Oxnard Drain No. 3. The monitoring site is located on an agricultural drain just upstream from the Arnold Road Bridge. Flow from this drain eventually discharges into the western arm of Mugu Lagoon (Calleguas Creek Reach 1). Because the site is tidally influenced, an attempt is made to conduct monitoring at this site approximately one-half hour after low tide.

Site Map



View downstream at sampling point



Samples were collected at this site during all three 2012 - 2013 monitoring events. Table 20 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Flow is not measured at this site because it is unsafe to do so. Table 21 summarizes the trash observations for each event. This area is frequently used by bird watchers and others participating in non-contact recreation. The trash found near the monitoring site is not specific to agriculture.

Exceedances of the nitrate and DDT compounds benchmarks occurred during every monitoring event at this site during 2012 to 2103. The copper benchmark for saltwater was exceeded at this site during the dry event 18. Wet weather exceedances of dissolved copper and ammonia-N were also observed during Event 17. Row crops and sod are the primary crop types in the vicinity of this site.

Table 20. 2012-2013 VCAILG Monitoring Data v. Waiver Benchmarks: 01T_ODD3_ARN

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Field Measurements					
Flow	CFS		N/A	N/A	N/A
pH		6.5 ≤ pH ≤ 8.5	8.13	7.46	7.92
Temperature	°C		27.95	14.12	25.29
Dissolved Oxygen	mg/L	≥ 5	25.38	6.05	15.36
Turbidity	NTU		39.2	57.1	41.8
Conductivity	µS/cm		6983	4174	6802
General Water Quality					
Total Dissolved Solids (TDS)	mg/L		5020	3050	4950
Total Suspended Solids (TSS)	mg/L		56	91.1	215
Total Hardness as CaCO ₃	mg/L		1928.6	1151.7	1934.6
Chloride	mg/L		1320	690	1270
Sulfate	mg/L		1740	1120	1700
Nutrients					
Ammonia-N	mg/L	0.4/ 4.0/ 0.6 ¹	DNQ	8.6	0.4
Nitrate-N	mg/L	10 ²	43.83	45.59	36.31
Total Orthophosphate	mg/L		0.12	0.89	0.18
Metals					
Dissolved Copper	µg/L	3.1 ³	2.22	4.48	3.68
Total Copper	µg/L		3.1	6.677	8.891
Organochlorine Pesticides					
Aldrin	µg/L	0.00014	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND
Chlordane-alpha	µg/L		ND	ND	DNQ
Chlordane-gamma	µg/L		ND	ND	DNQ
Total Chlordane	µg/L	0.00059	ND	ND	DNQ
2,4'-DDD	µg/L		ND	DNQ	0.0073
4,4'-DDD	µg/L	0.00084	0.0055	0.0125	0.0173
4,4'-DDE	µg/L	0.00059	0.0124	0.0612	0.0487
4,4'-DDT	µg/L	0.00059	ND	0.0154	ND
Dieldrin	µg/L	0.00014	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endrin Aldehyde	µg/L	0.81	ND	ND	ND
Toxaphene	µg/L	0.00075	DNQ	DNQ	ND
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	ND	ND	ND
Diazinon	µg/L	0.1	ND	ND	ND
Malathion	µg/L		ND	1.403	ND
Pyrethroid Pesticides					
Bifenthrin	µg/L		0.003	ND	ND
Danitol	µg/L		ND	0.002	ND

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the Basin Plan Amendment to Update Saltwater Ammonia Objectives (LARWQCB Resolution No. 2004-022). The benchmarks are based on the chronic saltwater equation and are dependent upon the pH, temperature, and salinity of the water at the time of sample collection.
2. There is no site-specific nitrogen objective in the Basin Plan (Table 3-8) applicable to this reach. The Basin Plan objective of 10 mg/L nitrate-N was used for comparison with VCAILG data for this site.
3. Copper benchmark for saltwater applies at this site as prescribed in Table 17.

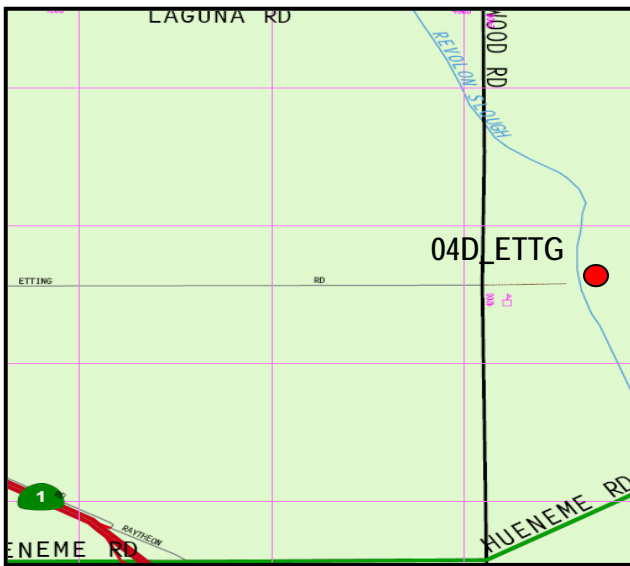
Table 21. 2012 - 2013 Trash Observations for 01T_ODD3_ARN

Event	Count	Types
Event 16	20-30	plastic bags, bottles, cardboard, aluminum cans, styrofoam cups
Event 17	25-50	cups, tires, bottles
Event 18	4	cups, wrappers

04D_ETTG

This monitoring site is located on an agricultural drain just upstream from its confluence with Revolon Slough, just east of the intersection of Wood Road and Etting Road. Flow from this drain eventually discharges into Calleguas Creek Reach 4 (Revolon Slough).

Site Map



View toward SW looking downstream an ag drain before the confluence with Revolon



Flow was present at this site during every monitoring event. Table 22 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. The approximate amount and types of trash observed at this site is recorded in Table 23.

Concentrations of nitrate, copper, and DDT compounds exceeded benchmarks during all three monitoring events. Row crops are the most common crops grown within this site drainage area. Additional crop types include strawberries, other berries (such as raspberries or blueberries), and citrus.

Table 22. 2012 - 2013 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_ETTG

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Field Measurements					
Flow	CFS		4.21	8.55	4.07
pH		6.5 ≤ pH ≤ 8.5	8.03	7.9	8
Temperature	°C	≤ 26.67°C ¹	22.91	15.32	23.45
Dissolved Oxygen	mg/L	≥ 5	11.41	8.71	20.58
Turbidity	NTU		35.4	30.7	1.3
Conductivity	µS/cm		4179	4575	4531
General Water Quality					
Total Dissolved Solids (TDS)	mg/L		3590	4120	3960
Total Suspended Solids (TSS)	mg/L		46.2	ND	9.89
Total Hardness as CaCO ₃	mg/L		1935.1	2047.9	2077.9
Chloride	mg/L		293	284	307
Sulfate	mg/L		1640	2170	1950
Nutrients					
Ammonia-N	mg/L	1.36/ 2.66/ 1.37 ²	0.23	0.15	0.09
Nitrate-N	mg/L	10 ³	53.00	75.64	51.71
Total Orthophosphate	mg/L		2.97	1.04	3.43
Metals					
Dissolved Copper	µg/L	3.1 ⁴	3.82	4.05	5.16
Total Copper	µg/L		5.58	5.57	5.09
Organochlorine Pesticides					
Aldrin	µg/L	0.00014	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND
Chlordane-alpha	µg/L		ND	ND	ND
Chlordane-gamma	µg/L		ND	ND	ND
Total Chlordane	µg/L	0.00059	ND	ND	ND
4,4'-DDD	µg/L	0.00084	0.0055	0.0069	ND
4,4'-DDE	µg/L	0.00059	0.0254	0.0449	0.0079
4,4'-DDT	µg/L	0.00059	ND	0.0099	ND
Dieldrin	µg/L	0.00014	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endrin Aldehyde	µg/L	0.81	ND	ND	ND
Toxaphene	µg/L	0.00075	DNQ	DNQ	ND
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	0.005	0.023	ND
Diazinon	µg/L	0.1	ND	ND	ND

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
2. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS absent) and are dependent upon the pH and temperature of the water at the time of sample collection.
3. There is no site-specific nitrogen objective in the Basin Plan (Table 3-8) applicable to this reach. The Basin Plan objective of 10 mg/L nitrate-N was used for comparison with VCAILG data for this site.
4. The copper benchmark for saltwater applies at this site as prescribed in Table 17.

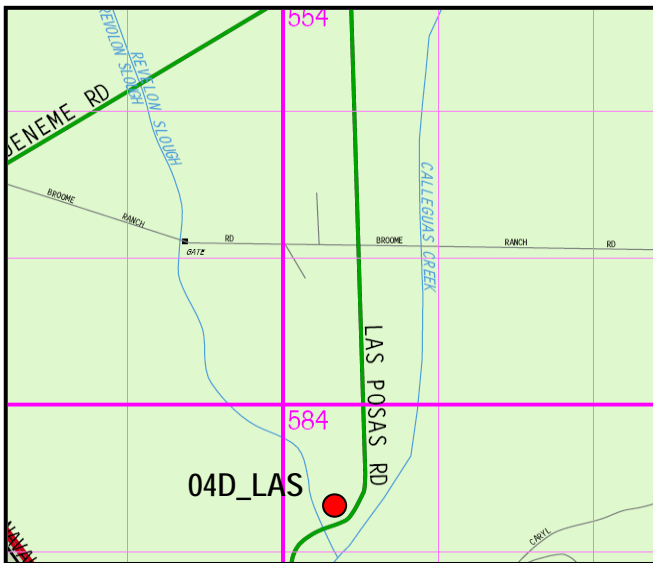
Table 23. 2012 - 2013 Trash Observations for 04D_ETTG

Event	Count	Types
Event 16	>50	couch, ag trash, cups, bags
Event 17	>50	Ag and urban trash, furniture, drum
Event 18	0	N/A

04D_LAS

This monitoring site is located on an agricultural drain just upstream of its confluence with Revolon Slough just upstream of South Las Posas Road. A tile drain discharge is intermittently pumped into this ag drain upstream of the monitoring site. Flow from this drain eventually flows into Calleguas Creek Reach 4 (Revolon Slough).

Site Map



View toward S looking downstream on ag drain before the culvert draining into Revolon Slough



Flow was present at this site during all three 2012 - 2013 monitoring events. Table 24 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 25 quantifies and describes trash found at this site. As noted in the table, a few pieces of trash were observed during the second event, but none during the other two events. This monitoring site is located away from any roads or highways with gates limiting public access.

The nitrate-N benchmark was exceeded every event this year. In addition, there were exceedances of DDT compounds during every event and an exceedance of the chlorpyrifos benchmark during wet Event 17. Row crops are the primary crop type along with significant acreage of strawberries being grown in the vicinity of this site.

Table 24. 2012 - 2013 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_LAS

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Field Measurements					
Flow	CFS		1.55	6.22 EST	1.46
pH		6.5 ≤ pH ≤ 8.5	7.96	7.83	7.88
Temperature	°C	≤ 26.67°C ¹	25.65	14.24	21.62
Dissolved Oxygen	mg/L	≥ 5	16.34	7.59	15.97
Turbidity	NTU		17.1	17.2	17
Conductivity	µS/cm		3596	4004	4074
General Water Quality					
Total Dissolved Solids (TDS)	mg/L		2710	3310	3360
Total Suspended Solids (TSS)	mg/L		12.9	ND	24.9
Total Hardness as CaCO ₃	mg/L		1383.4	1505.6	1643
Chloride	mg/L		350	411	411
Sulfate	mg/L		1080	1540	1430
Nutrients					
Ammonia-N	mg/L	1.26/ 3.12/ 1.82 ²	0.15	0.06	0.3
Nitrate-N	mg/L	10 ³	33.78	44.28	42.52
Total Orthophosphate	mg/L		1.29	1.41	0.89
Metals					
Dissolved Copper	µg/L	3.1 ⁴	2.1	3.1	3.1
Total Copper	µg/L		3.3	3.9	3.2
Organochlorine Pesticides					
Aldrin	µg/L	0.00014	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND
Chlordane-alpha	µg/L		ND	ND	ND
Chlordane-gamma	µg/L		ND	ND	ND
Total Chlordane	µg/L	0.00059	ND	ND	ND
4,4'-DDD	µg/L	0.00084	DNQ	DNQ	0.0064
4,4'-DDE	µg/L	0.00059	0.0116	0.0302	0.017
4,4'-DDT	µg/L	0.00059	ND	DNQ	ND
Dieldrin	µg/L	0.00014	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endrin Aldehyde	µg/L	0.81	ND	ND	ND
Toxaphene	µg/L	0.00075	DNQ	ND	ND
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	0.0055	0.0327	ND
Diazinon	µg/L	0.1	ND	ND	ND
Pyrethroid Pesticides					
Bifenthrin	µg/L		DNQ	0.0024	ND

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
2. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS absent) and are dependent upon the pH and temperature of the water at the time of sample collection.
3. There is no site-specific nitrogen objective in the Basin Plan (Table 3-8) applicable to this reach. The Basin Plan objective of 10 mg/L nitrate-N was used for comparison with VCAILG data for this site.
4. The copper benchmark for saltwater applies at this site as prescribed in Table 17.

Table 25. 2012 - 2013 Trash Observations for 04D_LAS

Event	Count	Types
Event 16	0	N/A
Event 17	<10	cup, plastic wrappers
Event 18	0	N/A

05D_LAVD

This monitoring site is located on the La Vista Drain just east of La Vista Avenue, north of Hwy 118. Flow from this drain eventually discharges into Calleguas Creek Reach 5 (Beardsley Channel). The Ventura County Watershed Protection District maintains a stormwater monitoring station just downstream of the VCAILG monitoring site.

Site Map



View upstream (NE) from sampling location



Sufficient flow was present during the first two 2012 - 2013 monitoring events. Table 26 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 27 quantifies and describes trash found at this site.

TDS and sulfate benchmarks were exceeded at this site during dry Event 16 and there were exceedances of DDT compounds as well as toxaphene and chlopyrifos benchmarks during wet Event 17. Citrus, avocados, and berries (other than strawberries) are the major crop types that drain to this monitoring location.

Table 26. 2012 - 2013 VCAILG Monitoring Data v. Waiver Benchmarks: 05D_LAVD

Constituent	Units	Benchmark	Event 16 Dry 8/28/2012	Event 17 Wet 1/25/2013	Event 18 Dry 5/21/2013	
Field Measurements						
Flow	CFS		0.045	5.44	Not Sampled; site dry	
pH		6.5 ≤ pH ≤ 8.5	8.33	7.83		
Temperature	°C	≤ 26.67°C ¹	19.95	14.8		
Dissolved Oxygen	mg/L	≥ 5	11.48	9.98		
Turbidity	NTU		3.8	1322		
Conductivity	µS/cm		2275	451.7		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850	1690	275		
Total Suspended Solids (TSS)	mg/L		3.57	1370		
Total Hardness as CaCO ₃	mg/L		739.1	156.7		
Chloride	mg/L	150	121	19.7		
Sulfate	mg/L	250	850	129		
Nutrients						
Ammonia-N	mg/L	1.02/ 3.01/ DRY ²	0.08	0.25		
Nitrate-N	mg/L	10	2.84	2.67		
Total Orthophosphate	mg/L		ND	1.96		
Metals						
Dissolved Copper	µg/L	29.28/ 13.15/ DRY ³	1.51	6.30		
Total Copper	µg/L		1.74	83.90		
Organochlorine Pesticides						
Aldrin	µg/L	0.00014	ND	ND		
BHC-alpha	µg/L	0.013	ND	ND		
BHC-beta	µg/L	0.046	ND	ND		
BHC-gamma	µg/L	0.063	ND	ND		
Chlordane-alpha	µg/L		ND	ND		
Chlordane-gamma	µg/L		ND	ND		
Total Chlordane	µg/L	0.00059	ND	ND		
2,4'-DDT	µg/L		ND	0.0329		
4,4'-DDD	µg/L	0.00084	ND	0.0348		
4,4'-DDE	µg/L	0.00059	ND	0.4065		
4,4'-DDT	µg/L	0.00059	ND	0.1347		
Dieldrin	µg/L	0.00014	ND	ND		
Endosulfan-I	µg/L	0.056	ND	ND		
Endosulfan-II	µg/L	0.056	ND	ND		

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endosulfan Sulfate	µg/L	240	ND	ND	Not Sampled; site dry
Endrin	µg/L	0.036	ND	ND	
Endrin Aldehyde	µg/L	0.81	ND	ND	
Toxaphene	µg/L	0.00075	ND	0.08264	
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	0.0073	0.157	
Diazinon	µg/L	0.1	ND	0.0362	
Pyrethroid Pesticides					
Bifenthrin	µg/L		DNQ	0.2464	
Cypermethrin	µg/L		ND	0.0974	

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
2. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS absent) and are dependent upon the pH and temperature of the water at the time of sample collection.
3. The benchmarks for copper are listed in order of monitoring event and were calculated for freshwater at this site as prescribed in Table 17.

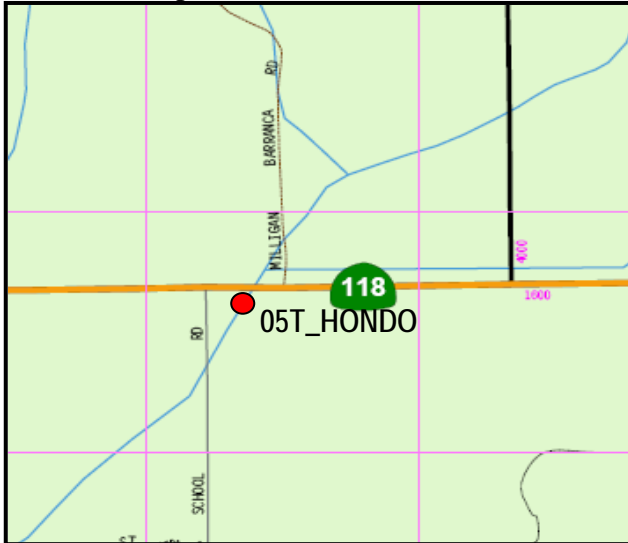
Table 27. 2012 - 2013 Trash Observations for 05D_LAVD

Event	Count	Types
Event 16	6	plastic bottles, bags
Event 17	0	N/A
Event 18	0	N/A

05T_HONDO

This monitoring site is located on Hondo Barranca just downstream of the Hwy 118 Bridge. Hondo Barranca is a tributary to Calleguas Creek Reach 5 (Beardsley Channel).

Site Map



View downstream (S) at sampling location



Flow was not present at this site during any of the monitoring events. Table 28 quantifies and describes trash found at this site. The site is located directly adjacent to Hwy 118 and as noted in the table, a significant portion of the trash does not appear to come from an agricultural source. Hondo Barranca drains land planted primarily with citrus and avocado orchards.

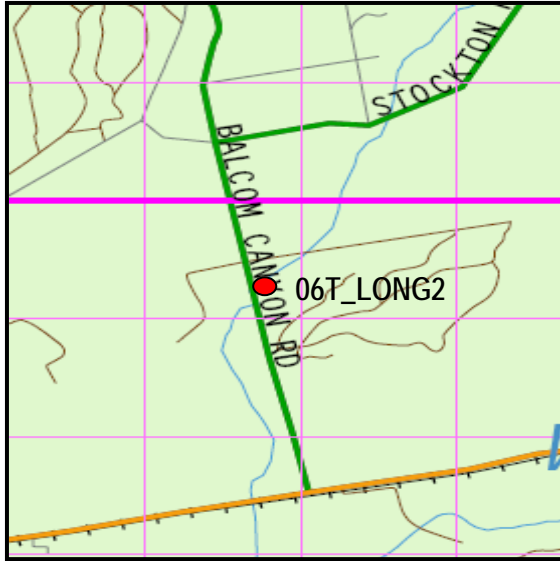
Table 28. 2012 - 2013 Trash Observations for 05T_HONDO

Event	Count	Types
Event 16	25-30	urban trash, bags, boxes, cups, cans, bottles
Event 17	>50	plastic cups, cans, urban trash
Event 18	20-25	cups, plastic, paper, wrappers

06T_LONG2

This monitoring site is located on Long Canyon where it crosses Balcom Canyon Road north of Highway 118. Long Canyon is a tributary to Calleguas Creek Reach 6 (Arroyo Las Posas).

Map of Sites



View upstream from sampling location



Flow was not present at this site during any of the monitoring events. Table 29 quantifies and describes trash found at this site. The drainage area for this monitoring site consists mostly of citrus and avocado orchards, with small portions used for growing nursery stock, berries, and cut flowers.

Table 29. 2012 - 2013 Trash Observations for 06T_LONG2

Event	Count	Types
Event 16	0	N/A
Event 17	0	N/A
Event 18	2	paper, chip bag

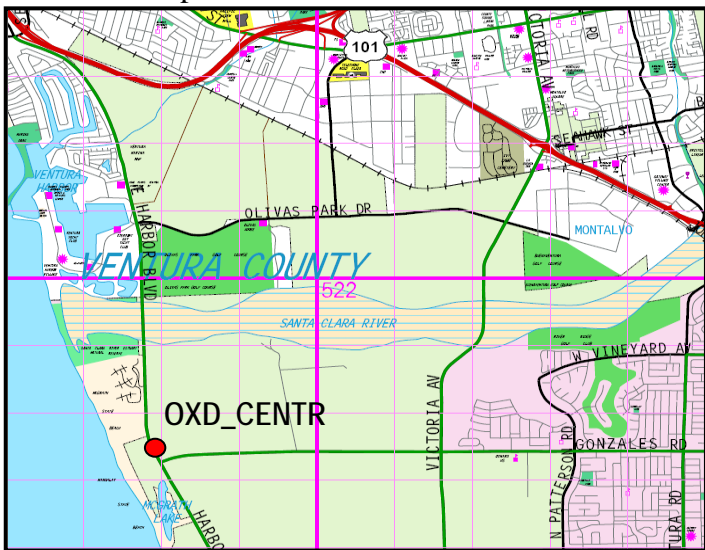
Oxnard Coastal Watershed

The Oxnard Coastal Watershed contains only one VCAILG monitoring site. The site is located on a drain used primarily for irrigated agriculture.

OXD_CENTR

This is the only VCAILG monitoring site in the Oxnard Coastal Watershed. The site is located on the Central Ditch, which flows under Harbor Boulevard and into McGrath Lake. Water from McGrath Lake is pumped periodically into the ocean to prevent the Central Ditch from backing up and flooding Harbor Boulevard.

Site Map



View looking downstream



Sufficient flow was present at this site during all three monitoring events. Table 30 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 31 quantifies and describes trash found at this site.

Exceedances of the Nitrate-N benchmark occurred during all three monitoring events. Exceedances of the DO and chlorpyrifos benchmarks occurred during dry Event 16 and exceedances of DDT compounds and chlorpyrifos benchmarks occurred during wet Event 17. Strawberries and row crops are the predominant crop types that drain to this site.

Table 30. 2012 - 2013 VCAILG Monitoring Data v. Waiver Benchmarks: OXD_CENTR

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Field Measurements					
Flow	CFS		0.63	1.72	2.78
pH		6.5 ≤ pH ≤ 8.5	7.3	7.53	7.01
Temperature	°C		18.84	15.75	18.06
Dissolved Oxygen	mg/L	≥ 5	4.63	8.17	5.15
Turbidity	NTU		0	0	0
Conductivity	µS/cm		3516	1.72	2.78
General Water Quality					
Total Dissolved Solids (TDS)	mg/L		2780	2880	2880
Total Suspended Solids (TSS)	mg/L		DNQ	ND	1.47
Total Hardness as CaCO ₃	mg/L		1507.3	1545.4	1560.2
Chloride	mg/L		269	223	287
Sulfate	mg/L		1320	1520	1400
Nutrients					
Ammonia-N	mg/L	3.84/ 3.92/ 4.69 ¹	0.33	0.12	0.15
Nitrate-N	mg/L	10 ²	18.1	27.84	14.1
Total Orthophosphate	mg/L		0.15	0.21	0.12
Metals					
Dissolved Copper	µg/L	3.1 ³	1.21	2.37	1.50
Total Copper	µg/L		1.42	2.19	1.12
Organochlorine Pesticides					
Aldrin	µg/L	0.00014	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND
Chlordane-alpha	µg/L		ND	ND	ND
Chlordane-gamma	µg/L		ND	ND	ND
Total Chlordane	µg/L	0.0059	ND	ND	ND
4,4'-DDD	µg/L	0.00084	ND	DNQ	ND
4,4'-DDE	µg/L	0.00059	ND	0.0094	ND
4,4'-DDT	µg/L	0.00059	ND	0.0061	ND
Dieldrin	µg/L	0.00014	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endrin Aldehyde	µg/L	0.81	ND	ND	ND
Toxaphene	µg/L	0.00075	ND	ND	ND
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	0.045	0.118	ND
Diazinon	µg/L	0.1	ND	ND	ND
Pyrethroid Pesticides					
Danitol	µg/L		ND	0.0038	ND

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS absent) and are dependent upon the pH and temperature of the water at the time of sample collection.
2. There is no site-specific nitrogen objective in the Basin Plan (Table 3-8) applicable to this reach. The Basin Plan objective of 10 mg/L nitrate-N was used for comparison with VCAILG data for this site.
3. The copper benchmark was applied for saltwater at this site as prescribed in Table 17.

Table 31. 2012 - 2013 Trash Observations for OXD_CENTR

Event	Count	Types
Event 16	15	paper and plastics
Event 17	0	N/A
Event 18	1	cup

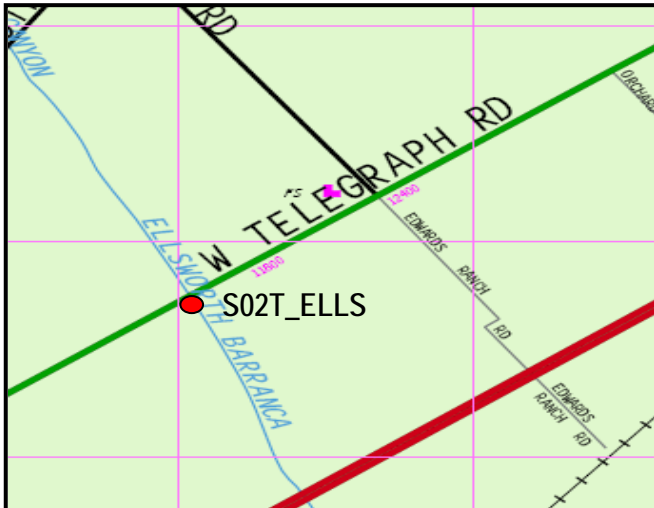
Santa Clara River Watershed

The Santa Clara River Watershed contains seven VCAILG monitoring sites, including one background site. Five of the sites are located on tributaries to the Santa Clara River. S03D_BARDS is the only monitoring site located on a drain used primarily for irrigated agriculture. Monitoring sites are discussed below in order of the Santa Clara River reach into which they drain.

S02T_ELLS

This monitoring site is located on Ellsworth Barranca just downstream of the Telegraph Road Bridge. Ellsworth Barranca drains the Aliso Canyon area and is a tributary to Santa Clara River Reach 2.

Site Map



View upstream at the bridge



Flow was present at this site only during dry Event 16. Table 32 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 33 describes trash found at this site. There were no exceedances of any benchmarks during Event 16. Citrus and avocados are the primary crop types associated with this site.

Table 32. 2012- 2013 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_ELLS

Constituent	Units	Benchmark	Event 16 Dry 8/28/2012	Event 17 Wet 1/25/2013	Event 18 Dry 5/21/2013
Field Measurements					
Flow	CFS		0.22		
pH		$6.5 \leq \text{pH} \leq 8.5$	8.02		
Temperature	°C	$\leq 26.67^{\circ}\text{C}^1$	16.97		
Dissolved Oxygen	mg/L	≥ 6	9.59		
Turbidity	NTU		0.3		
Conductivity	µS/cm		1464		
General Water Quality					
Total Dissolved Solids (TDS)	mg/L	1200	1080		
Total Suspended Solids (TSS)	mg/L		1.18		
Total Hardness as CaCO ₃	mg/L		589.6		
Chloride	mg/L	150	54.1		
Sulfate	mg/L	600	486		
Nutrients					
Ammonia-N	mg/L	2.02/ DRY/ DRY ²	0.08		
Nitrate-N	mg/L		0.42		
Total Orthophosphate	mg/L		0.09		
Metals					
Dissolved Copper	µg/L	29.28 ³	0.33	Not Sampled; site ponded	Not Sampled; site ponded
Total Copper	µg/L		0.52		
Organochlorine Pesticides					
Aldrin	µg/L	0.00014	ND		
BHC-alpha	µg/L	0.013	ND		
BHC-beta	µg/L	0.046	ND		
BHC-gamma	µg/L	0.063	ND		
Chlordane-alpha	µg/L		ND		
Chlordane-gamma	µg/L		ND		
Total Chlordane	µg/L	0.00059	ND		
4,4'-DDD	µg/L	0.00084	ND		
4,4'-DDE	µg/L	0.00059	ND		
4,4'-DDT	µg/L	0.00059	ND		
Dieldrin	µg/L	0.00014	ND		
Endosulfan-I	µg/L	0.056	ND		
Endosulfan-II	µg/L	0.056	ND		
Endosulfan Sulfate	µg/L	240	ND		
Endrin	µg/L	0.036	ND		

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endrin Aldehyde	µg/L	0.81	ND	Not Sampled; site ponded	Not Sampled; site ponded
Toxaphene	µg/L	0.00075	DNQ		
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	ND		
Diazinon	µg/L	0.1	ND		

See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
2. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS present) and are dependent upon the pH and temperature of the water at the time of sample collection.
3. The copper benchmarks are listed in order of monitoring event and were calculated for freshwater at this site as prescribed in Table 17.

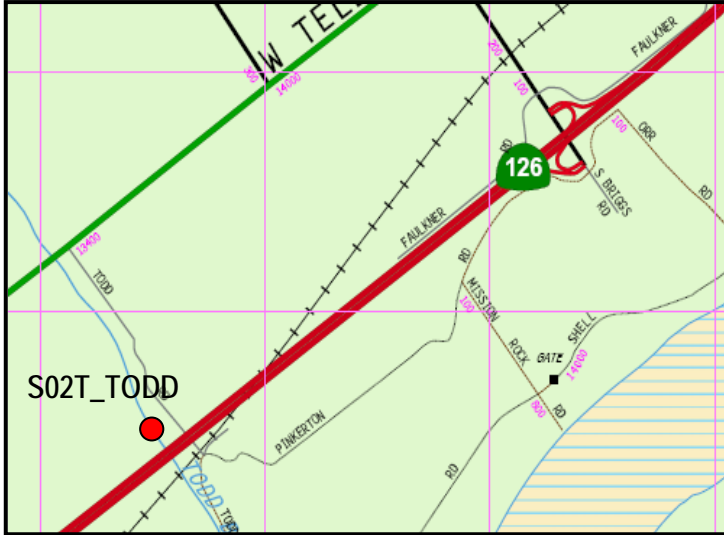
Table 33. 2012 - 2013 Trash Observations for S02T_ELLS

Event	Count	Types
Event 16	8	plastic bag, 3 cups, 1 bottle, paper bag
Event 17	20	cups, wrappers, food bags, cans
Event 18	>20	food wrappers, cups, cans, ag refuse

S02T_TODD

This monitoring site is located on Todd Barranca upstream of Hwy 126. Todd Barranca drains the Wheeler Canyon area and is a tributary to Santa Clara River Reach 2.

Site Map



View upstream of the sampling site



Sufficient flow was present during all three 2012 - 2013 monitoring events. Table 34 contains a summary of detected constituents and a comparison of concentrations with applicable water quality benchmarks. Table 35 lists trash observation made at the site.

There were exceedances of TDS, sulfate, and nitrate-N benchmarks during dry Event 16; TDS, nitrate-N, and DDT compounds during wet Event 17; and TDS, sulfate, and DDT compounds during dry Event 18. Row crops, cut flowers, and orchards drain to this site.

Table 34. 2012 - 2013 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_TODD

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Field Measurements					
Flow	CFS		1.68	0.70	0.43
pH		6.5 ≤ pH ≤ 8.5	7.86	7.81	8.11
Temperature	°C	≤ 26.67°C ¹	16.71	14.7	18.77
Dissolved Oxygen	mg/L	≥ 6	8.87	9.49	9.4
Turbidity	NTU		1.4	2.9	32.1
Conductivity	µS/cm		2485	2999	2210
General Water Quality					
Total Dissolved Solids (TDS)	mg/L	1200	2040	2280	1730
Total Suspended Solids (TSS)	mg/L		3.14	ND	20.6
Total Hardness as CaCO ₃	mg/L		1213.4	1315.7	963.3
Chloride	mg/L	150	98.2	123	86.3
Sulfate	mg/L	600	928	1180	829
Nutrients					
Ammonia-N	mg/L	2.56/ 3.11/ 1.57 ²	DNQ	0.06	0.07
Nitrate-N	mg/L	10	12.96	10.58	5.01
Total Orthophosphate	mg/L		0.21	0.31	1.13
Metals					
Dissolved Copper	µg/L	29.28 ³	2.50	3.44	2.53
Total Copper	µg/L		3.17	6.49	5.08
Organochlorine Pesticides					
Aldrin	µg/L	0.00014	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND
Chlordane-alpha	µg/L		DNQ	ND	ND
Chlordane-gamma	µg/L		DNQ	ND	ND
Total Chlordane	µg/L	0.00059	DNQ	ND	ND
4,4'-DDD	µg/L	0.00084	ND	ND	ND
4,4'-DDE	µg/L	0.00059	ND	0.0144	0.0078
4,4'-DDT	µg/L	0.00059	ND	0.0122	0.0232
Dieldrin	µg/L	0.00014	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endrin Aldehyde	µg/L	0.81	ND	ND	ND
Toxaphene	µg/L	0.00075	DNQ	ND	ND
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	ND	0.024	ND
Diazinon	µg/L	0.1	ND	ND	ND
Merphos	µg/L		ND	ND	0.0261
Pyrethroid Pesticides					
Cypermethrin	µg/L		ND	0.011	0.022
Fluvalinate	µg/L		ND	DNQ	0.0045

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
2. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS present) and are dependent upon the pH and temperature of the water at the time of sample collection.
3. The copper benchmark was calculated for freshwater at this site as prescribed in Table 17.

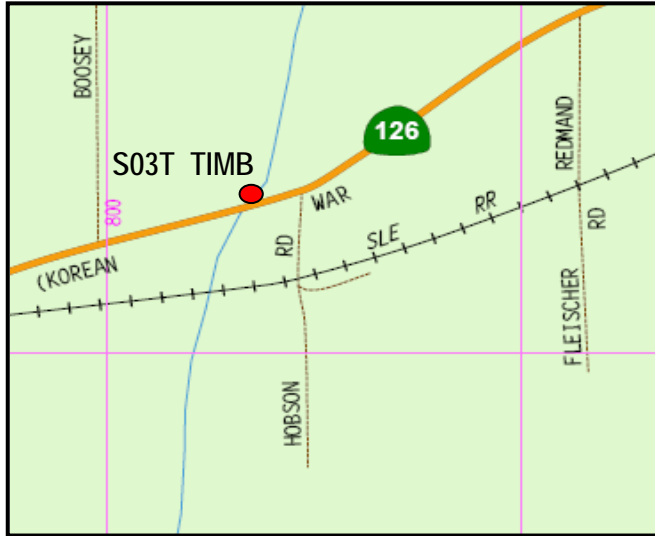
Table 35. 2012 - 2013 Trash Observations for S02T_TODD

Event	Count	Types
Event 16	0	N/A
Event 17	2	trash bag, chip bag
Event 18	2	trash bag, can

S03T_TIMB

This monitoring site is located on Timber Canyon Creek just upstream of Hwy 126, east of Santa Paula. Timber Creek is a tributary to Santa Clara River Reach 3.

Site Map



View of site (S) toward Hwy 126



Sufficient flow was not present for any of the monitoring events during 2012 - 2013. Trash observations are provided in Table 36. This site drains mostly avocado and citrus orchards.

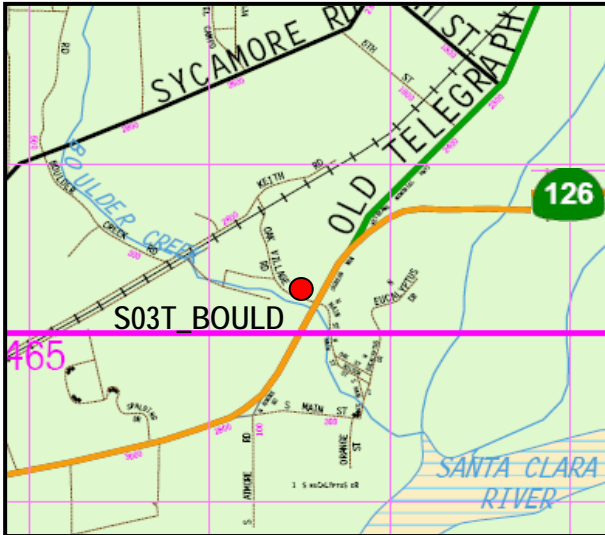
Table 36. 2012 - 2013 Trash Observations for S03T_TIMB

Event	Count	Types
Event 16	0	N/A
Event 17	0	N/A
Event 18	0	N/A

S03T_BOULD

This monitoring site is located on Boulder Creek just upstream of Hwy 126, west of Fillmore. Boulder Creek is a tributary to Santa Clara River Reach 3.

Site Map



View of sampling location (upstream)



Sufficient flow was not present for any of the monitoring events during 2012 - 2013. Trash observations for this site can be found in Table 37. Citrus, avocados, and nurseries are the primary crop types associated with this site.

Table 37. 2012 - 2013 Trash Observations for S03T_BOULD

Event	Count	Types
Event 16	6	cups, can, cardboard, wrappers
Event 17	10	nursery pots, liner bags, bottle, drip hose
Event 18	>10	soda cups, styrofoam, snack bags, bucket, pails, ag waste

S03D_BARDS

This monitoring site is located near the end of the agricultural drain that runs parallel to Bardsdale Avenue in Bardsdale. The drain is located on the south side of the Santa Clara River and eventually discharges into Santa Clara River Reach 3.

Site Map



View of site looking upstream



Sufficient flow was not present for any of the monitoring events during 2012 - 2013. Trash observations for S03D_BARDS are provided below in Table 38. This site drains mostly citrus orchards with small proportions of the area used for avocados and row crops.

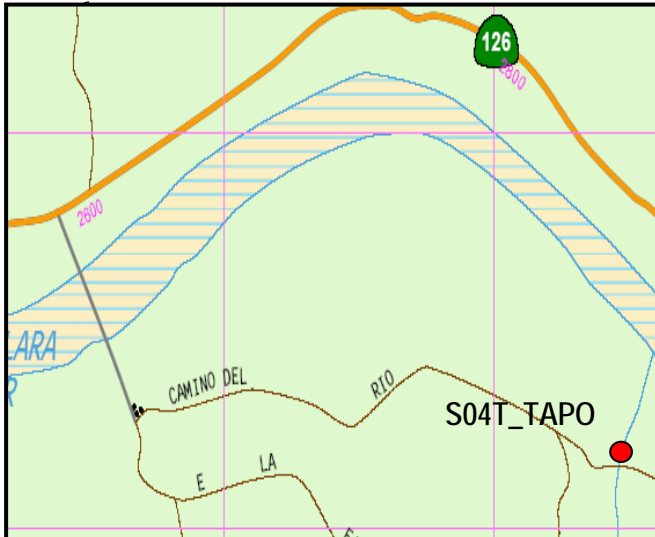
Table 38. 2012 - 2013 Trash Observations for S03D_BARDS

Event	Count	Types
Event 16	6	crate, boxes, cups
Event 17	20-25	buckets, shoes, cups, plastics, drip hose, boxes, crate
Event 18	15	beer cans/bottles, ag plastic, food bags, wrappers

S04T_TAPO

This monitoring site is located on Tapo Creek near the Ventura / Los Angeles County line, south of Hwy 126 and the Santa Clara River. Tapo Creek is a tributary to Santa Clara River Reach 4.

Site Map



View upstream toward the sample site at the



Sufficient flow was present for sampling at this site during all three monitoring events. Table 39 contains a summary of detected constituents and a comparison of results with applicable water quality benchmarks. Table 40 summarizes trash observations for this site.

Salts constituents and nitrate-N benchmarks were exceeded during all three events. One exceedance of DDE occurred during the wet event. No other pesticides were reported for the monitoring year. Citrus, row crops, and nursery stock are grown in the vicinity of this monitoring site.

Table 39. 2012 - 2013 VCAILG Monitoring Data v. Waiver Benchmarks: S04T_TAPO

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Field Measurements					
Flow	CFS		0.31	1.88	0.06
pH		6.5 ≤ pH ≤ 8.5	7.84	7.98	8.05
Temperature	°C	≤ 26.67°C ¹	18.79	13.65	16.43
Dissolved Oxygen	mg/L	≥ 5	8.24	11.13	10.38
Turbidity	NTU		1.5	1.9	0
Conductivity	µS/cm		3603	3423	3225
General Water Quality					
Total Dissolved Solids (TDS)	mg/L	1300	2850	2650	2470
Total Suspended Solids (TSS)	mg/L		1.32	ND	1.57
Total Hardness as CaCO ₃	mg/L		1351.2	1187	1139.2
Chloride	mg/L	100	199	215	189
Sulfate	mg/L	600	1320	1320	1150
Nutrients					
Ammonia-N	mg/L	2.30/ 2.65/ 2.00 ²	ND	0.11	DNQ
Nitrate-N	mg/L	5	16.48	14.76	12.06
Total Orthophosphate	mg/L		0.18	ND	ND
Metals					
Dissolved Copper	µg/L	29.28 ³	4.48	5.17	3.64
Total Copper	µg/L		4.92	5.78	3.48
Organochlorine Pesticides					
Aldrin	µg/L	0.00014	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND
Chlordane-alpha	µg/L		ND	ND	ND
Chlordane-gamma	µg/L		ND	ND	ND
Total Chlordane	µg/L	0.0059	ND	ND	ND
4,4'-DDD	µg/L	0.00084	ND	ND	ND
4,4'-DDE	µg/L	0.00059	DNQ	0.0081	ND
4,4'-DDT	µg/L	0.00059	ND	DNQ	ND
Dieldrin	µg/L	0.00014	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND

Constituent	Units	Benchmark	Event 16	Event 17	Event 18
			Dry 8/28/2012	Wet 1/25/2013	Dry 5/21/2013
Endrin Aldehyde	µg/L	0.81	ND	ND	ND
Toxaphene	µg/L	0.00075	ND	ND	ND
Organophosphorus Pesticides					
Chlorpyrifos	µg/L	0.025	ND	ND	ND
Diazinon	µg/L	0.1	ND	ND	ND

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 15 through 20 for a list of benchmarks applicable to this site.

1. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
2. The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS present) and are dependent upon the pH and temperature of the water at the time of sample collection.
3. The copper benchmark was calculated for freshwater at this site as prescribed in Table 17.

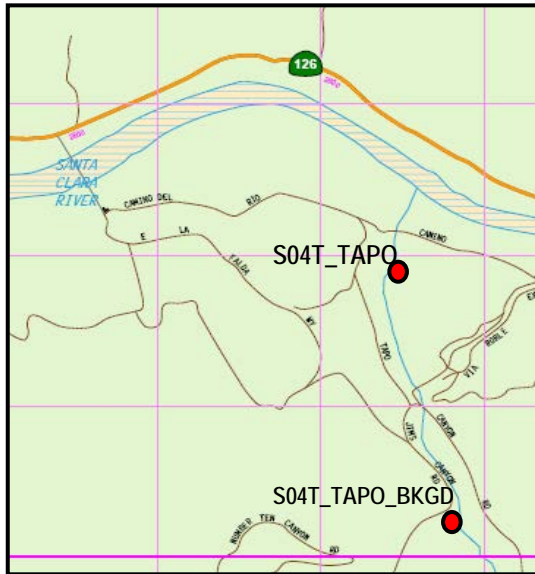
Table 40. 2012 - 2013 Trash Observations for S04T_TAPO

Event	Count	Types
Event 16	0	N/A
Event 17	0	N/A
Event 18	0	N/A

S04T_TAPO_BKGD

This monitoring site is a background site for S04T_TAPO that is located upstream of irrigated agricultural land that drains to S04T_TAPO. This site was selected to determine whether high salts concentrations are a background condition for the area. Since this site can only be reached by dirt roads, it has been too muddy to gain access for sampling during storm events.

Site Map



View of monitoring location



Sufficient flow was not present for any of the dry monitoring events during 2012 – 2013 when the site was accessible. Table 41 summarizes trash observations for this site.

Table 41. 2012 - 2013 Trash Observations for S04T_TAPO_BKGD

Event	Count	Types
Event 16	0	N/A
Event 17	N/A	Site not visited
Event 18	0	N/A

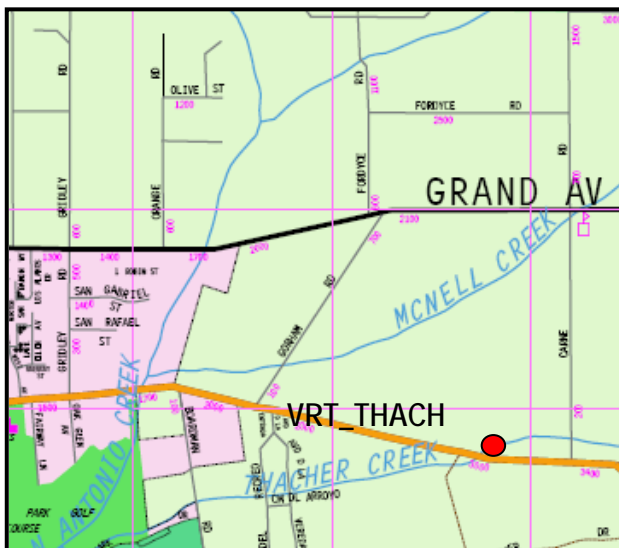
Ventura River Watershed

There are two VCAILG monitoring sites located in this watershed, both tributaries to the Ventura River and located on the east end of the City of Ojai.

VRT_THACH

This monitoring site is located on Thacher Creek just upstream of Ojai Avenue in Ojai. Thacher Creek is a tributary of San Antonio Creek, which is a tributary of the Ventura River.

Site Map



View downstream from site looking towards Ojai Ave. bridge



Sufficient flow was not present for any of the monitoring events during 2012 - 2013. Table 42 provides trash observations for this site. Avocados and citrus are the predominant crop types associated with this site.

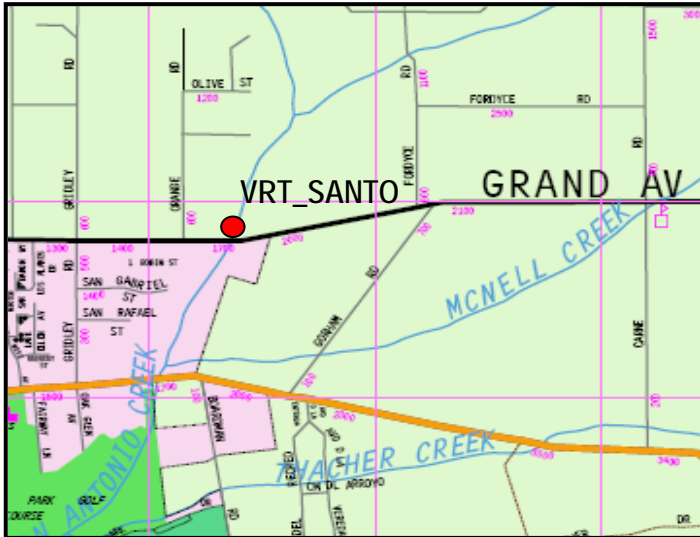
Table 42. 2012 - 2013 Trash Observations for VRT_THACH

Event	Count	Types
Event 16	0	N/A
Event 17	0	N/A
Event 18	0	N/A

VRT_SANTO

This monitoring site is located on San Antonio Creek just upstream of Grand Avenue in Ojai. San Antonio Creek is a tributary of the Ventura River.

Site Map



View downstream at the Grand Ave. bridge



Sufficient flow was not present for any of the monitoring events during 2012 - 2013. Table 43 includes the number and types of trash observed at the monitoring site. Citrus and avocados are the predominant crop types associated with this site.

Table 43. 2012 - 2013 Trash Observations for VRT_SANTO

Event	Count	Types
Event 16	0	N/A
Event 17	2	paper, styrofoam cup
Event 18	0	N/A

CHRONIC TOXICITY TEST RESULTS

During the 2013 monitoring year, Pacific EcoRisk (PER) performed single-species short-term chronic toxicity tests for samples collected during Event 17 on January 25, 2013. The Event 17 toxicity report submitted by PER contains test results and raw data. PER submitted two types of reports, an electronic data deliverable (EDD), which is compatible with the Surface Water Ambient Monitoring Program (SWAMP), and a narrative report. Both reports are included as Appendix G on the Annual Report Data CD. Toxicity samples were not collected during a dry event this monitoring year due to a scheduling mistake. To adjust for this error, toxicity samples will be collected during both dry events in the 2013-2014 monitoring year.

Determination of Most Sensitive Species at Toxicity Monitoring Sites

There are 11 toxicity sites that are part of the VCAILGMP. The Conditional Waiver requires that three-species chronic toxicity testing be performed on samples collected at each site to determine the most sensitive species among the invertebrate, vertebrate, and algae; the most sensitive species is then used for subsequent toxicity testing for the duration of the VCAILGMP.

Based on previously conducted three-species screening tests, the Regional Board approved a single-species to be used at each toxicity site for the remainder of this Conditional Waiver in a June 28, 2012 letter. There are three remaining sites where flow has not been present during toxicity sampling events. These sites will have three-species screenings the first time they are sampled during a toxicity event. Sites with conductivity measuring less than 3,000 $\mu\text{S}/\text{cm}$ at the time of sampling will be evaluated based on the survival and reproduction of the invertebrate *Ceriodaphnia dubia* (*C. dubia*). High conductivity sites ($>3,000 \mu\text{S}/\text{cm}$) will be tested using *Hyalella azteca* (*Hyalla*) (Table 44).

Table 44. Most Sensitive Species Selected for Toxicity Testing

Site ID	Species
01T_ODD3_ARN	<i>Hyalella azteca</i>
05D_LAVD	<i>Ceriodaphnia dubia</i>
05T_HONDO	<i>Ceriodaphnia dubia</i>
06T_LONG2	<i>Ceriodaphnia dubia</i>
S02T_ELLS	<i>Ceriodaphnia dubia</i>
S02T_TODD	<i>Ceriodaphnia dubia</i>
S03T_BOULD	<i>Ceriodaphnia dubia</i>
S04T_TAPO	<i>Hyalella azteca</i>

Single-Species Test Results

The toxicity event for this monitoring year was Event 17 conducted on January 25, 2013. During this dry weather event, all toxicity sites with flow previously had three-species screening tests from Event 12; therefore, only single-species chronic toxicity testing was performed. The *C. dubia* chronic test consisted of the 3-brood (6- to 8-day) survival and reproduction test and the *Hyalella* test consisted of a 10-day survival test.

None of the sites exhibited organism survival toxicity, while two sites had significant *C. dubia* reproduction toxicity. TIE testing was not triggered by these results as initiation threshold for *C. dubia* is based on survival, not reproduction. Single species test results for both freshwater and high-conductivity sites can be found in the table below.

Table 45. Chronic Toxicity Results for Single-Species Testing for 2012

Site	Event	<i>Ceriodaphnia</i> ¹			<i>Hyalella</i> ²	TIE Triggered?
		Survival Toxicity	Reproduction Toxicity	Reproduction % Reduction	Survival Toxicity	
S02T_TODD	17: 1/25/13	No	Yes	41.2% ³		No
05D_LAVD	17: 1/25/13	No	Yes	13.4% ³		No
S04_TAPO	17: 1/25/13				No	No
01T_ODD3_ARN	17: 1/25/13				No	No

1. *Ceriodaphnia dubia* (invertebrate – water flea) is evaluated for the survival and reproduction endpoints.
2. *Hyalella azteca* (invertebrate – crustacean) is evaluated for the survival endpoint.
3. The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).

TMDL LOAD ALLOCATIONS AND MONITORING RESULTS

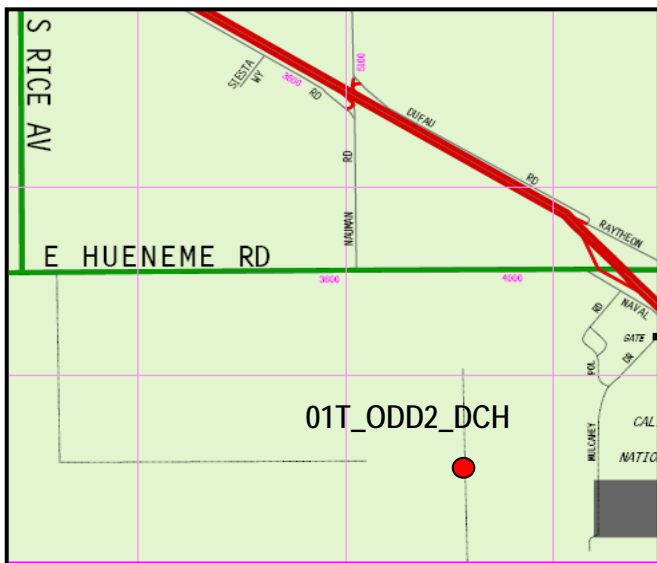
Calleguas Creek Watershed Agricultural Land Use Monitoring Sites

Seven agricultural land use sites are monitored under the CCWTMP. Site descriptions, maps, and photos are included below. Two additional background sites are monitored under the VCAILGMP and their site information is also included, however flow was not present during this year of sampling, so no data is provided. Future reports will not include the two CCW background sites per the monitoring change recommended in the 2012 AMR. Following the site information are TMDL LAs and compliance information related to each of the CCW TMDLs that have benchmarks listed in the Conditional Waiver. Receiving water site information and files with all monitoring data collected at CCWTMP sites can be found in the fifth year annual monitoring report.

01T_ODD2_DCH

Duck Pond Agricultural Drains / Mugu Drain / Oxnard Drain No. 2. The monitoring site is located on an agricultural drain just south of Hueneme Road near the Duck Ponds. Flow from this drain eventually discharges into the western arm of Mugu Lagoon (Calleguas Creek Reach 1).

Site Map



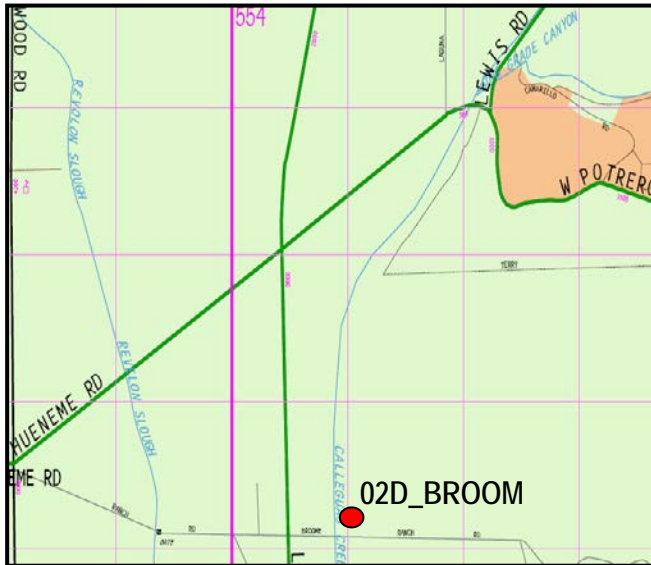
View toward the NE (looking downstream)



02D_BROOM

The monitoring site is located on an agricultural drain that discharges into Calleguas Creek Reach 2 at Broome Ranch Road.

Site Map



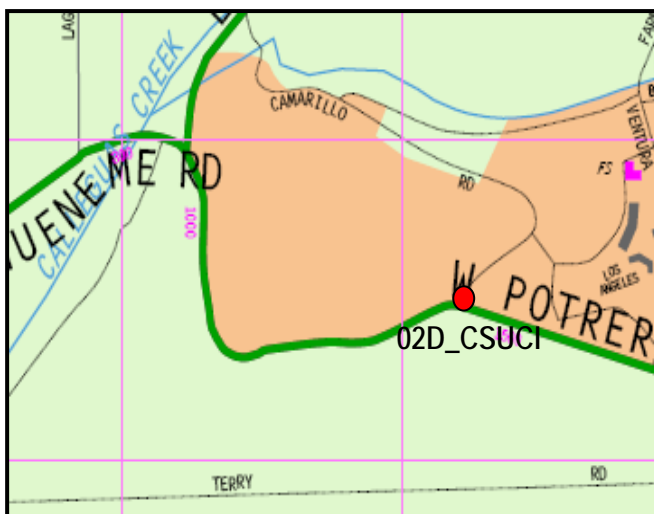
View of discharge (looking upstream on Calleguas Creek)



02D_CSUCI

This site was selected as a background site for 02D_BROOM to account for nutrients, salts, or pesticides that may be contained in runoff from CSUCI grounds that ultimately makes its way to 02D_BROOM. This site is visited only if flow is present at 02D_BROOM.

Site Map



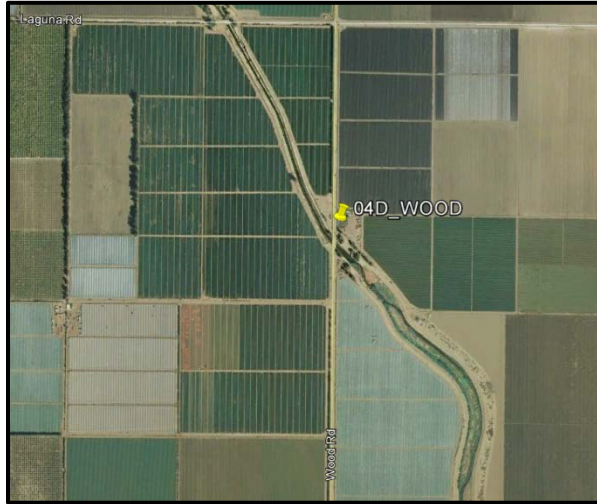
View toward SE of culvert draining runoff from CSUCI campus.



04D_WOOD

The monitoring site is located on an agricultural drain on the east side of Wood Road. Flow from this drain discharges into Calleguas Creek Reach 4 (Revolon Slough) above the 04_WOOD monitoring site.

Site Map



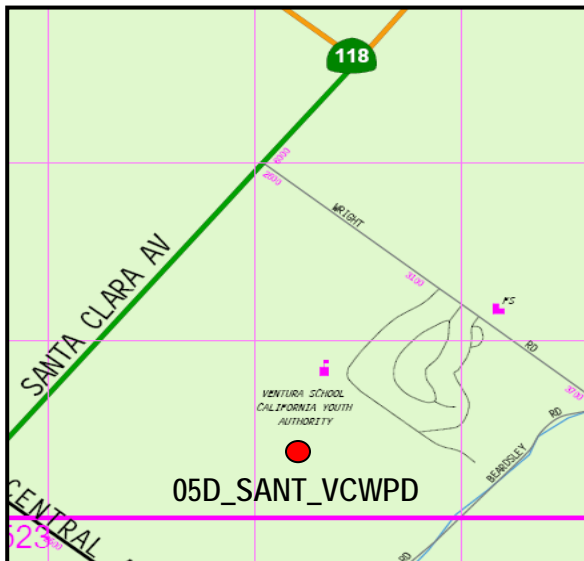
View at site looking upstream



05D_SANT_VCWPD

This monitoring site is located on the Santa Clara Drain east of Santa Clara Avenue at the Ventura County Watershed Protection District's Stream Gage #781. Flow from this drain eventually discharges into Calleguas Creek Reach 5 (Beardsley Channel).

Site Map



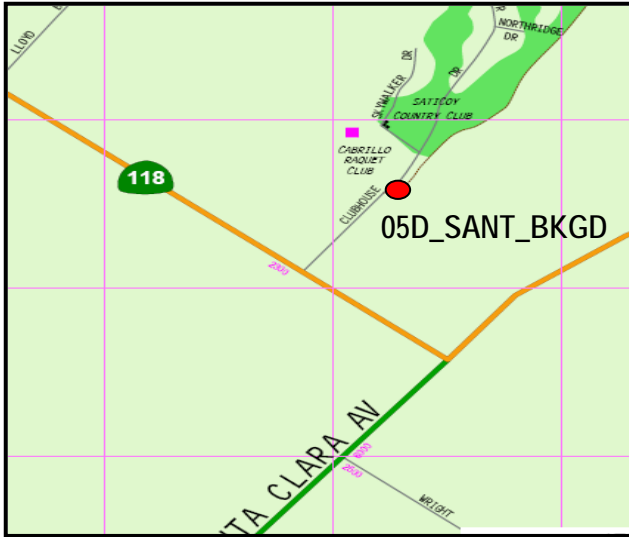
View upstream (NW) facing gage #781



05D_SANT_BKGD

This monitoring site is a background site for 05D_SANT_VCWPD and was selected to account for nutrients, salts, or pesticides that may be contained in runoff from the Saticoy Country Club and Golf Course and surrounding residential area that ultimately drains through 05D_SANT_VCWPD. This site is visited only if flow is present at 05D_SANT_VCWPD.

Site Map



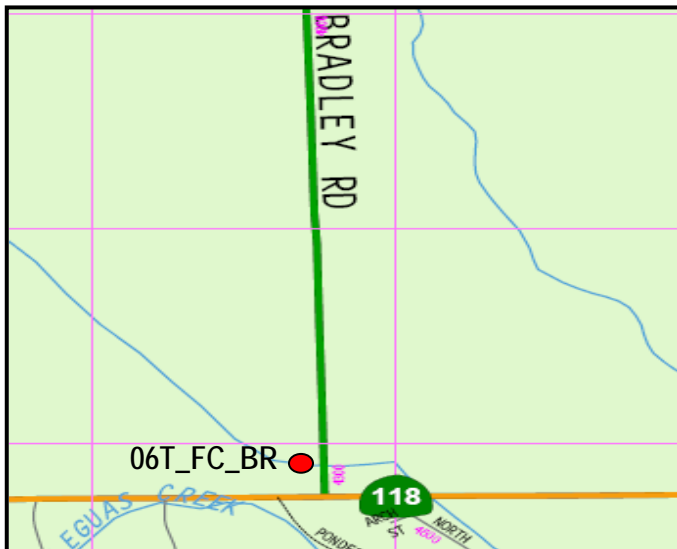
View of sampling location on channel upstream of Clubhouse Dr.



06T_FC_BR

This monitoring site is located on Fox Barranca just upstream of the Bradley Road Bridge, north of Hwy 118. Fox Barranca is a tributary to Calleguas Creek Reach 6 (Arroyo Las Posas).

Site Map



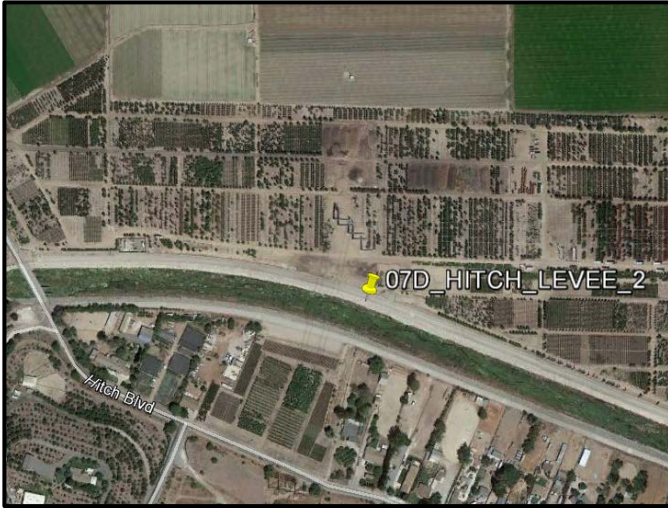
View downstream (E) from sampling location toward Bradley Road



07D_HITCH_LEVEE_2

The site is sampled from a corrugated pipe discharging on the north side of the Arroyo Simi Flood Control Levee off of Hitch Blvd, directly into Calleguas Creek Reach 7 (Arroyo Simi).

Site Map



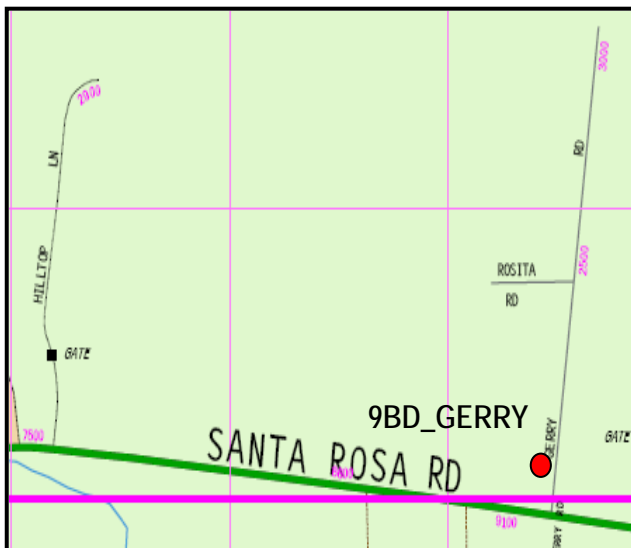
View of pipe discharging into Arroyo Simi



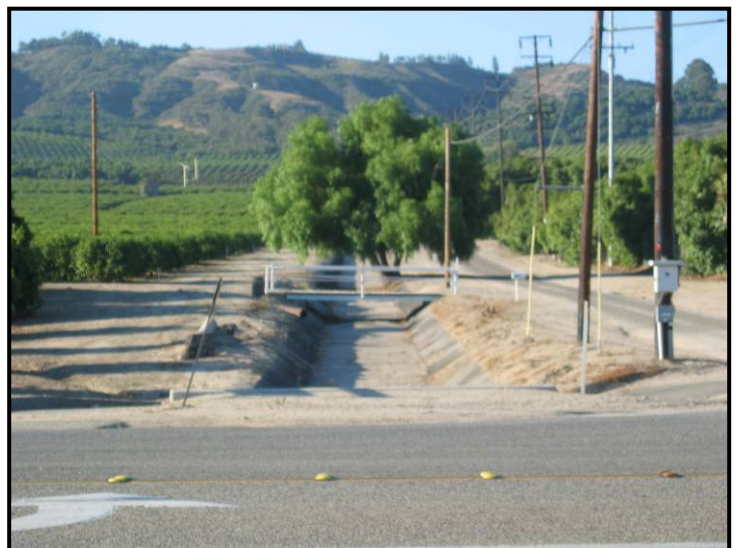
9BD_GERRY

This monitoring site is located on an agricultural drain adjacent to Gerry Road north of Santa Rosa Road. Flow from this drain eventually discharges into Calleguas Creek Reach 9B (Conejo Creek).

Site Map



View (N) of the sampling site



Calleguas Creek Watershed and Mugu Lagoon OC Pesticides and PCBs TMDL

Interim Load Allocations

Interim sediment LAs are currently in effect for this TMDL (Table 46). Compliance with these LAs is measured at the base of each subwatershed.

Table 46. CCW OC Pesticides and PCBs Interim Sediment Load Allocations

Constituent	Units	Subwatershed					
		Mugu Lagoon ¹	Calleguas Creek	Revolon Slough	Arroyo Las Posas	Arroyo Simi	Conejo Creek
Chlordane	ng/g	25.0	17.0	48.0	3.3	3.3	3.4
4,4'-DDD	ng/g	69.0	66.0	400.0	290.0	14.0	5.3
4,4'-DDE	ng/g	300.0	470.0	1,600.0	950.0	170.0	20.0
4,4'-DDT	ng/g	39.0	110.0	690.0	670.0	25.0	2.0
Dieldrin	ng/g	19.0	3.0	5.7	1.1	1.1	3.0
PCBs	ng/g	180.0	3,800.0	7,600.0	25,700.0	25,700.0	3,800.0
Toxaphene	ng/g	22,900.0	260.0	790.0	230.0	230.0	260.0

1. The Mugu Lagoon subwatershed includes Duck Pond/Agricultural Drain/Mugu/Oxnard Drain #2.

Monitoring Results and Compliance

The following table includes sediment monitoring results from receiving waters at the base of each subwatershed. The data was collected as part of the CCWTMP. Additional information related to the sample collection and upstream land use data can be found in the “Calleguas Creek Watershed TMDL Compliance Monitoring Program Fifth Year Annual Monitoring Report.” Monitoring at sites within Mugu Lagoon only occurs every three years, therefore, sediment samples were not collected and reported.

Table 47. OC Pesticides and PCBs TMDL Load Allocations Compared to Sediment Monitoring Data

Site & Constituent	Units	Interim LA ¹	Event 28 Aug-2011
Calleguas Creek – Hwy 1 Bridge (02_PCH)			
Total Chlordane ²	ng/g dw	17	ND
4,4'-DDD	ng/g dw	66	ND
4,4'-DDE	ng/g dw	470	6.4
4,4'-DDT	ng/g dw	110	ND
Dieldrin	ng/g dw	3	ND
PCBs ³	ng/g dw	3,800	ND
Toxaphene	ng/g dw	260	ND

Table continued on next page.

Site & Constituent	Units	Interim LA ¹	Event 28 Aug-2011
<i>Revolon Slough – Wood Road (04_WOOD)</i>			
Total Chlordane ²	ng/g dw	48	ND
4,4'-DDD	ng/g dw	400	DNQ
4,4'-DDE	ng/g dw	1,600	26.7
4,4'-DDT	ng/g dw	690	ND
Dieldrin	ng/g dw	5.7	ND
PCBs ³	ng/g dw	7,600	ND
Toxaphene	ng/g dw	790	ND
<i>Calleguas Creek – University Drive CSUCI (03_UNIV)</i>			
Total Chlordane ²	ng/g dw	17	ND
4,4'-DDD	ng/g dw	66	ND
4,4'-DDE	ng/g dw	470	DNQ
4,4'-DDT	ng/g dw	110	ND
Dieldrin	ng/g dw	3	ND
PCBs ³	ng/g dw	3,800	ND
Toxaphene	ng/g dw	260	ND
<i>Conejo Creek – Adolfo Road (9B_ADOLF)</i>			
Total Chlordane ²	ng/g dw	3.4	ND
4,4'-DDD	ng/g dw	5.3	ND
4,4'-DDE	ng/g dw	20	DNQ
4,4'-DDT	ng/g dw	2	ND
Dieldrin	ng/g dw	3	ND
PCBs ³	ng/g dw	3,800	ND
Toxaphene	ng/g dw	260	ND
<i>Arroyo Las Posas – Somis Road (06_SOMIS)</i>			
Total Chlordane ²	ng/g dw	3.3	ND
4,4'-DDD	ng/g dw	290	ND
4,4'-DDE	ng/g dw	950	DNQ
4,4'-DDT	ng/g dw	670	ND
Dieldrin	ng/g dw	1.1	ND
PCBs ³	ng/g dw	25,700	ND
Toxaphene	ng/g dw	230	ND

Table continued on next page.

Site & Constituent	Units	Interim LA ¹	Event 28 Aug-2011
Arroyo Simi – Hitch Boulevard (07_HITCH)			
Total Chlordane ²	ng/g dw	3.3	ND
4,4'-DDD	ng/g dw	14	ND
4,4'-DDE	ng/g dw	170	ND
4,4'-DDT	ng/g dw	25	ND
Dieldrin	ng/g dw	1.1	ND
PCBs ³	ng/g dw	25,700	ND
Toxaphene	ng/g dw	230	ND

ND=not detected; DNQ=detected not quantified

1. Interim load allocations for agricultural dischargers; effective until March 24, 2026 (R4-2005-010).

2. Total chlordane is the sum of alpha and gamma-chlordane.

3. PCBs concentrations are the sum of the seven aroclors identified in CTR (1016, 1221, 1232, 1242, 1248, 1254, and 1260).

As shown in the table above, the OC pesticides and PCBs interim LAs were met in all subwatersheds this monitoring year. Should an exceedance of any interim LAs occur in future monitoring years, upstream agricultural and urban land use site data will be assessed to evaluate the potential cause of the exceedance.

Calleguas Creek Watershed and Mugu Lagoon Toxicity, Chlorpyrifos, and Diazinon TMDL

Interim Load Allocations

Interim LAs are currently in effect for this TMDL (Table 48). Compliance with these LAs is measured at the base of each subwatershed.

Table 48. CCW Toxicity, Chlorpyrifos, and Diazinon Interim Load Allocations

Constituent	Interim LA ¹	
	Acute (1 hour) (µg/L) ²	Chronic (4 day) (µg/L) ³
Chlorpyrifos	2.57	0.81
Diazinon	0.278	0.138
Toxicity	1 TU _c	1 TU _c

1. These TMDL load allocations apply to the receiving water at the base of each subwatershed.

2. Acute interim LAs are used for assessing wet-weather data.

3. Chronic interim LAs are used for assessing dry-weather data.

Monitoring Results and Compliance

The following table includes sediment monitoring results from receiving waters at the base of each subwatershed. The data was collected as part of the CCWTMP. Additional information related to the sample collection and upstream land use data can be found in the “Calleguas Creek Watershed TMDL Compliance Monitoring Program Fifth Year Annual Monitoring Report.”

Table 49. Toxicity, Chlorpyrifos, and Diazinon TMDL Load Allocations Compared to Monitoring Data

Site & Constituent	Units	Dry Interim LA ¹	Event 34 Dry Aug-2012	Event 35 Dry Nov-2012	Event 37 Dry Feb-2013	Event 38 Dry May-2013	Wet Interim LA ²	Event 36 Wet Jan-2013
<i>Mugu Lagoon – Ronald Reagan Bridge (01_RR_BR)</i>								
Chlorpyrifos	µg/L	0.81	ND	0.048	0.008	ND	2.57	0.020
Diazinon	µg/L	0.138	ND	0.040	ND	ND	0.278	ND
<i>Revolon Slough – Wood Road (04_WOOD)</i>								
Chlorpyrifos	µg/L	0.81	0.019	0.044	0.040	0.004	2.57	0.058
Diazinon	µg/L	0.138	ND	ND	ND	ND	0.278	ND
<i>Calleguas Creek – University Drive CSUCI (03_UNIV)</i>								
Chlorpyrifos	µg/L	0.81	0.003	0.014	0.008	ND	2.57	0.005
Diazinon	µg/L	0.138	ND	0.104	ND	ND	0.278	ND
<i>Conejo Creek – Adolfo Road (9B_ADOLF)</i>								
Chlorpyrifos	µg/L	0.81	0.002	0.003	ND	ND	2.57	ND
Diazinon	µg/L	0.138	ND	0.056	ND	ND	0.278	ND
<i>Arroyo Las Posas – Somis Road (06_SOMIS)</i>								
Chlorpyrifos	µg/L	0.81	0.003	0.015	ND	Dry	2.57	ND
Diazinon	µg/L	0.138	ND	0.017	ND	Dry	0.278	ND
<i>Arroyo Simi – Hitch Boulevard (07_HITCH)</i>								
Chlorpyrifos	µg/L	0.81	0.019	ND	0.012	ND	2.57	ND
Diazinon	µg/L	0.138	ND	0.051	ND	ND	0.278	ND

ND=not detected

1. Interim dry and wet weather load allocations are effective until March 2014 (R4-2005-009).

During year 5 of CCWTMP monitoring, there were no exceedances of the interim LAs for agriculture as measured at the sites located at the base of each subwatershed. If an exceedance of an interim load allocation occurs during future events, the contributing agricultural land use data will be assessed to evaluate whether agricultural discharges were potentially causing the exceedances.

Calleguas Creek Watershed Boron, Chloride, Sulfate, and TDS (Salts) TMDL

Interim Dry Weather Load Allocations

Interim dry weather LAs are measured as in-stream monthly averages at the base of each subwatershed, except for chloride which is measured as an instantaneous maximum (Table 50). Dry weather LAs apply when flow rates are below the 86th percentile and there was no measurable precipitation in the previous 24 hour period.

Table 50. CCW Boron, Chloride, Sulfate, and TDS (Salts) Interim Dry Weather Load Allocations

Constituent	Interim Dry Weather LA (mg/L)
Boron Total	1.8
Chloride Total	230
Sulfate Total	1,962
TDS Total	3,995

Monitoring Results and Compliance

Compliance monitoring for salts was required starting September 9, 2012. The following table includes monthly dry weather mean salt concentrations for the five compliance sites. Data was collected as part of the CCWTMP and additional information related to salts monitoring can be found in the “Calleguas Creek Watershed TMDL Compliance Monitoring Program Fifth Year Annual Monitoring Report.” Interim load allocations for salts constituents are currently being met at all sites, with the exception of boron at 04_WOOD representing the Revolon Slough subwatershed. There is one agricultural land use site where salts are measured upstream of the compliance site. The results for boron from the 04D_WOOD agricultural land use site alongside the receiving water data are presented following the compliance monitoring table. When comparing the receiving water and land use data for boron, it is important to keep in mind that quarterly dry weather grab samples are collected at 04D_WOOD as compared to monthly dry weather means reported for 04_WOOD, generated from daily averages of five-minute sensor data. During the August and May quarterly events, the agricultural land use site 04D_WOOD was dry. Grab samples collected for boron in November and February were below the interim LA.

Table 51. Salts Load Allocations Compared to Monitoring Data

	Units	Interim LA	12-Jul	12-Aug	12-Sep	12-Oct	12-Nov	12-Dec	13-Jan	13-Feb	13-Mar	13-Apr	13-May	13-Jun
Revolon Slough – Wood Road (04_WOOD)														
Total Dissolved Solids	mg/L	3995	3704	3707	3591	2730	3483	3747	3591	3722	3393	3505	3506	3873
Chloride	mg/L	230	185	159	180	139	175	187	180	186	171	176	176	193
Sulfate	mg/L	1962	1850	1851	1793	1365	1740	1871	1793	1859	1695	1750	1751	1934
Boron	mg/L	1.8	1.89	1.89	1.83	1.43	1.78	1.91	1.83	1.9	1.74	1.79	1.79	1.97
Calleguas Creek – University Drive CSUCI (03_UNIV)														
Total Dissolved Solids	mg/L	3995	1012	991	978	955	965	821	924	990	1005	994	1110	1086
Chloride	mg/L	230	195	191	188	183	185	155	177	191	194	191	216	211
Sulfate	mg/L	1962	246	241	238	232	235	199	224	241	244	242	270	264
Conejo Creek – Howard Road Bridge (9A_HOWAR)														
Total Dissolved Solids	mg/L	3995	NS	NS	879	862	875	787	863	918	922	912	1077	1040
Chloride	mg/L	230	NS	NS	174	170	173	155	171	182	183	181	215	207
Sulfate	mg/L	1962	NS	NS	219	215	218	196	215	229	230	228	270	261
Conejo Creek – Baron Brothers Nursery (9B_BARON)														
Total Dissolved Solids	mg/L	3995	NS	656	652	659	661	621	683	688	674	668	657	651
Chloride	mg/L	230	NS	130	129	131	131	124	136	139	134	133	130	129
Sulfate	mg/L	1962	NS	152	151	153	154	143	159	161	157	155	152	151
Arroyo Simi – Tierra Rejada Road (07_TIERRA)														
Total Dissolved Solids	mg/L	3995	NS	NS	1058	992	1042	988	1121	1080	1111	1109	1096	1122
Chloride	mg/L	230	NS	NS	149	140	147	139	158	152	157	156	154	158
Sulfate	mg/L	1962	NS	NS	395	370	389	368	420	404	416	415	410	420
Boron	mg/L	1.8	NS	NS	0.65	0.61	0.65	0.61	0.69	0.67	0.69	0.69	0.68	0.69

1. Monthly dry weather mean salt concentrations were generated using mean daily salt concentrations (from 5-min data) for days that met the definition of dry weather in the Salts TMDL (i.e., discharge < 86th percentile flow *and* no measureable rain in preceding 24 hrs). The 86th percentile of mean daily discharge at 03_Univ (generated using 5-min discharge data for the period July 1, 2012-June 30, 2013) was used as the flow-related threshold for distinguishing wet and dry days for all five compliance sites. Daily precipitation records for 25 gages in the CCW watershed (accessed via the VCWPD Hydrologic Data Server) were used to determine days with “measureable precipitation”. Days were considered as having measureable precipitation if two or more rain gages in the watershed received 0.1 inch or more of precipitation.
2. Compliance monitoring for the Salts TMDL was required starting September 9, 2012. Data for 03_UNIV and 04_WOOD for July and August, 2012, are reported in the table, but were obtained prior to the beginning of required compliance monitoring.

Table 52. Boron Monitoring Data (mg/L) in Revolon Slough

Site ID	Site Type	Interim	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13
		LA												
04_WOOD	Receiving Water	1.8	1.89	1.89	1.83	1.43	1.78	1.91	1.83	1.90	1.74	1.79	1.79	1.97
04D_WOOD	Ag	1.8		NS			1.63			1.51			NS	

Calleguas Creek Watershed and Mugu Lagoon Metals and Selenium TMDL

Interim Load Allocations

Dry weather LAs apply to days when flows in the stream are less than the 86th percentile flow rate for each subwatershed. Wet weather LAs apply to days when flows in the stream exceed the 86th percentile flow rate for each subwatershed. Interim LAs for total recoverable metals and selenium are applied in the receiving water at the compliance points (Table 53).

Table 53. Interim Load Allocations for Total Recoverable Metals and Selenium

Constituent	Calleguas and Conejo Creeks			Revolon Slough		
	Dry Daily Max (µg/L)	Dry Monthly Avg. (µg/L)	Wet Daily Max (µg/L)	Dry Daily Max (µg/L)	Dry Monthly Avg. (µg/L)	Wet Daily Max (µg/L)
Copper	24	19	1,390	24	19	1,390
Nickel	43	42	---	43	42	---
Selenium	---	---	---	6.7 ¹	6 ¹	---

1. Attainment of interim load allocations will be evaluated in consideration of background loading data, if available.

Interim LAs for mercury are evaluated based on suspended sediment measured in-stream at the base of Revolon Slough and Calleguas Creek (Table 54).

Table 54. Interim Load Allocations for Mercury in Suspended Sediment

Flow Range (Million gallons/year)	Calleguas Creek (lbs/yr)	Revolon Slough (lbs/yr)
0-15,000	3.9	2
15,000-25,000	12.6	4.8
>25,000	77.5	12.2

Monitoring Results and Compliance

As shown in the table below, the interim allocations are being met in the receiving waters for all metals constituents; the exception is selenium in Revolon Slough during dry weather conditions. It has been noted in the current and previous CCW TMDL annual reports that rising groundwater is a large background source of selenium in the Revolon Slough subwatershed. There are two agricultural land use sites located in this subwatershed and their selenium monitoring results are provided below (Table 56). Of the two agricultural land use sites, 05D_SANT_VCWPD is located further upstream in the subwatershed and also has significantly higher selenium concentrations. Samples from the agricultural land use site 04D_WOOD were all below the total selenium load allocation. Further investigation of selenium sources will be conducted through special studies as required by the TMDL.

Table 55. Metals and Selenium Interim Load Allocations Compared to Monitoring Data

Site & Constituent	Units	Dry Interim LA ¹	Event 34	Event 35	Event 37	Event 38	Wet Interim LA ²	Event 36	Annual Average ³
			Dry Aug-2011	Dry Nov-2011	Dry Feb-2012	Dry May-2012		Wet Jan-2012	
Revolon Slough – Wood Road (04_WOOD)									
Total Copper	µg/L	19	4.19	5.66	4.99	3.37	1,390	4.97	0.05
Total Nickel	µg/L	42	6.53	4.83	6.18	4.13	---	6.85	
Total Selenium	µg/L	6	20.3	17.8	20.4	12.5	---	19.4	
Total Mercury ⁴	lbs/yr	2							
Calleguas Creek – University Drive CSUCI (03_UNIV)									
Total Copper	µg/L	19	3.39	8.33	3.83	3.34	1,390	4.099	0.04
Total Nickel	µg/L	42	6.17	7.14	5.14	6.75	---	4.15	
Total Selenium	µg/L	---	0.73	0.83	1.31	0.82	---	1.15	
Total Mercury ⁴	lbs/yr	3.9							

1. Dry interim LAs are listed as the dry monthly average concentrations.
2. Wet interim LAs are the daily maximum.
3. The mercury LA is assessed as an annual load in suspended sediment. The water column mercury concentrations were used in calculating the loads, conservatively assuming that all mercury is on suspended sediment rather than being dissolved. The loads at each site are based on estimated annual concentrations (average of all monitored events at each site) and total annual flow calculated from preliminary streamflow data received from real time data loggers recording 5-minute flow data in the creeks.
4. Interim LAs for mercury are expressed as annual loads. Total annual flow for 07/01/12 to 6/31/13 into Mugu Lagoon from Calleguas Creek and Revolon Slough is calculated as 4,926 Mgal/yr. As such, the interim LA shown corresponds to the flow range of 0 to 15,000 Mgal/yr, per R4-2006-0012.

Table 56. Selenium Interim Load Allocation Compared to Revolon Slough Receiving Water and Agricultural Land Use Monitoring Data

Site ID ¹	Dry Weather Events & Dates					Wet Weather Event & Date	
	Interim LA ¹	34 Aug-12	35 Nov-12	37 Feb-13	38 May-13	Interim LA	36 Jan-13
04_WOOD	6	20.3	17.8	20.4	12.5	---	19.4
04D_WOOD	6	NS	3.79	5.67	NS	---	5.69
05D_SANT_VCWPD	6	48.3	68.8	64.5	57.8	---	70.6

NS = Not Sampled; site dry

1. 04_WOOD is the receiving water site; 04D_WOOD and 05D_SANT_VCWPD are both agricultural land use sites further upstream of the receiving water monitoring location.

Calleguas Creek Watershed Nitrogen Compounds TMDL

Load Allocations

The LA for the Calleguas Creek Watershed Nitrogen Compounds TMDL is expressed as the sum of nitrate-nitrogen and nitrite-nitrogen (Table 57).

Table 57. Load Allocations for Nitrogen Compounds

Constituent	Load Allocation (mg/L)
Nitrate-N + Nitrite-N	9

Monitoring Results and Compliance

Monitoring sites located in the lower part of the watershed consistently exceed the nitrogen LAs, whereas sites in the upper reaches are typically below the allocation. The following two tables include monitoring data from CCWTMP agricultural land use sites and VCAILGMP sites located within the Calleguas Creek Watershed for comparison to the Nitrogen TMDL LAs.

Table 58. Nitrogen Load Allocations Compared to CCW TMDL Agricultural Land Use Site Data

Site	Constituent	Allocation (mg/L)	Event 34 Dry Aug-2012	Event 35 Dry Nov-2012	Event 36 Wet Jan-2013	Event 37 Dry Feb-2013	Event 38 Dry May-2013
01T_ODD2_DCH	Nitrate-N + Nitrite-N	9	50.17	45.83	47.67	51.44	64.60
02D_BROOM	Nitrate-N + Nitrite-N	9	NS	53.85	66.91	72.57	36.13
04D_WOOD	Nitrate-N + Nitrite-N	9	NS	38.75	56.91	36.28	NS
05D_SANT_VCWPD	Nitrate-N + Nitrite-N	9	35.04	37.92	44.30	44.77	33.49
06T_FC_BR	Nitrate-N + Nitrite-N	9	NS	1.66 EST	1.4	NS	NS
07D_HITCH_LEVEE_2	Nitrate-N + Nitrite-N	9	NS	NS	60.80	NS	NS
9BD_GERRY	Nitrate-N + Nitrite-N	9	19.54	NS	NS	NS	20.02

NS = Not Sampled; site dry.
EST = Estimated concentration; nitrite-N

Table 59. Nitrogen Load Allocations Compared to CCW VCAILGMP Site Data

Site	Constituent	Allocation (mg/L)	Event 16 Dry Aug-2012	Event 17 Wet Jan-2013	Event 18 Dry May-2013
01T_ODD3_ARN	Nitrate-N	9	43.83	45.59	36.31
04D_ETTG	Nitrate-N	9	53	75.64	51.71
04D_LAS	Nitrate-N	9	33.78	44.28	42.52
05D_LAVD	Nitrate-N	9	2.84	2.67	NS
05T_HONDO	Nitrate-N	9	NS	NS	NS
06T_LONG2	Nitrate-N	9	NS	NS	NS

Revolon Slough and Beardsley Wash Trash TMDL

Load Allocation

The Load Allocation (LA) for this TMDL is zero trash. Dischargers may achieve compliance with the LAs by implementing a minimum frequency of assessment and collection/best management practice (MFAC/BMP) program. By March 6, 2010, agricultural dischargers were required to demonstrate full compliance and attainment of the zero trash target and assure that trash is not accumulating in deleterious amounts between the required trash assessment and collection events.

Compliance

VCAILG members are complying with the Trash TMDL requirements through a MFAC/BMP Program. The MFAC program includes regular collection and assessment of trash. VCAILG members are in compliance with the TMDL requirement to ensure zero trash immediately after each MFAC event. Additionally, VCAILG has implemented additional BMPs to control trash and reduce the accumulation of trash between collection events. The importance of collecting and properly disposing of trash has also been a reoccurring topic at multiple VCAILG education classes. The VCAILG WQMP Management Practice Survey has also included BMPs related to trash and property management. For additional information, please refer to the “2013 Revolon Slough/Beardsley Wash Trash TMDL TMRP/MFAC Annual Report.”

Santa Clara River Nitrogen Compounds TMDL

Load Allocations

The LA for the Santa Clara River Nitrogen Compounds TMDL applicable to VCAILG monitoring sites is listed in Table 60.

Table 60. Load Allocations for Nitrogen Compounds

Constituent	Load Allocation (mg/L) ¹
Ammonia-N + Nitrate-N + Nitrite-N	10

1. The specified load allocation applies to all Santa Clara River reaches within Ventura County.

Monitoring Results and Compliance

Table 65 lists the VCAILGMP monitoring sites located within the Santa Clara River Watershed for comparison to the nitrogen load allocation. The allocation was exceeded at two monitoring sites, S02T_TODD and S04T_TAPO. Both of these sites were sampled during all three sampling events. Remaining sites in this watershed were consistently dry.

Table 61. Nitrogen Load Allocations Compared to SCR VCAILGMP Site Data

Site	Constituent	LA ¹ (mg/L)	Event 16 Dry Aug-2012	Event 17 Wet Jan-2013	Event 18 Dry May-2013
S02T_ELLS	Ammonia-N + Nitrate-N	10	0.50	NS	NS
S02T_TODD	Ammonia-N + Nitrate-N	10	13.01 EST	10.64	5.05 EST
S03T_TIMB	Ammonia-N + Nitrate-N	10	NS	NS	NS
S03T_BOULD	Ammonia-N + Nitrate-N	10	NS	NS	NS
S03D_BARDS	Ammonia-N + Nitrate-N	10	NS	NS	NS
S04T_TAPO	Ammonia-N + Nitrate-N	10	16.48	14.87	12.09 EST

NS = Not Sampled; site dry.

EST = Estimated concentration; ammonia-N below reporting limit

1. Nitrite-N concentrations are not monitored as part of the VCAILGMP, however, levels of nitrite are typically insignificant compared to the other nitrogen compounds that are measured.

Ventura River Estuary Trash TMDL

Load Allocation

The Load Allocation (LA) is zero trash. Dischargers may achieve compliance with the LA by implementing a minimum frequency of assessment and collection/best management practice (MFAC/BMP) program. By March 6, 2010 agricultural dischargers must demonstrate full compliance and attainment of the zero trash target's requirement that trash is not accumulating in deleterious amounts between the required trash assessment and collection events.

Compliance

Non-point source dischargers are complying with the Trash TMDL requirements through a MFAC/BMP Program. VCAILG members are in compliance with the TMDL requirement to ensure zero trash immediately after each MFAC event. Additionally, the VCAILG has implemented additional BMPs to control trash and reduce the accumulation of trash between collection events. The importance of collecting and properly disposing of trash has also been a reoccurring topic at multiple VCAILG education classes. The VCAILG WQMP Management Practice Survey has also included BMPs related to trash and property management. For additional information, please refer to the "2013 Ventura River Estuary Trash TMDL TMRP/MFAC Annual Report."

Santa Clara River Estuary Toxaphene TMDL

The Santa Clara River Estuary Toxaphene TMDL was adopted as a single regulatory action through the Conditional Waiver. Conditional Waiver Appendix 1, Monitoring and Reporting Requirements, specifies the following constituents be monitored as part of this TMDL: chlordane, dieldrin, and toxaphene. The constituents are also required to be analyzed in various media: fish tissue (every three years in the Estuary), water, and suspended sediment (during wet weather events). Two sites were selected to meet the TMDL requirements of having one water quality monitoring site representing agricultural discharges directly to the Estuary and one representative discharge to the Santa Clara River upstream of the Estuary. The existing VCAILGMP site S02T_ELLS is monitored as the upstream TMDL site by collecting additional sample volume for suspended sediment analysis, which is beyond normal Conditional Waiver

monitoring. Site S01D_MONAR was selected to represent agricultural discharges to the Estuary. A description of S02T_ELLS was provided previously with the Conditional Waiver monitoring results for that site. Analogous information regarding S01D_MONAR is provided below:

S01D_MONAR

This monitoring site is located on an agricultural drain that discharges directly to the Santa Clara River Estuary between Harbor Boulevard and Victoria Avenue.

Site Map



View downstream towards Estuary



Load Allocations

The Conditional Waiver incorporated toxaphene LAs for suspended sediment and fish tissue as Water Quality Benchmarks (Appendix 3) shown in the table below.

Table 62. Load Allocations for Toxaphene

Reach	Toxaphene in Fish Tissue (µg/kg)	Toxaphene in Suspended Sediment (µg/kg)
Santa Clara River Estuary	6.1	0.1

Monitoring Data and Compliance

LAs for the Santa Clara River Estuary Toxaphene TMDL were established for toxaphene measured in fish tissue and suspended sediment. Additionally, monitoring of chlordane and dieldrin is required; however, these constituents do not have LAs. In the VCAILG QAPP, it was specified that if possible, targeted fish should be those that are commonly consumed by humans, but based on the results of other studies in the Estuary that may not be feasible. Fish were collected in 2012; therefore, fish collection and analysis was not required for the 2012-2013 monitoring year. The next fish sampling will be in the summer of 2015. No exceedances of the toxaphene LA in suspended sediment occurred this monitoring year. When water was present at

the two TMDL sites, all TMDL pesticides were non-detect or below their respective reporting limits.

Table 63. Santa Clara River Estuary Toxaphene TMDL Monitoring Data: Water and Suspended Sediment

Site	Constituent	Units	Load Allocation	Event 16 Dry Aug-2012	Event 17 Wet Jan-2013	Event 18 Dry May-2013
Water						
S01T_ELLS	TSS	mg/L	---	1.18	Site dry	Site dry
	Chlordane ¹	µg/L	---	ND		
	Dieldrin	µg/L	---	ND		
	Toxaphene	µg/L	---	DNQ		
Suspended Sediment						
S01D_MONAR	Chlordane ¹	µg/kg	---	NR	Site dry	Site dry
	Dieldrin	µg/kg	---	NR		
	Toxaphene	µg/kg	0.1	NR		
Water						
S01D_MONAR	TSS	mg/L	---	2.29	ND	Site dry
	Chlordane ¹	µg/L	---	ND	ND	
	Dieldrin	µg/L	---	ND	ND	
	Toxaphene	µg/L	---	DNQ	DNQ	
Suspended Sediment						
S01D_MONAR	Chlordane ¹	µg/kg	---	NR	ND	Site dry
	Dieldrin	µg/kg	---	NR	ND	
	Toxaphene	µg/kg	0.1	NR	ND	

NR = Not Required

1. Reported total chlordane is the sum of alpha- and gamma-chlordane.

Harbor Beaches of Ventura County Bacteria TMDL

The Harbor Beaches of Ventura County Bacteria TMDL does not specify LAs for agricultural dischargers, but does include a provision for monitoring. The VCAILG QAPP specified a site, monitoring frequency, and constituents to comply with the implementation actions specified for agricultural dischargers in the TMDL. A site description, map, and photo are provided below for the site used to evaluate agricultural discharges upstream of the Channel Islands Harbor.

CIHD_VICT

The monitoring site is located along Victoria Avenue, just north of Doris Avenue and the Doris Drain.

Site Map



View at sampling point looking upstream



Monitoring Data

As specified in the VCAILG QAPP, the CIHD_VICT site is visited at the same frequency as Conditional Waiver monitoring. At each event flow and field meter parameters are measured in addition to water samples collected for bacteria testing. Flow was not present at this site during any of the monitoring events. The site was visited two times during the storm event to ensure no flow.

McGrath Lake PCBs, Pesticides, and Sediment Toxicity TMDL

The TMDL for PCBs, Pesticides, and Sediment Toxicity in McGrath Lake became effective June 30, 2011; after the adoption of the current Conditional Waiver. Though the agricultural LAs for this TMDL have not been incorporated into the Conditional Waiver as water quality benchmarks, actions have been taken by VCAILG to comply with the TMDL Implementation Schedule. The VCAILG QAPP and MRP were revised to include the Phase 1 Central Ditch monitoring specified in the McGrath Lake TMDL. Inclusion of monitoring data within this AMR also fulfills the TMDL requirement for annual reporting.

The existing VCAILGMP site OXD_CENTR is located at the Central Ditch, which drains into McGrath Lake. Information and Conditional Waiver monitoring results related to this site can be found in the previous data compilation section. Using the OXD_CENTR site, attainment of TMDL LAs in the inflow to the lake can be assessed. At this time, until the incorporation of the McGrath Lake TMDL LAs (Table 64) as water quality benchmarks, exceedances of the LAs will not trigger the need for a WQMP. However, the existence of this TMDL will influence prioritization and BMP implementation within the McGrath Lake subwatershed.

TMDL Monitoring and Load Allocations

Phase 1 of the McGrath Lake TMDL requires water and sediment sampling in the Central Ditch. Water samples are to be analyzed for:

- Total Organic Carbon (TOC)
- Total Suspended Solids (TSS)
- Total PCBs
- DDT and derivatives
- Dieldrin
- Total Chlordane

All of the above listed constituents except for PCBs and TOC are already required as standard Conditional Waiver monitoring constituents.

Sediment samples are analyzed for the following:

- Total Organic Carbon (TOC)
- Total PCBs
- DDT and derivatives
- Dieldrin
- Total Chlordane

Field parameters and flow are also required at each sampling event, which is already a Conditional Waiver requirement.

Table 64. McGrath Lake Central Ditch Load Allocations

Constituent	Water Column Load Allocation (µg/L)	Sediment Load Allocation (µg/dry kg)
Chlordane	0.00059	0.5
Dieldrin	0.00014	0.02
4,4'-DDD	0.00084	2
4,4'-DDE	0.00059	2.2
4,4'-DDT	0.00059	1
Total DDT	---	1.58
Total PCBs	0.00017	22.7

Monitoring Data

The QAPP and MRP revisions and Regional Board approval to incorporate the proposed monitoring for compliance with the McGrath Lake TMDL occurred midway through the 2012 monitoring year. This is the first full monitoring year since the TMDL monitoring approach was approved. Water sampling occurred concurrently with VCAILG monitoring and included the additional total organic carbon (TOC) and PCBs constituents. Sediments were collected twice this year. One sediment collection took place during approximately a week after the storm event when water levels were safe to enter. The end of the rainy season sediment sample was collected during event 18 in May 2013. Results applicable to this TMDL are reported in the tables below.

Table 65. McGrath Lake TMDL Central Ditch Monitoring Data in Water: OXD_CENTR

Constituents in Water	Units	Water LA	Event 16 Dry Aug-2012	Event 17 Wet Jan-2013	Event 18 Dry May-2013
TOC	mg/L	---	2.44	2.21	1.7
TSS	mg/L	---	DNQ	ND	1.47
Total PCBs ¹	µg/L	0.00017	ND	ND	ND
4,4'-DDD	µg/L	0.00084	ND	DNQ	ND
4,4'-DDE	µg/L	0.00059	ND	0.0094	ND
4,4'-DDT	µg/L	0.00059	ND	0.0061	ND
Dieldrin	µg/L	0.00014	ND	ND	ND
Total Chlordane ²	µg/L	0.00059	ND	ND	ND

1. Total PCBs include the 7 aroclors identified in CTR (1016, 1221, 1232, 1242, 1248, 1254, 1260).

2. Total chlordane is considered the sum of alpha- and gamma-chlordane.

Table 66. McGrath Lake TMDL Central Ditch Monitoring Data in Sediment: OXD_CENTR

Constituents in Sediment	Units	Sediment LA	Event 17.1 Post-Rain 2/4/2013	Event 18 Dry 5/21/2013
TOC	% dry wt.	---	3.3	ND
Total PCBs ¹	µg/dry kg	22.7	ND	ND
4,4'-DDD	µg/dry kg	2	0.0148	0.0484
4,4'-DDE	µg/dry kg	2.2	0.1128	0.1714
4,4'-DDT	µg/dry kg	1	0.0394	0.0685
Total DDT ²	µg/dry kg	1.58	0.167	0.288
Dieldrin	µg/dry kg	0.02	ND	ND
Total Chlordane ³	µg/dry kg	0.5	DNQ	DNQ

1. Total PCBs include the 7 aroclors identified in CTR (1016, 1221, 1232, 1242, 1248, 1254, 1260).

2. Total DDT is the sum of 4,4'-DDD, 4,4'-DDT, and 4,4'-DDT.

3. Total chlordane is considered the sum of alpha- and gamma-chlordane.

EVALUATION OF DATA QUALITY

The VCAILG QAPP specifies monitoring program requirements and procedures designed to ensure that the quality of data generated through the VCAILGMP are such that data can be used to 1) accurately assess environmental conditions and 2) make environmentally-sound decisions. This section provides a summary of the data quality evaluation performed on data collected through the VCAILGMP in 2012 through 2013. An evaluation of the data quality for Calleguas Creek Watershed TMDL monitoring is included as Appendix E in the fifth year annual monitoring report for that program.⁵ The evaluation herein is based on data quality objectives and quality control requirements specified in the VCAILG QAPP.

⁵ Larry Walker Associates. Calleguas Creek Watershed TMDL Compliance Monitoring Program Fifth Year Annual Monitoring Report. February 26, 2014.

Data Quality Objectives

Data quality objectives specified in the QAPP for the VCAILGMP include requirements pertaining to maximum detection limits achieved by field methods and analytical laboratories, and acceptance criteria for quality control samples. Additional data quality objectives were defined in the QAPP for percent completeness.

Detection Limits

Table 67. Analytical Methods and Project Reporting Limits for Field Measurements

Parameter	Method	Range	Project Reporting Limit
Flow	Electromagnetic	-0.5 to +20 ft/s	0.05 ft/s
pH	Electrometric	0 – 14 pH units	NA
Temperature	High stability thermistor	-5 – 50°C	NA
Dissolved Oxygen	Luminescent dissolved oxygen	0 – 50 mg/L	0.5 mg/L
Turbidity	Nephelometric	0 – 3000 NTU	0.2 NTU
Conductivity	Graphite electrodes	0 – 10 mmhos/cm	2.5 µmhos/cm

NA = Not Applicable

Table 68. VCAILGMP Analytical Methods and Project Detection Limits / Project Reporting Limits for Laboratory Analyses

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
<i>Aquatic Chronic Toxicity</i>²						
<i>Pimephales promelas</i> (fathead minnow)	EPA-821-R-02-013 and EPA 600-4-91-002	N/A	N/A	N/A	N/A	N/A
<i>Ceriodaphnia dubia</i> (water flea)	EPA 821-R-02-013 and EPA 600-4-91-002	N/A	N/A	N/A	N/A	N/A
<i>Selenastrum capricornutum</i> (green algae)	EPA 821-R-02-013 and EPA 600-4-91-002	N/A	N/A	N/A	N/A	N/A
<i>General Water Quality Constituents</i>						
Total Dissolved Solids (TDS)	SM 2540C	mg/L	13	13 (16) 11 (17 & 18)	20	20
Total Suspended Solids (TSS)	SM 2540D	mg/L	0.4	0.4 (16) 0.84 (17 & 18)	1	1
Chloride	EPA 300.0	mg/L	0.04	0.24 (16) 0.38 (17 & 18)	1	1
Sulfate	EPA 300.0	mg/L	0.13	0.2 (16) 0.038 (17 & 18)	2	1
Hardness	SM 2340B	mg/L	1	0.1	5	0.5
<i>Nutrients</i>						
Total Ammonia-N	SM 4500-NH ₃ F	mg/L	0.03	0.02	0.06	0.06 (16) 0.05 (17 & 18)
Nitrate-N	EPA 300.0	mg/L	0.01	0.01	0.05	0.05
Total Orthophosphate-P	SM 4500-PE	mg/L	0.01	0.01	0.01	0.02
<i>Metals</i>						
Dissolved Copper	EPA 200.8	µg/L	0.4	0.05 (16) 0.005 (17 & 18)	0.8	0.25 (16) 0.01 (17 & 18)

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
Total Copper	EPA 200.8	µg/L	0.4	0.05 (16) 0.005 (17 & 18)	0.8	0.25 (16) 0.01 (17 & 18)
Organochlorine Pesticides ³						
Aldrin	EPA 625	ng/L	1	1	5	5
BHC-alpha	EPA 625	ng/L	1	1	5	5
BHC -beta	EPA 625	ng/L	1	1	5	5
BHC-delta	EPA 625	ng/L	1	1	5	5
BHC-gamma (Lindane)	EPA 625	ng/L	1	1	5	5
Chlordane-alpha	EPA 625	ng/L	1	1	5	5
Chlordane-gamma	EPA 625	ng/L	1	1	5	5
2,4'-DDD	EPA 625	ng/L	1	1	5	5
2,4'-DDE	EPA 625	ng/L	1	1	5	5
2,4'-DDT	EPA 625	ng/L	1	1	5	5
4,4'-DDD	EPA 625	ng/L	1	1	5	5
4,4'-DDE	EPA 625	ng/L	1	1	5	5
4,4'-DDT	EPA 625	ng/L	1	1	5	5
Dieldrin	EPA 625	ng/L	1	1	5	5
Endosulfan I	EPA 625	ng/L	1	1	5	5
Endosulfan II	EPA 625	ng/L	1	1	5	5
Endosulfan Sulfate	EPA 625	ng/L	1	1	5	5
Endrin	EPA 625	ng/L	1	1	5	5
Endrin Aldehyde	EPA 625	ng/L	1	1	5	5
Endrin Ketone	EPA 625	ng/L	1	1	5	5
Toxaphene	NCI/GCMS	ng/L	10	10	50	50

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
<i>Organophosphorus Pesticides</i>						
Bolstar	EPA 625	ng/L	2	2	4	4
Chlorpyrifos	EPA 625	ng/L	1	1 (16) 0.5 (17 & 18)	2	2 (16) 1 (17 & 18)
Demeton	EPA 625	ng/L	1	1	2	2
Diazinon	EPA 625	ng/L	2	2 (16) 0.5 (17 & 18)	4	4 (16) 1 (17 & 18)
Dichlorvos	EPA 625	ng/L	3	3	6	6
Dimethoate	EPA 625	ng/L	3	5 (18)	6	10 (18)
Disulfoton	EPA 625	ng/L	1	1	2	2
Ethoprop	EPA 625	ng/L	1	1	2	2
Fenclorophos	EPA 625	ng/L	2	2	4	4
Fensulfothion	EPA 625	ng/L	1	1	2	2
Fenthion	EPA 625	ng/L	2	2	4	4
Malathion	EPA 625	ng/L	3	3	6	6
Methyl Parathion	EPA 625	ng/L	1	1	2	2
Mevinphos	EPA 625	ng/L	8	8 (16) 5 (17 & 18)	16	16 (16) 10 (17 & 18)
Phorate	EPA 625	ng/L	6	6 (16) 5 (17 & 18)	12	12 (16) 10 (17 & 18)
Tetrachlorvinphos	EPA 625	ng/L	2	2	4	4
Tokuthion	EPA 625	ng/L	3	3	6	6
Trichloronate	EPA 625	ng/L	1	1	2	2

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
<i>Pyrethroid Pesticides</i>						
Allethrin	EPA 625(NCI)	ng/L	0.5	0.5	2	2
Bifenthrin	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Cyfluthrin	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Cypermethrin	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Danitol	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Deltamethrin	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Esfenvalerate	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Fenvalerate	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Fluvalinate	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
L-Cyhalothrin	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
cis-Permethrin	EPA 625 (NCI)	ng/L	5	5	25	25 (16) 10 (17 & 18)
trans-Permethrin	EPA 625 (NCI)	ng/L	5	5	25	25 (16) 10 (17 & 18)
Prallethrin	EPA 625 (NCI)	ng/L	0.5	0.5	2	2
Resmethrin	EPA 625 (NCI)	ng/L	5	5	25	25 (16) 10 (17 & 18)
MDL = Method Detection Limit		RL = Reporting Limit				

Table 69. TMDL Analytical Methods and Project Method Detection Limits / Project Reporting Limits for Laboratory Analyses Performed Under the VCAILGMP

Parameter	Analytical Method	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
Total Organic Carbon (TOC) (water)	SM 5310C	mg/L	0.2	0.15	0.3	0.5
Total Organic Carbon (TOC) (sediment)	SM 5310B	% dry weight	0.01	0.01	0.05	0.02
OC Pesticides (filtered sediment)	EPA 8270C	ng/L	1 ¹	1	5 ¹	5
OC Pesticides (sediment)	EPA 8270C	ng/ dry g	1	1	5	5
OC Pesticides (fish tissue)	EPA 8270C	ng/wet g	1 ²	1	5 ²	5
PCBs (aroclors) (water)	EPA 625	ng/L	10	1	20	5
PCBs (aroclors) (sediment)	EPA 8270C	ng/ dry g	10	1	20	5
<i>E. coli</i>	9223B	MPN/100mL	<2	N/A	<2	N/A
Enterococcus	Indexx Enterolert	MPN/100mL	<1	0.5	<1	1
Total Coliform	9221B	MPN/100mL	<2	0.5	<2	1
Fecal Coliform	9221E	MPN/100mL	<2	1	<2	2

1. Table lists only those TMDL constituents not included in the previous table
2. MDL for toxaphene is 10 ng/L; RL for toxaphene is 50 ng/L
3. MDL for toxaphene is 10 ng/g; RL for toxaphene is 50 ng/g

All project detection limits were met in 2012 to 2013 monitoring year for field measurements.

MDLs for chloride, sulfate, and TSS were not met during 2013. However, RLs for these constituents were met, and levels of these analyses in environmental samples exceeded the RLs. Therefore, higher MDLs for these constituents are not considered quality control failures.

RLs for total orthophosphate were not met, but all the samples were either found to be below the MDL or above the RL and therefore, this reporting limit is not considered quality control failures.

All project detection limits were either met or lower than required for organophosphorus and organochlorine pesticides. The lab has dropped the analysis for merphos and added dimethoate into their suite of organophosphorus pesticides in event 18.

Data Quality Objectives for Precision and Accuracy

Table 70 lists data quality objectives for precision and accuracy for field measurements and laboratory analyses.

Table 70. VCAILGMP Data Quality Objectives for Precision and Accuracy

Parameter	Accuracy	Precision	Recovery
Water Velocity (for Flow calc.)	± 2%	NA	NA
pH	± 0.2 pH units	± 0.5 pH units	NA
Temperature	± 0.5 °C	± 5%	NA
Dissolved Oxygen	± 0.5 mg/L	± 10%	NA
Turbidity	± 10%	± 10%	NA
Conductivity	± 5%	± 5%	NA
Aquatic Chronic Toxicity	¹	²	NA
Total Suspended Solids (TSS)	80-120%	30%	38-138%
Total Dissolved Solids (TDS)	80-120%	10%	90-110%
Hardness (as CaCO ₃)	80-120%	30%	80-120%
Chloride	80-120%	23%	86-128%
Sulfate	80-120%	30%	92-113%
Ammonia-Nitrogen	80-120%	30%	70-130%
Nitrate-Nitrogen	80-120%	30%	70-130%
Orthophosphate-P	80-120%	30%	70-130%
Dissolved Copper	75-125%	30%	75-125%
Total Copper	75-125%	30%	75-125%
Organochlorine Pesticides	80-120%	30% ³	50-150% ³
Organophosphorus Pesticides	80-120%	30% ³	50-150% ³
Pyrethroid Pesticides	80-120%	30% ³	50-150% ³
Trash	NA	NA	NA

NA = Not Applicable

1. Must meet all method performance criteria relative to the reference toxicant test.
2. Must meet all method performance criteria relative to sample replicates.
3. Or control limits established as the mean ± 3 standard deviations based on laboratory precision and recovery data.

Table 71. TMDL Specific Data Quality Objectives ¹

Parameter	Accuracy	Precision	Recovery
Total Organic Carbon (water)	75-125%	23%	75-125%
Total Organic Carbon (sediment)	NA	25%	75-125%
PCBs (water)	50-150%	25%	50-150%
PCBs (sediment)	50-150%	25%	50-150%
Toxaphene (filtered sediment)	50-150%	30%	50-150% ¹
Chlordane (filtered sediment)	50-150%	30%	50-150% ¹
Dieldrin (filtered sediment)	50-150%	30%	50-150% ¹
Toxaphene (fish tissue)	50-150%	30%	50-150% ¹
Chlordane (fish tissue)	50-150%	30%	50-150% ¹
Dieldrin (fish tissue)	50-150%	30%	50-150% ¹
<i>E. coli</i> (water)	80-120% ²	RPD <25%	80-120%
Enterococcus (water)	80-120% ²	RPD <25%	80-120%
Total Coliform (water)	80-120% ²	RPD <25%	80-120%
Fecal Coliform (water)	80-120% ²	RPD <25%	80-120%

1. This table lists only those constituents not included in the previous table.

Field Data Quality

Hydrolab MS5 Data Sondes (field meters) were calibrated within 24 hours of each monitoring event, and calibration was verified for each probe by analyzing a mid-range standard. If a calibration failure occurred, the probe that failed calibration was not used for monitoring. At the end of each event, mid-range standards were re-run to verify that each probe was still in calibration. Calibration data are recorded on the calibration sheet in the field logbook, and ultimately entered into the VCAILG Monitoring Database. During event 16, both of the field meter's turbidity sensors would not validate with the mid-range standard of 1000 NTU. Since most sites have low turbidity, calibration was successfully completed with 0 and 1000 NTU and checked with 100 NTU. During event 17, both field meters' pH sensors would not calibrate at 8. Alternative hand-held pH meters were calibrated and used for pH readings during this event. All other calibration checks performed on field meters met data quality objectives for accuracy, signifying the validity of those field measurements.

Flow results for all events were obtained using a velocity meter or estimated by measuring stream width and average depth, and multiplying those estimates by the reciprocal of the time required for a floating object to travel over a measured distance.

Blank Contamination

Overall there was very little blank contamination detected during the 2012-2013 monitoring year. Field blank constituent detections occurred in two copper samples and one sample each for nitrate and sulfate. Details of all the blank hits are reported in Table 72 below. The following lists a basic summary of the blank contamination results:

- Field Blanks – 210 analyzed – 6 detections above the RL (2.9%) (does not include surrogates)
- Laboratory Blanks – 767 analyzed – 50 detections above RL (6.5%) (does not include surrogates)

Table 72. Blank Sample Contamination Detected – 2012-2013

Constituent	Matrix	Event	Lab Batch	Field Blank	Lab Blank	Program Qualifier	Comments
General Water Quality							
Sulfate (mg/L)	Water	018.0	2A1307683	1.11		Jb:J	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-002:A		0.54	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-002:A		1.23	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-013:A		0.54	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-013:A		1.85	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-025:A		0.93	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-025:A		0.60	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-037:A		0.80	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-037:A		0.44	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-049:A		0.49	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-049:A		0.90	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-061:A		0.40	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-061:A		0.74	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-073:A		1.00	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-073:A		0.64	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1307683-085:A		0.81	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1307683-085:A		0.58	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-002:A		0.39	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1308067-002:A		0.75	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-013:A		0.40	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1308067-013:A		1.14	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-025:A		0.47	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1308067-025:A		1.07	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-037:A		0.47	b	Analyte Found in Blank, below PQL

Constituent	Matrix	Event	Lab Batch	Field Blank	Lab Blank	Program Qualifier	Comments
Sulfate (ppm)	Water	018.0	2A1308067-037:A		0.74	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-049:A		0.43	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1308067-049:A		0.80	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-061:A		0.48	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1308067-061:A		1.88	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-073:A		0.72	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1308067-073:A		0.86	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	018.0	2A1308067-079:A		0.84	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	018.0	2A1308067-079:A		0.74	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	017.0	2A1301428-013:A		0.25	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	017.0	2A1301428-013:A		0.08		
Sulfate (ppm)	Water	017.0	2A1301428-025:A		0.26	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	017.0	2A1301428-025:A		0.13	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	017.0	2A1301428-037:A		0.37	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	017.0	2A1301428-037:A		0.15	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	017.0	2A1301735-013:A		0.38	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	017.0	2A1301735-025:A		0.83	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	017.0	2A1301735-037:A		0.86	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	017.0	2A1301735-037:A		0.01		
Chloride (ppm)	Water	017.0	2A1301735-049:A		0.16	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	017.0	2A1301735-049:A		1.48	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	017.0	2A1301735-061:A		0.23	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	017.0	2A1301735-061:A		0.16		
Sulfate (ppm)	Water	017.0	2A1301735-073:A		0.06		
Chloride (ppm)	Water	017.0	2A1301735-073:A		0.06		
Sulfate (ppm)	Water	017.0	2A1301735-085:A		0.02		
Chloride (ppm)	Water	017.0	2A1301735-085:A		0.20	b	Analyte Found in Blank, below PQL

Constituent	Matrix	Event	Lab Batch	Field Blank	Lab Blank	Program Qualifier	Comments
Nutrients							
Nitrate-N (mg/L)	Water	016.0	C-9012	0.10			
OC Pesticides							
None							
PCBs							
None							
OP Pesticides							
None							
Pyrethroid Pesticides							
None							
Metals & Selenium							
Dissolved Copper (µg/L)	Water	017.0	E-5029	0.05			
Total Copper (µg/L)	Water	017.0	E-5029	0.01		J, FD RPD	Detected at the RL, Field Duplicate RPD Failed
Dissolved Copper (µg/L)	Water	018.0	E-5083	0.34			
Total Copper (µg/L)	Water	018.0	E-5083	0.03			

Precision

The purpose of analyzing duplicates is to demonstrate precision of sample collection, preparation, and analytical methods. The relative percent difference (RPD) is reported for field duplicates, lab duplicates, blank spike duplicates, laboratory control spike (LCS) duplicates, and matrix spike duplicates. QA failures for precision are noted when the RPD between a sample and its duplicate are greater than the acceptance value. See Table 73 below for details of all the precision failures. See Table 70 and Table 71 for the VCAILG acceptance values for precision. The following list summarizes the precision analysis results:

- Field Duplicates – 398 analyzed – 16 failed RPD (4.0%) (does not include surrogates)
- Laboratory Duplicates – 416 analyzed – 11 failed RPD (2.6%) (includes surrogates)
- Blank Spike/LCS Duplicates – 664 analyzed – 4 failed RPD (0.6%) (includes surrogates)
- Matrix Spike Duplicates – 397 analyzed – 6 failed RPD (1.5%) (includes surrogates)

Table 73. Precision Control Failures – 2012-2013

Constituent	Matrix	Event	Lab Batch	Site	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
General Water Quality										
Total Organic Carbon (mg/L)	Water	016.0	2P1210168-003:A	LABQA				31.7	H	
Nutrients										
None										
OC Pesticides										
2,4'-DDT (µg/dry g)	Sediment	017.0	O-4066	OXD_CENTR	65	10	2	2	FD RPD	Estimate due to FD Failure
4,4'-DDD (µg/dry g)	Sediment	017.0	O-4066	OXD_CENTR	70	5	1	2	FD RPD	Estimate due to FD Failure
4,4'-DDE (µg/dry g)	Sediment	017.0	O-4066	OXD_CENTR	69	1	2	3	FD RPD	Estimate due to FD Failure
4,4'-DDE (µg/L)	Water	017.0	O-4040	S02T_TODD	41	18	1	1	FD RPD	Estimate due to FD Failure
4,4'-DDT (µg/dry g)	Sediment	017.0	O-4066	OXD_CENTR	64	13	2	2	FD RPD	Estimate due to FD Failure
4,4'-DDT (µg/L)	Water	017.0	O-4040	S02T_TODD	65	2	8	4	FD RPD	Estimate due to FD Failure
2,4'-DDD (µg/dry g)	Sediment	018.0	O-4114	OXD_CENTR	25	96	5	1	SL	
2,4'-DDT (µg/dry g)	Sediment	018.0	O-4114	OXD_CENTR	4	92	3	3	SL	
4,4'-DDD (µg/dry g)	Sediment	018.0	O-4114	OXD_CENTR	40	86	5	2	SH, NH	
4,4'-DDE (µg/dry g)	Sediment	018.0	O-4114	OXD_CENTR	3	82	2	13	NH	
4,4'-DDT (µg/dry g)	Sediment	018.0	O-4114	OXD_CENTR	7	98	3	4	SH, NH, BS >UL	Estimate due to BS above upper limit
Endrin aldehyde (µg/dry g)	Sediment	017.0	O-4066	OXD_CENTR	0	0	40	40	EST BS/BSD, EST MS/MSD	Estimate due to BS/BSD & MS/MSD failure

Constituent	Matrix	Event	Lab Batch	Site	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
Endrin aldehyde (µg/dry g)	Sediment	018.0	O-4114	OXD_CENTR	0	0	32	30	R	
PCBs										
PCB169 (µg/L)	Water	017.0	O-4046	LABQA			31			
OP Pesticides										
Bolstar (µg/L)	Water	016.0	O-3092	04D_LAS	0	0	2	50	EST MS/MSD	Estimate due to MS/MSD failure
Fensulfothion (µg/L)	Water	016.0	O-3092	04D_LAS	0	0	2	82	M	Matrix interference
Trichloronate (µg/L)	Water	016.0	O-3092	04D_LAS	0	0	4	49	R	
Malathion (µg/L)	Water	018.0	O-4109	S02T_TODD	159	0	1	2	MS >UL, FD RPD	Estimate due to MS above Upper limit & FD Failure
Pyrethroid Pesticides										
Cypermethrin (µg/L)	Water	017.0	O-4040	S02T_TODD	52	7	6	7	FD RPD	Estimate due to FD Failure
Deltamethrin/Tralomethrin (µg/L)	Water	018.0	O-4109	S02T_TODD	121	29	97	21	R, FD RPD	Estimate due to FD Failure
Fluvalinate (µg/L)	Water	018.0	O-4109	S02T_TODD	41	116	15	22	LD RPD, FD RPD	Estimate due to LD & FD Failure
Trans-Permethrin (µg/L)	Water	018.0	O-4109	S02T_TODD	0	0	1	33	EST MS/MSD	Estimate due to MS/MSD failure
Metals										
Copper Total (µg/L)	Water	017.0	E-5029	S02T_TODD	42		1		FD RPD	Estimate due to FD Failure
Copper Total (µg/L)	Water	017.0	E-5029	01T_ODD3_ARN		2			FD RPD	Estimate due to FD Failure

BS/BSD = Blank Spike/Blank Spike Duplicate
MS/MSD = Matrix Spike/Matrix Spike Duplicate
RPD = Relative Percent Difference

Accuracy

Percent recoveries of blank spike samples (BS), laboratory control spike samples (LCS), and matrix spike samples (MS) check the accuracy of lab reported sample concentrations. The BS samples that fell outside the acceptable range occurred in OC or OP pesticides and mostly during event 18. The matrix spike samples that fell outside the acceptable range were split between all three events. Table 74 summarizes the QA/QC sample results for accuracy that did not meet percent recovery objectives. The following lists the results of the accuracy analysis results:

- Blank Spike/LCS Samples – 1389 Analyzed – 7 fell outside the range (0.5%) (does not include surrogates)
- Matrix Spike Samples – 754 Analyzed – 78 fell outside the range (10.3%) (does not include surrogates)

Table 74. Accuracy Control Failures – 2012-2013

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
General Water Quality											
Total Organic Carbon (mg/L)	Water	016.0	2P1210168-002:A	75	114	X	X	243	349	H	Holdtime exceeded
Nutrients											
Ammonia-N (mg/L)	Water	016.0	C-9050	70	130	104	108	140	140	M, MS>UL	Matrix Interference, MS greater than upper limit
Ammonia-N (mg/L)	Water	017.0	C-11008	70	130	96	92	150	149	M, MS>UL	Matrix Interference, MS greater than upper limit
Ammonia-N (mg/L)	Water	018.0	C-11150	70	130	84	80	68	72	M, MS<LL	Matrix Interference, MS less than lower limit
OC Pesticides											
4,4'-DDT (µg/dry g)	Sediment	017.0	O-4066	25	125	119	121	128	126	MS>UL	MS greater than upper limit
Oxychlorane (µg/dry g)	Sediment	017.0	O-4066	50	150	112	115	383	327	M, MS>UL	Matrix Interference, MS greater than upper limit
2,4'-DDT (µg/dry g)	Sediment	018.0	O-4114	25	125	117	120	129	133	MS>UL	MS greater than upper limit
4,4'-DDD (µg/dry g)	Sediment	018.0	O-4114	50	150	142	150	165	169	SH	
4,4'-DDT (µg/dry g)	Sediment	018.0	O-4114	25	125	145	148	179	186	SH, M, BS>UL	Matrix Interference, BS greater than upper limit
Endrin (µg/dry g)	Sediment	018.0	O-4114	25	125	122	110	143	147	M, MS>UL	Matrix Interference, MS greater than upper limit

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Oxychlorane (µg/dry g)	Sediment	018.0	O-4114	50	150	94	95	238	270	M, MS>UL	Matrix Interference, MS greater than upper limit
Perthane (µg/dry g)	Sediment	018.0	O-4114	50	150	148	155	178	180	M, MS>UL, BS>UL	Matrix Interference, BS & MS greater than upper limit
Methoxychlor (µg/dry g)	Sediment	018.0	O-4114	50	150	147	144	198	206	M, MS>UL	Matrix Interference, MS greater than upper limit
Methoxychlor (µg/L)	Water	018.0	O-4109	50	150	150	155	161	152	M, MS>UL, BS>UL	Matrix Interference, BS & MS greater than upper limit
PCBs											
None											
OP Pesticides											
Bolstar (Sulprofos) (µg/L)	Water	016.0	O-3092	50	150	129	131	5	3	M, EST MS/MSD	Matrix Interference, Estimate due to MS/MSD failure
Demeton (µg/L)	Water	016.0	O-3092	50	150	54	52	0	0	M, MS<LL	Matrix Interference, MS less than lower limit
Disulfoton (µg/L)	Water	016.0	O-3092	50	150	51	51	0	0	M, MS<LL	Matrix Interference, MS less than lower limit
Fenclorophos (Ronnel) (µg/L)	Water	016.0	O-3092	50	150	74	73	155	141	M, MS>UL	Matrix Interference, MS greater than upper limit
Fensulfothion (µg/L)	Water	016.0	O-3092	50	150	109	111	219	92	M, MS>UL	Matrix Interference, MS greater than upper limit

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Fenthion (µg/L)	Water	016.0	O-3092	50	150	81	80	2	2	M, MS<LL	Matrix Interference, MS less than lower limit
Malathion (µg/L)	Water	016.0	O-3092	50	150	108	108	240	197	M, MS>UL	Matrix Interference, MS greater than upper limit
Methyl parathion (µg/L)	Water	016.0	O-3092	50	150	124	131	358	344	M, MS>UL	Matrix Interference, MS greater than upper limit
Mevinphos (Phosdrin) (µg/L)	Water	016.0	O-3092	50	150	62	61	155	164	M, MS>UL	Matrix Interference, MS greater than upper limit
Phorate (µg/L)	Water	016.0	O-3092	50	150	52	52	0	0	M, MS<LL	Matrix Interference, MS less than lower limit
Tetrachlorvinphos (Stirofos) (µg/L)	Water	016.0	O-3092	50	150	136	135	396	370	M, MS>UL	Matrix Interference, MS greater than upper limit
Tokuthion (µg/L)	Water	016.0	O-3092	50	150	103	96	228	192	M, MS>UL	Matrix Interference, MS greater than upper limit
Disulfoton (µg/L)	Water	017.0	O-4040	25	125	26	29	122	129	M, H	Matrix Interference, Holdtime exceeded
Ethoprop (Ethoprofos) (µg/L)	Water	017.0	O-4040	50	150	41	52	64	79	R, H	
Malathion (µg/L)	Water	017.0	O-4040	50	150	138	114	418	440	M, H	Matrix Interference, Holdtime exceeded
Methyl parathion (µg/L)	Water	017.0	O-4040	50	150	88	79	149	152	M, H	Matrix Interference, Holdtime exceeded
Bolstar (Sulprofos) (µg/L)	Water	018.0	O-4109	50	150	145	168	200	198	M, MS>UL, BS>UL	Matrix Interference, BS & MS greater than upper limit

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Malathion (µg/L)	Water	018.0	O-4109	50	150	145	147	191	194	M, MS>UL, FD RPD	Matrix Interference, MS greater than upper limit, FD failed RPD
Methyl parathion (µg/L)	Water	018.0	O-4109	50	150	139	145	159	165	M, MS>UL	Matrix Interference, MS greater than upper limit
Tetrachlorvinphos (Stirofos) (µg/L)	Water	018.0	O-4109	50	150	146	147	192	191	M, MS>UL	Matrix Interference, MS greater than upper limit
Tokuthion (µg/L)	Water	018.0	O-4109	50	150	164	141	178	168	M, R, MS>UL, BS>UL	Matrix Interference, BS & MS greater than upper limit
Methamidophos (Monitor) (µg/L)	Water	018.0	O-4109	50	150	145	137	7	6	M, MS<LL	Matrix Interference, MS less than lower limit
Methidathion (µg/L)	Water	018.0	O-4109	50	150	143	143	218	206	M, MS>UL	Matrix Interference, MS greater than upper limit
Phosmet (µg/L)	Water	018.0	O-4109	50	150	131	141	179	147	M, MS>UL	Matrix Interference, MS greater than upper limit
Pyrethroid Pesticides											
Bifenthrin (µg/L)	Water	017.0	O-4040	50	150	121	125	154	161	M, MS>UL	Matrix Interference, MS greater than upper limit
Danitol (Fenpropathrin) (µg/L)	Water	017.0	O-4040	50	150	142	145	175	192	M, MS>UL	Matrix Interference, MS greater than upper limit
Permethrin, cis- (µg/L)	Water	017.0	O-4040	50	150	101	116	172	200	M, MS>UL	Matrix Interference, MS greater than upper limit

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Permethrin, trans- (µg/L)	Water	017.0	O-4040	50	150	149	142	224	248	M, MS>UL	Matrix Interference, MS greater than upper limit
Resmethrin (µg/L)	Water	018.0	O-4109	50	150	141	143	165	154	M, MS>UL	Matrix Interference, MS greater than upper limit
Metals and Selenium											
None											

MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Lab Control Spike
LCSD = Lab Control Spike Duplicate
Rec. = Recovery

Completeness

Data completeness is a measure of the amount of successfully collected and validated data relative to the amount of data planned to be collected for the project. It is usually expressed as a percentage value. A project objective for percent completeness is typically based on the percentage of the data needed for the program or study to reach valid conclusions.

Because the VCAILGMP is intended to be a long-term monitoring program, data that are not successfully collected for a specific monitoring event will not be collected at a later date. Rather, subsequent events conducted over the course of the program will provide a sufficient data set to appropriately characterize conditions at individual sampling sites. Moreover, some monitoring sites will often be dry (particularly during the dry season), which is important information necessary to identify areas where discharge from irrigated agricultural lands is nonexistent. For these reasons, most of the data planned for collection cannot be considered absolutely critical, and it is difficult to set a meaningful objective for data completeness. As explained in the QAPP, some reasonable objectives for data are desirable, if only to measure the effectiveness of the program. Program goals for data completeness were established at the 90% level for field measurements, general water quality constituents, organic constituents, and aquatic toxicity.

Table 75 lists the percent completeness of data collected during 2012-2013 in comparison with the established data quality objective.

Table 75. VCAILG MP and Associated TMDL Data Completeness – 2012-2013

Monitoring Element	Completeness Objective	Completeness Achieved
Field Measurements	90%	100%
General Water Quality Constituents	90%	100%
Total & Dissolved Copper	90%	100%
Organic Constituents - Pesticides	90%	100%
Organic Constituents - Tissue	90%	100%
Organic Constituents – Filtered Sediment	90%	100%
Organic Constituents - Sediment	90%	100%
Bacteria	90%	100%
Aquatic Toxicity	90%	50%

Values listed for percent completeness achieved are based on successfully collecting samples at all VCAILG monitoring sites with sufficient flow present, and successfully generating analytical data for all planned constituents. As previously explained in the Conditional Waiver Monitoring Constituents and Frequency section, a scheduling error resulted in aquatic toxicity samples not being collected during the appropriate dry weather monitoring event. Dry weather toxicity samples will therefore be collected during both of the 2013-2014 monitoring year dry events to account for this mistake.

Additional Program Requirements

Data quality is dependent on samples that are collected properly by following established protocols. To ensure that samples are collected properly, the QAPP requires field crews to

receive sampling training prior to initiation of sampling. Refresher training is required annually thereafter.

Sampling refresher training took place November 26, 2012. Training included a PowerPoint presentation detailing program goals, requirements, monitoring sites, constituents, field protocols, sample handling, and safety.

Training documentation is kept on file with other VCAILGMP documents and is available for review upon request.

Summary of Water Quality Benchmark Exceedances

Exceedances of water quality benchmarks occurred in all watersheds, except Ventura River, and triggered the requirement to prepare a Water Quality Management Plan. The WQMP will include specific steps to attain water quality benchmarks through the use of best management practices.

STANDARD WATER QUALITY BENCHMARK EXCEEDANCES

The following summarizes the exceedances of standard water quality benchmarks as specified in Conditional Waiver Appendix 2 or included by reference to narrative and numeric Basin Plan objectives and water quality standards from the California Toxics Rule. Any exceedances were previously noted in the data tables of each VCAILGMP site, the following is a compilation to evaluate the sites overall. Table 76 lists the exceedances that occurred at each site for each monitoring event.

pH

All sites were within the acceptable pH range of 6.5 to 8.5 during the 2012-2013 monitoring year.

Temperature

No exceedances of the temperature benchmark occurred during the 2012-2013 monitoring year.

Dissolved Oxygen

One exceedance of the dissolved oxygen benchmark occurred at OXD_CENTR (Central Ditch) during the August 2012 dry event.

Salts

Exceedances of the salts benchmarks (TDS, chloride, sulfate, or any combinations thereof) occurred at three monitoring sites. Benchmarks for TDS and sulfate were exceeded during the first dry event at CCW site 05D_LAVD (La Vista Drain). The other two sites with salts exceedances were S02T_TODD (Todd Rd.) and S04T_TAPO (Tapo Canyon) in the SCRW.

Nitrogen

Exceedances of the nitrate-N benchmark occurred at six monitoring sites. Sites with nitrate-N exceedances were split between watersheds with three sites located in the Calleguas Creek Watershed, two in the Santa Clara River Watershed, and one in the Oxnard Coastal Watershed.

Copper

Exceedances of the copper benchmarks only occurred at brackish/saltwater sites in the Calleguas Creek Watershed. Site 01T_ODD3_ARN (Oxnard Drain #3, Arnold Rd.) exceeded the copper benchmark during the wet event and May 2013 dry event. The copper benchmark was exceeded during all three sampling events at 04D_ETTG (Etting Rd.).

Pesticides

At least one DDT compound was detected at each of the seven sites sampled during the storm event. During dry weather, DDT compound detections were less consistent. One CCW site exceeded the toxaphene benchmark during the storm event, but no other OC pesticide constituents had exceedances besides the previously mentioned DDT compounds. In regards to OP pesticides, two sites exceeded the chlorpyrifos benchmark, one in the Calleguas Creek Watershed and the other in the Oxnard Coastal Watershed. No diazinon exceedances were observed this monitoring year.

Chronic Toxicity

Toxicity sampling took place during event 17. No exceedances of the 1.0 TU_c benchmark were observed.

Table 76. Exceedances of Standard Water Quality Benchmarks in 2012–2013 by Site and Event ^{1, 2}

Site	Event 16 – Dry August 28, 2012	Event 17 – Wet January 25, 2013	Event 18 – Dry May 21, 2013
01T_ODD3_ARN	Nitrate-N DDD, DDE	Ammonia-N, Nitrate-N, Copper DDD, DDE, DDT	Nitrate-N Copper DDD, DDE
04D_ETTG	Nitrate-N Copper DDD, DDE,	Nitrate-N Copper DDD, DDE, DDT	Nitrate-N Copper DDE
04D_LAS	Nitrate-N DDE	Nitrate-N DDE Chlorpyrifos	Nitrate-N DDD, DDE
05D_LAVD	TDS, Sulfate	DDD, DDE, DDT, Toxaphene, Chlorpyrifos	NS
05T_HONDO	NS	NS	NS
06T_LONG2	NS	NS	NS
OXD_CENTR	DO Nitrate-N Chlorpyrifos	Nitrate-N DDE, DDT Chlorpyrifos	Nitrate-N
S02T_ELLS	None	NS	NS
S02T_TODD	TDS, Sulfate Nitrate-N,	TDS, Sulfate Nitrate-N DDE, DDT,	TDS, Sulfate DDE, DDT
S03T_TIMB	NS	NS	NS
S03T_BOULD	NS	NS	NS
S03D_BARDS	NS	NS	NS
S04T_TAPO	TDS, Chloride, Sulfate Nitrate-N,	TDS, Chloride, Sulfate Nitrate-N DDE	TDS, Chloride, Sulfate Nitrate-N
VRT_SANTO	NS	NS	NS
VRT_THACH	NS	NS	NS
Total Number of Sites Sampled	8	7	6
Total Number of Sites with Exceedances	7	7	6

NS = Not Sampled; site dry or ponded

1. Listed exceedances for DDD, DDE, and DDT are all in the form of 4,4' isomers.
2. Exceedances for copper are in the dissolved form.

TMDL BENCHMARK EXCEEDANCES

Appendix 3 of the Conditional Waiver specifies water quality benchmarks that come from TMDL LAs. Exceedances of these benchmarks are another way of triggering a WQMP. The following evaluates TMDL load allocation benchmark compliance and required actions.

Calleguas Creek Watershed and Mugu Lagoon OC Pesticides and PCBs TMDL

Benchmarks for this TMDL are the interim sediment LAs, which are assessed at the base of each subwatershed. The interim LAs for OC pesticides and PCBs were not exceeded at any of the compliance monitoring locations; however, this TMDL includes the requirement to develop an agricultural WQMP. The actions to be taken to implement the VCAILG WQMP will be designed to maintain compliance with interim LAs and eventually achieve compliance with final LAs.

Calleguas Creek Watershed and Mugu Lagoon Toxicity, Chlorpyrifos, and Diazinon TMDL

Interim LAs are currently in effect for this TMDL and are used as the benchmarks. Compliance with these LAs is measured at the compliance sites, located at the base of each subwatershed. No exceedances of the chlorpyrifos or diazinon interim LAs were observed during the monitoring year. This TMDL also includes the requirement to develop an agricultural WQMP. The VCAILG WQMP will consider this TMDL and include BMPs to continue meeting interim LAs and lead to the achievement of final LAs.

Calleguas Creek Watershed Boron, Chloride, Sulfate, and TDS (Salts) TMDL

Benchmarks for this TMDL are interim dry weather LAs, which are assessed at the five compliance monitoring sites and compared to monthly dry weather mean salt concentrations. Interim LAs were met at all sites and for all salts constituents, with the exception of boron at site 04_WOOD. Data from the upstream agricultural land use site did not exceed the interim LA. However, the Salts TMDL also requires an agricultural WQMP, which will be addressed by VCAILG.

Calleguas Creek Watershed and Mugu Lagoon Metals and Selenium TMDL

The evaluation of receiving water data show that copper, nickel, and mercury allocations are all being attained. Exceedances did occur for the selenium interim dry weather LA at the Revolon Slough receiving water site as well as one of the upstream agricultural land use sites. These selenium results trigger the need for a WQMP, however, it is already a requirement of the TMDL.

Calleguas Creek Watershed Nitrogen Compounds TMDL

Exceedances of the nitrogen LA were observed at six out of the seven CCWTMP agricultural land use sites and three out of the six VCAILGMP sites located in the Calleguas Creek Watershed. Most of the sites with consistent exceedances are located in the lower parts of the watershed. Though this TMDL does not require a WQMP, the data demonstrates that one is required due to LA exceedances.

Revolon Slough and Beardsley Wash Trash TMDL

VCAILG members are complying with the Trash TMDL requirements through a MFAC/BMP Program. VCAILG members are in compliance with the TMDL requirements to ensure zero trash immediately after each MFAC event. To ensure that trash doesn't accumulate to deleterious amounts, trash BMPs are included in the WQMP.

Santa Clara River Nitrogen Compounds TMDL

The Santa Clara River Watershed LA for nitrogen was exceeded at two of the six monitoring sites during the year. These observed exceedances trigger a WQMP.

Ventura River Estuary Trash TMDL

VCAILG members are complying with the Trash TMDL requirements through a MFAC/BMP Program. VCAILG members are in compliance with the TMDL requirements to ensure zero trash immediately after each MFAC event. To ensure that trash doesn't accumulate to deleterious amounts, trash BMPs are included in the WQMP.

Santa Clara River Estuary Toxaphene TMDL

No exceedances of the suspended sediment toxaphene allocation occurred during the monitoring year. Data collected during the AMR reporting period does not trigger the need for a WQMP.

Monitoring Trends

With multiple years of monitoring data completed, the following sections describe trends observed at the VCAILG monitoring sites. The sites are grouped and discussed based on their priority rankings in the VCAILG WQMP. All first and second tier priority sites are discussed regardless of whether they are VCAILGMP or TMDL monitoring sites. For remaining sites that are not categorized as priority one or two, only the VCAILGMP sites are discussed. Refer to Table 32 of the 2012 VCAILG WQMP for more information regarding site prioritization.

It is important to note that not all constituents with standard water quality benchmarks are evaluated in this section. Field measurements (pH, DO, temperature), for example rarely exceed applicable benchmarks. Many of the OC pesticides are never or only very rarely detected. Considering all 2005 Conditional Waiver events and the first two years of 2010 Conditional Waiver monitoring (Events 1-18), the following table lists the number of detections have occurred at VCAILG monitoring sites for OC pesticides not considered for trend analysis.

Table 77. Rarely Detected OC Pesticides with Water Quality Benchmarks

OC Pesticide	# of Detections Considering VCAILG Events 1-18
Aldrin	0
Alpha-BHC	0
Beta-BHC	1
Gamma-BHC	0
Dieldrin	4
Endosulfan I	1
Endosulfan II	0
Endosulfan sulfate	2
Endrin	0
Endrin Aldehyde	0

In the evaluation that follows, the focus is on constituents that are frequently detected or have benchmarks that are the most often exceeded.

FIRST PRIORITY SITES

Five sites were categorized as first tier priority for BMP implementation and outreach to address water quality benchmark exceedances. Water quality data for constituents with the most commonly exceeded benchmarks between 2007 and 2013 were analyzed to identify trends. First tier priority sites include:

05D_SANT_VCWPD 05D_LAVD OXD_CENTR
S02T_TODD S04T_TAPO

Water quality data were analyzed for the following constituents:

4,4'-DDT	4,4'-DDE	4,4'-DDD	chlordan
chlorpyrifos	diazinon	toxaphene	nitrate-N
ammonia-N	TDS	sulfate	

Data trends are discussed below by constituent.

4,4-DDT; 4,4-DDD; 4,4-DDE

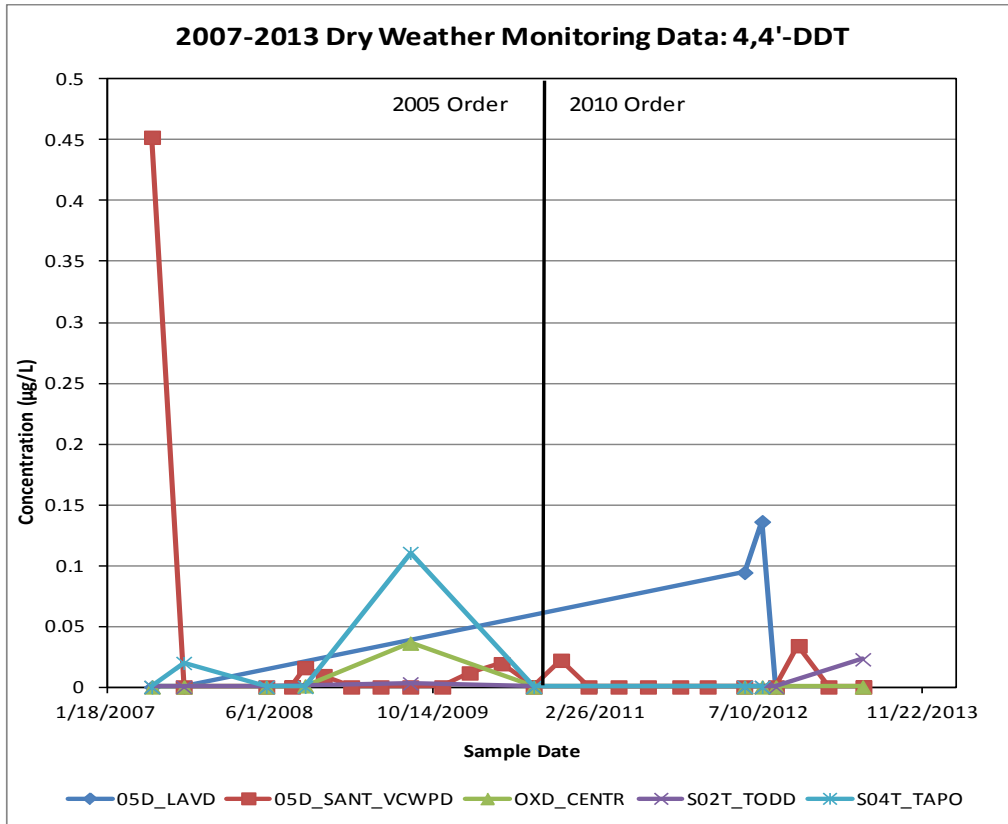


Figure 12. Dry weather 4,4'-DDT concentrations collected at first priority sites 2007-2013

The majority of 4,4'-DDT samples collected during dry weather before the 2010 Conditional Waiver contained detectable levels of 4,4'-DDT (22 of 32 samples). Conversely, the majority of dry weather samples collected after the 2010 Conditional Waiver did not contain detectable levels of 4,4'-DDT (5 of 26 samples).

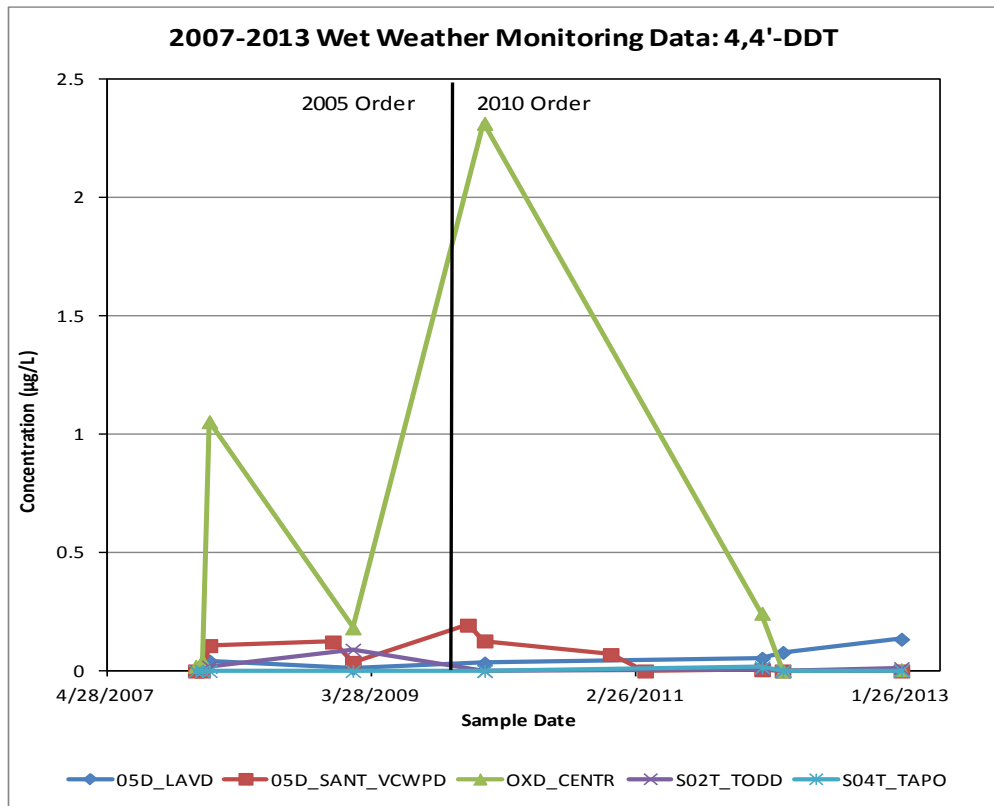


Figure 13. Wet weather 4,4'-DDT concentrations collected at first priority sites 2007-2013

For 4,4'-DDT during wet weather, concentrations appear to be decreasing as compared to concentrations collected before the 2010 Conditional Waiver.

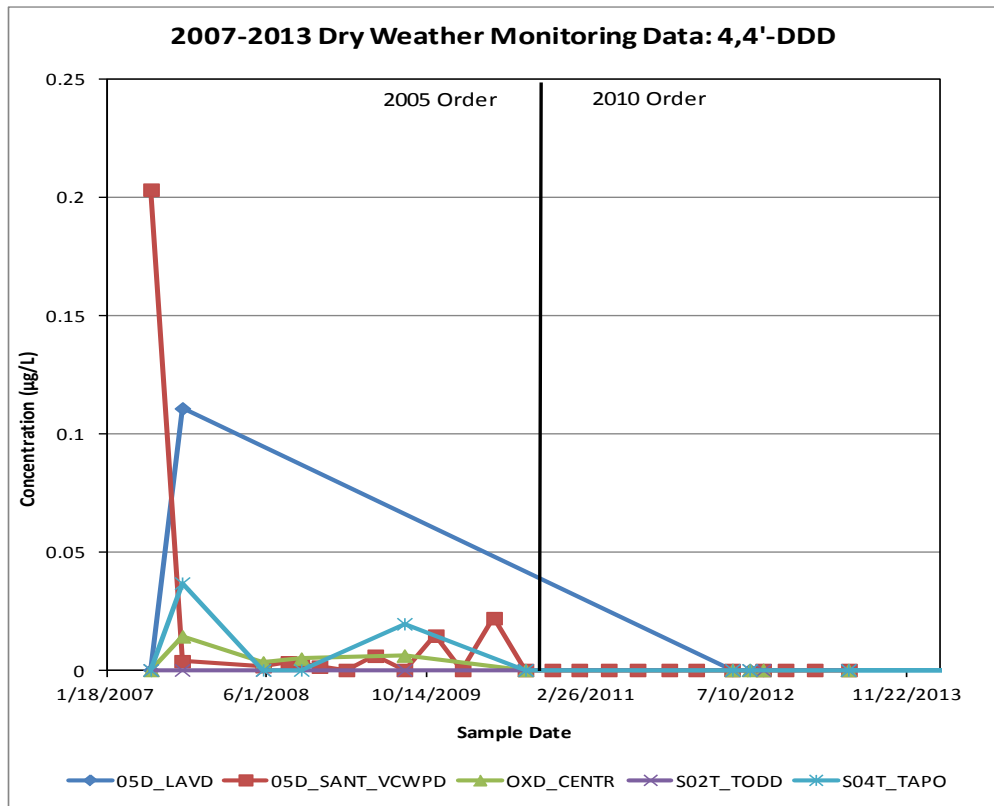


Figure 14. Dry weather 4,4'-DDD concentrations collected at first priority sites 2007-2013

For 4,4'-DDD samples collected during dry weather before the 2010 Order, half of the samples contained detectable levels of 4,4'-DDD. However, none of the samples collected for 4,4'-DDD during dry weather after the 2010 Order contained any detectable levels of DDD (**Figure 14**).

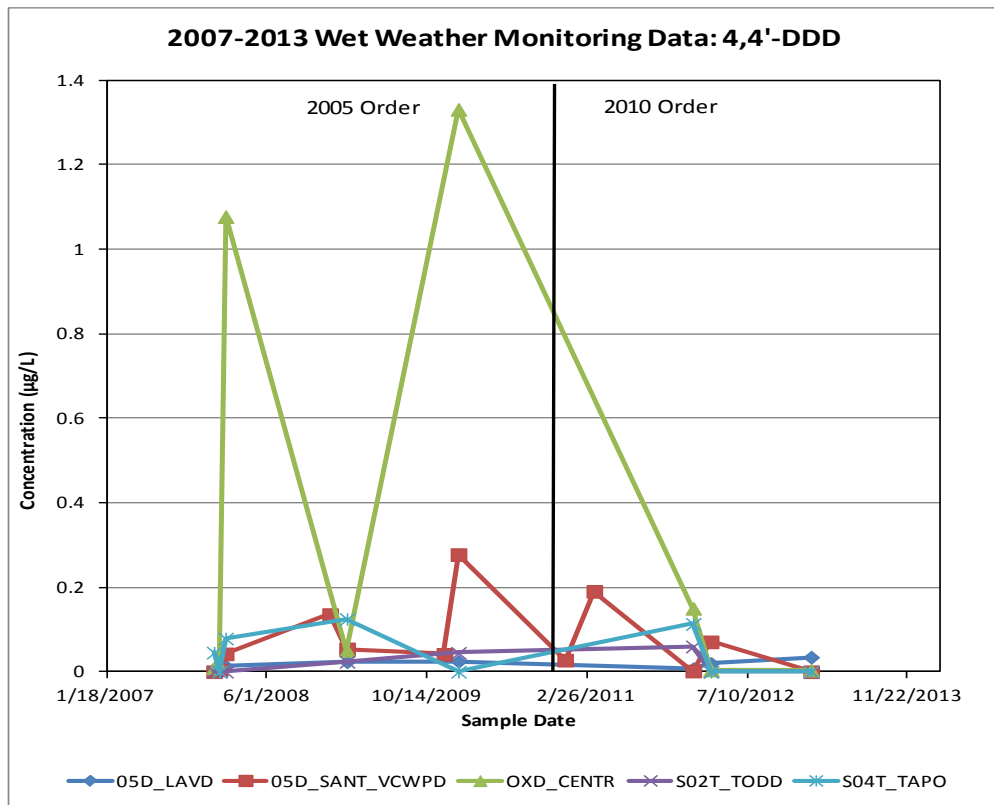


Figure 15. Wet weather 4,4'-DDD concentrations collected at first priority sites 2007-2013

Samples to date do not show any trends in wet weather 4,4'-DDD concentrations. Sites with low or non-detect concentrations have continued with that trend. Two sites, 05D_SANT_VCWPD (Santa Clara Drain) and OXD_CENTR (Central Ditch) both have sporadic spikes during some wet weather events.

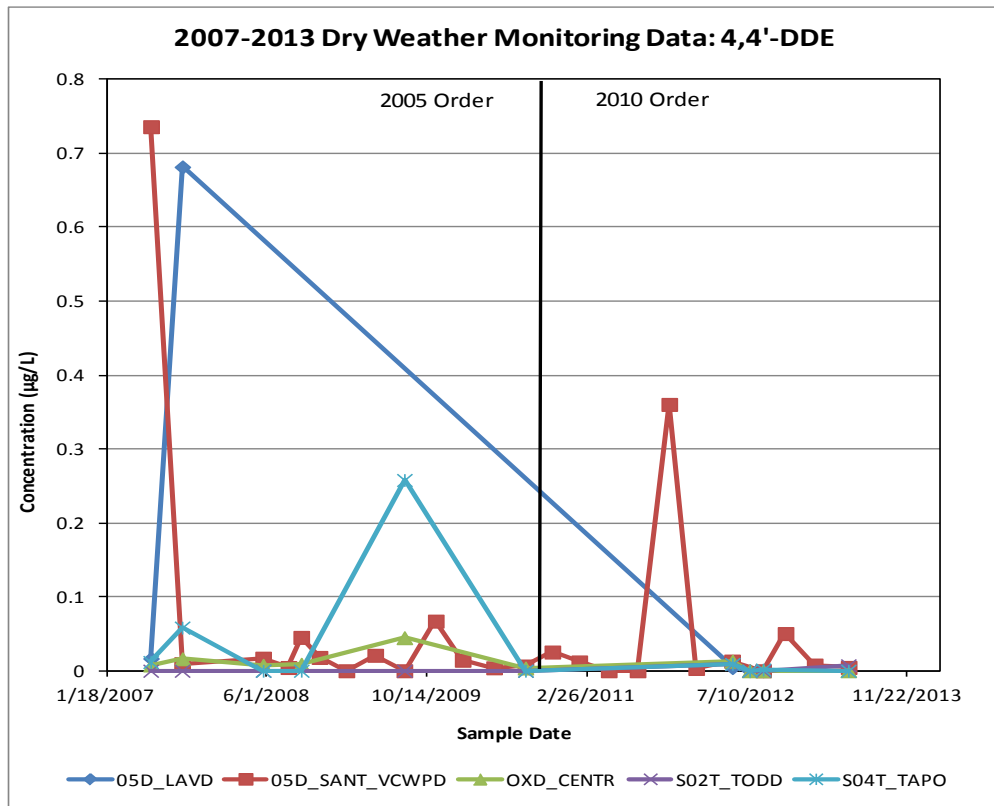


Figure 16. Dry weather 4,4'-DDE concentrations collected at first priority sites 2007-2013

For 4,4'-DDE during dry weather, the data indicate concentrations have decreased over time, but are still being detected in the majority of the samples (**Figure 16**).

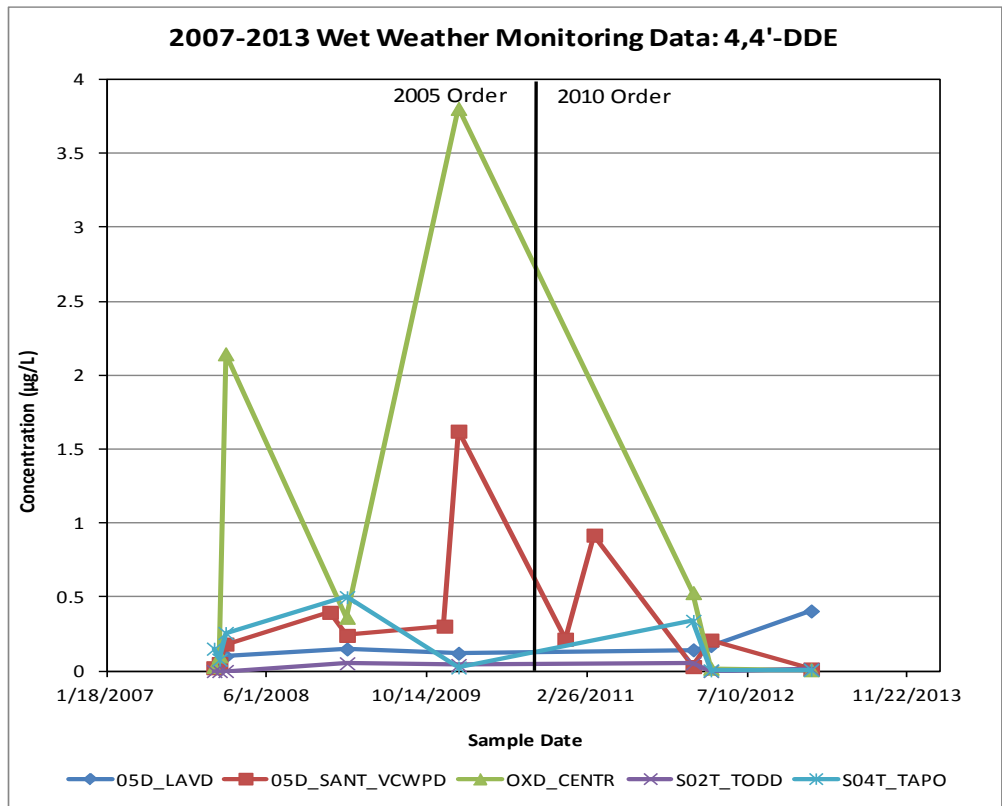


Figure 17. Wet weather 4,4'-DDE concentrations collected at first priority sites 2007-2013

The wet weather chart for 4,4'-DDE looks similar to the corresponding 4,4'-DDD chart. The same two sites have the highest concentrations, OXD_CENTR and 05D_SANT_VCWPD. Detected concentrations of 4,4'-DDE are greater than those observed for 4,4'-DDD during wet weather conditions.

Overall, based on the data collected for 4,4'-DDT, 4,4'-DDD, and 4,4'-DDE during dry weather from 2007-2013, it appears that 4,4'-DDT has been breaking down into its metabolites with 4,4'-DDE the most prevalent metabolite. Wet weather shows a similar breakdown pattern, concentrations are just greater as expected for these constituents that are associated and transported with sediment.

Toxaphene

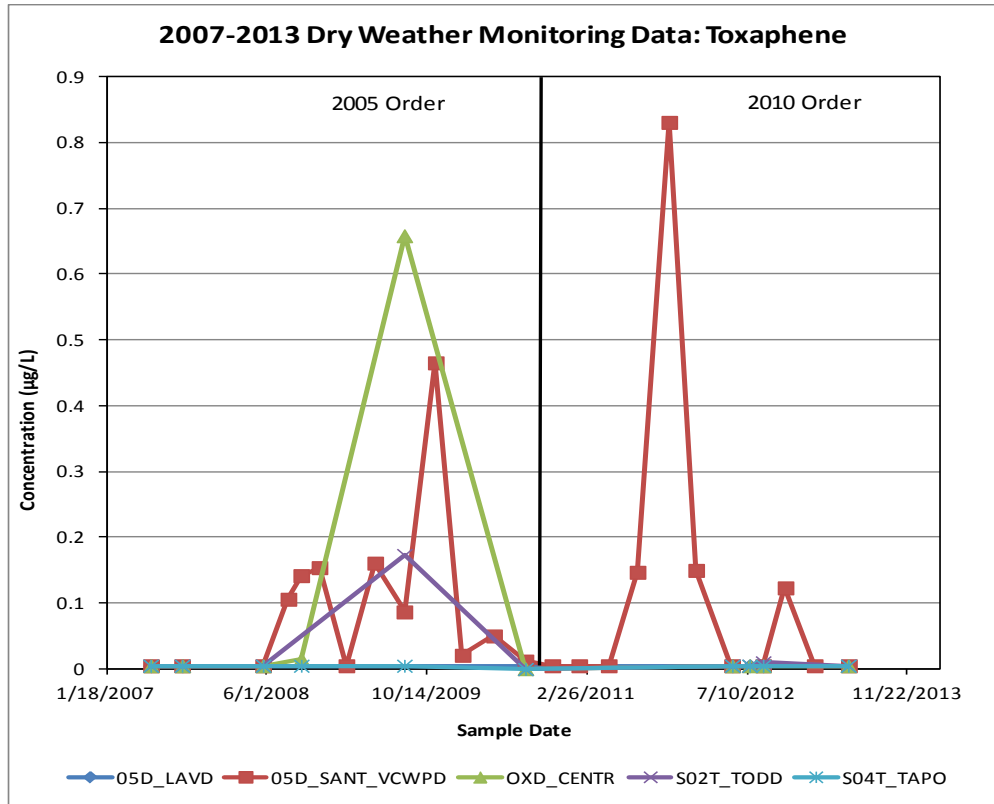


Figure 18. Dry weather toxaphene concentrations collected at first priority sites 2007-2013

During dry weather, there appears to be a decreasing trend in the concentrations of toxaphene at all monitoring sites except for at 05D_SANT_VCWPD (Santa Clara Drain). Sites 05D_LAVD (La Vista Drain) and S04T_TAPO (Tapo Canyon) have not had any toxaphene detections during dry weather. OXD_CENTR (Central Ditch) has not had any detections since 2010, nor has S02T_TODD (Todd Rd.) since 2009.

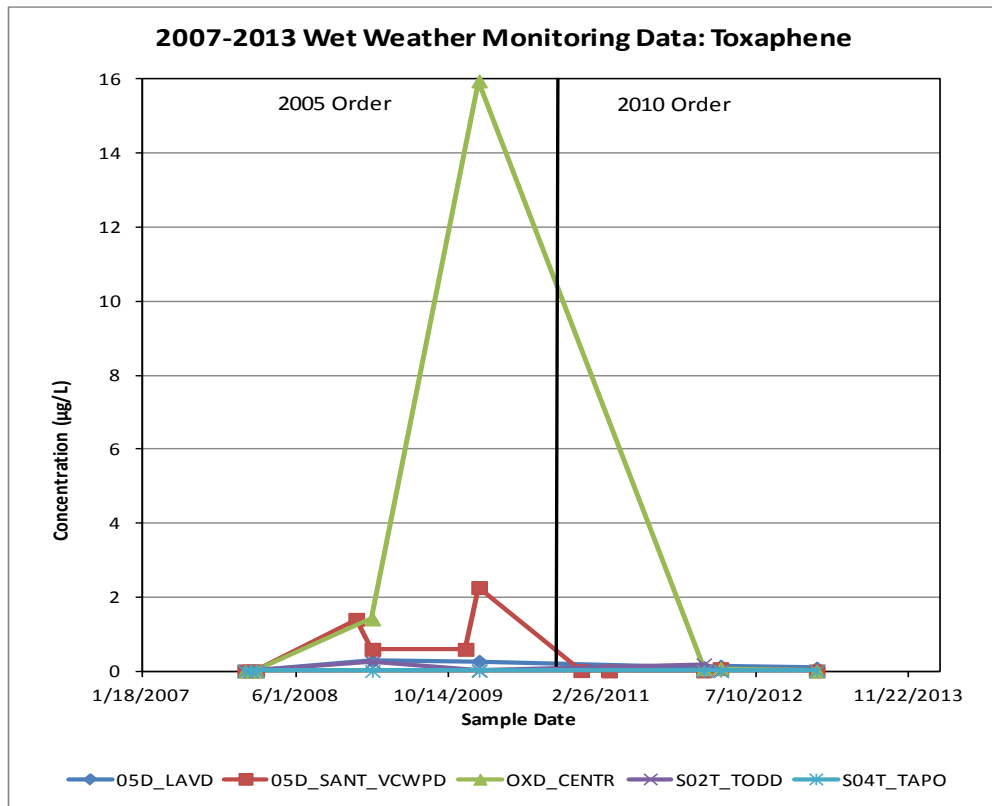


Figure 19. Wet weather toxaphene concentrations collected at first priority sites 2007-2013

During wet weather, there appears to be a decreasing trend in the concentrations of toxaphene (Figure 19). S04T_TAPO (Tapo Canyon) is the only site without any wet weather toxaphene detections.

Chlordane

During dry weather, there are no trends as chlordane has only been detected in one of the samples since September 2007. For chlordane during wet weather, there are no discernible trends as concentrations have increased and decreased variably throughout the monitoring time frame.

Dieldrin

During dry and wet weather, there are no trends as dieldrin has not been detected in any of the samples since May 2008 during dry weather and has not been detected over the entire monitoring time frame during wet weather.

Chlorpyrifos

For chlorpyrifos during dry and wet weather, there are no discernible trends as concentrations have increased and decreased variably throughout the monitoring time frame.

Diazinon

For diazinon during dry and wet weather, there are no discernible trends as concentrations have increased and decreased variably throughout the monitoring time frame.

Nitrate-N

For nitrate-N during dry and wet weather, there are no discernible trends as concentrations have increased and decreased variably throughout the monitoring time frame.

Ammonia-N

During dry weather, there does not appear to be any trends as concentrations have increased and decreased variably throughout the monitoring time frame. However, concentrations have been below 0.6 milligrams per liter for all samples after the 2010 Order. During wet weather, there does not appear to be any trends as concentrations have increased and decreased variably throughout the monitoring time frame.

TDS

For dry and wet weather TDS, there does not appear to be any trends as concentrations have increased and decreased variably throughout the monitoring time frame.

Sulfate

For dry and wet weather TDS, there does not appear to be any trends as concentrations have increased and decreased variably throughout the monitoring time frame.

SECOND PRIORITY SITES

Water quality data for constituents with benchmarks listed in the 2010 Order collected at second tier priority sites between 2007 and 2013 were analyzed to identify trends. Second tier priority sites include:

01T_ODD2_DCH 01T_ODD3_ARN 02D_BROOM
04D_ETTG 04D_LAS

Water quality data were analyzed for the following constituents:

4,4'-DDT 4,4'-DDE 4,4'-DDD chlordane
toxaphene chlorpyrifos diazinon nitrate-N
ammonia-N

Salts constituents are not discussed for these sites since they are all located in the lower part of Calleguas Creek Watershed where salts benchmarks do not apply. Data trends are discussed below by constituent.

4,4-DDT; 4,4-DDD; 4,4-DDE

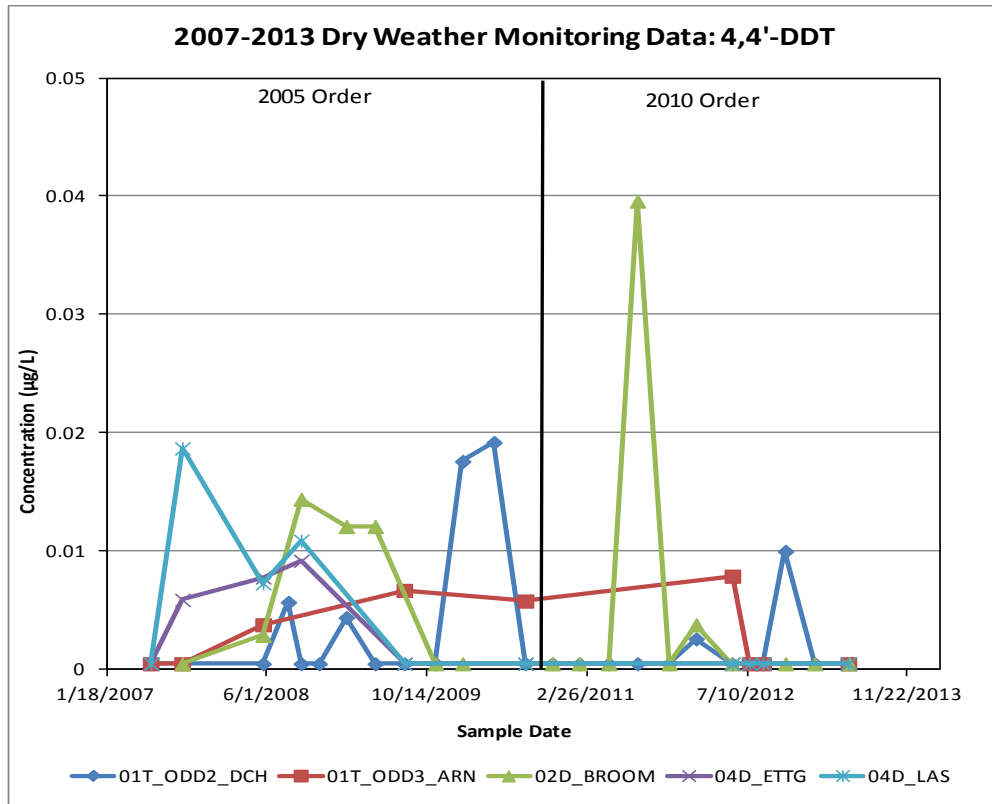


Figure 20. Dry weather 4,4'-DDT concentrations collected at second priority sites 2007-2013

For DDT during dry weather, the data show a slight decreasing trend and fewer detections between samples collected after the 2010 Order. During the new Conditional Waiver period, there was one detection at 01T_ODD3_ARN (Oxnard Drain #3, Arnold Rd.) and two dry weather detections each at sites 01T_ODD2_DCH (Oxnard Drain #2, Duck Pond) and 02D_BROOM (Broome Ranch Rd.). No dry weather 4,4'-DDT detections occurred at sites 04D_ETTG (Etting Rd.) and 04D_LAS (S. Las Posas Rd.) during the 2010 Conditional Waiver monitoring period to date.

Dry weather data for 4,4'-DDD and 4,4'-DDE do not appear to have any discernible trends. A greater number of detections, typically at a higher magnitude occurred for 4,4'-DDD and 4,4'-DDE as compared to 4,4'-DDT dry weather samples, indicating the continued breakdown of DDT into its metabolites.

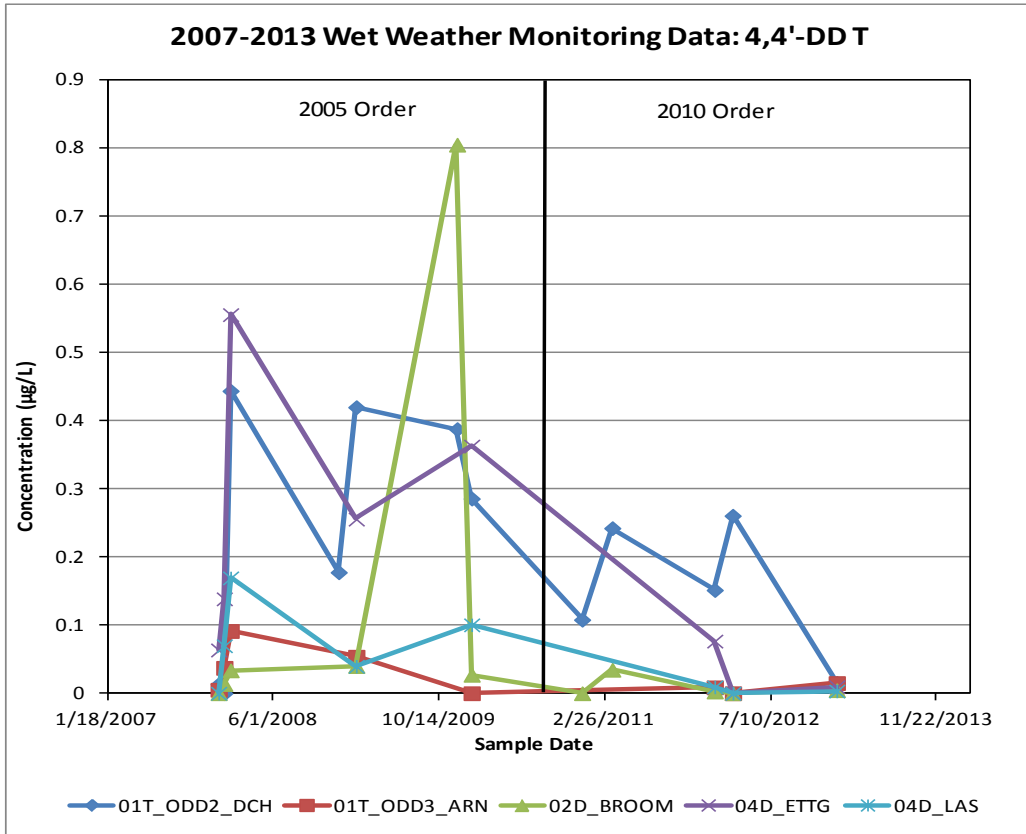


Figure 21. Wet weather 4,4'-DDT concentrations collected at second priority sites 2007-2013

For DDT during wet weather, concentrations appear to be decreasing slightly as compared to concentrations collected before the 2010 Order.

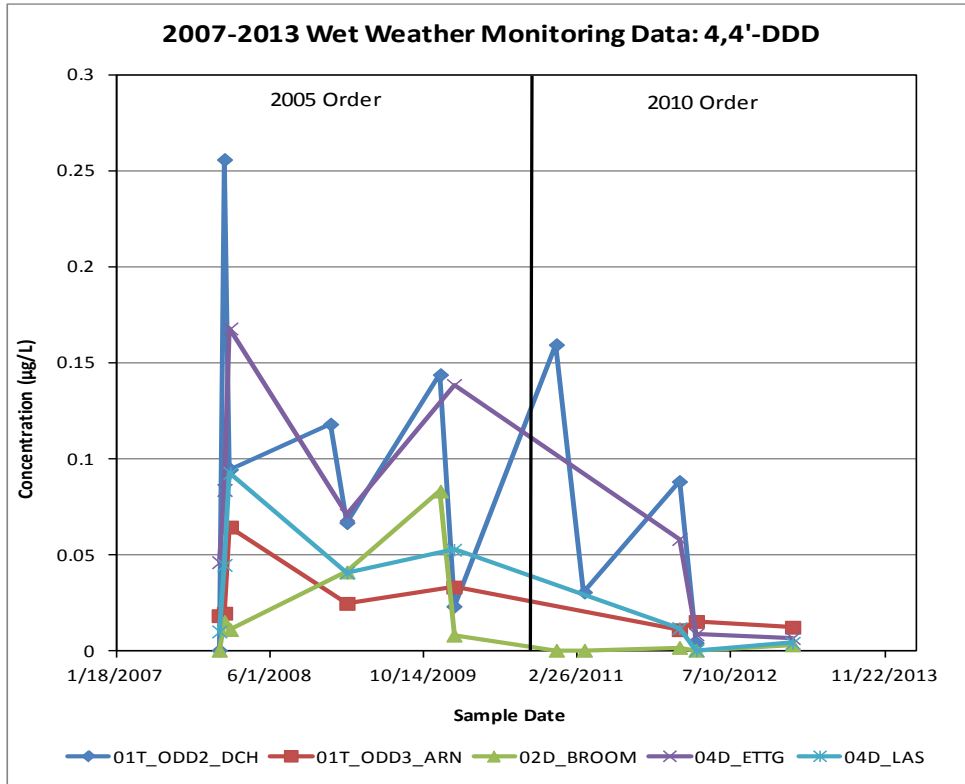


Figure 22. Wet weather 4,4'-DDD concentrations collected at second priority sites 2007-2013

Wet weather concentrations of 4,4'-DDD appear to be decreasing over time (Figure 22). A similar pattern is apparent for 4,4'-DDE as shown in the figure below.

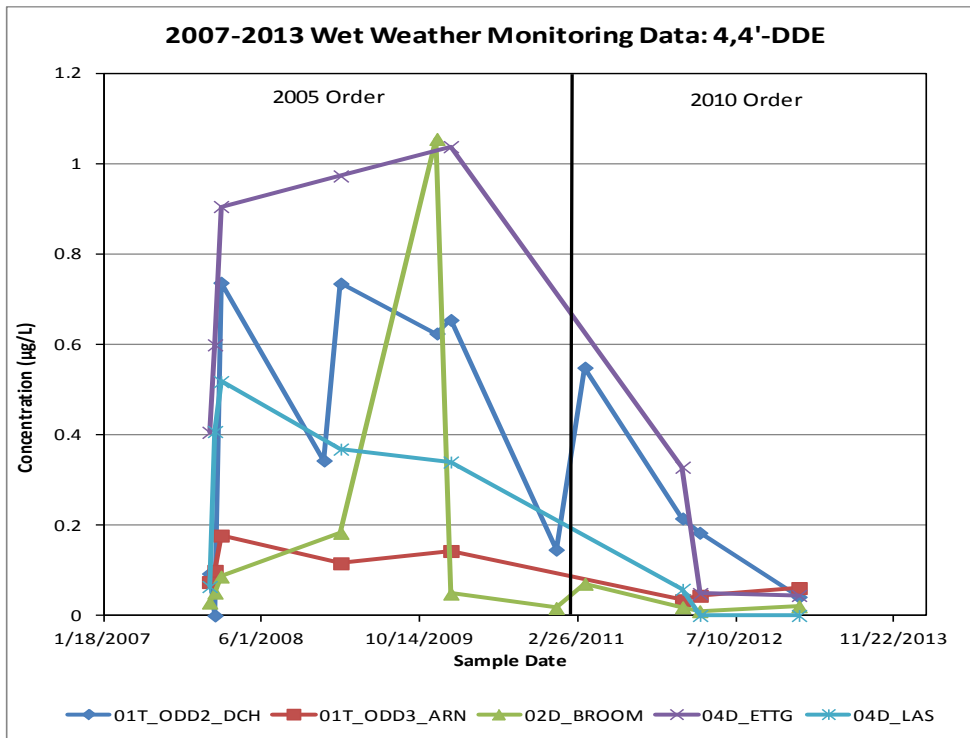


Figure 23. Wet weather 4,4'-DDE concentrations collected at second priority sites 2007-2013

Chlordane

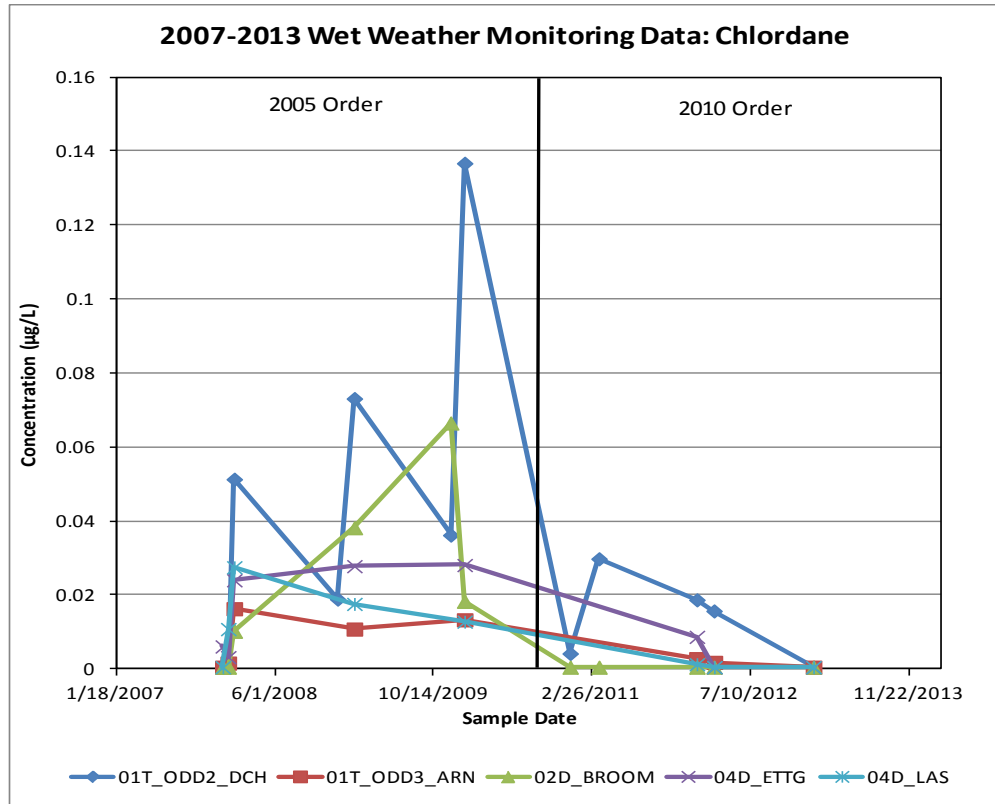


Figure 24. Wet weather chlordane concentrations collected at second priority sites 2007-2013

For chlordane during wet weather, there appears to be a decreasing trend (Figure 24).

During dry weather, two of the second priority sites have continued to have no chlordane detections since the 2010 Conditional Waiver. The remaining sites have had exceedances, but without an observable pattern, increasing or decreasing.

Toxaphene

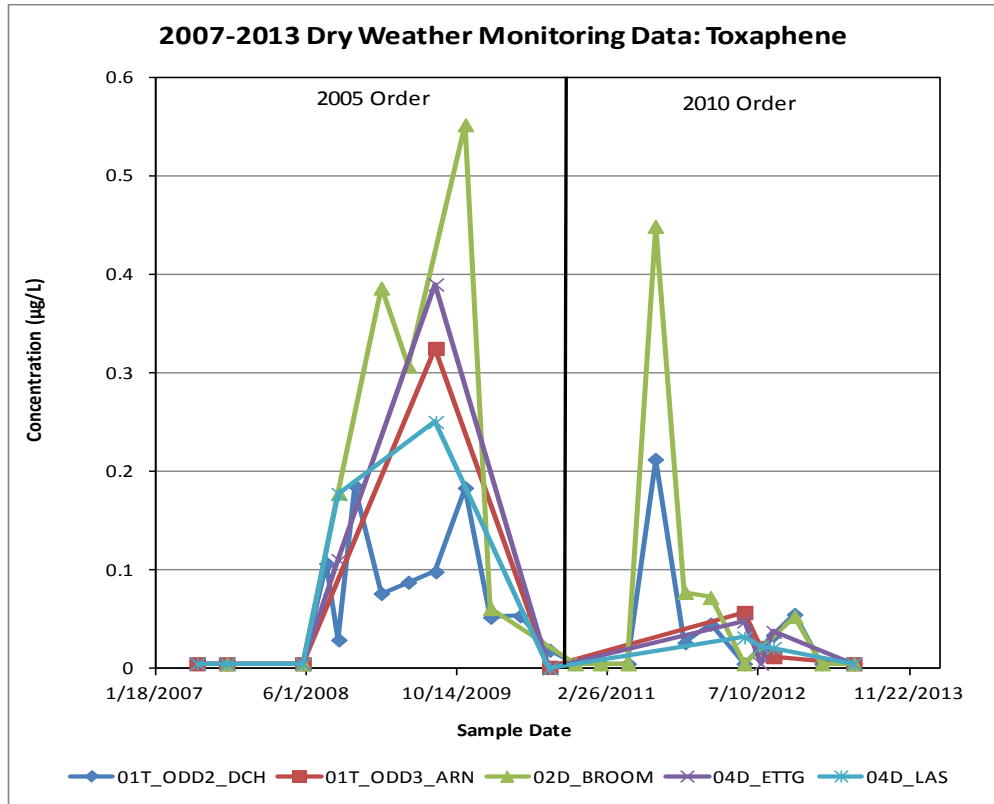


Figure 25. Dry weather toxaphene concentrations collected at second priority sites 2007-2013

During dry weather, there appears to be a decreasing trend in the concentrations of toxaphene except for two samples collected in August 2011.

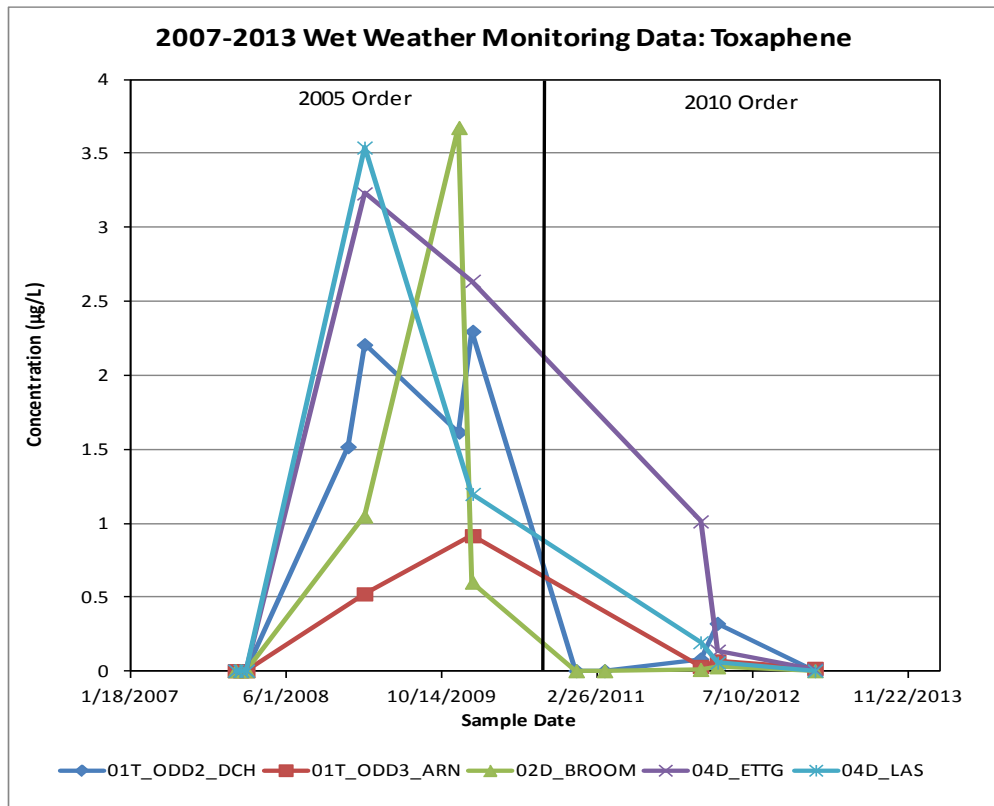


Figure 26. Wet weather toxaphene concentrations collected at second priority sites 2007-2013

Wet weather concentrations of toxaphene are much lower since sampling began under the 2010 Conditional Waiver (Figure 26).

Chlorpyrifos

There is no discernible trend for chlorpyrifos during dry weather, as concentrations have increased and decreased variably throughout the monitoring time frame. However, during wet weather, there appears to be a decreasing trend in concentrations (Figure 27).

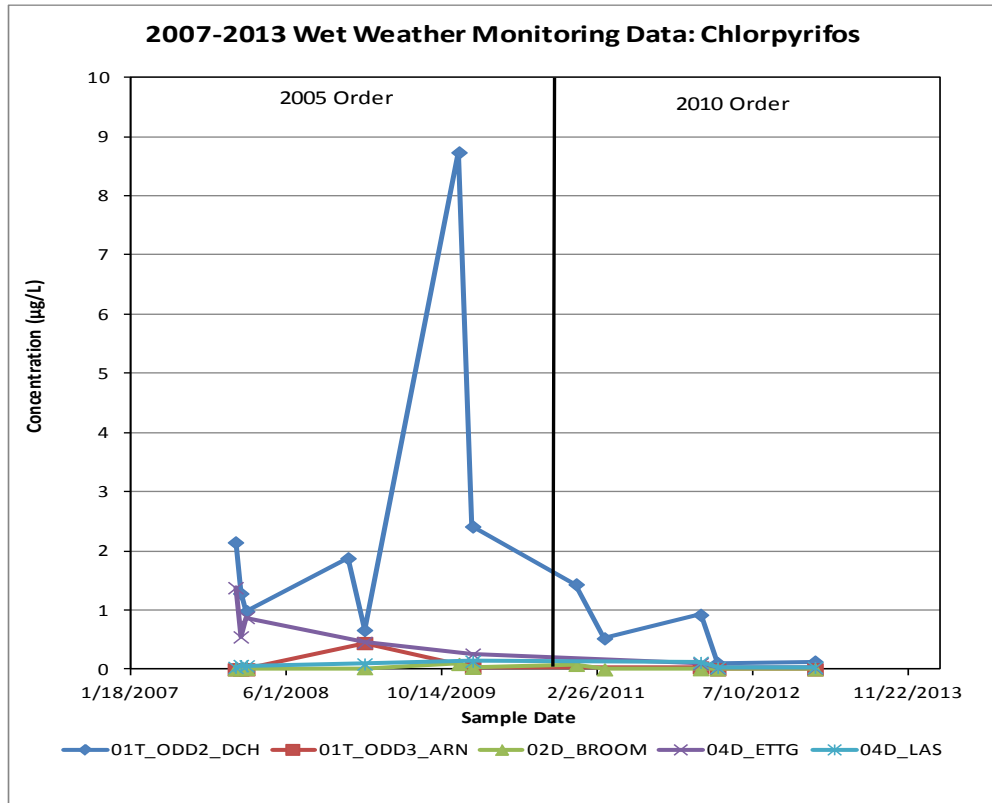


Figure 27. Wet weather chlorpyrifos concentrations collected at second priority sites 2007-2013

Diazinon

For diazinon during dry and wet weather, there is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame.

Nitrate-N

For nitrate-N during dry and wet weather, there is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame.

Ammonia-N

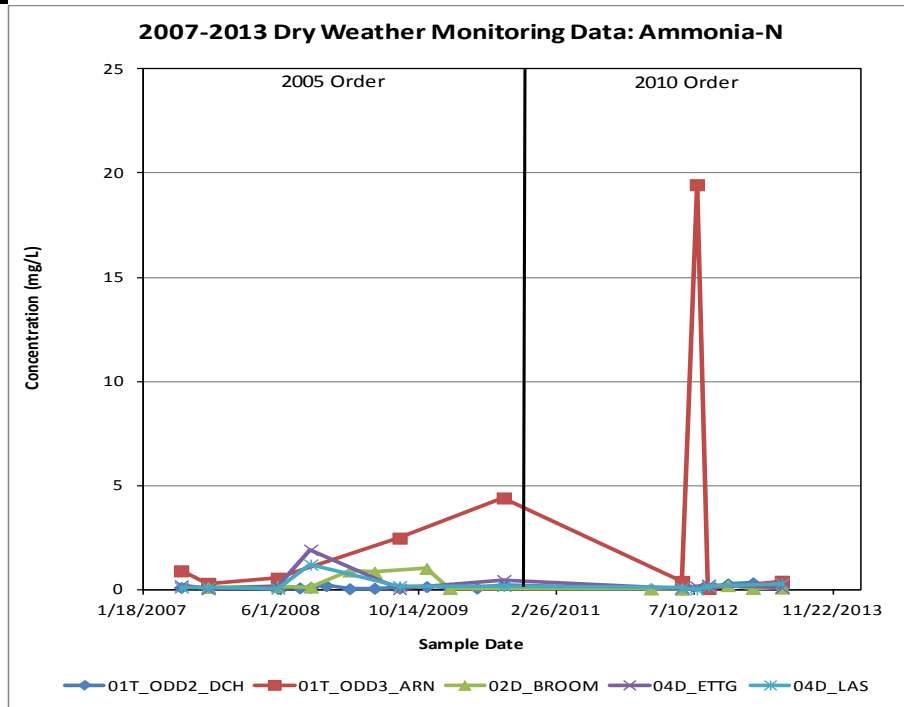


Figure 28. Dry weather ammonia-N concentrations collected at second priority sites 2007-2013

During dry weather, there appears to be a slight downward trend at all sites; however, there is one high concentration at 01T_ODD3_ARN, which appears to be an anomaly (Figure 28).

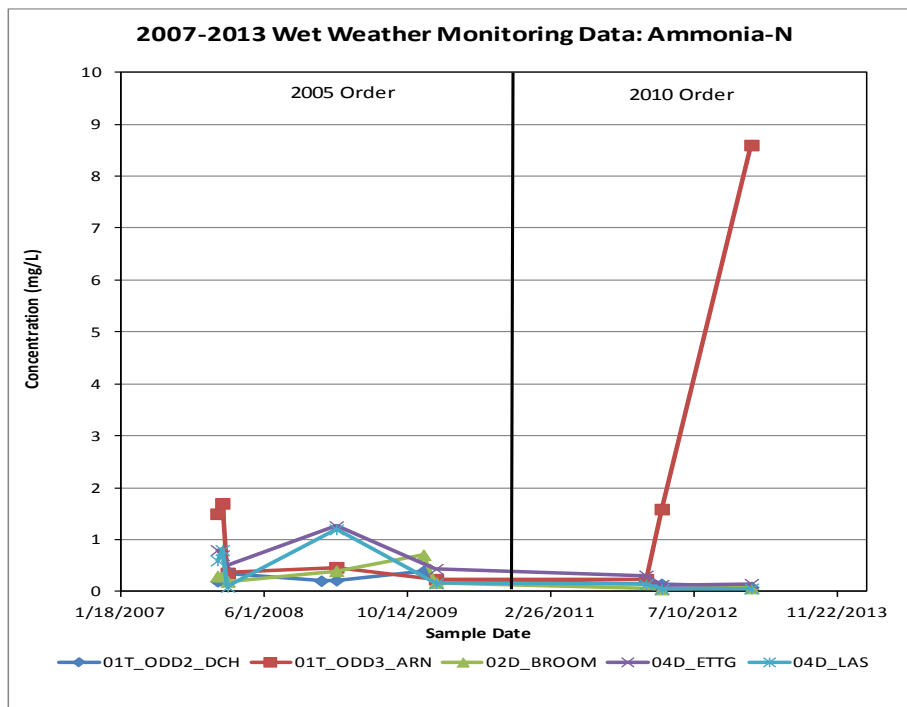


Figure 29. Wet weather ammonia-N concentrations collected at second priority sites 2007-2013

During wet weather, there appears to be a decreasing trend at all sites except 01T_ODD3_ARN (Figure 29).

THIRD AND NON-PRIORITY SITES

Water quality data for constituents with benchmarks listed in the 2010 Order collected at VCAILG sites between 2007 and 2013 were analyzed to identify trends. Third and non-priority sites include:

05T_HONDO	06T_FC_BR	06T_LONG2	9BD_GERRY	S02T_ELLS
S03D_BARDS	S03T_BOULD	S03T_TIMB	VRT_SANTO	VRT_THACH

Water quality data were analyzed for the following constituents:

4,4'-DDT	4,4'-DDE	4,4'-DDD	chlordanne
chlorpyrifos	diazinon	dieldrin	toxaphene
nitrate-N	ammonia-N	total dissolved solids (TDS)	sulfate

For dry weather, only one VCAILG site has data that span the entire monitoring time frame (06T_FC_BR). Therefore, dry weather data trends are not discussed. For wet weather, 06T_LONG2 (Long Canyon), S03T_TIMB (Timber Canyon), S03T_BOULD (Boulder Creek), VRT_SANTO (San Antonio Creek), and VRT_THACH (Thacher Creek) do not have data that span the entire monitoring time frame. In addition, no wet weather samples were collected during the last monitoring year due to various environmental conditions (no flow, ponded water, etc). Therefore, no wet weather trends are discussed.

CHRONIC TOXICITY

During the 2013 monitoring year, Pacific EcoRisk (PER) performed single-species short-term chronic toxicity tests for samples collected during Event 17 on January 25, 2013. The Event 17 toxicity report submitted by PER contains test results and raw data. PER submitted two types of reports, an electronic data deliverable (EDD), which is compatible with the Surface Water Ambient Monitoring Program (SWAMP), and a narrative report. Both reports are included as Appendix G on the Annual Report Data CD. Toxicity samples were not collected during a dry event this monitoring year due to a scheduling mistake. To adjust for this error, toxicity samples will be collected during both dry events in the 2013-2014 monitoring year.

Determination of Most Sensitive Species at Toxicity Monitoring Sites

There are 11 toxicity sites that are part of the VCAILGMP. The Conditional Waiver requires that three-species chronic toxicity testing be performed on samples collected at each site to determine the most sensitive species among the invertebrate, vertebrate, and algae; the most sensitive species is then used for subsequent toxicity testing for the duration of the VCAILGMP.

Based on previously conducted three-species screening tests, the Regional Board approved a single-species to be used at each toxicity site for the remainder of this Conditional Waiver in a June 28, 2012 letter. There are three remaining sites where flow has not been present during toxicity sampling events. These sites will have three-species screenings the first time they are sampled during a toxicity event. Sites with conductivity measuring less than 3,000 $\mu\text{S}/\text{cm}$ at the time of sampling will be evaluated based on the survival and reproduction of the invertebrate *Ceriodaphnia dubia* (*C. dubia*). High conductivity sites ($>3,000 \mu\text{S}/\text{cm}$) will be tested using *Hyalella azteca* (*Hyalla*) (Table 44).

Table 78. Most Sensitive Species Selected for Toxicity Testing

Site ID	Species
01T_ODD3_ARN	<i>Hyalella azteca</i>
05D_LAVD	<i>Ceriodaphnia dubia</i>
05T_HONDO	<i>Ceriodaphnia dubia</i>
06T_LONG2	<i>Ceriodaphnia dubia</i>
S02T_ELLS	<i>Ceriodaphnia dubia</i>
S02T_TODD	<i>Ceriodaphnia dubia</i>
S03T_BOULD	<i>Ceriodaphnia dubia</i>
S04T_TAPO	<i>Hyalella azteca</i>

Single-Species Test Results

The toxicity event for this monitoring year was Event 17 conducted on January 25, 2013. During this dry weather event, all toxicity sites with flow previously had three-species screening tests from Event 12; therefore, only single-species chronic toxicity testing was performed. The *C. dubia* chronic test consisted of the 3-brood (6- to 8-day) survival and reproduction test and the *Hyalella* test consisted of a 10-day survival test.

None of the sites exhibited organism survival toxicity, while two sites had significant *C. dubia* reproduction toxicity. TIE testing was not triggered by these results as initiation threshold for *C. dubia* is based on survival, not reproduction. Single species test results for both freshwater and high-conductivity sites can be found in the table below.

Table 79. Chronic Toxicity Results for Single-Species Testing for 2012

Site	Event	<i>Ceriodaphnia</i> ¹			<i>Hyalella</i> ²	TIE Triggered?
		Survival Toxicity	Reproduction Toxicity	Reproduction % Reduction	Survival Toxicity	
S02T_TODD	17: 1/25/13	No	Yes	41.2% ³		No
05D_LAVD	17: 1/25/13	No	Yes	13.4% ³		No
S04_TAPO	17: 1/25/13				No	No
01T_ODD3_ARN	17: 1/25/13				No	No

4. *Ceriodaphnia dubia* (invertebrate – water flea) is evaluated for the survival and reproduction endpoints.

5. *Hyalella azteca* (invertebrate – crustacean) is evaluated for the survival endpoint.

6. The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).

Education Requirement

Since the adoption of this Conditional Waiver, VCAILG members have completed 12,263 hours of water quality education. To date, 893 VCAILG members have fulfilled the eight hour requirement; 565 of those members have completed more than eight hours. The large number of members going above and beyond the education requirement is an indicator of the perceived value and benefit of the information being presented regarding specific water quality problems and the management practices and tools available to the farmers for addressing them.

During this Conditional Waiver period alone, over forty-five education opportunities have been offered to VCAILG members, adding up to 149 hours. Education classes have been organized by VCAILG, Ventura County Resource Conservation District (RCD), University of California Cooperative Extension – Ventura, as well as commodity groups such as the California Avocado and Strawberry Commissions. Table 80 lists the courses that have been offered to date during this Conditional Waiver. Appendix H lists the number of education hours earned by each VCAILG member.

The effort to provide classes and encourage VCAILG members to obtain education credits is for compliance with the Conditional Waiver provision that within two years of issuance of the NOA, all dischargers shall complete eight hours of education. Course agendas are approved by the Executive Officer for a specified number of credit hours to ensure that the education classes meet the training requirements related to water quality impairments, regulatory requirements, and management practices that control waste discharges.

Table 80. Courses Offered for Education Credit

Date	Course Title	Education Hours
11/01/2010	ABC's of Fertilizer and Irrigation Management	6
11/02/2010	ABC sobre Manejo de Fertilizantes y Riego	6
02/18/2011	Strawberry Irrigation Field Day	2
06/20/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
06/21/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
06/22/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
06/23/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
07/25/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
07/26/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
07/27/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
07/28/2011	Conditional Waiver & TMDL Regulatory Overview & BMP Info.	4
09/13/2011	Erosion and Pesticide Runoff Management in Nurseries	4
09/14/2011	Erosion and Pesticide Runoff Management in Orchards	4
11/02/2011	Managing Nitrogen in Row Crops	2
11/15/2011	Irrigation and Nutrient Management	2
11/16/2011	General Conditional Waiver Education (Spanish)	4
02/23/2012	Reducing runoff through tailwater capture and reuse	2
03/21/2012	Nutrient Management, Grassed Waterways, & IPM for Improved Water Quality	4
04/05/2012	Irrigation and Nutrient Management	2
04/19/2012	Manejo de Irrigacion en Fresas	2
04/24/2012	Site Planning to Improve Water Quality of Farm Runoff	2
06/05/2012	Effective Use Pesticides to Produce Healthy Ornamental Plants	4
06/06/2012	Irrigation Management	2
08/31/2012	Strawberry Production Meeting	2
09/11/2012	The New FCGMA Irrigation Allocation Index	2
10/10/2012	Managing Nitrogen in Row Crops	2
10/11/2012	Irrigation and Nutrient Management - Vendor Fair	2
10/17/2012	UC Hansen Ag Center Field Day	2
11/13/2012	Nutrient Management, Grassed Waterways, and IPM for Improved Water Quality	2
11/26/2012	Private Applicator Seminar	1
11/29/2012	Conditional Waiver - General overview	4
1/22/2013	NGA Water School	4
02/19/2013	4Rs of Nutrient Stewardship and Moisture Sensors	2
3/6/2013	Nutrient Trials and Moisture Sensors in Row Crops	2
3/20/2013	BMPs for California Nurseries	4
4/23/2013	Detention Basins and Nutrient Management for Improved Water Quality	2

Date	Course Title	Education Hours
5/8/2013	Algae TMDL Update and Nutrient Needs of Tree Crops	2
7/24/2013	Avocado Irrigation (Spanish)	3
8/7/2013	Farming Without Fumigants, Grower Demonstration Field Day	2
9/5/2013	Strawberry Production Meeting	3
9/17/2013	BMPs for California Nurseries	3
9/19/2013	LAILG Summer Water School	5
6/26/2013	Strawberry Field Day, Water Saving Practices	2
1/27/2014	Strawberry Irrigation and Nutrient Management	4
1/28/2014	Strawberry Irrigation and Nutrient Management (Spanish)	4
Ongoing	Online FCGMA Irrigation Allowance Index Training	2

Conclusions

Submittal of this report fulfills the Annual Monitoring Report requirements specified in Appendix 1 of the Conditional Waiver. All required elements are included in this narrative report and with the accompanying appendices.

This report presents monitoring data for evaluating agricultural discharges as compared to standard water quality benchmarks as well as compliance with effective TMDL LAs that were incorporated in the Conditional Waiver as benchmarks. Instances where exceedances occurred of either type of benchmark triggers the need to develop a WQMP; which will be submitted to the Regional Board May 26, 2014.

The following summary highlights compliance with standard water quality benchmarks.

- Six OC pesticides that have applicable water quality benchmarks have never been detected during VCAILG monitoring to date (Events 1-18). An additional four OC pesticides with benchmarks have only been detected a few times throughout the entire monitoring program considering all the sites. Though DDT and its breakdown products are often detected during wet weather, dry weather exceedances have greatly decreased and it is the breakdown products that are most common. This demonstrates the degradation of DDT in the environment and the minimization of transport during the irrigation season, of which farmers have some control.
- This is the second year of copper results. All freshwater sites continued to meet the copper benchmark. Two of the three sites where the saltwater benchmark applies exhibited exceedances.
- Regarding OP pesticides, the diazinon benchmark was not exceeded during this monitoring year. Three chlorpyrifos exceedances did occur during wet weather, but there was only a single dry weather exceedance.
- None of the sites exhibited significant toxicity; therefore, no TIEs were required during this monitoring year.
- Nitrate-N continues to be an issue at some monitoring locations (6 out of 15 VCAILGMP sites had exceedances). The Ammonia-N objective was only exceeded once when considering all sites and monitoring events.
- All samples were within the acceptable pH range. Temperature was always under the upper limit, where applicable. The dissolved oxygen benchmark was only exceeded once at a single site during the first dry event.
- Salts benchmarks were exceeded at three sites during the monitoring year.

Overall, this was an abnormal sampling year with significantly lower than normal rainfall that fell during fast moving and low volume precipitation events. Additionally, fewer sites had flow during dry events than in previous monitoring years. With the support of BMP data gathered through the WQMP, this may prove to be the result of irrigation method upgrades and management, but that cannot be confirmed at this time.

During this monitoring year TMDL load allocation benchmarks were met at all applicable compliance sites or by completing required actions for the following TMDLs: Calleguas Creek Watershed and Mugu Lagoon OC Pesticides and PCBs TMDL, Calleguas Creek Watershed and Mugu Lagoon Toxicity, Chlorpyrifos, and Diazinon TMDL, Calleguas Creek Watershed Boron, Chloride, Sulfate, and TDS (Salts) TMDL, Revolon Slough and Beardsley Wash Trash TMDL,

Ventura River Estuary Trash TMDL, and Santa Clara River Estuary Toxaphene TMDL. Monitoring was performed in compliance with the Harbor Beaches of Ventura County Bacteria TMDL and the McGrath Lake PCBs, Pesticides, and Sediment Toxicity TMDL.

Using the process described in the WQMP, VCAILG members will continue implementing and installing BMPs to improve water quality and achieve Conditional Waiver benchmarks.