

December 15, 2017

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

2016-2017 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
NR	Not Required
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

Bordering the Pacific Ocean, Ventura County covers approximately 1.2 million acres with the Los Padres National Forest in the northern half of the county and residential, agricultural and business uses in the southern portion. Agriculture has long played an economic and cultural role in Ventura County with over 90,000 acres of irrigated cropland in current production. Home to three major watersheds, the Calleguas Creek Watershed contains the highest number of irrigated acres (approximately 50,000), followed by the Santa Clara River Watershed (approximately 33,000), Ventura River Watershed (approximately 3,500), and finally the Oxnard Plain and Coastal Watersheds (approximately 6,500).

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. Each *Waiver* is adopted for a five-year period. After a six month extension of the 2010 *Conditional Waiver*, a new *Conditional Waiver* (Order No. R4-2016-0143) was adopted by the Regional Board on April 14, 2016.

Both the 2010 and 2016 *Conditional Waivers* allow individual landowners and growers to comply with the provisions by working collectively as a Discharger Group, or as an individual. 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 acts as a Discharger Group for those agricultural landowners and growers that wish to participate.

Currently, 77 percent of Ventura County’s agricultural landowners, representing approximately 88 percent of its total irrigated acres are complying with the 2016 *Conditional Waiver* as members of VCAILG. These farmers, as land and water stewards, understand the links between drought and water use and water quality. For decades, farming operations have invested in technology and adopted irrigation practices to use water more efficiently. In September 2016, a State grant-funded program was launched to provide technical assistance and equipment rebates to help more Ventura County farmers improve their irrigation and energy efficiency. The program has \$1.2 million available to reimburse farmers up to 60% of equipment upgrades that show quantifiable water and energy savings. This and other grant programs will support progress towards attaining water quality goals.

Demonstrating VCAILG’s commitment, this document serves as the 2016-2017 VCAILG Annual Monitoring Report (AMR) and summarizes water quality monitoring results as well as other VCAILG activities during the July 2016 through June 2017 reporting period. All monitoring prior to January of this reporting year was conducted according to the VCAILG Monitoring and Reporting Plan (MRP) approved to meet the 2010 *Conditional Waiver* requirements. Monitoring beginning in January 2017 was conducted according to the 2017

VCAILG MRP approved to meet the 2016 *Conditional Waiver* requirements. Additionally, the “Calleguas Creek Watershed TMDL Compliance Monitoring Program Ninth Year Annual Monitoring Report” is being submitted as an accompaniment to this VCAILG AMR. Other relevant TMDL monitoring reports are included by reference. VCAILG coordinates with established TMDL monitoring programs and plays an active role in facilitating the participation of agriculture in TMDL development and implementation processes. Acting on behalf of its members, VCAILG representatives participate in stakeholder meetings, provide comments, and contribute to cooperative agreements.

Monitoring Results

The VCAILG AMR compiles the past year of monitoring data and compares it to the water quality benchmarks included in the Conditional Waiver and with the final or interim Load Allocations (LAs) assigned to irrigated agriculture in TMDLs throughout Ventura County and incorporated into the *Conditional Waivers*. Fifteen sites representing runoff from agriculture-dominated drainages are monitored by VCAILG during two dry events and two wet events annually to assess attainment of the water quality benchmarks. In addition, the Calleguas Creek Watershed TMDL Monitoring Program (CCWTMP) monitors an additional seven agricultural land use sites representing runoff from agriculture-dominated drainages, and several receiving water sites, each during four dry events and two wet events annually. Unlike in the 2010 *Conditional Waiver* when water quality benchmark exceedances detected during the previous year’s monitoring triggered the requirement for a WQMP, the development of a WQMP is now according to a set schedule. The next WQMP is due December 15, 2018.

In summary, during the 2016-2017 monitoring year, Conditional Waiver benchmarks or TMDL LAs were exceeded for the following constituents at least at one monitoring location:

- Organochlorine (OC) Pesticides (DDT and breakdown products, total chlordane, toxaphene, dieldrin)
- Copper and Selenium
- Chlorpyrifos
- Toxicity
- Nitrate and Ammonia
- Chloride
- Sulfate
- Total Dissolved Solids
- E. coli
- Dissolved Oxygen
- Bifenthrin

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Introduction

On April 14, 2016, the Los Angeles Regional Water Quality Control Board adopted the *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Los Angeles Region* (“*Conditional Waiver*”, Order No. R4-2016-0143). 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. This was the third iteration of the *Conditional Waiver* adopted for the Los Angeles Region.

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 individual farmers joined together in 2006 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 was submitted to the Regional Board by the VCAILG under the two previous *Conditional Waivers* and on October 14, 2016 an NOI for compliance with the 2016 *Conditional Waiver* was submitted. 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*.

This report covers the period from July 2016 to June 2017 during which monitoring was conducted according to the requirements and MRP approved under the 2016 *Conditional Waiver*.

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 a 17-member Steering Committee and a 6-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.

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:

- Assessor Parcel Number
- Parcel Owner and Grower Name(s) (if applicable)
- Parcel Irrigated Acres
- Parcel Watershed
- Parcel Owner and Grower Mailing Address

In addition to Appendix A, VCAILG is required to provide a list of enrolled and non-enrolled parcels for each monitoring site. This list is included as Appendix I.

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 November of 2017. At this time, VCAILG represents 1,433 Ventura County agricultural landowners and 81,807 irrigated acres. According to the Ventura County Assessor’s records, there are an estimated 431 landowners not enrolled in VCAILG. Therefore, VCAILG represents 77 percent of agricultural landowners in Ventura County covering approximately 88 percent of the estimated irrigated acreage. This is a nine percent increase in irrigated acreage enrolled in VCAILG since the previous annual monitoring report.

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
Jonathan Chase, Hailwood, Inc.	Strawberries, Vegetables	Calleguas Creek
Robert Crudup, BrightView 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
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
Jason Vis, Lloyd Butler Ranch	Avocado, Citrus	Calleguas Creek, Santa Clara River

N/A = Not Applicable

1. An asterisk denotes Executive Committee membership

Table 2. VCAILG Membership Statistics as of November 2017

Watershed	Landowner Count	Parcel Count	Irrigated Acres
Calleguas Creek	706	1,495	42,820
Santa Clara River	528	1,251	30,109
Oxnard Coastal	57	121	4,366
Ventura River	194	396	4,511
<i>Total</i>	<i>1,485</i>	<i>3,263</i>	<i>81,807</i>

1. There are 1,433 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. Of the estimated 293,549 acres of agricultural land in the county, there are approximately 93,000 acres of irrigated cropland. The Calleguas Creek Watershed contains the highest number of irrigated acres (approximately 50,000), followed by the Santa Clara River Watershed (approximately 33,000), Ventura River Watershed (approximately 3,500), and finally the Oxnard Plain and Coastal Watersheds (approximately 6,500).¹

Agriculture is a major industry in Ventura County, generating over \$2 billion in gross sales for 2015, placing the county 8th in a statewide ranking of California's 58 counties.² This gross value is up three percent from 2014.³ Strawberries is the number one grossing crop type, lemons were the second highest grossing crop, and raspberries were the third highest grossing crop in Ventura County in 2015. Table 3 lists the County's ten leading crops in gross value for 2015. Characteristics of each of the three main watersheds in Ventura County are discussed in more detail in the following sections.

¹ 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.

² California Department of Food and Agriculture. *California Agricultural Statistics Review 2015-2016*. Agricultural Statistics Overview.

³ Ventura County Agricultural Commissioner. *Ventura County's Crop and Livestock Report 2014*. November 3, 2015.

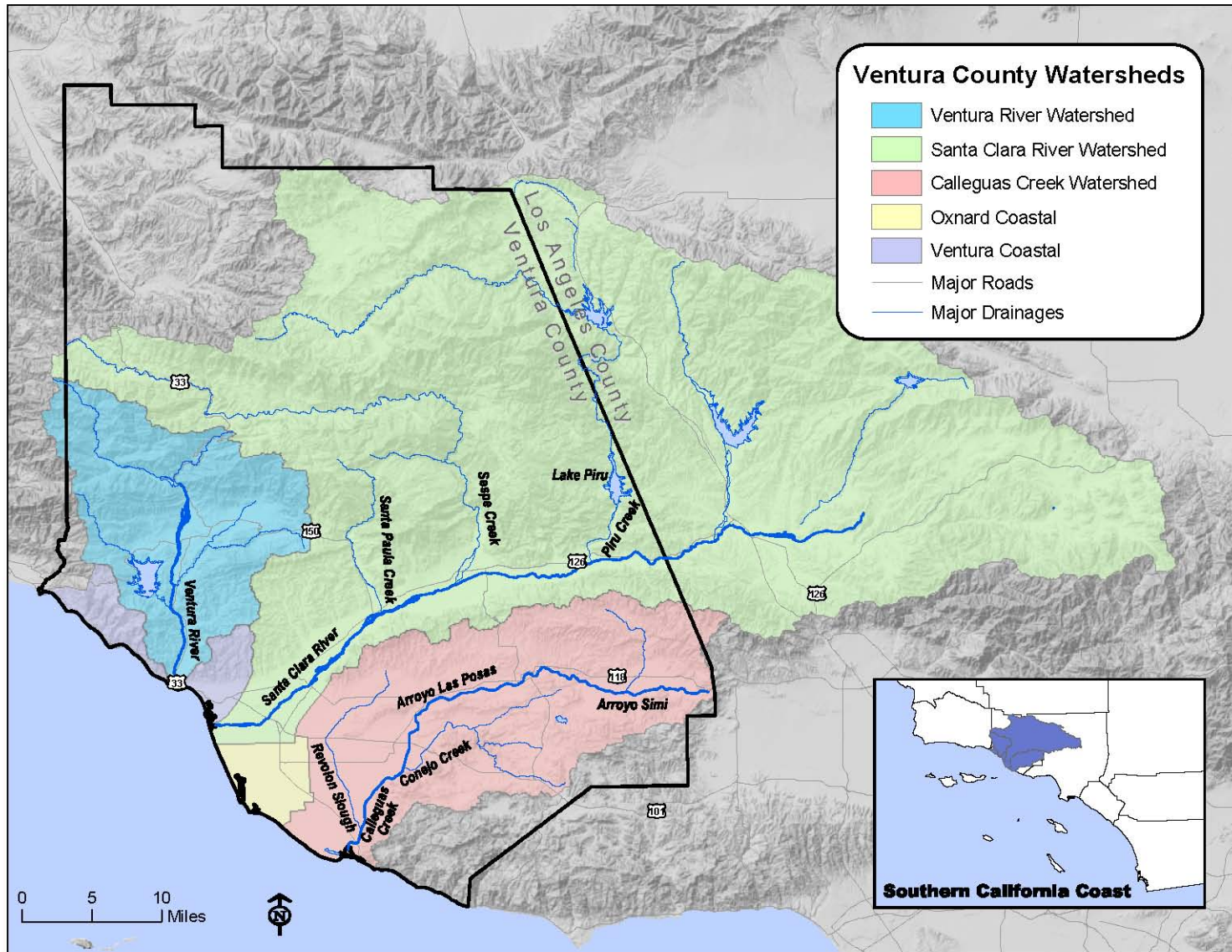


Figure 1. Ventura County Watersheds

Table 3. Ventura County’s Leading Agricultural Commodities–2015

Commodity	Gross Value (\$)
1. Strawberries	617,832,000
2. Lemons	259,539,000
3. Raspberries	228,217,000
4. Nursery Stock	195,817,000
5. Celery	194,756,000
6. Avocados	188,818,000
7. Peppers	54,163,000
8. Tomatoes	50,474,000
9. Cut Flowers	48,522,000
10. Kale	38,088,000

Source: Ventura County Agricultural Commissioner. *Ventura County’s Crop and Livestock Report 2015*. December 12, 2016.

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.

At the northwest end of the Oxnard Plain 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 applies to the area within the Oxnard Coastal watershed that drains to the Central Ditch at Harbor Boulevard. Another portion of the Oxnard Plain drains to the Channel Islands Harbor in the City of Oxnard. For this drainage area, a TMDL addressing bacteria has been adopted.

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, raspberries, 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 shows the distribution of crop types throughout the Calleguas Creek and Oxnard Coastal Watersheds.

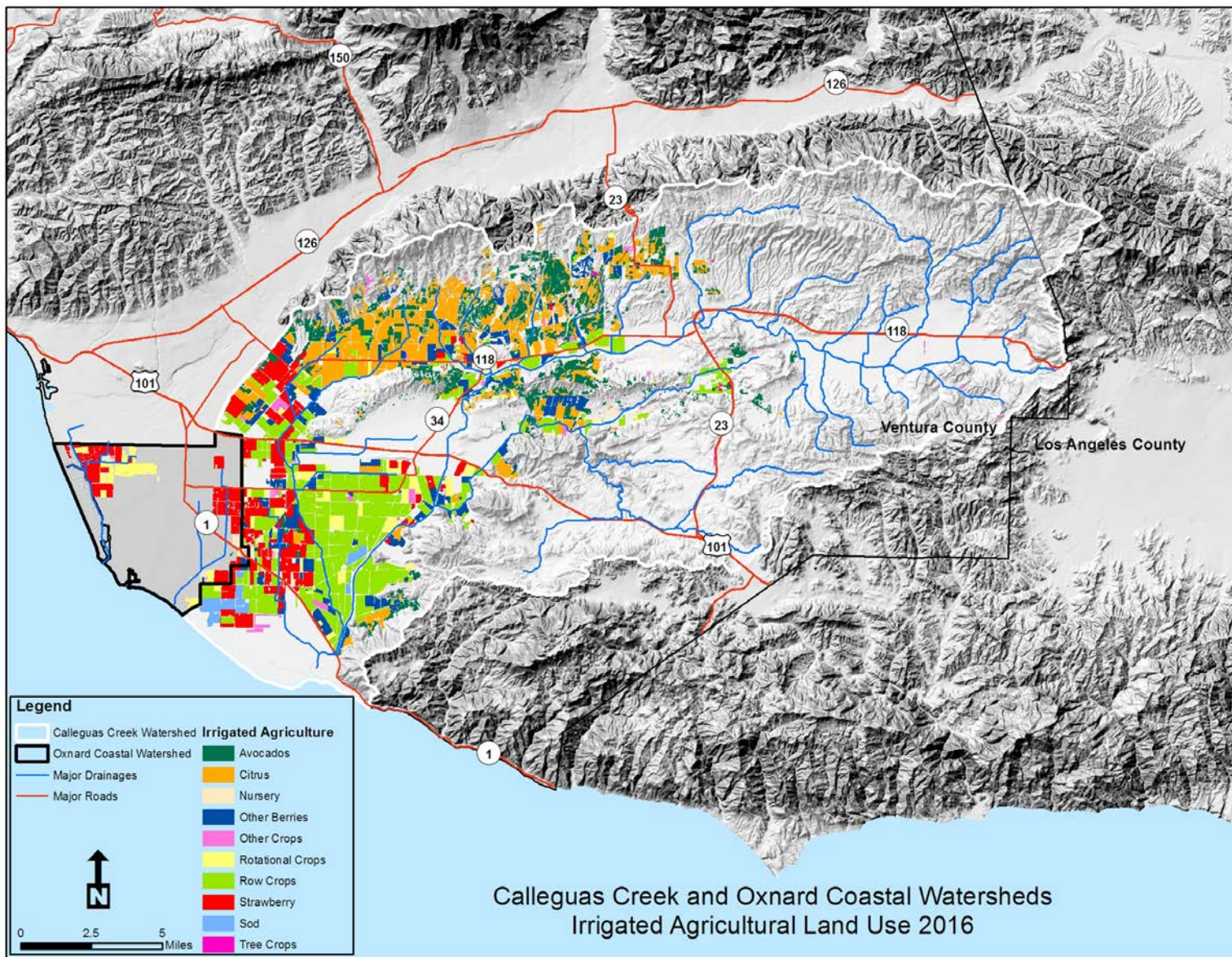


Figure 2. Calleguas Creek and Oxnard Coastal Watersheds Agricultural Land Use

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. Within Ventura County, major tributaries include the Sespe, Piru, and Santa Paula Creeks. Approximately 60 percent of the watershed is located 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 4B) 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 and is also included in the 2016 *Conditional Waiver*.

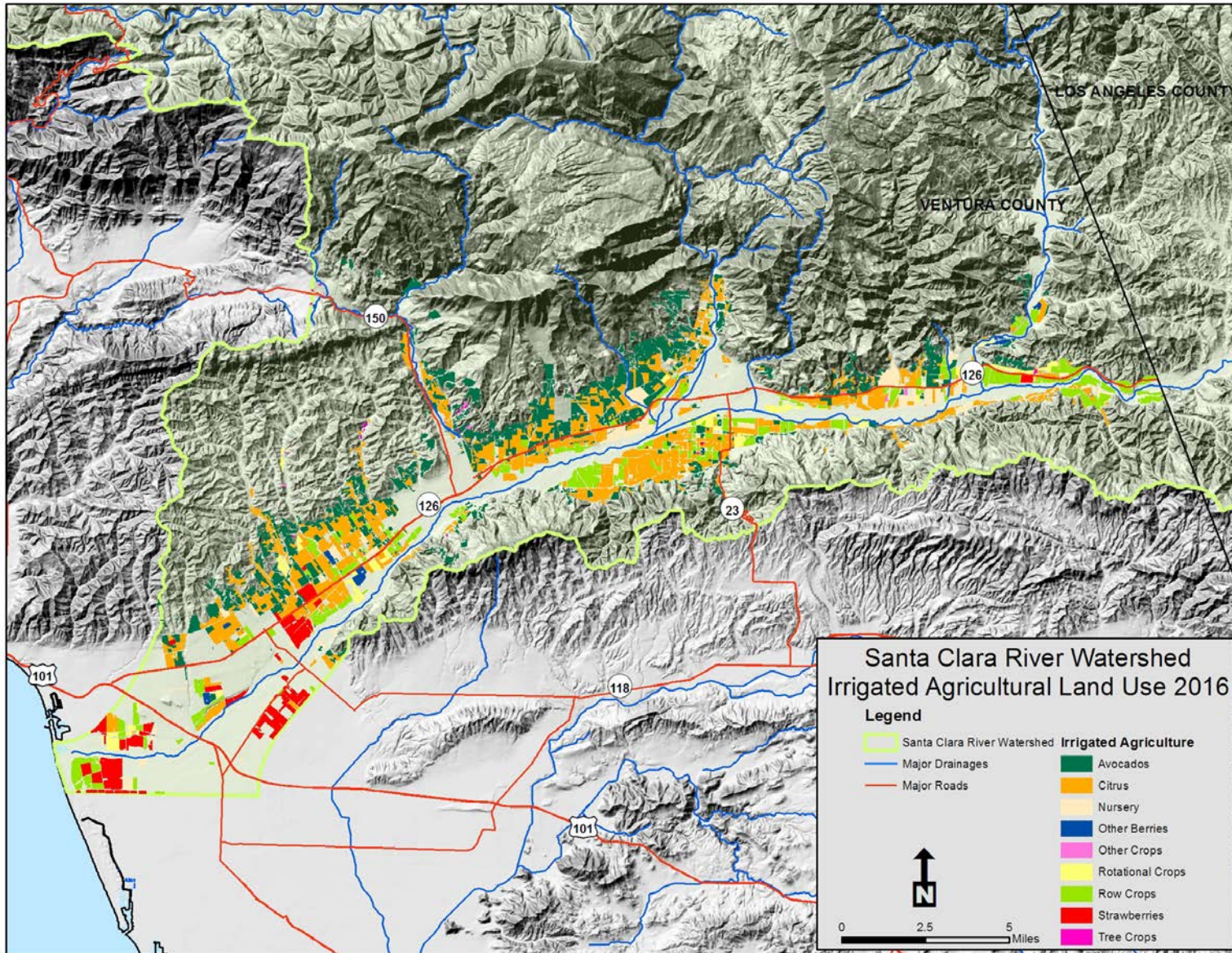


Figure 3. Santa Clara River Watershed Agricultural Land Use

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). In its approval notice for the Algae TMDL, the United States Environmental Protection Agency (USEPA) determined that the Algae TMDL addresses the beneficial use impairments on the 303(d) list identified as being caused by pumping and water diversions. Consequently, a separate TMDL for pumping and water diversions is not expected to be adopted.

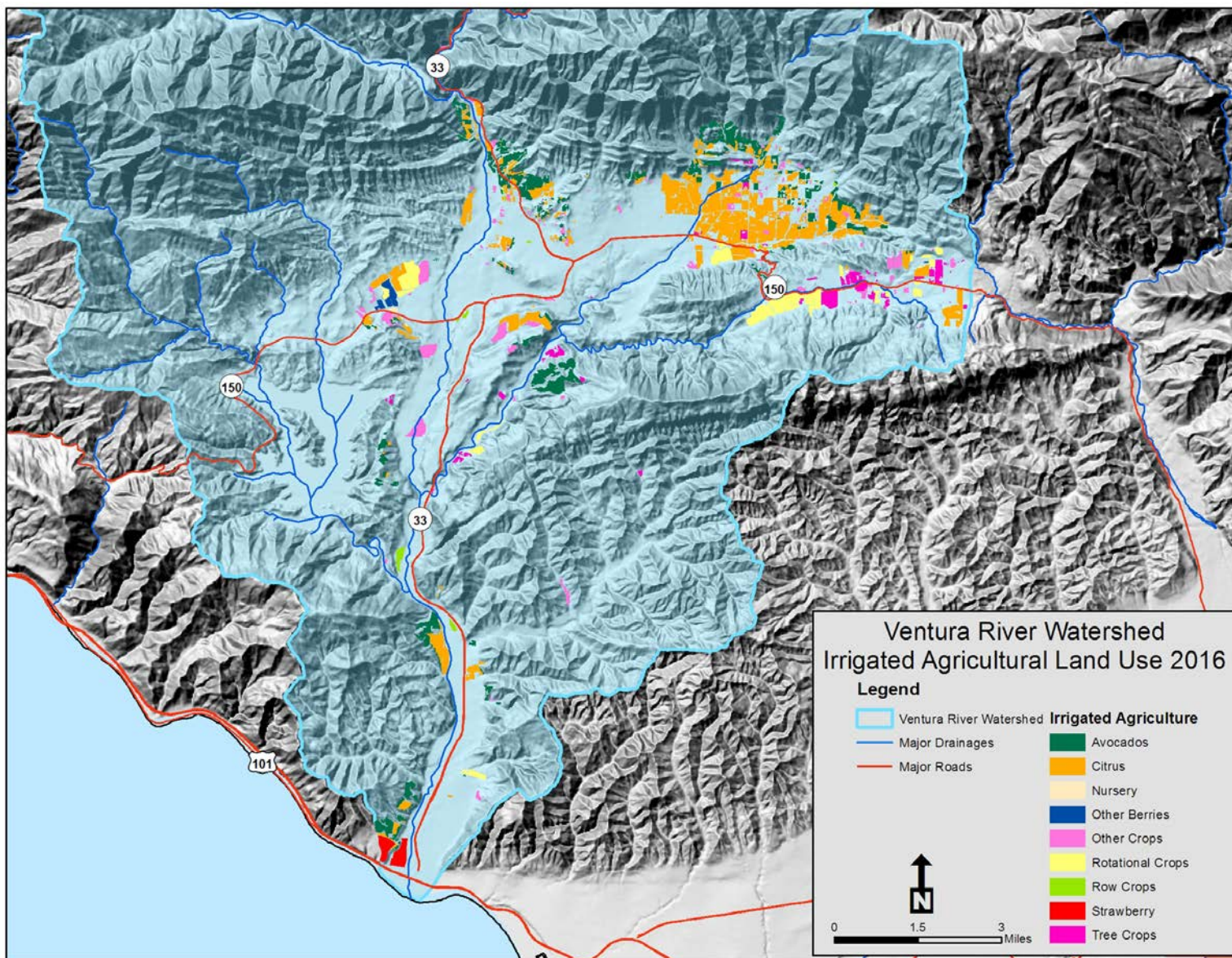


Figure 4. Ventura River Watershed Agricultural Land Use

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 and collaborates with the other responsible parties in implementing the two effective trash TMDLs within the County.

Effective TMDL monitoring requirements have been incorporated into both the 2010 and 2016 *Conditional Waivers* (Order No. R4-2010-0186 and R4-2016-0143, respectively). The VCAILG coordinates with established TMDL monitoring programs or conducts additional monitoring where necessary in order to meet TMDL requirements. Where coordinated efforts to meet TMDL requirements are not in place, this annual report includes information regarding agriculture's monitoring and compliance. Separate annual monitoring reports are produced for some TMDL monitoring programs; rather than duplicate these efforts those reports are incorporated herein by reference, where appropriate.

Several TMDLs became effective during the 2010 waiver period and were added to the 2016 *Conditional Waiver*. Monitoring approaches to meet the requirements of these TMDLs are included in the 2016 VCAILG MRP.

Water Quality Monitoring

MONITORING OBJECTIVES

The objectives of the VCAILG Monitoring Program (VCAILGMP) required under the *Conditional Waiver* include the following:

- Assess the impacts of waste discharges from irrigated agricultural lands on waters of the state,
- Evaluate the effectiveness of management practices to control waste discharges,
- Track progress in reducing the amount of waste discharged to waters of the state to improve water quality and protect beneficial uses, and
- Assess compliance with discharge limitations, where applicable.

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. 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 2016 *Conditional Waiver* Appendix 1, Table 1 constituents. Table 5 lists monitoring sites and GPS coordinates for effective TMDL monitoring locations.

Figure 5 through Figure 9 show site locations for all monitoring sites within each watershed and include drainage areas and HUC-12 boundaries.

The format for the monitoring site ID/code is XXXA_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
	01T_ODD3 EDI ³	1	T	Rio de Santa Clara/Oxnard Drain #3 downstream of Edison Dr.	34.132631	-119.160666
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	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).

3. The 01T_ODD3 EDI site replaced the 01T_ODD3_ARN site after the first two events, per the approved 2017 MRP and QAPP.

4. The S04T_TAPO_BKGRD site was removed from the sampling program after the first two events, per the approved 2017 MRP and QAPP.

Table 5. Monitoring Locations for Effective TMDLs Monitored According to the 2016 *Conditional Waiver* VCAILG MRP

Watershed/ Subwatershed	Site ID	Reach	Waterbody Type ¹	Site Location	GPS Coordinates ²	
					Latitude	Longitude
Santa Clara River	S01D_MONAR	1	D	Drain entering SCR Estuary at Monarch Lane between Harbor Blvd. and Victoria Ave.	34.2333	-119.2413
	S02T_ELLS	2	T	Ellsworth Barranca at Telegraph Rd.	34.3068	-119.1413
Oxnard Coastal/ McGrath Lake	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
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
	V02D_SPM	2	D	Drainage channel to Ventura River at SP Milling Rd. crossing	34.2892	-118.3090

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).

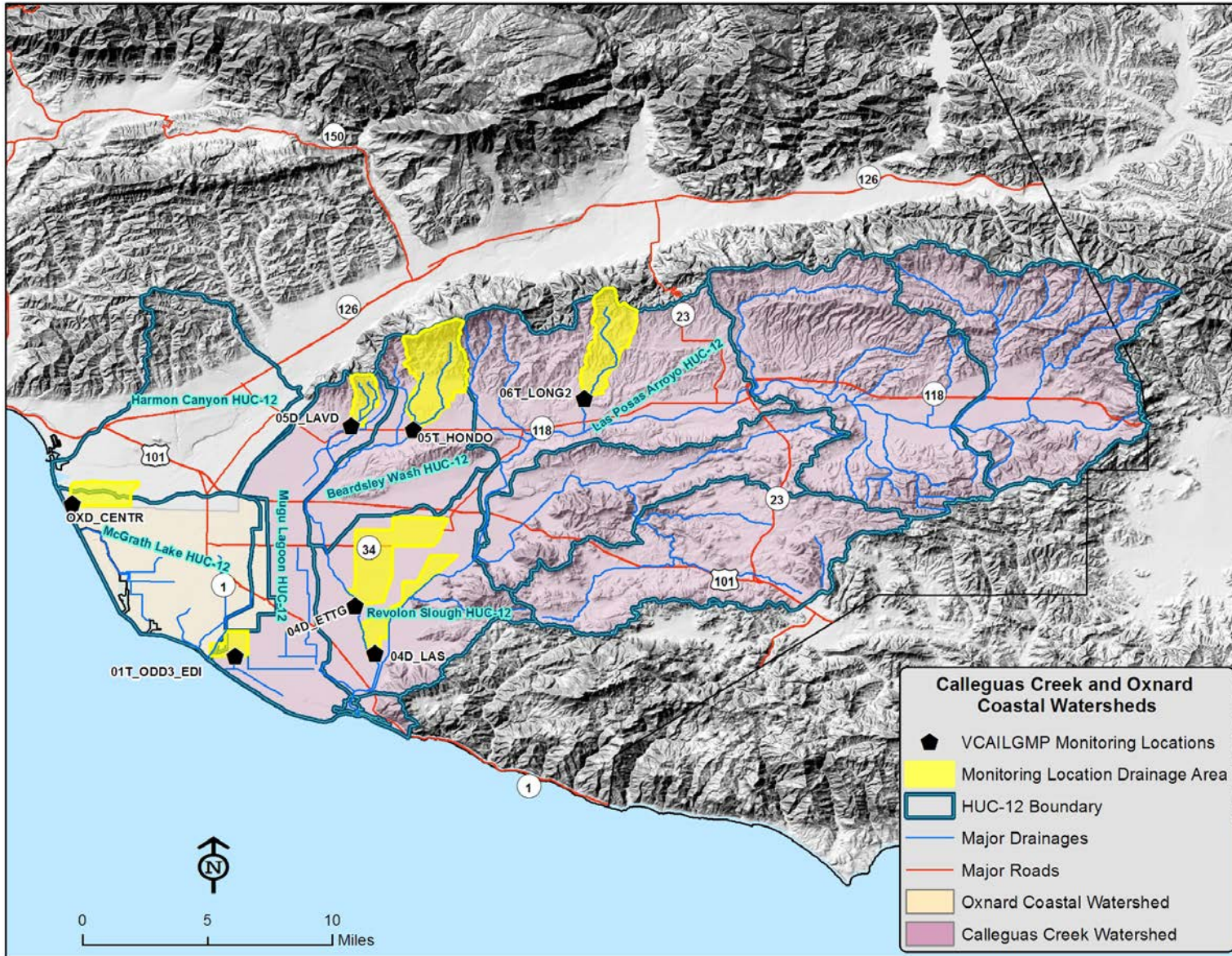


Figure 5. VCAILG Monitoring Sites in the Calleguas Creek/Oxnard Coastal Watersheds

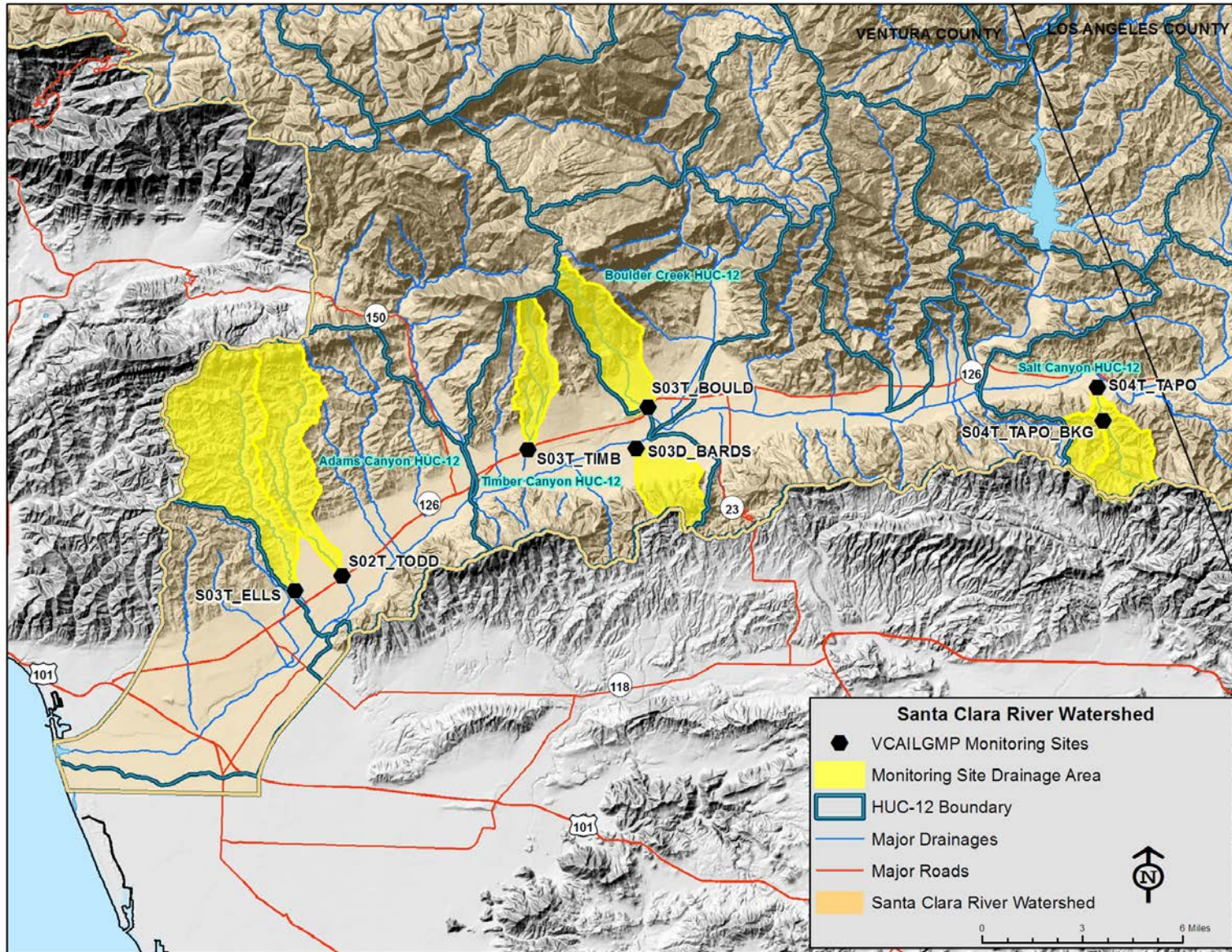


Figure 6. VCAILG Monitoring Sites Located in the Santa Clara River Watershed

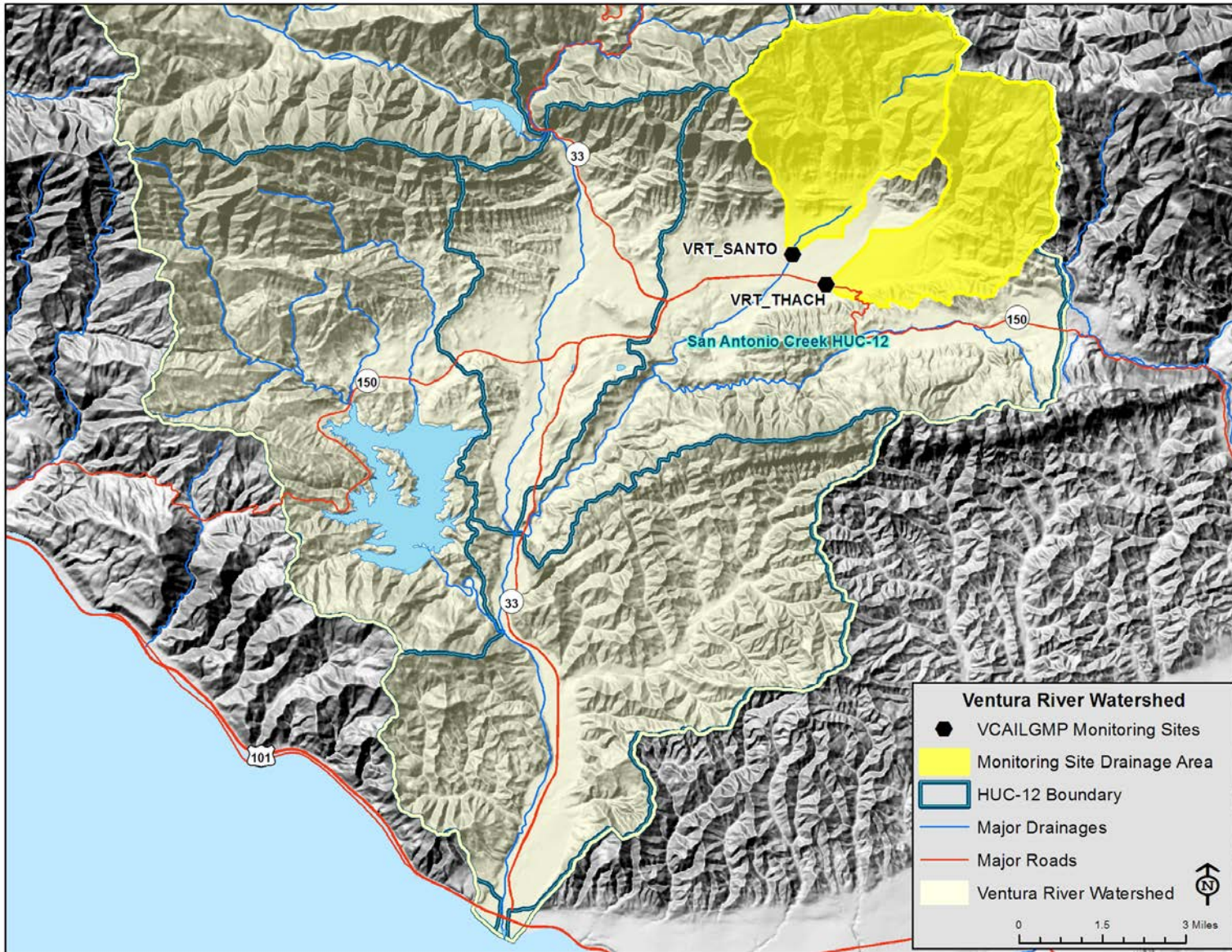


Figure 7. VCAILG Monitoring Sites Located in the Ventura River Watershed

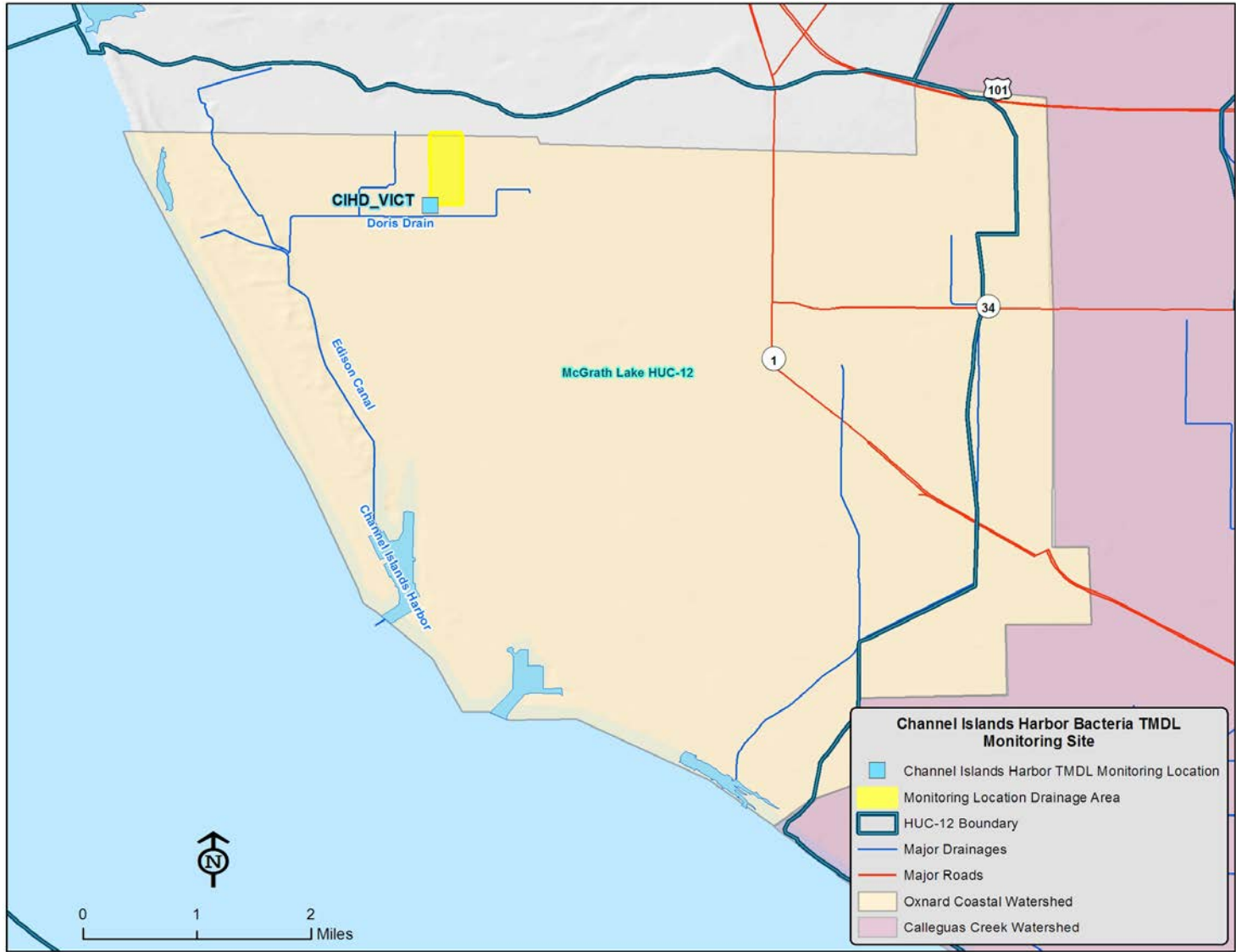


Figure 8. Channel Islands Harbor Bacteria TMDL Monitoring Site

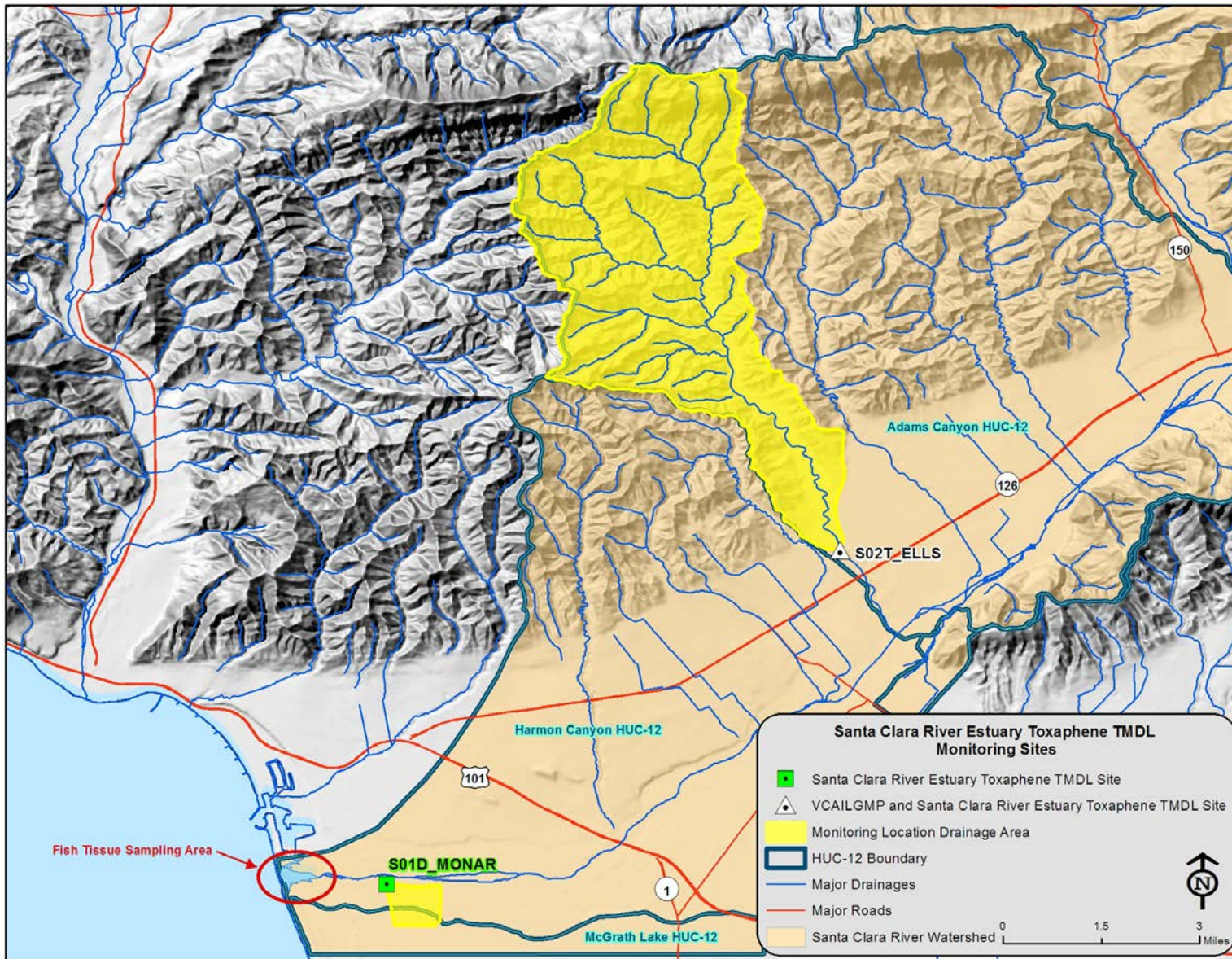


Figure 9. Santa Clara River Estuary Toxaphene TMDL Monitoring Sites

Table 6. Estimated Irrigated Acreage Represented at 2016 *Conditional Waiver* VCAILG MRP Monitoring Sites

Station ID	Irrigated Agricultural Acreage ^{1,2}									Drainage Area Acres
	Row Crops	Citrus	Avocados	Tree Crops	Strawberries	Other Berries	Sod	Nursery	Other Crops	
01T_ODD3_ARN	308						345		7	800
01T_ODD3_EDI ³	308						231		7	643
04D_ETTG	2,186	117			219	176			25	3,309
04D_LAS	1051				14		138	4	4	1,339
05D_LAVD	59	341	224			134			2	877
05T_HONDO	26	1,670	674	2		118		25	3	3,928
06T_LONG2	39	472	743		19	178		88	17	2,813
OXD_CENTR ⁴	389				466			85		1,243
S02T_ELLS ⁴	110	580	646	<1					8	9,015
S02T_TODD	143	838	224	3				64	19	5,748
S03D_BARDS	50	905	158					17	2	2,214
S03T_BOULD	10	202	1,084					151		3,764
S03T_TIMB	33	250	496	2		1				2,183
S04T_TAPO	228	98						54		3,686
VRT_SANTO		415	268	17					8	7,220
VRT_THACH	6	797	156	13				3	67	6,003
S01D_MONAR ⁵					346					209
CIHD_VICT ⁵					108					99

1. Data Source: Ventura County Agricultural Commissioner's Office, September 2016.
2. Some acreage is double or triple counted due to multi-cropping practices.
3. The 01T_ODD3_EDI site replaced the 01T_ODD3_ARN site after the first two events, per the approved 2017 MRP and QAPP.
4. This site is monitored for 2016 *Conditional Waiver* Appendix 1, Table 1 constituents and for an applicable TMDL.
5. This is a TMDL specific monitoring site that is sampled according to the VCAILG MRP approved under the 2016 *Conditional Waiver*.

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 7) 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 2016-2017, storm monitoring occurred on December 16, 2016, and January 22, 2017. Dry weather monitoring occurred on August 24, 2016 and May 31, 2017. Wet weather toxicity samples were collected during Event 31 on December 16, 2016. Dry weather toxicity samples were collected during the second dry weather event on May 31, 2017.

Table 8 provides a summary of monitoring sites and constituents that were monitored during the wet and dry weather monitoring events in 2016 and 2017. Field measurements were also collected at the sites where samples were collected.

Table 7. Constituents and Monitoring Frequency for the 2016 Conditional Waiver VCAILGMP

Constituent ¹	Frequency ²
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, Total Nitrogen, Phosphate, Total Phosphorus	
Pesticides	
Organochlorine Pesticides ³ , Organophosphorus Pesticides ⁴ , Pyrethroid Pesticides ⁵	2 dry events; 2 wet events
Metals	
Dissolved Copper, Total Copper	
Trash	
Trash observations	
Bacteria	
<i>E. coli</i>	
Aquatic Chronic Toxicity	
<i>Ceriodaphnia dubia</i> ⁶	1 wet event; second dry event

1. Total Nitrogen, Total Phosphorus, and *E. coli* were added to the program after the first two events, per the 2017 MRP and QAPP.
2. The “wet” season is defined as October 15th through May 15th; the “dry” season is defined as May 16th through October 14th each year.
3. 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.
4. Organophosphorus Pesticides include: bolstar, chlorpyrifos, demeton, diazinon, dichlorvos, dimethoate, disulfoton, ethoprop, fenclorophos, fensulfathion, fenthion, malathion, merphos (merphos is no longer included in the laboratory OP suite and since there is not a water quality benchmark and has not been detected in the past, it will not be reported on in the future), methyl parathion, mevinphos, phorate, tetrachlorvinphos, tokuthion, and trichloronate.
5. Pyrethroid Pesticides include: allethrin, bifenthrin, cyfluthrin, cypermethrin, danitol, deltamethrin, esfenvalerate, fenvalerate, lambda-cyhalothrin, permethrin, and prallethrin.
6. If sample conductivity exceeded 3000 µs/cm, *hyalella azteca* was used for toxicity testing.

Table 8. VCAILG Sites Monitored and Constituents Sampled in 2016-2017

Watershed / Subwatershed	Site ID	Reach	Yearly Events ¹			
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Calleguas Creek / Mugu Lagoon	01T_ODD3_ARN ⁴	1	WQ	WQ, TOX ²	--	--
	01T_ODD3 EDI ⁴	1	--	--	WQ	WQ, TOX
Calleguas Creek / Revolon Slough	04D_ETTG	4	WQ	WQ	WQ	WQ, TOX
	04D_LAS	4	WQ	WQ	WQ ³	WQ, TOX
Calleguas Creek / Beardsley Channel	05D_LAVD	5	WQ ³	WQ, TOX	WQ	WQ, TOX ³
	05T_HONDO	5	WQ ³	WQ, TOX ³	WQ	WQ, TOX ³
Calleguas Creek / Arroyo Las Posas	06T_LONG2	6	WQ ³	WQ, TOX ³	WQ	WQ, TOX ³
Oxnard Coastal	OXD_CENTR	--	WQ ³	WQ	WQ	WQ, TOX
Santa Clara River	S02T_ELLS	2	WQ ³	WQ, TOX	WQ	WQ, TOX ³
	S02T_TODD	2	WQ	WQ, TOX	WQ	WQ, TOX
	S03T_TIMB	3	WQ ³	WQ, TOX	WQ	WQ, TOX ³
	S03T_BOULD	3	WQ ³	WQ, TOX ³	WQ	WQ, TOX ³
	S03D_BARDS	3	WQ ³	WQ	WQ	WQ, TOX ³
	S04T_TAPO	4	WQ	WQ, TOX	WQ	WQ, TOX
	S04T_TAPO_BKGD ⁵	4	WQ	WQ	--	--
Ventura River	VRT_THACH	--	WQ ³	WQ, TOX	WQ	WQ, TOX ³
	VRT_SANTO	--	WQ ³	WQ, TOX ³	WQ	WQ, TOX ³

TOX = Toxicity

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

1. Toxicity testing was performed during the first wet event and the second dry event.
2. No samples collected as site was inaccessible.
3. No samples collected due to insufficient flow/dry conditions.
4. The 01T_ODD3 EDI site replaced the 01T_ODD3_ARN site after the first two events, per the approved 2017 MRP and QAPP.
5. The S04T_TAPO_BKGRD site is only visited during storm events when the corresponding upstream site is sampled. The S04T_TAPO_BKGRD site was removed from the sampling program after the first two events, per the approved 2017 MRP and QAPP.

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 (Table 9). Table 10 and Table 11 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 Ninth Year Annual Monitoring Report* describes the TMDL monitoring program and results in detail.⁴ All efforts have been made to coordinate the VCAILG monitoring program and CCWTMP when timing sampling events. CCWTMP monitoring is conducted quarterly with an additional two storm events each year.

⁴ Larry Walker Associates. 2016. Calleguas Creek Watershed TMDL Compliance Monitoring Program Ninth Year Annual Monitoring Report. December 15, 2017.

Table 9. Constituents and Frequency for TMDL Monitoring Performed Under the 2016 Conditional Waiver VCAILGMP

TMDL	SITE ID	CONSTITUENT ^{1, 2}	FREQUENCY
Santa Clara River Estuary Toxaphene TMDL	S01D_MONAR S02T_ELLS	TSS, toxaphene, chlordane, dieldrin (water)	2 dry events; 2 wet events
		Toxaphene, chlordane, dieldrin (filtered sediment)	2 wet events
	Santa Clara River Estuary	Toxaphene, chlordane, dieldrin (fish tissue)	Every three years ³
Channel Islands Harbor Bacteria TMDL	CIHD_VICT	<i>E. coli</i> , enterococcus, total coliform, fecal coliform	2 dry events; 2 wet events
Oxnard Drain #3 Pesticides, PCBs, and Sediment Toxicity TMDL	01T_ODD3_EDI	Bifenthrin, total chlordane, chlorpyrifos, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, dieldrin, total PCBs, toxaphene (water)	2 dry events; 2 wet events
		TOC, total chlordane, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, dieldrin, total PCBs, toxaphene, sediment toxicity ⁴ (sediment)	Once a year
Malibu Creek Watershed Sedimentation and Nutrients TMDLs	05T_HONDO ⁵	Total nitrogen, total phosphorus	2 dry events; 2 wet events
		Nitrate-N and nitrite-N	2 wet events
Ventura River Algae TMDL	VRT_THACH VRT_SANTO V02D_SPM	Total nitrogen, total phosphorus	2 dry events
		Nitrate-N and nitrite-N	2 wet events
McGrath Lake Pesticides, PCBs, and Sediment Toxicity TMDL	OXD_CENTR	Total organic carbon (TOC), TSS, total PCBs, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, dieldrin, total chlordane (water)	2 dry events; 2 wet events
		TOC, Total PCBs, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, dieldrin, total chlordane (suspended sediment) ⁶	2 wet events
Santa Clara River Bacteria TMDL ⁷	S01D_MONAR ⁸	Fecal coliform, total coliform, enterococcus	Weekly samples, every other month for one year
	S03D_BARDS ⁹	<i>E. coli</i>	Weekly samples, every other month for one year

1. This table lists constituents necessary for data comparison with TMDL load allocations, some of which are already required as region-wide constituents under the *Conditional Waiver* that are not already collected at the specified site as part of the Table 15 VCAILGMP sampling.
2. Required TMDL constituents not listed in this table will be collected as part of the *Conditional Waiver* constituents listed in Table 7.
3. Continuing the current fish tissue sampling schedule, the next collection will be in spring/summer 2018.
4. Bulk sediment toxicity testing will be performed on either *Hyalella azteca* or urchin fertilization, depending on sample conditions. Testing *Hyalella azteca* is appropriate when pore water is in the range of 0-15 ppt salinity. Urchin testing would be appropriate for higher salinities.
5. Site selected to assess compliance with the Malibu Creek Watershed Nutrients TMDL and Malibu Creek and Lagoon TMDLs for Sedimentation and Nutrients to Address Benthic Community Impairments. Data will only be compared to these LAs if VCAILG has members farming within the Malibu Creek Watershed.
6. While the Monitoring section of the TMDL specifies sediment sampling and the 2010 VCAILG MRP was written to align with this provision of the TMDL, load allocations are in fact for suspended sediment. Therefore, the 2017 MRP and QAPP updated the monitoring to be comparable to the load allocations by monitoring only suspended sediment transported during wet weather, which matches the procedures for the Santa Clara River Estuary Toxaphene TMDL.
7. Since the load allocations are unique for this TMDL as they are represented by exceedance days, an adaptive approach is being taken for this TMDL. This table specifies monitoring for one year. Upon receipt and evaluation of the results of this baseline monitoring, an approach will be developed in the WQMP for outreach and management practice implementation, as needed. As allowed by Appendix 3 of the *Conditional Waiver*, the MRP will be updated to reflect the next stage of monitoring planned for the future prior to the TMDL timelines for achieving dry and wet weather load allocations.
8. This is the closest site to the Santa Clara River Estuary. Data will be compared to load allocations for the estuary.
9. This site was selected to represent Reach 3 agricultural discharge contributions since it is the only site within this reach located in an agricultural drain.

Table 10. TMDL Sites Monitored and Constituents Sampled in 2016-2017

TMDL	Site ID	Yearly Events			
		Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/17	Dry 5/31/2017
Santa Clara River Estuary Toxaphene TMDL	S01D_MONAR	OC-W TSS ¹	OC-W OC-S TSS	OC-W OC-S TSS	OC-W TSS
	S02T_ELLS	OC-W TSS ¹	OC-W OC-S TSS	OC-W OC-S TSS	OC-W TSS ¹
	Santa Clara River Estuary	Frequency is every three years. Fish collection was not required this monitoring year.			
Channel Islands Harbor Bacteria TMDL	CIHD_VICT	Bact ¹	Bact ²	Bact	Bact ¹
Oxnard Drain #3 Pesticides, PCBs, and Sediment Toxicity TMDL	01T_ODD3_ED1	NR	NR	PP-W	PP-W
Malibu Creek Watershed Sedimentation and Nutrients TMDL	05T-HONDO	NR	NR	TN, TP, NO ₃ , NO ₂ ³	TN, TP ¹
McGrath Lake PCBs, Pesticides and Sediment Toxicity TMDL	OXD_CENTR	OC-PCB-W TOC TSS ²	OC-PCB-W TOC TSS	OC-PCB-W OC-PCB-S TOC TSS	OC-PCB-W TOC TSS ²
Ventura River Algae TMDL	VRT_THACH	NR	NR	NO ₃ , NO ₂	TN, TP ¹
	VRT_SANTO	NR	NR	NO ₃ , NO ₂	TN, TP ¹
	V02D_SPM	NR	NR	NO ₃ , NO ₂	TN, TP ¹

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

PP-W = Pesticides and PCBs bifenthrin, total chlordane, chlorpyrifos, DDT and derivatives, dieldrin, total PCBs, toxaphene in water

PP-S = Pesticides and PCBs TOC, total chlordane, DDT and derivatives, dieldrin, total PCBs, toxaphene, sediment toxicity in sediment

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, TOC in filtered sediment

TOC = Total Organic Carbon

TSS = Total Suspended Solids

TN, TP = Total nitrogen, Total phosphorus

NO₃, NO₂ = Nitrate, Nitrite

NR – Constituents not required to be sampled prior to approval of the 2017 MRP/QAPP.

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

2. Site not sampled for water quality parameters due to stagnant conditions.

3. Nitrite was not sampled due to an oversight in transitioning to the new MRP/QAPP.

Table 11. Santa Clara River Bacteria TMDL Sites Sampled in 2017

Month/Site	Monitoring Events				
Month 1	2/13/17	2/20/17	2/27/17	3/6/17	3/13/17
S01D_MONAR ¹	NS	X	X	X	X
S03D_BARDS ²	NS	X	NS	NS	NS
Month 2	4/3/17	4/10/17	4/17/17	4/24/17	5/1/17
S01D_MONAR ¹	X	X	X	X	NS
S03D_BARDS ²	NS	NS	NS	NS	NS
Month 3	6/5/17	6/12/17	6/19/17	6/26/17	7/3/17
S01D_MONAR ¹	NS	NS	NS	X	X
S03D_BARDS ²	NS	NS	NS	NS	NS

¹'X' denotes a sample was collected.

NS = Not Sampled; site either dry or ponded.

1. Bacteria sampled for during the events include fecal coliform, total coliform, and enterococcus.
2. Bacteria sampled for during the events include *E. coli*.

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 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. 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.* 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 (COC) documentation was completed and toxicity samples were prepared for overnight delivery to the toxicity testing laboratory, Pacific EcoRisk (PER). 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 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 2010 *Conditional Waiver* constituents during the 2015-2016 monitoring year. Table 12 lists analytical methods for TMDL constituents monitored as part of the VCAILGMP. Refer to the CCWTMP QAPP for methods used on samples collected for that monitoring program.

Table 12. Analytical Methods for Conditional Waiver Constituents

Constituent	Analytical Method
Aquatic Chronic Toxicity¹	
<i>Ceriodaphnia dubia</i> (water flea) ²	EPA-821-R-02-013
General Water Quality Constituents (WQ)	
Flow, pH, Temperature, Dissolved Oxygen, Conductivity, Turbidity	Field Measurement
TDS	SM 2540C
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
Total Nitrogen	Direct Method
Phosphate (Total Orthophosphate as P)	SM 4500-PE
Total Phosphorus	SM 4500 PE
Metals	
Total and Dissolved Copper	EPA 200.8
Organic Constituents⁴	
Organochlorine Pesticides ⁵	EPA 625
Organophosphorus Pesticides	EPA 625
Pyrethroid Pesticides	EPA 625-NCI
Bacteria	
<i>E. coli</i>	SM 9223 B

1. The 2017 MRP/QAPP calls for *Ceriodaphnia dubia* for Chronic toxicity at all sites.
2. If sample conductivity exceeded 3000 $\mu\text{S}/\text{cm}$, *Hyalella azteca* was used for toxicity testing.
3. See Table 7 for the list of constituents in each pesticide group.
4. Toxaphene is analyzed using EPA 625-NCI.

Table 13. Analytical Methods for TMDL Constituents

Constituent ¹	Analytical Method
General Water Quality Constituents	
Total organic carbon (TOC) (water)	SM 5310C
Total organic carbon (TOC) (sediment)	EPA 9060A
Nutrients	
Nitrite-N	EPA 300.0
PCB Aroclors and Organochlorine Pesticides	
PCBs (water)	EPA 625
PCBs (sediment)	EPA 8270C
OC Pesticides (filtered sediment)	EPA 8270C
OC Pesticides (fish tissue)	EPA 8280C
OC Pesticides (sediment)	EPA 8270C
Bacteria	
Enterococcus	SM9230D
Total coliform	SM 9221B
Fecal coliform	SM 9221E

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

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. Appendix H provides a summary of the data quality evaluation performed on the data collected during the 2016-2017 monitoring year. An evaluation of the data quality for the Calleguas Creek Watershed TMDL monitoring program is included as Appendix E as part of the ninth year annual monitoring report for that program.⁵

WATER QUALITY BENCHMARKS AND OTHER OBJECTIVES

This section presents the standard water quality benchmarks as specified in the 2010 and 2016 *Conditional Waivers* (R4-2010-0186 and R4-2016-0143) used to evaluate monitoring data collected at VCAILG monitoring sites during the 2016-2017 monitoring year. These benchmarks are the same for both waivers aside from the addition of bifenthrin and *E. coli* in the 2016 *Conditional Waiver*. Bifenthrin data is available as it is included in the pyrethroid pesticides analysis suite and is compared to the new benchmark. *E. coli* data is also available and is compared to the applicable benchmark.

“Standard water quality benchmarks” in the 2010 and 2016 *Conditional Waivers* include numeric and narrative water quality objectives, and include several narrative and numeric Basin Plan

⁵ Larry Walker Associates. “Calleguas Creek Watershed TMDL Compliance Monitoring Program Ninth Year Annual Monitoring Report.” December 15, 2017.

objectives and water quality standards from the California Toxics Rule (CTR). In cases where the *Conditional Waivers* references the Basin Plan or CTR, without specifying a benchmark number, the lowest applicable number was selected for each watershed. CTR water quality criteria are available for several OC pesticides that are analyzed as part of the VCAILGMP; though not listed as benchmarks in the *Conditional Waivers* they are provided in a separate table in this section for reference. In addition to the benchmarks, the *Conditional Waivers* also include effective TMDL LAs as additional water quality benchmarks. Due to the complexity of appropriately comparing TMDL LAs to the proper location, site type, sample media, and sampling condition, these benchmarks and the associated monitoring results are presented and discussed separately in the report section titled “TMDL Load Allocations and Monitoring Results”.

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. Conditional Waiver Standard Water Quality Benchmarks Derived From Narrative Objectives

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
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.
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. R4-2016-0143, Los Angeles Regional Water Quality Control Board, adopted April 14, 2016.

Table 15. Conditional Waiver 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. Conditional Waiver 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	= $0.96e^{[0.8545(\ln \text{hardness}) + (-1.702)]}$	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. Conditional Waiver Standard Water Quality Benchmarks for Organophosphorus Pesticides

Constituent	CC, OXD, SCR, VR Watersheds
	Benchmark (µg/L)
Chlorpyrifos	0.025
Diazinon	0.10

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

Table 18. Conditional Waiver Water Quality Benchmarks for Organochlorine Pesticides

Constituent	CC Watershed		OXD, SCR Watersheds		VR Watershed	
	Benchmark (µg/L)	Benchmark Source ¹	Benchmark (µg/L)	Benchmark Source ¹	Benchmark (µg/L)	Benchmark Source ¹
Chlordane, sum	0.00059	CTR HHO	0.00059	CTR HHO	0.00059	CTR HHO
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
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)

Table 19. Conditional Waiver Water Quality Benchmarks for Bifenthrin and E. coli

Constituent	CC, OXD, SCR, VR Watersheds	
	Unit	Benchmark
Bifenthrin	µg/L	0.0006
E. coli	MPN/100mL	235

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

Table 20. Organochlorine Pesticides Monitored by the VCAILGMP with CTR Water Quality Criteria

Constituent	CC Watershed		OXD, SCR Watersheds		VR Watershed	
	Benchmark (µg/L)	Benchmark Source ¹	Benchmark (µg/L)	Benchmark Source ¹	Benchmark (µg/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
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

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)

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

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 2016-2017. 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 2010 *Conditional Waiver* and Appendix 4 of the 2016 *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 2016-2017 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 2010 *Conditional Waiver* standard water quality benchmarks from Appendix 2 and Appendix 4 of the 2016 *Conditional Waiver* (except for *E. coli* as previously noted) and specified in Table 14 through Table 20 where applicable, all exceedances are indicated in **bold type** in the following data tables for each monitoring site.

Any data reported by the laboratory in units of ng/L were converted to µg/L for comparison with benchmarks expressed in units of µg/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 during the 2016-2017 monitoring year 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 six VCAILG monitoring sites. Monitoring sites are discussed below in order of the Calleguas Creek reach into which they drain.

01T_ODD3_ARN/01T_ODD3 EDI

Rio de Santa Clara / Oxnard Drain No. 3. The 01T_ODD3_ARN monitoring site is located on an agricultural drain just upstream from the Arnold Road Bridge. Per approval of the 2017 QAPP, the 01T_ODD3_ARN site was changed to 01T_ODD3 EDI following Event 31. Relocation of the site ensures access during wet weather events. This site is located on an agricultural drain just downstream of Edison Drive. Flow from this drain eventually discharges into the western arm of Mugu Lagoon (Calleguas Creek Reach 1).

View downstream at 01T_ODD3_ARN



View downstream at 01T_ODD3 EDI



Samples were collected at this site during three of the four 2016-2017 monitoring events; during wet weather Event 31, the site was flooded rendering the site inaccessible. Event 30 and Event 31 took place at sampling site 01T_ODD3_ARN while Event 32 and Event 33 took place at sampling site 01T_ODD3 EDI. Table 21 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality

benchmarks. Table 22 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 4,4'-DDE and 4,4'-DDT occurred during the three sampling events during the 2016-2017 monitoring year. The 4,4'-DDD benchmark was exceeded during dry weather Event 30 and wet weather Event 32. The nitrate-N and dissolved copper benchmark were both exceeded during dry weather Events 30 and 33. Total chlordane, toxaphene, bifenthrin, and *E. coli* benchmarks were all exceeded during Event 32. Row crops and sod are the primary crop types in the vicinity of this site.

Table 21. 2016-2017 VCAILG Monitoring Data v. Waiver Benchmarks: 01T_ODD3_ARN/EDI¹

Constituent	Units	Benchmark	01T_ODD3_ARN		01T_ODD3_EDI	
			Event 30 Dry 8/24/2016	Event 31 Wet 12/16/2016	Event 32 Wet 1/22/2017	Event 33 Dry 5/31/2017
Field Measurements						
Flow	CFS		N/A		19.7	0.8
pH		6.5 ≤ pH ≤ 8.5	7.3		7.4	7.2
Temperature	°C		21.8		10.8	18.8
Dissolved Oxygen	mg/L	≥ 5	5.5		10.4	0.0
Turbidity	NTU		30.2		409.0	0.0
Conductivity	µS/cm		6071.0		575.6	4180.0
General Water Quality						
TDS	mg/L		4620		330	3670
TSS	mg/L		94		380	34
Total Hardness as CaCO ₃	mg/L		1767		170	1959
Chloride	mg/L		1030		43	210
Sulfate	mg/L		1530		141	1660
Nutrients						
Ammonia-N	mg/L	3.08/ NS/ 5.96/ 5.15 ²	2.79	NS	0.27	1.96
Nitrate-N	mg/L	10 ³	54.30		4.39	83.00
Total Nitrogen	mg/L		NR		9.22	21.68
Total Orthophosphate	mg/L		0.77		3.28	0.77
Total Phosphorus	mg/L		NR		2.30	0.29
Metals						
Dissolved Copper	µg/L	3.10 ⁴	3.90		1.54	3.95
Total Copper	µg/L		4.60		26.87	4.29
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
cis-Nonachlor	µg/L		ND		0.00790	ND
trans-Nonachlor	µg/L		DNQ		0.01720	ND
Chlordane-alpha	µg/L		DNQ		0.02340	ND
Chlordane-gamma	µg/L		DNQ		0.02130	ND
Total Chlordane	µg/L	0.00059	DNQ		0.04470	ND
2,4'-DDD	µg/L		DNQ		0.0580	ND
2,4'-DDE	µg/L		ND		0.0090	ND
2,4'-DDT	µg/L		DNQ		0.0215	DNQ
4,4'-DDD	µg/L	0.00084	0.01040		0.19660	DNQ
4,4'-DDE	µg/L	0.00059	0.02880		0.40770	0.01110
4,4'-DDT	µg/L	0.00059	0.00870		0.12880	0.00710
Dieldrin	µg/L	0.00014	ND		ND	ND

Constituent	Units	Benchmark	01T_ODD3_ARN		01T_ODD3 EDI		
			Event 30	Event 31	Event 32	Event 33	
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017	
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	
Endrin Aldehyde	µg/L	0.81	ND		ND	ND	
Toxaphene	µg/L	0.00075	ND		1.22500	DNQ	
Organophosphorus Pesticides							
Chlorpyrifos	µg/L	0.025	ND		ND	ND	
Diazinon	µg/L	0.1	ND		ND	ND	
Pyrethroid Pesticides							
Bifenthrin	µg/L	0.0006	ND	0.0089	ND		
L-Cyhalothrin	µg/L		ND	0.0033	ND		
Bacteria							
<i>E. coli</i>	MPN/100 mL	235	NR	1320	10		

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

N/A – Flow was not sampled due to tidal influence. Turbidity meter malfunctioned.

NR – Constituent not required to be sampled during Events 30 and 31.

NS – No samples were collected due to the site being inaccessible. Site was flooded.

1. Site changed from 01T_ODD3_ARN to 01T_ODD3 EDI after event 31 per the approved 2017 MRP and QAPP. The site was relocated upstream to ensure site access during wet weather events.
2. 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.
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. Copper benchmark for saltwater applies at this site as prescribed in Table 16.

Table 22. 2016-2017 Trash Observations for 01T_ODD3_ARN/EDI¹

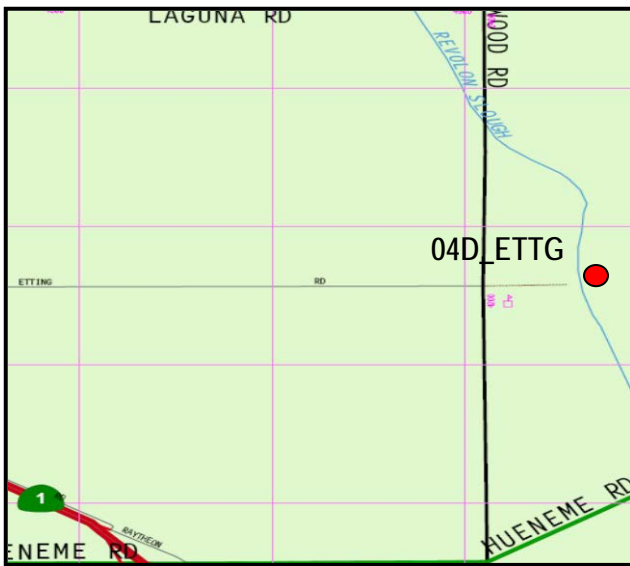
Event	Count	Types
Event 30	3	Plastic bottles, paper
Event 31	NS ²	N/A
Event 32	20-30	Cups, ag trash, plastic
Event 33	20	Cups, styrofoam, plastic bags, pipe

1. Site changed from 01T_ODD3_ARN to 01T_ODD3 EDI during Event 32 per the approved 2017 MRP and QAPP. The site was relocated upstream to ensure site access during wet weather events.
2. Site inaccessible, flooded.

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 all 2016-2017 monitoring events. Table 23 contains a summary of concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. The approximate amount and types of trash observed at this site is listed in Table 24.

Exceedances of nitrate-N, dissolved copper, 4,4' DDE, and toxaphene, occurred during all four monitoring events. The 4,4'-DDT benchmark was exceeded during wet weather Events 31 and 32, as well as dry weather Event 30. Bifenthrin exceedances occurred during wet weather Events 31 and 32. *E. coli* exceedances occurred during wet weather Event 32 and dry weather Event 33. Exceedances of total chlordane, 4,4'-DDD, and chlorpyrifos occurred during Event 32. The dissolved oxygen benchmark was not met during Event 31. 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 23. 2016-2017 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_ETTG

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS		1.9	23.0	194.9	3.4
pH		6.5 < pH < 8.5	8.4	7.5	7.7	8.0
Temperature	°C	≤ 26.67°C ¹	22.7	14.8	11.5	20.0
Dissolved Oxygen	mg/L	≥ 5	15.9	4.1	10.4	12.4
Turbidity	NTU		3.4	N/A	1025.0	0.5
Conductivity	µS/cm		3416.0	282.0	809.0	3950.0
General Water Quality						
TDS	mg/L		2870	2170	520	3380
TSS	mg/L		ND	21	4000	6
Total Hardness as CaCO ₃	mg/L		1424	1090	276	1689
Chloride	mg/L		240	220	48	290
Sulfate	mg/L		1260	912	240	1460
Nutrients						
Ammonia-N	mg/L	0.81/ 4.16/ 4.45/ 1.83 ²	0.07	0.56	0.25	0.31
Nitrate-N	mg/L	10 ³	37.25	37.58	12.54	57.70
Total Nitrogen	mg/L		NR	NR	19.61	20.85
Total Orthophosphate	mg/L		1.93	2.64	36.31	1.56
Total Phosphorus	mg/L		NR	NR	18.13	0.58
Metals						
Dissolved Copper	µg/L	3.10 ⁴	3.78	6.92	3.31	4.41
Total Copper	µg/L		3.90	7.72	159.74	4.89
Organochlorine Pesticides						
Aldrin	µg/L	0.00014	ND	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND	ND
cis-Nonachlor	µg/L		ND	ND	0.01920	ND
trans-Nonachlor	µg/L		ND	ND	0.03340	ND
Chlordane-alpha	µg/L		ND	ND	0.04080	ND
Chlordane-gamma	µg/L		ND	ND	0.04280	ND
Total Chlordane	µg/L	0.00059	ND	ND	0.08360	ND
2,4'-DDD	µg/L		DNQ	ND	0.27840	ND
2,4'-DDE	µg/L		ND	ND	0.07710	ND
2,4'-DDT	µg/L		ND	ND	0.18080	ND
4,4'-DDD	µg/L	0.00084	ND	ND	0.68880	DNQ
4,4'-DDE	µg/L	0.00059	0.01580	0.03160	3.31290	0.00990
4,4'-DDT	µg/L	0.00059	0.00800	0.02220	0.64170	DNQ
Dieldrin	µg/L	0.00014	ND	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND	ND

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Endosulfan-II	µg/L	0.056	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND	ND
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	0.13500	0.17120	5.42980	0.11630
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	ND	ND	0.055	0.001
Diazinon	µg/L	0.1	ND	ND	ND	ND
Dimethoate	µg/L		0.051	ND	ND	ND
Malathion	µg/L		ND	ND	ND	0.046
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	ND	0.0082	0.1999	ND
Cyfluthrin	µg/L		ND	DNQ	0.0180	ND
Cypermethrin	µg/L		0.0023	0.0041	0.1179	ND
Danitol	µg/L		ND	ND	0.0043	ND
Esfenvalerate	µg/L		ND	DNQ	0.0023	ND
cis-Permethrin	µg/L		ND	ND	0.1091	ND
trans-Permethrin	µg/L		ND	ND	0.2944	ND
Bacteria						
<i>E. coli</i>	MPN/100 mL	235	NR	NR	630	980

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

N/A – Turbidity meter did not post calibrate.

NR – Constituent not required to be sampled during Events 30 and 31.

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 16.

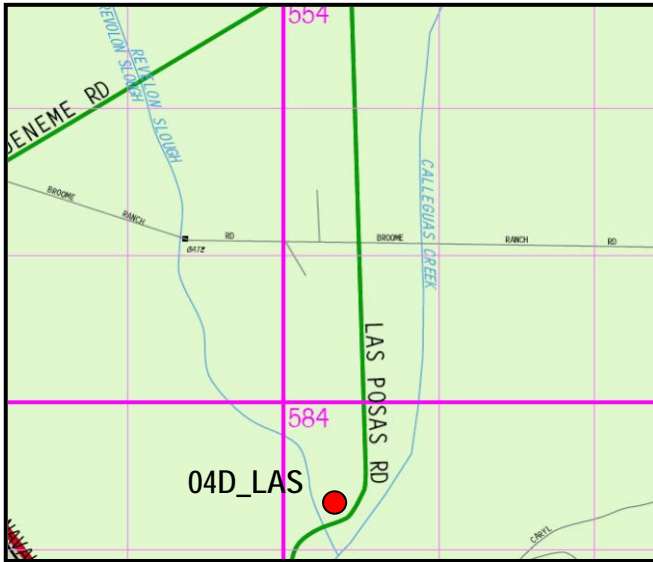
Table 24. 2016-2017 Trash Observations for 04D_ETTG

Event	Count	Types
Event 30	1	Styrofoam cup
Event 31	5-10	Bottle, Styrofoam cup, bags
Event 32	75+	Bottles, cans, gloves, ag trash
Event 33	10+	Plastic bag, metal pole, food wrappers, Styrofoam, cardboard

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 agricultural 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



Samples were collected at this site for three of the four 2016-2017 monitoring events; the site was not sampled during wet weather Event 32 because water was flowing backwards at the site and therefore was not representative of agricultural runoff. Table 25 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 26 quantifies and describes trash found at this site.

Exceedances of nitrate-N, dissolved copper, and 4,4'-DDE occurred during dry weather Events 30 and 33, as well as wet weather Event 31. Benchmarks for 4,4'-DDD, 4,4'-DDT, and toxaphene were exceeded during wet weather Event 31 and dry weather Event 33. The total chlordane and bifenthrin benchmarks were exceeded during wet weather Event 31. The *E. coli* benchmark was exceeded during dry weather Event 33. Row crops are the primary crop type along with acreage of sod being grown in the vicinity of this site.

Table 25. 2016-2017 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_LAS

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS		1.7	6.4	NS	1.4
pH		6.5 ≤ pH ≤ 8.5	7.9	7.0		8.0
Temperature	°C	≤ 26.67°C ¹	24.0	14.3		20.5
Dissolved Oxygen	mg/L	≥ 5	16.3	7.9		18.2
Turbidity	NTU		17.2	N/A		9.3
Conductivity	µS/cm		4551.0	2411.0		4832.0
General Water Quality						
TDS	mg/L		3800	1730	4030	
TSS	mg/L		ND	224	29	
Total Hardness as CaCO ₃	mg/L		1674	748	1952	
Chloride	mg/L		500	290	540	
Sulfate	mg/L		1410	752	1550	
Nutrients						
Ammonia-N	mg/L	1.56/ 6.04/ NS/ 1.68 ²	0.07	0.72	0.04	
Nitrate-N	mg/L	10 ³	62.65	30.83	64.90	
Total Nitrogen	mg/L		NR	NR	21.10	
Total Orthophosphate	mg/L		0.83	3.03	0.86	
Total Phosphorus	mg/L		NR	NR	0.29	
Metals						
Dissolved Copper	µg/L	3.10 ⁴	3.86	6.10	3.66	
Total Copper	µg/L		4.17	11.36	4.39	
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	DNQ	DNQ	
Chlordane-gamma	µg/L		ND	0.00570	ND	
Total Chlordane	µg/L	0.00059	ND	0.00570	DNQ	
2,4'-DDD	µg/L		DNQ	0.00910	ND	
2,4'-DDT	µg/L		ND	0.03100	ND	
4,4'-DDD	µg/L	0.00084	DNQ	0.02160	0.00580	
4,4'-DDE	µg/L	0.00059	0.01420	0.14490	0.01680	
4,4'-DDT	µg/L	0.00059	DNQ	0.10450	0.00910	
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 30	Event 31	Event 32	Event 33	
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017	
Endrin Aldehyde	µg/L	0.81	ND	ND		ND	
Toxaphene	µg/L	0.00075	ND	0.48570		0.13250	
Organophosphorus Pesticides							
Chlorpyrifos	µg/L	0.025	ND	0.018		0.003	
Diazinon	µg/L	0.1	ND	0.099		ND	
Malathion	µg/L	ND	ND	ND		0.027	
Pyrethroid Pesticides							
Bifenthrin	µg/L	0.0006	ND	0.0074		ND	
Cypermethrin	µg/L		ND	0.0475		ND	
Bacteria							
<i>E. coli</i>	MPN/100 mL	235	NR	NR	300		

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

N/A – Turbidity meter did not post calibrate.

NS – No samples were collected due to the site flowing backwards. Site not representative of agricultural runoff.

NR – Constituent not required to be sampled during Events 30 and 31.

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 16.

Table 26. 2016–2017 Trash Observations for 04D_LAS

Event	Count	Types
Event 30	5	Styrofoam cups
Event 31	50+	Tire, bags, bottles, cups
Event 32	5	Gloves, cans, cups, bottles
Event 33	12	Foil, cups, paper, bags

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



Samples were collected at this site for two of the four 2016-2017 monitoring events. Flow was not present during dry weather Events 30 and 33. The site was sampled during wet weather Events 31 and 32. Table 27 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 28 quantifies and describes trash found at this site.

The chlorpyrifos benchmark was exceeded during wet weather Events 31 and 32. The sulfate benchmark was exceeded during Event 31. The dissolved copper, total chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toxaphene, bifenthrin, and *E. coli* benchmarks were all exceeded during Event 32. Citrus, avocados, and berries (other than strawberries) are the major crop types that drain to this monitoring location.

Table 27. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: 05D_LAVD

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS			N/A ⁴	40.3	
pH		6.5 ≤ pH ≤ 8.5		8.2	8.0	
Temperature	°C	≤ 26.67°C ¹		13.9	10.8	
Dissolved Oxygen	mg/L	≥ 5		10.5	11.1	
Turbidity	NTU			N/A ⁵	1216.0	
Conductivity	µS/cm			860.1	182.0	
General Water Quality						
TDS	mg/L	850		660	120	
TSS	mg/L			43	3970	
Total Hardness as CaCO ₃	mg/L			381	60	
Chloride	mg/L	150		29	5	
Sulfate	mg/L	250		336	38	
Nutrients						
Ammonia-N	mg/L	NS/ 2.03/ 3.09/ NS ²		0.18	0.28	
Nitrate-N	mg/L	10		4.94	1.32	
Total Nitrogen	mg/L			NR	3.90	
Total Orthophosphate	mg/L			3.68	1.96	
Total Phosphorus	mg/L		NS	NR	5.48	NS
Metals						
Dissolved Copper	µg/L	NS/ 28.09/ 5.79/ NS ³		8.69	9.43	
Total Copper	µg/L			10.77	117.27	
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	
trans-Nonachlor	µg/L			ND	0.00560	
Chlordane-alpha	µg/L			ND	0.00890	
Chlordane-gamma	µg/L			ND	0.00680	
Total Chlordane	µg/L	0.00059		ND	0.01570	
2,4'-DDD	µg/L			ND	0.03470	
2,4'-DDE	µg/L			ND	0.00770	
2,4'-DDT	µg/L			ND	0.01500	
4,4'-DDD	µg/L	0.00084		ND	0.17730	
4,4'-DDE	µg/L	0.00059		ND	0.50220	
4,4'-DDT	µg/L	0.00059		ND	0.13690	
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 30	Event 31	Event 32	Event 33	
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017	
Endosulfan Sulfate	µg/L	240		ND	ND		
Endrin	µg/L	0.036		ND	ND		
Endrin Aldehyde	µg/L	0.81		ND	ND		
Toxaphene	µg/L	0.00075		ND	0.34650		
Organophosphorus Pesticides							
Chlorpyrifos	µg/L	0.025		0.589	0.340		
Diazinon	µg/L	0.1		ND	ND		
Pyrethroid Pesticides							
Bifenthrin	µg/L	0.0006		DNQ	0.0868		
Cyfluthrin	µg/L			ND	0.0146		
Cypermethrin	µg/L			0.0081	0.0504		
Danitol	µg/L			ND	0.0022		
Bacteria							
<i>E. coli</i>	MPN/100 mL	235		NR	3730		

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

NS – No samples were collected due to the site being dry.

NR – Constituent not required to be sampled during Events 30 and 31.

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 16.
4. Flow diminished during sampling.
5. Turbidity meter did not post calibrate.

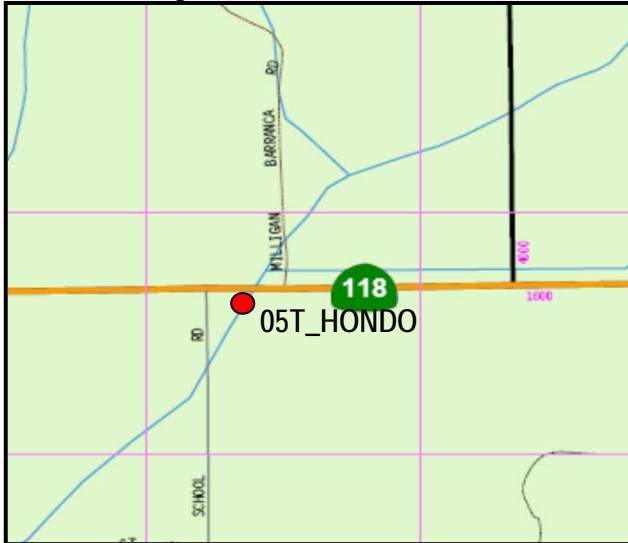
Table 28. 2016–2017 Trash Observations for 05D_LAVD

Event	Count	Types
Event 30	2	Soda can, bottle
Event 31	5	Plastic, spoon
Event 32	0-5	Lemons
Event 33	7	Wood, plastic

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 only present at this site during wet weather Event 32. Table 29 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During Event 32 there were exceedances of the dissolved copper, total chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toxaphene, chlorpyrifos, and *E. coli* benchmarks. The site is located directly adjacent to Hwy 118 and drains land planted primarily with citrus and avocado orchards. Table 30 quantifies and describes trash found at this site.

Table 29. 2016-2017 VCAILG Monitoring Data v. Waiver Benchmarks: 05T_HONDO

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33					
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017					
Field Measurements											
Flow	CFS						234.4E				
pH		6.5 ≤ pH ≤ 8.5					8.1				
Temperature	°C	≤ 26.67°C ¹					11.1				
Dissolved Oxygen	mg/L	≥ 5					11.0				
Turbidity	NTU						2430.0				
Conductivity	µS/cm						54.1				
General Water Quality											
TDS	mg/L	850									130
TSS	mg/L										618
Total Hardness as CaCO ₃	mg/L		76								
Chloride	mg/L	150	3								
Sulfate	mg/L	250	56								
Nutrients											
Ammonia-N	mg/L	NS/NS/2.70/NS ²									0.20
Nitrate-N	mg/L	10									1.11
Total Nitrogen	mg/L										3.27
Total Orthophosphate	mg/L						5.42				
Total Phosphate	mg/L						11.69				
Metals											
Dissolved Copper	µg/L	NS/NS/7.08/NS ³									9.37
Total Copper	µg/L										346.67
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								
cis-Nonchlor	µg/L		0.00660								
trans-Nonachlor	µg/L		0.01350								
Chlordane-alpha	µg/L		0.01380								
Chlordane-gamma	µg/L		0.01360								
Total Chlordane	µg/L	0.00059	0.02740								
2,4'-DDD	µg/L		0.03870								
2,4'-DDE	µg/L		0.00760								
2,4'-DDT	µg/L		0.01370								
4,4'-DDD	µg/L	0.00084	0.16190								
4,4'-DDE	µg/L	0.00059	0.64270								
4,4'-DDT	µg/L	0.00059	0.16560								
Dieldrin	µg/L	0.00014	ND								

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
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	
Endrin Aldehyde	µg/L	0.81			ND	
Toxaphene	µg/L	0.00075			0.35050	
Organophosphorus Pesticide						
Chlorpyrifos	µg/L	0.025			0.247	
Diazinon	µg/L	0.1			ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006			ND	
Cyfluthrin	µg/L				0.0132	
Cypermethrin	µg/L				0.1791	
Danitol	µg/L				1.0431	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235			3410	

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

NS – No samples were collected due to the site being dry.

E – Estimated value.

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 16.

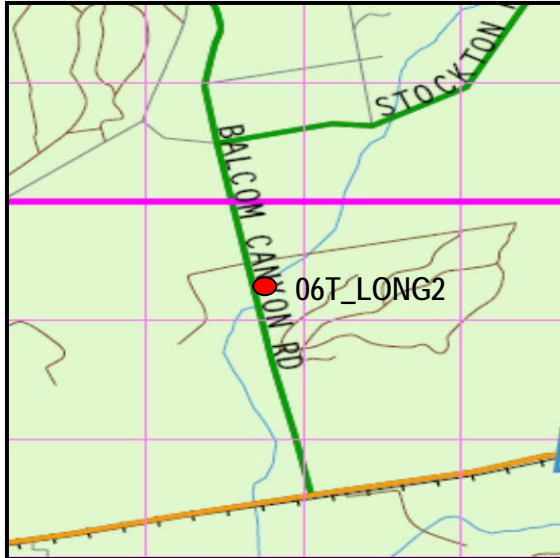
Table 30. 2016–2017 Trash Observations for 05T_HONDO

Event	Count	Types
Event 30	5	Clothing, plastic bottles
Event 31	50+	Cups, plastic, ag trash, bottles
Event 32	20-30	Cups, cans, wrappers
Event 33	75	Blankets, buckets, clothing, cups, glass 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



Samples were only collected at this site during wet weather monitoring Event 32. No flow was observed during both dry weather events (30 and 33), as well as wet weather Event 31. Table 31 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. There were exceedances of total chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, chlorpyrifos, and *E. coli* during Event 32. The drainage area for this monitoring site consists mostly of citrus and avocado orchards, with small portions used for growing, berries, and nursery stock. Table 32 quantifies and describes trash found at this site.

Table 31. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: 06T_LONG2

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS				137.8	
pH		6.5 ≤ pH ≤ 8.5			8.1	
Temperature	°C	≤ 26.67°C ¹			10.5	
Dissolved Oxygen	mg/L	≥ 5			11.2	
Turbidity	NTU				2063.0	
Conductivity	µS/cm				185.9	
General Water Quality						
TDS	mg/L	850			120	
TSS	mg/L				5500	
Total Hardness as CaCO ₃	mg/L				69	
Chloride	mg/L	150			4	
Sulfate	mg/L	250			36	
Nutrients						
Ammonia-N	mg/L	NS/ NS/ 2.72/ NS ²			0.25	
Nitrate-N	mg/L	10			1.09	
Total Nitrogen	mg/L				3.51	
Total Orthophosphate	mg/L				5.49	
Total Phosphorus	mg/L		NS	NS	16.91	NS
Metals						
Dissolved Copper	µg/L	NS/ NS/ 6.52/ NS ³			3.08	
Total Copper	µg/L				166.05	
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	
cis-Nonachlor	µg/L				0.00830	
trans-Nonachlor	µg/L				0.01450	
Chlordane-alpha	µg/L				0.01240	
Chlordane-gamma	µg/L				0.01000	
Total Chlordane	µg/L	0.00059			0.02240	
4,4'-DDD	µg/L	0.00084			0.03730	
4,4'-DDE	µg/L	0.00059			0.09400	
4,4'-DDT	µg/L	0.00059			0.15700	
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 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Endrin Aldehyde	µg/L	0.81			ND	
Toxaphene	µg/L	0.00075			ND	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025			0.197	
Diazinon	µg/L	0.1			ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006			ND	
Cyfluthrin	µg/L				0.0247	
Danitol	µg/L				0.0712	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235		14670		

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

NS – No samples were collected due to the site being dry.

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 16.

Table 32. 2016–2017 Trash Observations for 06T_LONG2

Event	Count	Types
Event 30	0	N/A
Event 31	30 – 50	Cups, Styrofoam, paper, plastic bottles
Event 32	10 – 12	Bags, cups, paper
Event 33	15	Bottles, glove, paper, plastic bags

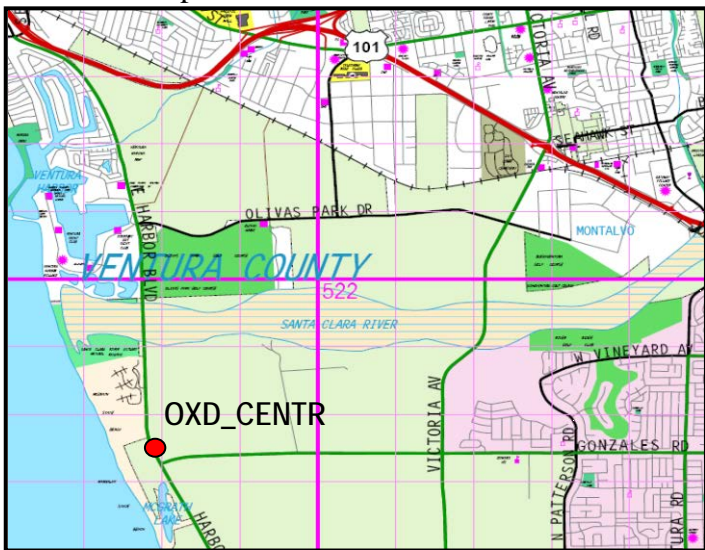
Oxnard Coastal Watershed

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



Flow was present at this site during three of the four 2016-2017 monitoring events. This site was ponded during dry weather monitoring Event 30. Table 33 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During wet weather Events 31 and 32 the benchmarks for dissolved copper, 4,4'-DDT, toxaphene, and bifenthrin were all exceeded. During Events 31 and 33, the nitrate-N benchmark was exceeded, and the dissolved oxygen benchmark was not met. The *E. coli* benchmark was exceeded during Events 32 and 33. During Event 32, the total chlordane, 4,4'-DDD, 4,4'-DDE, and chlorpyrifos benchmarks were exceeded. Strawberries and row crops are the predominant crop types that drain to this site. Table 34 quantifies and describes trash found at this site.

Table 33. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: OXD_CENTR

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Flow	CFS		NS	1.0	36.2	0.4
pH		6.5 ≤ pH ≤ 8.5		7.2	7.2	6.7
Temperature	°C			14.1	10.1	17.4
Dissolved Oxygen	mg/L	≥ 5		3.6	10.0	4.5
Turbidity	NTU			N/A	711.0	0.0
Conductivity	µS/cm			1987.0	960.6	3603.0
General Water Quality						
TDS	mg/L			1510	690	3090
TSS	mg/L			120	910	2
Total Hardness as CaCO ₃	mg/L			785	397	1660
Chloride	mg/L			123	37	190
Sulfate	mg/L			741	391	1520
Nutrients						
Ammonia-N	mg/L	NS/ 5.69/ 7.26/ 5.34 ¹		0.17	0.15	0.10
Nitrate-N	mg/L	10 ²		15.63	6.67	22.63
Total Nitrogen	mg/L			NR	12.56	19.12
Total Orthophosphate	mg/L			5.12	12.07	0.18
Total Phosphorus	mg/L			NR	3.68	0.12
Metals						
Dissolved Copper	µg/L	3.10 ³		8.38	3.25	2.35
Total Copper	µg/L			18.11	53.89	2.57
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
cis-Nonachlor	µg/L			ND	0.00760	ND
trans-Nonachlor	µg/L			ND	0.01320	ND
Chlordane-alpha	µg/L			DNQ	0.02290	ND
Chlordane-gamma	µg/L			DNQ	0.02570	ND
Total Chlordane	µg/L	0.0059		DNQ	0.04860	ND
2,4'-DDD	µg/L			ND	0.27960	ND
2,4'-DDE	µg/L			ND	0.04620	ND
2,4'-DDT	µg/L			0.08020	0.18230	ND
4,4'-DDD	µg/L	0.00084		0.05290	0.67530	DNQ
4,4'-DDE	µg/L	0.00059		0.25170	1.97020	DNQ
4,4'-DDT	µg/L	0.00059		0.37690	0.60130	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

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Endosulfan Sulfate	µg/L	240		ND	ND	ND
Endrin	µg/L	0.036		ND	ND	ND
Endrin Aldehyde	µg/L	0.81		ND	ND	ND
Toxaphene	µg/L	0.00075		0.38550	4.51720	DNQ
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025		0.009	0.040	ND
Diazinon	µg/L	0.1		ND	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006		0.4044	0.2574	ND
L-Cyhalothrin	µg/L			ND	0.0094	ND
Danitol	µg/L			0.8050	0.1754	ND
Bacteria						
<i>E. coli</i>	MPN/100 mL	235		NR	620	1019

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent.

See Tables 14 through 20 for a list of benchmarks applicable to this site.

N/A – Turbidity meter did not post calibrate.

NR – Constituent not required to be sampled during Events 30 and 31.

NS – No sample were collected due to the site being ponded.

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 16.

Table 34. 2016–2017 Trash Observations for OXD_CENTR

Event	Count	Types
Event 30	10	Cups, cigarette pack, food containers
Event 31	15+	Plastic cups, glass bottle, plastic bags, ag trash
Event 32	20+	Ag trash, styrofoam cups, plastic, clothing
Event 33	20+	Cups, paper plates, automotive debris

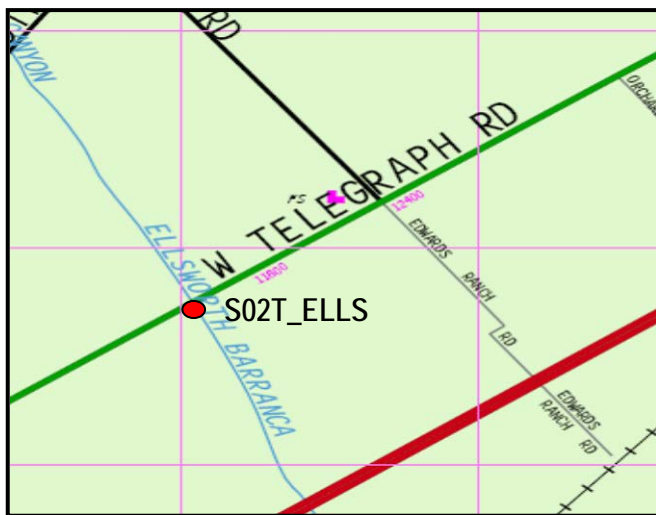
Santa Clara River Watershed

The Santa Clara River Watershed contains six VCAILG monitoring sites. 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 during two of the four 2016-2017 monitoring events. The site was ponded during dry weather monitoring Event 30, and dry during dry weather monitoring Event 33. Table 35 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During wet weather Events 31 and 32, the benchmarks for 4,4'-DDE, and chlorpyrifos were exceeded. The bifenthrin benchmark was exceeded during Event 31. The *E. coli* benchmark was exceeded during wet weather Event 32. Citrus and avocados are the primary crop types associated with this site. Table 36 describes trash found at this site.

Table 35. 2016 – 2017 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_ELLS

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS			1.8	562.5E	
pH		6.5 ≤ pH ≤ 8.5		7.8	8.1	
Temperature	°C	≤ 26.67°C ¹		13.3	9.9	
Dissolved Oxygen	mg/L	≥ 6		9.6	11.1	
Turbidity	NTU			389.5	2897.0	
Conductivity	µS/cm			583.3	522.8	
General Water Quality						
TDS	mg/L	1200		400	410	
TSS	mg/L			399	1,360,000	
Total Hardness as CaCO ₃	mg/L			195	124	
Chloride	mg/L	150		34	26	
Sulfate	mg/L	600		178	143	
Nutrients						
Ammonia-N	mg/L	NS/ 3.52/ 2.69/ NS ²		0.18	0.26	
Nitrate-N	mg/L	10		3.06	1.38	
Total Nitrogen	mg/L			NR	4.03	
Total Orthophosphate	mg/L			1.93	21.36	
Total Phosphorus	mg/L		NS ⁴	NR	26.38	NS ⁵
Metals						
Dissolved Copper	µg/L	NS/ 15.83/ 10.73/ NS ³		10.88	3.47	
Total Copper	µg/L			29.58	237.52	
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			DNQ	0.00550	
Chlordane-gamma	µg/L			DNQ	DNQ	
Total Chlordane	µg/L	0.00059		DNQ	0.00550	
4,4'-DDD	µg/L	0.00084		ND	ND	
4,4'-DDE	µg/L	0.00059		0.01500	0.02330	
4,4'-DDT	µg/L	0.00059		ND	ND	
Dieldrin	µg/L	0.00014		ND	ND	
Endosulfan-I	µg/L	0.056		ND	ND	
Endosulfan-II	µg/L	0.056		ND	ND	
Endosulfan Sulfate	µg/L	240		ND	ND	
Endrin	µg/L	0.036		ND	ND	
Endrin Aldehyde	µg/L	0.81		ND	ND	
Toxaphene	µg/L	0.00075		ND	ND	

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33	
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017	
Organophosphorus Pesticides							
Chlorpyrifos	µg/L	0.025			0.143	0.110	
Diazinon	µg/L	0.1			ND	ND	
Pyrethroid Pesticides							
Bifenthrin	µg/L	0.0006			0.0054	ND	
Cypermethrin	µg/L				0.0133	ND	
Bacteria							
	MPN/100 mL						
<i>E. coli</i>		235			NR	24890	

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent.

See Tables 14 through 20 for a list of benchmarks applicable to this site.

NR – Constituent not required to be sampled during Events 30 and 31.

E – Estimated value.

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 16.
4. No samples were collected due to the site being ponded
5. No samples were collected due to the site being dry.

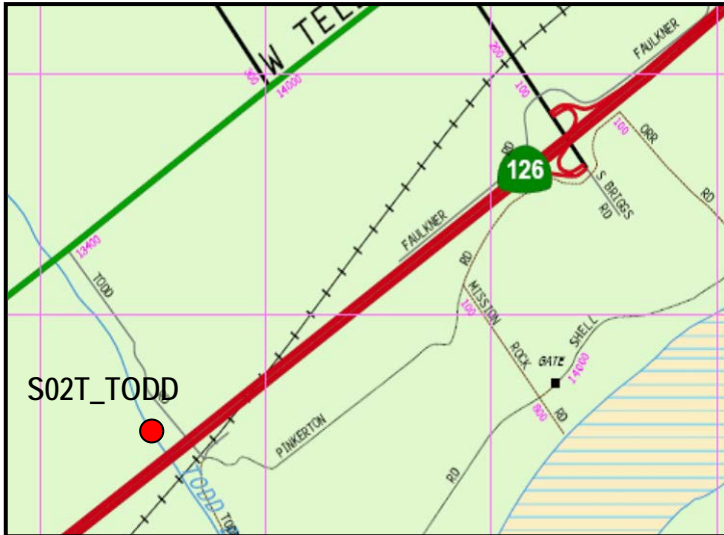
Table 36. 2016–2017 Trash Observations for S02T_ELLS

Event	Count	Types
Event 30	2	Bags, trash
Event 31	1	Fast food container
Event 32	0	N/A
Event 33	0	N/A

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 to sample during all four 2016-2017 monitoring events. Table 37 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During dry weather Event 30, and wet weather Events 31 and 32, the total chlordane and bifenthrin benchmarks were exceeded. During Events 30 and 31, the 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toxaphene, and chlorpyrifos benchmarks were exceeded. The TDS and sulfate benchmarks were exceeded during dry weather Events 30 and 33. The *E. coli* benchmark was exceeded during Events 32 and 33. The nitrate-N benchmark was exceeded during Event 30. Citrus and avocados are the primary crop types associated with this site, along with portions used for row crops. Table 38 lists trash observations made at the site.

Table 37. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_TODD

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS		0.6	0.8	226.9	0.1
pH		6.5 ≤ pH ≤ 8.5	8.0	7.4	8.0	8.0
Temperature	°C	≤ 26.67°C ¹	19.5	13.5	10.2	16.7
Dissolved Oxygen	mg/L	≥ 6	8.7	8.2	11.0	8.9
Turbidity	NTU		590.0	215.5	2897.0	N/A
Conductivity	µS/cm		2086.0	1550.0	503.2	2387.0
General Water Quality						
TDS	mg/L	1200	1700	1110	390	1920
TSS	mg/L		1900	210	9200	2
Total Hardness as CaCO ₃	mg/L		922	614	129	1063
Chloride	mg/L	150	88	71	18	102
Sulfate	mg/L	600	796	585	139	858
Nutrients						
Ammonia-N	mg/L	1.37/ 4.93/ 3.17/ 2.15 ²	0.35	0.23	0.21	DNQ
Nitrate-N	mg/L	10	13.26	8.25	2.48	7.94
Total Nitrogen	mg/L		NR	NR	6.28	12.92
Total Orthophosphate	mg/L		3.46	1.78	10.24	0.15
Total Phosphorus	mg/L		NR	NR	17.00	0.07
Metals						
Dissolved Copper	µg/L	29.28/ 29.28/ 11.13/ 29.28 ³	11.34	9.31	3.79	1.94
Total Copper	µg/L		95.35	30.72	159.89	2.27
Organochlorine Pesticides						
Aldrin	µg/L	0.00014	ND	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND	ND
cis-Nonachlor	µg/L		0.01210	ND	ND	ND
trans-Nonachlor	µg/L		0.03910	DNQ	DNQ	ND
Chlordane-alpha	µg/L		0.07690	0.00730	0.00560	ND
Chlordane-gamma	µg/L		0.07490	0.00780	ND	ND
Total Chlordane	µg/L	0.00059	0.15180	0.01510	0.00560	ND
2,4'-DDT	µg/L		0.01320	0.01930	ND	ND
4,4'-DDD	µg/L	0.00084	0.02040	0.02230	ND	ND
4,4'-DDE	µg/L	0.00059	0.04070	0.05120	ND	ND
4,4'-DDT	µg/L	0.00059	0.16810	0.14410	ND	ND
Dieldrin	µg/L	0.00014	ND	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND	ND

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Endrin	µg/L	0.036	ND	ND	ND	ND
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	0.15560	0.12260	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.058	0.052	ND	ND
Diazinon	µg/L	0.1	ND	ND	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	0.0192	0.0263	0.0147	ND
Cyfluthrin	µg/L		ND	0.0020	ND	ND
Cypermethrin	µg/L		1.8000	0.0839	0.0185	ND
Danitol	µg/L		ND	ND	0.0046	ND
Esfenvalerate	µg/L		0.0036	DNQ	ND	ND
Fenvalerate	µg/L		0.0037	ND	DNQ	ND
Bacteria						
	MPN/100					
<i>E. coli</i>	mL	235	NR	NR	98040	583

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

N/A – Meter did not post calibrate.

NR – Constituent not required to be sampled during Events 30 and 31.

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 16.

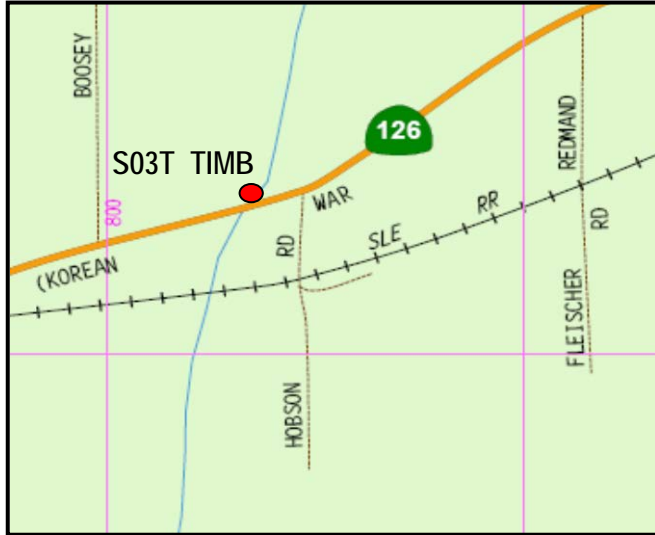
Table 38. 2016–2017 Trash Observations for S02T_TODD

Event	Count	Types
Event 30	0	N/A
Event 31	0	N/A
Event 32	0	N/A
Event 33	8	Plastic, styrofoam, wrappers

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 present to monitor during wet weather Events 31 and 32, and the site was dry during both dry weather Events 30 and 33. Table 39 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. The benchmarks for TDS, chloride, and sulfate were exceeded during wet weather Event 31. The benchmarks for chlorpyrifos and *E. coli* were exceeded during wet weather Event 32. This site drains mostly avocado and citrus orchards. Trash observations are provided in Table 40.

Table 39. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_TIMB

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS			0.1	29.5	
pH		6.5 ≤ pH ≤ 8.5		7.9	8.2	
Temperature	°C	≤ 26.67°C ¹		13.8	9.4	
Dissolved Oxygen	mg/L	≥ 5		9.8	11.3	
Turbidity	NTU			3000.0	2896.0	
Conductivity	µS/cm			41.3	1090.0	
General Water Quality						
TDS	mg/L	1300		3130	930	
TSS	mg/L			43200	48300	
Total Hardness as CaCO ₃	mg/L			692	264	
Chloride	mg/L	100		330	43	
Sulfate	mg/L	650		1620	554	
Nutrients						
Ammonia-N	mg/L	NS/ 3.08/ 2.58/ NS ²		1.04	0.25	
Nitrate-N	mg/L	5		4.83	1.82	
Total Nitrogen	mg/L			NR	4.68	
Total Orthophosphate	mg/L		NS	0.37	30.03	NS
Total Phosphorus	mg/L			NR	95.87	
Metals						
Dissolved Copper	µg/L	NS/ 29.28/ 20.51/ NS ³		11.85	6.27	
Total Copper	µg/L			752.28	710.74	
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	
4,4'-DDD	µg/L	0.00084		ND	ND	
4,4'-DDE	µg/L	0.00059		ND	ND	
4,4'-DDT	µg/L	0.00059		ND	ND	
Dieldrin	µg/L	0.00014		ND	ND	
Endosulfan-I	µg/L	0.056		ND	ND	
Endosulfan-II	µg/L	0.056		ND	ND	
Endosulfan Sulfate	µg/L	240		ND	ND	
Endrin	µg/L	0.036		ND	ND	
Endrin Aldehyde	µg/L	0.81		ND	ND	
Toxaphene	µg/L	0.00075		ND	ND	

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025		ND	0.114	
Diazinon	µg/L	0.1		ND	ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006		ND	ND	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235	NR	6970		

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

NR – Constituent not required to be sampled during Events 30 and 31.

NS – No samples were collected due to the site being dry.

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 16.

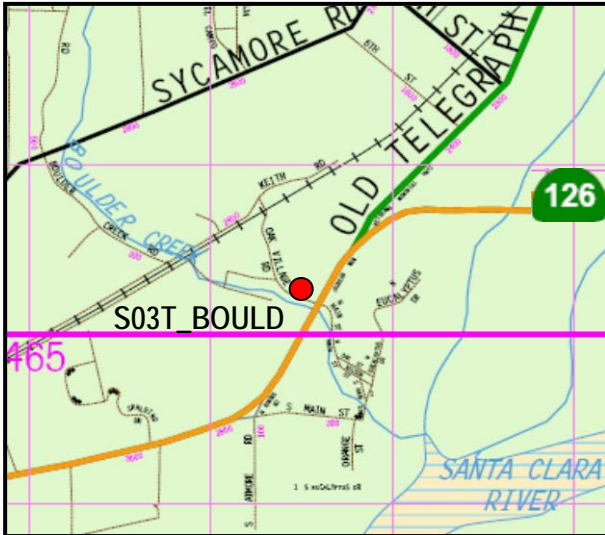
Table 40. 2016–2017 Trash Observations for S03T_TIMB

Event	Count	Types
Event 30	5-10	Boxes, cardboard, plastic bottles
Event 31	6	Styrofoam cups, plastic bottles
Event 32	3	Plastic bottle
Event 33	2	Plastic bag, bottle

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 to monitor during the 2016-2017 season was only present at this site during wet weather Event 32. During dry weather Events 30 and 33 no samples were collected due to the site being dry. During wet weather Event 31 the site was ponded and therefore not sampled. Table 41 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. The benchmarks for total chlordane, 4,4'-DDE, chlorpyrifos, bifenthrin, and *E. Coli* were exceeded during Event 32. Citrus, avocados, and nurseries are the primary crop types associated with this site. Trash observations for this site can be found in Table 42.

Table 41. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_BOULD

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS				60.5	
pH		6.5 ≤ pH ≤ 8.5			8.1	
Temperature	°C	≤ 26.67°C ¹			9.4	
Dissolved Oxygen	mg/L	≥ 5			11.4	
Turbidity	NTU				886.0	
Conductivity	µS/cm				451.9	
General Water Quality						
TDS	mg/L	1300			390	
TSS	mg/L				3380	
Total Hardness as CaCO ₃	mg/L				167	
Chloride	mg/L	150			9	
Sulfate	mg/L	650			151	
Nutrients						
Ammonia-N	mg/L	NS/ NS/ 2.92/ NS ²			0.31	
Nitrate-N	mg/L	5			2.31	
Total Nitrogen	mg/L				5.68	
Total Orthophosphate	mg/L				0.92	
Total Phosphorus	mg/L				5.04	
Metals						
Dissolved Copper	µg/L	NS/ NS/ 13.87/ NS ³	NS ⁴	NS ⁵	4.29	NS ⁴
Total Copper	µg/L				90.26	
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	
cis-Nonachlor	µg/L				0.00510	
trans-Nonachlor	µg/L				0.00970	
Chlordane-alpha	µg/L				0.01170	
Chlordane-gamma	µg/L				0.00980	
Total Chlordane	µg/L	0.00059			0.02150	
4,4'-DDD	µg/L	0.00084			ND	
4,4'-DDE	µg/L	0.00059			0.00650	
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 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Endrin Aldehyde	µg/L	0.81			ND	
Toxaphene	µg/L	0.00075			ND	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025			0.035	
Diazinon	µg/L	0.1			ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006			0.0205	
Cyfluthrin	µg/L				0.0068	
Danitol	µg/L				0.0408	
cis-Permethrin	µg/L				0.0365	
trans-Permethrin	µg/L				0.0890	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235			1690	

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 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 16.
4. No samples were collected due to the site being dry.
5. No samples were collected due to the site being ponded.

Table 42. 2016–2017 Trash Observations for S03T_BOULD

Event	Count	Types
Event 30	5-10	Case of bottles, cups, plastic
Event 31	8	Car parts, hubcap, plastic bottles, bags
Event 32	10+	Cans, cups, styrofoam
Event 33	15-20	Cups, bottles, styrofoam, plastic bags, cans

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 to monitor was present during two of the four 2016-2017 monitoring events. Sampling was carried out during wet weather Events 31 and 32. Sampling was not conducted during dry Events 30 and 33 due to the site being dry. Table 43 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. There were no exceedances of benchmarks during wet weather Event 31. There were exceedances of the dissolved copper, total chlordane, 4,4'-DDE, chlorpyrifos, bifenthrin, and *E. coli* benchmarks during wet weather Event 32. This site drains mostly citrus orchards with small proportions of the area used for avocados and row crops. Trash observations for S03D_BARDS are provided below in Table 44.

Table 43. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: S03D_BARDS

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS			0.2	11.1	
pH		6.5 ≤ pH ≤ 8.5		8.1	8.5	
Temperature	°C	≤ 26.67°C ¹		16.9	9.1	
Dissolved Oxygen	mg/L	≥ 5		9.9	11.2	
Turbidity	NTU			89.3	981.0	
Conductivity	µS/cm			9.9	148.0	
General Water Quality						
TDS	mg/L	1300		210	70	
TSS	mg/L			116	2670	
Total Hardness as CaCO ₃	mg/L			101	31	
Chloride	mg/L	100		14	5	
Sulfate	mg/L	650		72	21	
Nutrients						
Ammonia-N	mg/L	NS/ 1.72/ 1.60/ NS ²		0.14	0.12	
Nitrate-N	mg/L	5		4.51	0.92	
Total Nitrogen	mg/L			NR	2.40	
Total Orthophosphate	mg/L			1.35	2.39	
Total Phosphorus	mg/L		NS	NR	4.69	NS
Metals						
Dissolved Copper	µg/L	NS/ 9.02/ 3.25/ NS ³		3.92	9.20	
Total Copper	µg/L			6.20	54.77	
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	
cis-Nonachlor	µg/L			ND	0.00690	
trans-Nonachlor	µg/L			ND	0.01210	
Chlordane-alpha	µg/L			ND	0.00930	
Chlordane-gamma	µg/L			ND	0.00750	
Total Chlordane	µg/L	0.00059		ND	0.01680	
4,4'-DDD	µg/L	0.00084		ND	ND	
4,4'-DDE	µg/L	0.00059		ND	0.04430	
4,4'-DDT	µg/L	0.00059		ND	ND	
Dieldrin	µg/L	0.00014		ND	ND	
Endosulfan-I	µg/L	0.056		ND	ND	
Endosulfan-II	µg/L	0.056		ND	ND	
Endosulfan Sulfate	µg/L	240		ND	ND	
Endrin	µg/L	0.036		ND	ND	

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Endrin Aldehyde	µg/L	0.81		ND	ND	
Toxaphene	µg/L	0.00075		ND	ND	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025		0.011	0.049	
Diazinon	µg/L	0.1		ND	ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006		ND	0.0293	
Cyfluthrin	µg/L			DNQ	0.0300	
Cypermethrin	µg/L			0.0308	0.0267	
Danitol	µg/L			0.0162	0.0167	
Esfenvalerate	µg/L			ND	0.0041	
Fenvalerate	µg/L			ND	0.0032	
Fluvalinate	µg/L			ND	0.0020	
Bacteria						
	MPN/100 mL	235				
<i>E. coli</i>				NR	5480	

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

NR – Constituent not required to be sampled during Events 30 and 31.

NS – No samples were collected due to the site being dry.

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 16.

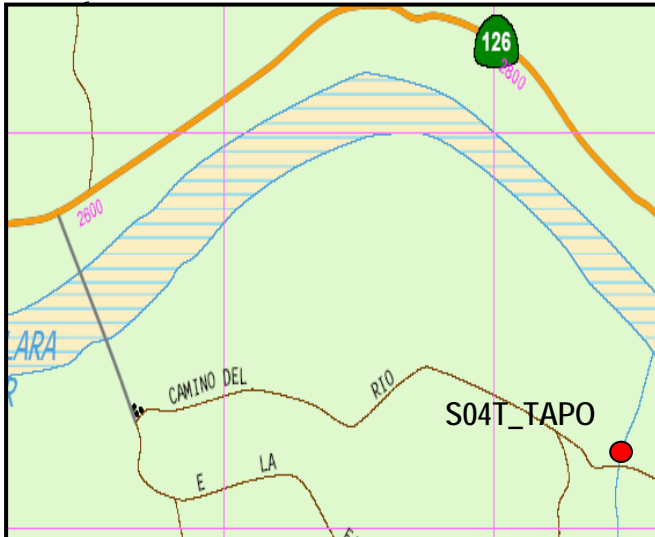
Table 44. 2016–2017 Trash Observations for S03D_BARDS

Event	Count	Types
Event 30	5-10	Cans, buckets, PVC pipe
Event 31	15	Styrofoam cups, plastic bottles, plastic sheeting, paint cans
Event 32	30-40	Ag boxes, buckets
Event 33	25-30	Boxes, plastic bucket, Ag trash

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 to sample during all four 2016-2017 monitoring events. Table 45 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. The benchmarks for TDS, and sulfate were exceeded during dry weather Events 30 and 33, as well as wet weather Event 32. The chloride benchmark was exceeded during both dry weather Events 30 and 33, as well as wet weather Event 31. The nitrate-N benchmark was exceeded during dry weather Events 30 and 33. The total chlordane, 4,4'-DDE, bifenthrin, and *E. coli* benchmarks were exceeded during wet weather Event 32. Row crops, citrus, and nursery stock are grown in the vicinity of this monitoring site. Table 46 summarizes trash observations for this site.

Table 45. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: S04T_TAPO

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS		0.04	2.3	9.4	0.1
pH		6.5 ≤ pH ≤ 8.5	8.2	8.0	8.0	8.0
Temperature	°C	≤ 26.67°C ¹	17.3	17.9	9.5	17.3
Dissolved Oxygen	mg/L	≥ 5	8.9	8.3	11.1	9.6
Turbidity	NTU		0.2	72.5	2893.0	N/A
Conductivity	µS/cm		3503	1825.0	1921.0	3265.0
General Water Quality						
TDS	mg/L	1300	2780	1230	1490	3260
TSS	mg/L		ND	90	10600	3
Total Hardness as CaCO ₃	mg/L		1224	577	679	1544
Chloride	mg/L	100	210	139	54	250
Sulfate	mg/L	600	1310	454	822	1480
Nutrients						
Ammonia-N	mg/L	1.63/ 1.93/ 3.18/ 2.01 ²	0.05	0.12	0.25	0.15
Nitrate-N	mg/L	5	18.22	2.59	1.87	8.70
Total Nitrogen	mg/L		NR	NR	5.04	13.96
Total Orthophosphate	mg/L		0.15	0.28	1.65	0.06
Total Phosphorus	mg/L		NR	NR	17.63	0.05
Metals						
Dissolved Copper	µg/L	29.28 ³	2.63	5.59	4.97	4.96
Total Copper	µg/L		2.72	10.75	185.05	6.47
Organochlorine Pesticides						
Aldrin	µg/L	0.00014	ND	ND	ND	ND
BHC-alpha	µg/L	0.013	ND	ND	ND	ND
BHC-beta	µg/L	0.046	ND	ND	ND	ND
BHC-gamma	µg/L	0.063	ND	ND	ND	ND
Chlordane-alpha	µg/L		ND	ND	0.00670	ND
Chlordane-gamma	µg/L		ND	ND	0.00530	ND
Total Chlordane	µg/L	0.0059	ND	ND	0.01200	ND
4,4'-DDD	µg/L	0.00084	ND	ND	ND	ND
4,4'-DDE	µg/L	0.00059	DNQ	ND	0.17870	ND
4,4'-DDT	µg/L	0.00059	ND	ND	ND	ND
Dieldrin	µg/L	0.00014	ND	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND	ND
Endosulfan-II	µg/L	0.056	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND	ND
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	ND	ND	ND	ND

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	ND	ND	ND	ND
Diazinon	µg/L	0.1	ND	ND	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	ND	ND	0.0103	ND
Danitol	µg/L		DNQ	ND	0.0036	ND
Bacteria						
	MPN/100					
<i>E. coli</i>	mL	235	NR	NR	1200	183

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

N/A – Meter did not post calibrate.

NR – Constituent not required to be sampled during Events 30 and 31.

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 16. It was the same for all four events.

Table 46. 2016–2017 Trash Observations for S04T_TAPO

Event	Count	Types
Event 30	1	Cup
Event 31	1	Plastic bottle
Event 32	1	Beverage cup
Event 33	0	N/A

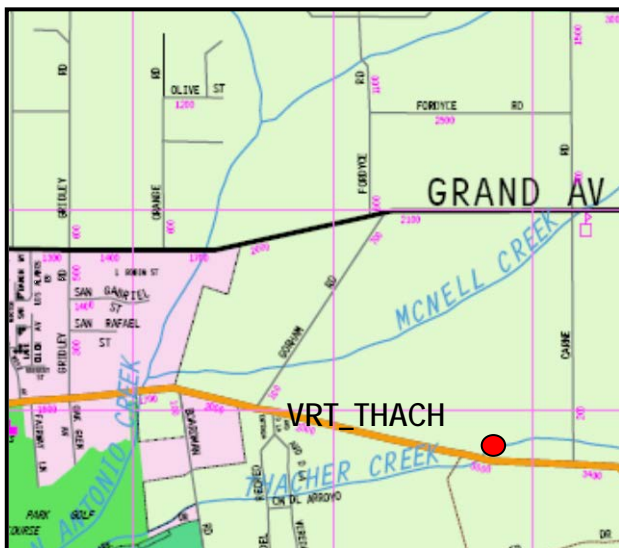
Ventura River Watershed

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 present for sampling at this site during two of the four 2016-2017 monitoring events. The site was sampled during both wet weather Events 31 and 32. During both dry weather Events 30 and 33 the site was not sampled due to it being dry. Table 47 contains a summary of concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During both wet weather Events 31 and 32 there were exceedances of the 4,4'-DDE benchmark. During Event 31 the dissolved copper and 4,4'-DDT benchmarks were exceeded. During Event 32 the sulfate, 4,4'-DDD, and *E. coli* benchmarks were exceeded. Citrus and avocados are the predominant crop types associated with this site. The approximate amount and types of trash observed at this site is recorded in Table 48.

Table 47. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: VRT_THACH

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS			0.01EST	50.2	
pH		6.5 ≤ pH ≤ 8.5		6.9	8.1	
Temperature	°C	≤ 26.67°C ¹		11.9	9.7	
Dissolved Oxygen	mg/L	≥ 7		10.1	11.0	
Turbidity	NTU			233.6	700.3	
Conductivity	µS/cm			171.5	269.5	
General Water Quality						
TDS	mg/L	800		120	240	
TSS	mg/L			170	1800	
Total Hardness as CaCO ₃	mg/L			55	99	
Chloride	mg/L	60		7	7	
Sulfate	mg/L	30		24	48	
Nutrients						
Ammonia-N	mg/L	NS/ 7.30/ 2.72 / NS ²		0.33	0.15	
Nitrate-N	mg/L	5		1.85	1.44	
Total Nitrogen	mg/L			NR	3.26	
Total Orthophosphate	mg/L			1.59	0.98	
Total Phosphorus	mg/L		NS	NR	2.94	NS
Metals						
Dissolved Copper	µg/L	NS/ 5.38/ 8.91/ NS ³		17.59	2.85	
Total Copper	µg/L			30.72	52.85	
Organochlorine Pesticides						
Aldrin	µg/L	0.00013		ND	ND	
BHC-alpha	µg/L	0.0039		ND	ND	
BHC-beta	µg/L	0.014		ND	ND	
BHC-gamma	µg/L	0.019		ND	ND	
Chlordane-alpha	µg/L			ND	DNQ	
Chlordane-gamma	µg/L			ND	DNQ	
Total Chlordane	µg/L	0.00059		ND	DNQ	
4,4'-DDD	µg/L	0.00084		ND	0.04610	
4,4'-DDE	µg/L	0.00059		0.11990	0.25890	
4,4'-DDT	µg/L	0.00059		0.02550	ND	
Dieldrin	µg/L	0.00014		ND	ND	
Endosulfan-I	µg/L	0.056		ND	ND	
Endosulfan-II	µg/L	0.056		ND	ND	
Endosulfan Sulfate	µg/L	110		ND	ND	
Endrin	µg/L	0.036		ND	ND	
Endrin Aldehyde	µg/L	0.76		ND	ND	
Toxaphene	µg/L	0.00075		ND	ND	

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025		ND	0.016	
Diazinon	µg/L	0.1		ND	ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006		ND	ND	
Cyfluthrin	µg/L			ND	0.0037	
Cypermethrin	µg/L			ND	0.0041	
Danitol	µg/L			ND	0.0021	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235		NR	3890	

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

NR – Constituent not required to be sampled during Events 30 and 31.

NS – No samples were collected due to the site being dry.

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 16.

Table 48. 2016–2017 Trash Observations for VRT_THACH

Event	Count	Types
Event 30	15-20	Bags, bottles, lumber paper, food containers
Event 31	2	Trash bag, drink bottle
Event 32	5	Plastic bottles
Event 33	6	Styrofoam, plastic, chip bags, paper, sheet metal

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



Samples were collected at this site during one of the four 2016-2017 monitoring events. The site was dry during both dry weather sampling Events 30 and 33, as well as wet weather sampling Event 31. Table 49 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During wet weather sampling Event 32, the benchmarks for 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and *E. coli* were exceeded. Citrus and avocados are the predominant crop types associated with this site. Table 50 includes the number and types of trash observed at the monitoring site.

Table 49. 2016–2017 VCAILG Monitoring Data v. Waiver Benchmarks: VRT_SANTO

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Field Measurements						
Flow	CFS				63.6	
pH		$6.5 \leq \text{pH} \leq 8.5$			8.2	
Temperature	°C	$\leq 26.67^{\circ}\text{C}^1$			10.5	
Dissolved Oxygen	mg/L	≥ 7			10.8	
Turbidity	NTU				786.0	
Conductivity	µS/cm				479.0	
General Water Quality						
TDS	mg/L	800			340	
TSS	mg/L				1020	
Total Hardness as CaCO ₃	mg/L				192	
Chloride	mg/L	60			16	
Sulfate	mg/L	300			121	
Nutrients						
Ammonia-N	mg/L	NS/ NS/ 2.51/ NS ²			0.06	
Nitrate-N	mg/L	5			3.09	
Total Nitrogen	mg/L				6.64	
Total Orthophosphate	mg/L				0.77	
Total Phosphorus	mg/L		NS	NS	1.64	NS
Metals						
Dissolved Copper	µg/L	NS/ NS/ 15.65/ NS ³			2.58	
Total Copper	µg/L				30.71	
Organochlorine Pesticides						
Aldrin	µg/L	0.00013			ND	
BHC-alpha	µg/L	0.0039			ND	
BHC-beta	µg/L	0.014			ND	
BHC-gamma	µg/L	0.019			ND	
Chlordane-alpha	µg/L				DNQ	
Chlordane-gamma	µg/L				ND	
Total Chlordane	µg/L	0.00059			DNQ	
4,4'-DDD	µg/L	0.00084			0.00640	
4,4'-DDE	µg/L	0.00059			0.04100	
4,4'-DDT	µg/L	0.00059			0.07870	
Dieldrin	µg/L	0.00014			ND	
Endosulfan-I	µg/L	0.056			ND	
Endosulfan-II	µg/L	0.056			ND	
Endosulfan Sulfate	µg/L	110			ND	
Endrin	µg/L	0.036			ND	
Endrin Aldehyde	µg/L	0.76			ND	
Toxaphene	µg/L	0.00075			ND	

Constituent	Units	Benchmark	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2016	Wet 1/22/2017	Dry 5/31/2017
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025			ND	
Diazinon	µg/L	0.1			ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	ND			
Bacteria						
<i>E. coli</i>	MPN/100 mL	235			2230	

Concentrations in **bold** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 14 through 20 for a list of benchmarks applicable to this site.

NS – No samples were collected due to the site being dry.

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 16.

Table 50. 2016–2017 Trash Observations for VRT_SANTO

Event	Count	Types
Event 30	10-15	Paper cups, plastic bags, paper, food wrappers
Event 31	3	Fast food trash
Event 32	0	N/A
Event 33	4	Plastic, cardboard

CHRONIC TOXICITY TEST RESULTS

During the 2016-2017 monitoring year, Pacific EcoRisk (PER) performed single-species short-term chronic toxicity tests for samples collected during the first wet weather event (Event 31) and second dry weather event (Event 33). The toxicity reports submitted by PER contain test results and raw data. PER submitted two types of reports, an electronic data deliverable (EDD), which has been configured to California Environmental Data Exchange Network (CEDEN) format, and a narrative report. The toxicity data is included as Appendix G and the narrative lab reports are provided on the accompanying data CD.

Event 31 toxicity testing was limited to receiving water monitoring sites per the 2010 *Conditional Waiver* MRP and QAPP. Event 33 took place following the approval of the QAPP and MRP developed under the 2016 *Conditional Waiver*, which includes toxicity monitoring at all VCAILGMP sites. Single-species toxicity testing was conducted using the appropriate invertebrate species, either *C. dubia* or *Hyalella*, based on the conductivity of the sample. 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. As shown in Table 51, toxicity testing during Event 31 indicated reproduction toxicity for *C. dubia* at the S02T_TODD site and survival toxicity for *Hyalella* at the S03T_TIMB Site. A targeted TIE was not initiated based on the *Hyalella* toxicity at the S03T_TIMB site as mortality was not less than 50 percent. No other significant reductions in *C. dubia* survival or reproduction toxicity occurred in any of the remaining single-species results for Event 31. Toxicity testing during Event 33 indicated reproduction toxicity for *C. dubia* at the S02T_TODD site and survival toxicity at the 01T_ODD3 EDI, 04D_ETTG, S04T_TAPO, and OXD_CENTR sites. Due to the observation of a greater than 50 percent reduction in survival in the initial testing of the 04D_ETTG and S04T_TAPO *Hyalella* samples, TIEs targeted for organics were initiated.

For the TIE performed on the 04D_ETTG sample, there was a reduction in survival and reproduction in the Baseline TIE treatment, indicating toxicity was persistent. There were blank interferences present in the 100 µg/L piperonyl butoxide (PBO) blank. Toxicity was removed in the centrifugation + C₁₈ solid phase extraction (SPE) treatment and the carboxylesterase treatment, indicating that a dissolved-phase non-polar organic with ester bonds was responsible for the toxicity. The weight of evidence from this TIE is suggestive of a pyrethroid insecticide as the cause of the toxicity. For the TIE performed on the S04T_TAPO sample, there was only a slight reduction in survival in the Baseline TIE treatment site water, indicating toxicity was not persistent. As a result, the contaminant classes responsible for the toxicity in the initial test could not be identified.

Table 51. Chronic Toxicity Results 2016-2017

Site	Event	<i>Ceriodaphnia dubia</i> ¹			<i>Hyalella</i> ²	TIE? Triggered
		Survival Toxicity	Reprod. Toxicity	Reprod. % Red.	Survival Toxicity	
05D_LAVD	31: 12/16/16	No	No	--		--
S02T_ELLS	31: 12/16/16	No	No	--		--
S02T_TODD	31: 12/16/16	No	Yes	16.8% ³		--
VRT_THACH	31: 12/16/16	No	No	--		--
S04T_TAPO	31: 12/16/16	No	No	--		--
S03T_TIMB	31: 12/16/16				Yes	No ⁴
01T_ODD3_EDI	33: 5/31/17				Yes ³	No ⁴
04D_LAS	33: 5/31/17				No	--
04D_ETTG	33: 5/31/17				Yes ³	Yes
S02T_TODD	33: 5/31/17	No	Yes	44.9% ³		--
S04T_TAPO	33: 5/31/17				Yes ³	Yes
OXD_CENTR	33: 5/31/17				Yes ³	No ⁴

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 ($p < 0.05$).
4. Although there was survival toxicity in this sample, the Mean Percent Survival was greater than 50 percent, so a TIE was not initiated per the trigger outlined in the 2016 QAPP.

TMDL LOAD ALLOCATIONS AND MONITORING RESULTS

Calleguas Creek Watershed

The Stakeholders Implementing TMDLs in the Calleguas Creek Watershed submit an annual monitoring report on December 15th of each year. This year's report, "Calleguas Creek Watershed TMDL Compliance Monitoring Program Ninth Year Annual Monitoring Report – July 2016 to June 2017" is included as an additional attachment to the VCAILG AMR. The report includes summaries of the sampling events, data summaries, and a compliance comparison to the allocations for six of the currently effective TMDLs in the watershed:

- Nitrogen Compounds and Related Effects in Calleguas Creek (Nitrogen or Nutrients TMDL)
- Organochlorine (OC) Pesticides, Polychlorinated Biphenyls (PCBs) and Siltation in Calleguas Creek, its Tributaries, and Mugu Lagoon (OC Pesticides TMDL)
- Toxicity, Chlorpyrifos, and Diazinon in the Calleguas Creek, its Tributaries and Mugu Lagoon (Toxicity TMDL)
- Metals and Selenium in Calleguas Creek, its Tributaries, and Mugu Lagoon (Metals TMDL)
- Boron, Chloride, Sulfate and TDS (Salts) in the Calleguas Creek, its Tributaries and Mugu Lagoon (Salts TMDL)
- Revolon Slough and Beardsley Wash Trash TMDL (Trash TMDL)

The Trash TMDL is addressed through a separate monitoring and reporting program. For additional information, refer to the "2018 Revolon Slough/Beardsley Wash Trash TMDL TMRP/MFAC Annual Report", which will be submitted in January 2018.

Santa Clara River Watershed

Effective TMDLs for the Santa Clara River Watershed are discussed below. This is the second year monitoring and data for comparison to the Santa Clara River TMDL benchmarks are included in the AMR.

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 52. Levels of Nitrite-N are typically insignificant compared to the other nitrogen compounds that are measured, and are not monitored as part of the VCAILGMP.

Table 52. 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

Table 53 lists the data collected at the VCAILGMP monitoring sites located within the Santa Clara River Watershed for comparison to the nitrogen LA. The LA was exceeded at two monitoring sites, S02T_TODD and S04T_TAPO. The S02T_TODD site was sampled during all four monitoring events with the concentration from the first dry event exceeding the LA. The S04T_TAPO site was sampled during all four monitoring events with the concentration from the first dry event exceeding the LA.

Table 53. Nitrogen Load Allocations Compared to SCR VCAILGMP Site Data

Site	Constituent	LA ¹ (mg/L)	Event 30 Dry Aug-2016	Event 31 Wet Dec-2017	Event 32 Wet Jan-2017	Event 33 Dry May-2017
S02T_ELLS	Ammonia-N + Nitrate-N	10	NS	3.24	1.64	NS
S02T_TODD	Ammonia-N + Nitrate-N	10	13.61	8.48	2.69	7.94
S03T_TIMB	Ammonia-N + Nitrate-N	10	NS	5.87	2.07	NS
S03T_BOULD	Ammonia-N + Nitrate-N	10	NS	NS	2.62	NS
S03D_BARDS	Ammonia-N + Nitrate-N	10	NS	4.65	1.04	NS
S04T_TAPO	Ammonia-N + Nitrate-N	10	18.27	2.71	2.12	8.85

Bold numbers indicate the value is greater than the Load Allocation.

NS = Not Sampled; site dry.

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.

Upper Santa Clara River Chloride TMDL Revisions

Load Allocations

The chloride LA applies to reaches 4B, 5, and 6 of the Santa Clara River. There is one VCAILG monitoring site, S04T_TAPO, which drains to reach 4B. The remaining reaches are located within Los Angeles County.

Table 54. Load Allocation for Chloride

Constituent	Load Allocation (mg/L) ¹
Chloride	100

1. Allocation applies as a 3-month rolling average.

Monitoring Results

According to the Upper Santa Clara River Chloride TMDL source analysis, nonpoint sources are not a major chloride source. Three of the four single samples collected at the S04T_TAPO site were greater than the TMDL LA; however, the load allocation is a 3-month rolling average benchmark.

Table 55. Chloride Load Allocation Compared to S04T_TAPO Site Data

Site	Constituent	LA ¹ (mg/L)	Event 30 Dry Aug-2016	Event 31 Wet Dec-2017	Event 32 Wet Jan-2017	Event 33 Dry May-2017
S04T_TAPO	Chloride	100	210	139	54	250

Bold numbers indicate the value is greater than the Load Allocation.

1. While the load allocation is a 3-month rolling average, the data provided in this table consists of single samples.

Santa Clara River Estuary Toxaphene TMDL

The Santa Clara River Estuary Toxaphene TMDL was adopted as a single regulatory action in the 2010 *Conditional Waiver*. The 2016 *Conditional Waiver* and Appendix 3, 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 represent agricultural discharges directly to the Estuary, and one represent discharge to the Santa Clara River upstream of the Estuary. The 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 2010 and 2016 *Conditional Waivers* incorporated toxaphene LAs for suspended sediment and fish tissue as Water Quality Benchmarks, shown in the table below.

Table 56. Load Allocations for Toxaphene

Reach	Toxaphene in Fish Tissue ($\mu\text{g}/\text{kg}$)	Toxaphene in Suspended Sediment ($\mu\text{g}/\text{kg}$)
Santa Clara River Estuary	6.1	0.1

Monitoring Results

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 spring 2015 and results were reported in the 2014-15 AMR; therefore, fish collection and analysis was not required for the 2016-2017 monitoring year. The next fish sampling will be in the spring/summer of 2018. The results of monitoring for the Santa Clara River Estuary Toxaphene TMDL are presented in Table 57. The suspended sediment load allocation for toxaphene was exceeded once at site S01D_MONAR during Event 32. The remaining suspended sediment toxaphene samples were non-detect.

Table 57. Santa Clara River Estuary Toxaphene TMDL Monitoring Data: Water and Suspended Sediment

Site	Constituent	Units	Load Allocation	Event 30 Dry Aug-2016	Event 31 Wet Dec-2017	Event 32 Wet Jan-2017	Event 33 Dry May-2017
Water							
S02T_ELLS	TSS	mg/L	---	NS ²	399	1,360,000	NS ³
	Chlordane ¹	µg/L	---	NS ²	DNQ	0.00550	NS ³
	Dieldrin	µg/L	---	NS ²	ND	ND	NS ³
	Toxaphene	µg/L	---	NS ²	ND	ND	NS ³
Suspended Sediment							
	Chlordane ¹	µg/dry kg	---	NR	ND	ND	NR
	Dieldrin	µg/dry kg	---	NR	ND	ND	NR
	Toxaphene	µg/dry kg	0.1	NR	ND	ND	NR
Water							
S01D_MONAR	TSS	mg/L	---	NS ³	160	1,450	NS ²
	Chlordane ¹	µg/L	---	NS ³	0.02260	0.11980	NS ²
	Dieldrin	µg/L	---	NS ³	ND	ND	NS ²
	Toxaphene	µg/L	---	NS ³	0.21590	4.53160	NS ²
Suspended Sediment							
	Chlordane ¹	µg/dry kg	---	NR	ND	ND	NR
	Dieldrin	µg/dry kg	---	NR	ND	ND	NR
	Toxaphene	µg/dry kg	0.1	NR	ND	25.7	NR

NS = Not Sampled

ND = Not detected at the applicable reporting limit.

NR = Not Required; filtered sediment sampling is only required during wet weather sampling events.

DNQ = Detected, not qualified

1. Reported total chlordane is the sum of alpha- and gamma-chlordane.
2. Site not sampled due to site being ponded.
3. Site not sampled due to site being dry.

Santa Clara River Bacteria TMDL

On January 31, 2012 the Santa Clara River Bacteria TMDL became effective. Monitoring and reporting requirements as well as water quality benchmarks based upon the TMDL numeric target were included in the 2016 *Conditional Waiver*. The TMDL identifies two different water quality benchmarks: benchmarks for the Santa Clara River Estuary which is monitored at site S01D_MONAR, and benchmarks for Reaches 3, 5, 6 & 7 which is monitored on Reach 3 at site S03D_BARDS (Reaches 5, 6, & 7 are located in Los Angeles County). Table 58 provides the numeric targets for bacteria. Table 59 provides the allowable number of exceedance days. As noted in Appendix 5 of the 2016 *Conditional Waiver*, the calculated number of exceedance days assumes that daily sampling is conducted. To determine the number of allowable exceedances for less frequent sampling, a ratio is used.

Table 58. Santa Clara River Bacteria TMDL, Numeric Targets

Objective	Constituent	Numeric Target: S01D_MONAR ¹	Numeric Target: S03D_BARDS ²
Single sample	<i>E. coli</i>	NA	235/100 mL
	Fecal Coliform	400/100 mL	NA
	Enterococcus	104/100 mL	NA
	Total coliform ³	10,000/100 mL	NA
Geometric Mean ⁴	<i>E. coli</i>	NA	126/100 mL
	Fecal Coliform	200/100 mL	NA
	Enterococcus	35/100 mL	NA
	Total coliform	1,000/100 mL	NA

NA = Not Applicable

1. S01D_MONAR sampling location discharges to the Santa Clara River Estuary.
2. S03D_BARDS sampling location discharges to Santa Clara River Reach 3.
3. Total coliform density shall not exceed 1,000/100 mL, if the ratio of fecal-to-total coliform exceeds 0.1.
4. Geometric mean targets are not in effect until 2023 (dry) and 2029 (wet).

Table 59. Santa Clara River Bacteria TMDL, Interim Allowable Exceedance Days¹

Time Period	Santa Clara River Reaches 3,5,6, & 7 ²	Santa Clara River Estuary ³
Dry Weather	17 allowable exceedance days of single sample objectives	Not Applicable
Wet Weather ⁴	61 allowable exceedance days of single sample objectives	62 allowable exceedance days of single sample objectives
Summer Dry Weather (April 1 – October 31)	Not Applicable	150 allowable exceedance days of single sample objectives
Winter Dry Weather (November 1 – March 31)	Not Applicable	49 allowable exceedance days of single sample objectives

1. The calculated number of exceedance days assumes that daily sampling is conducted. To determine the number of allowable exceedances for less frequent sampling, a ratio is used.
2. Applies to S03D_BARDS.
3. Applies to S01D_MONAR.
4. Wet weather is defined as days of 0.1 inch of rain or more plus three days following the rain event.

Monitoring Results

Sampling was conducted weekly, approximately every other month, for three months, providing a total of 15 sampling events. Sample collection was only possible once at the S03D_BARDS monitoring location, the site was either dry or ponded 14 of the 15 monitoring events. Samples were collected 10 times at the S01D_MONAR site, with the site being dry or ponded for the other 5 monitoring events. Of the 10 sampled events at monitoring location S01D_MONAR, there were 8 exceedances of enterococcus, 5 exceedances of fecal coliform, and 10 exceedances of total coliform. There was an *E. coli* exceedance at the S03D_BARDS monitoring location during the one event it was sampled. Monitoring results for Santa Clara River TMDL are listed in Table 60.

Table 61 summarizes the number of events by type (winter dry, wet weather, or summer dry) and calculates the number of allowable exceedance days based on the number of sampling events and compares that to the number of exceedances, as shown in Table 60.

Table 60. Santa Clara River Bacteria TMDL Weekly Sampling Data

Date	S01D_MONAR			S03D_BARDS
	Enterococcus (MPN/100 mL)	Fecal Coliform (MPN/100 mL)	Total Coliform (MPN/100 mL)	<i>E. coli</i> (MPN/100 mL)
	LA = 104	LA = 400	LA = 10,000 ¹	LA = 235
2/13/2017 ^{WD}	NS	NS	NS	NS
2/20/2017^{WD}	241	7,000	540,000	2,909
2/27/2017^{WD}	277	63	33,000	NS
3/6/2017^{WD}	104	33	33,000	NS
3/13/2017^{WD}	1,414	310	70,000	NS
4/3/2017^{SD}	90	49	17,000	NS
4/10/2017^{SD}	>2,420	130	14,000	NS
4/17/2017^{SD}	>2,420	1,300	92,000	NS
4/24/2017^{SD}	>2,420	490	54,000	NS
5/1/2017 ^{SD}	NS	NS	NS	NS
6/5/2017 ^{SD}	NS	NS	NS	NS
6/12/2017 ^{SD}	NS	NS	NS	NS
6/19/2017 ^{SD}	NS	NS	NS	NS
6/26/2017^{SD}	>2,420	24,000	24,000²	NS
7/3/2017^{SD}	400	1,300	92,000	NS

Bold numbers indicate the value is greater than the Numeric Target.

Bold dates indicate a numeric target was exceeded that day.

NS = Not Sampled; site either dry or ponded.

WD = Winter dry weather

W = Wet weather sample (days of 0.1 inch of rain or more plus three days following the rain event)

SD = Summer dry weather

1. Total coliform density shall not exceed 1,000/100 mL, if the ratio of fecal-to-total coliform exceeds 0.1.

2. Ratio of fecal-to-total coliform exceeds 0.1, therefore the numeric target for total coliform is 1,000/100 mL.

Table 61. SCR Bacteria TMDL Exceedance Days: Allowable Exceedance Days, and Exceeded Days

Events/Exceedances	Santa Clara River Reaches 3,5,6, & 7		Santa Clara River Estuary		
	S03D_BARDS		S01D_MONAR		
	Dry Weather	Wet Weather	Summer Dry Weather (April 1 – October 31) ³	Winter Dry Weather (November 1 – March 31) ⁴	Wet Weather
Number of 2017 sampling events	1	0	10	5	0
Allowable exceedance days (ratio applied) ^{1,2}	1	NA	6	1	NA
Days Exceeded (2017)	1	0	6	4	0

Bold numbers indicate that the number of Allowable Exceedance Days has been exceeded.

1. Allowable exceedance days are calculated by the following equation: Allowable Exceedance Days = (Number of sampling days conducted during time period / Number of days during 1995 time period) x Allowable exceedance days (interim)
 - a. Number of days during 1995: Wet days = 81; Dry days = 284
2. Consistent with the Santa Monica Bay Beaches TMDL, where the fractional remainder for the calculated allowable exceedance days exceeds 1/10th then the number of days are rounded up (e.g., 4.12 is rounded up to 5). In instances where the tenth decimal place for the allowable exceedance days (or weeks or months) is lower than 1/10th then the number of days are rounded down (e.g., 4.02 is rounded down to 4).
3. Summer Dry Weather (April 1 – October 31).
4. Winter Dry Weather (November 1 – March 31).

Ventura River Watershed

Effective TMDLs for the Ventura River Watershed are discussed below.

Ventura River Algae TMDL

The Ventura River Algae TMDL became effective on June 28, 2013. Load allocations for this TMDL have been added to the 2016 *Conditional Waiver* as water quality benchmarks. This AMR covers the 2016-2017 monitoring year, which is the first year monitoring is conducted for this TMDL. Monitoring is performed at the two VCAILGMP sites located in the upper watershed (VRT_SANTO and VRT_THACH; both drain to Reach 4 of the Ventura River) and the lower watershed TMDL site V02D_SPM (Reach 2 of the Ventura River, drainage channel to Ventura River). Dry weather LAs are provided in Table 62 and wet weather LAs are provided in Table 63. Due to the fact that the QAPP was submitted in October 2016, but did not receive approval until December and was further revised in February 2017, monitoring for the Ventura River Algae TMDL began with Event 32, mid-way through the monitoring year. Monitoring results for the Ventura River Algae TMDL are presented in Table 64 and Table 65. Wet weather Event 32 is the only event with constituents analyzed, and there were no exceedances of the LA at any of the sites.

Table 62. Dry Weather Load Allocations for the Ventura River Algae TMDL

Constituent	Load Allocation (lbs/day) ¹
Total Nitrogen	16
Total Phosphorus	0.12

1. Dry weather load allocations are the same for all reaches

Table 63. Wet Weather Load Allocations for the Ventura River Algae TMDL

Site	Constituent	Load Allocation (mg/L)
VRT_THACH ¹	Nitrate-N + Nitrite-N	5
VRT_SANTO ¹	Nitrate-N + Nitrite-N	5
V02D_SPM ²	Nitrate-N + Nitrite-N	10

1. Sampling site drains to Reach 4

2. Sampling site drains to Reach 2

Monitoring Results

Table 64. Dry Weather Ventura River Algae TMDL Site Data

Site	Constituent	Units	Load Allocation	Event 30 Dry Aug-2016	Event 33 Dry May-2017
VRT_THACH	Total Nitrogen	lbs/day	16	NR	NS
	Total Phosphorus	lbs/day	0.12		
VRT_SANTO	Total Nitrogen	lbs/day	16		
	Total Phosphorus	lbs/day	0.12		
V02D_SPM	Total Nitrogen	lbs/day	16		
	Total Phosphorus	lbs/day	0.12		

NR = Not required; approval of QAPP not received prior to sampling date.

NS = Not sampled due to site being dry

Table 65. Wet Weather Ventura River Algae TMDL Site Data

Site	Constituent	Units	Load Allocation	Event 31 Wet Dec-2017	Event 32 Wet Jan-2017
VRT_THACH	Nitrate-N + Nitrite-N	mg/L	5	NS	1.44
VRT_SANTO	Nitrate-N + Nitrite-N	mg/L	5		3.09
V02D_SPM	Nitrate-N + Nitrite-N	mg/L	10		4.90

NS = Not Sampled; approval of QAPP not received prior to sampling date.

Ventura River Estuary Trash TMDL

The Ventura River Estuary Trash TMDL is addressed through a separate monitoring and reporting program, with the annual report submitted on January 30th. For additional information, please refer to the “2016-2017 Ventura River Estuary Trash TMDL TMRP/MFAC Annual Report”. The next annual report is due January 30, 2018.

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 2017 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 2016 QAPP, the CIHD_VICT site is visited at the same frequency as *Conditional Waiver* monitoring sites. At each event, flow and field meter parameters are measured in addition to water samples collected for bacteria testing. Flow was only present at this site during the January wet weather event. The site was dry during Events 30 and 33, and ponded during Event 31. *E. coli*, fecal coliform, total coliform, and enterococcus monitoring results are presented in Table 66.

Table 66. Harbor Beaches of Ventura County Bacteria TMDL Monitoring Data

Event	Bacteria Concentrations (MPN/100mL)			
	<i>E. coli</i>	Fecal Coliform	Total Coliform	Enterococcus
30: 8/24/2016			NS ¹	
31: 12/16/2016			NS ²	
32: 1/22/2017	750	1,300	3,500,000	800
33: 5/31/2017			NS ¹	

NS = Not Sampled

1. Site not sampled due to site being dry.

2. Site not sampled due to site being ponded.

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 2010 *Conditional Waiver*. To comply with the 2016 *Conditional Waiver* the VCAILG QAPP and MRP were written 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. Water quality data collected at the OXD_CENTR site that pertains to this TMDL is summarized below and compared to the load allocation benchmarks. LAs for this TMDL are provided in Table 16. The final two monitoring events for the year took place following approval of the VCAILG QAPP and MRP to comply with 2016 *Conditional Waiver* requirements. Therefore, it is only Events 32 and 33 that include monitoring for the full suite of TMDL constituents.

TMDL Monitoring and Load Allocations

The McGrath Lake PCBs, Pesticides, and Sediment Toxicity TMDL includes the following LAs (Table 67).

Table 67. McGrath Lake Central Ditch Load Allocations

Constituent	Water Column Load Allocation (µg/L)	Suspended 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 Results

Water sampling occurred concurrently with VCAILG monitoring and included the addition of total organic carbon (TOC) and PCBs constituents. Due to the fact that the QAPP was submitted in October 2016, but did not receive conditional approval until December, monitoring for this TMDL began with Event 32, mid-way through the monitoring year. *Conditional Waiver* prescribed water column data that overlaps with TMDL monitoring requirements is reported for the earlier events. Water quality data and suspended sediment data are presented in Table 68 and Table 69, respectively. Exceedances of the following water column LAs occurred during wet weather Event 31: 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. During the second storm (Event 32), these same constituents were exceeded in addition to total chlordane. Suspended sediment was collected during wet weather Event 32. The samples exceeded LAs for 4,4'-DDD, 4,4'-DDE, and total DDT.

Table 68. McGrath Lake TMDL Central Ditch Monitoring Data in Water: OXD_CENTR

Constituents in Water	Units	Water LA	Event 30	Event 31	Event 32	Event 33
			Dry 8/24/2016	Wet 12/16/2017	Wet 1/22/2017	Dry 5/31/2017
TOC	mg/L	---	NS	NR	7.7	3.1
TSS	mg/L	---		120	910	2
Total PCBs ¹	µg/L	0.00017		NR	ND	ND
4,4'-DDD	µg/L	0.00084		0.05290	0.67530	DNQ
4,4'-DDE	µg/L	0.00059		0.25170	1.97020	DNQ
4,4'-DDT	µg/L	0.00059		0.37690	0.60130	ND
Dieldrin	µg/L	0.00014		ND	ND	ND
Total Chlordane ²	µg/L	0.00059		DNQ	0.04860	ND

Bold numbers indicate the value is greater than the Load Allocation.

NS = Not Sampled; site dry.

NR = Not Required; approval of QAPP not received prior to sampling date.

ND = Not detected at the applicable reporting limit.

DNQ = Detected, not qualified

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 69. McGrath Lake TMDL Central Ditch Monitoring Data in Suspended Sediment:
OXD_CENTR**

Constituents in Sediment	Units	Sediment LA	Event 30 Dry 8/24/2016	Event 31 Wet 12/16/2017	Event 32 Wet 1/22/2017	Event 33 Dry 5/31/2017
TOC	% Dry Weight	---			9.52	
Total PCBs ¹	µg/dry kg	22.7			ND	
4,4'-DDD	µg/dry kg	2	NR ³	NR ³	3.9	NR ⁴
4,4'-DDE	µg/dry kg	2.2			6.9	
4,4'-DDT	µg/dry kg	1			ND	
Dieldrin	µg/dry kg	0.02			ND	
Total Chlordane ²	µg/dry kg	0.5			ND	
Total DDT	µg/dry kg	1.58			10.8	

NR = Not Required

DNQ = Detected, not qualified

ND = Not detected at the applicable reporting limit.

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.

3. Approval of QAPP not received prior to sampling date.

4. Sampling for suspended sediments is only required during wet weather.

Oxnard Drain #3 Subwatershed

The USEPA established the Oxnard Drain #3 Pesticides, PCBs, and Sediment Toxicity TMDL, which became effective October 6, 2011. TMDL load allocations were incorporated into the 2016 *Conditional Waiver* as water quality benchmarks. To evaluate agricultural discharges progress in attaining this TMDL, the 2017 MRP and QAPP include a monitoring site as well as specifics regarding monitoring frequency and constituents for comparison to the LAs. LAs for this TMDL are presented in Table 70. Due to the fact that the QAPP was submitted in October 2016, but did not receive approval until December and further revised in February 2017, monitoring for this TMDL began with Event 32, mid-way through the monitoring year. Monitoring data for water quality are provided in Table 71. Exceedances of water allocations for 4,4'-DDT and 4,4'-DDE occurred during Events 32 and 33. Exceedances of water allocations of bifenthrin, Total Chlordane, 4,4'-DDD, and toxaphene occurred during Event 32. Sediment toxicity monitoring results are not provided as the first samples were taken in August 2017.

Table 70. Oxnard Drain No. 3 TMDL Load Allocations

Constituents	Water Allocations (µg/L)	Sediment ^{1,2}	Alternate Sediment ^{1,3}
Bifenthrin ⁴	0.0006	-	-
Chlordane, total	0.00059	0.5	3.3
Chlorpyrifos ⁴	0.0056	-	-
4,4'-DDT	0.00059	1	0.3
4,4'-DDE	0.00059	2.2	2.2
4,4'-DDD	0.00084	2	2
Dieldrin	0.00014	0.02	4.3
PCBs, total ⁵	0.00017	22.7	180
Toxaphene	0.0002	0.1	360
Sediment Toxicity	-	-	-

1. Sediment concentrations associated with suspended sediment and Oxnard Drain #3 bottom sediment.
2. Sediment allocations apply if there are fish tissue or sediment toxicity exceedances. All sediment allocations are ERLs, except toxaphene. Toxaphene does not have an ERL, so the TEL concentration was selected.
3. The alternate sediment allocation applies when the fish tissue target and the sediment toxicity allocation are achieved in Oxnard Drain 3. The alternate sediment allocation concentrations match the Mugu Lagoon TMDL allocations
4. Bifenthrin and chlorpyrifos allocations included to address the sediment toxicity impairment.
5. Total PCBs include the 7 aroclors identified in CTR (1016, 1221, 1232, 1242, 1248, 1254, 1260).

Table 71. Oxnard Drain No. 3 TMDL Monitoring Data in Water: 01T_ODD3_ED1¹

Constituents	Water Allocations (µg/L)	Event 30 Dry 8/24/2016	Event 31 Wet 12/16/2017	Event 32 Wet 1/22/2017	Event 33 Dry 5/31/2017
Bifenthrin	0.0006			0.0089	ND
Chlordane, total	0.00059			0.04470	ND
Chlorpyrifos	0.0056			ND	ND
4,4'-DDT	0.00059			0.12880	0.00710
4,4'-DDE	0.00059	NR	NR	0.40770	0.01110
4,4'-DDD	0.00084			0.19660	DNQ
Dieldrin	0.00014			ND	ND
PCBs, total ²	0.00017			ND	ND
Toxaphene	0.0002			1.22500	DNQ

Bold numbers indicate the value is greater than the Load Allocation.

ND = Not Detected at the applicable reporting limit

NR = Not Required; approval of QAPP not received prior to sampling date.

DNQ = Detected, not qualified

1. Site changed from 01T_ODD3_ARN to 01T_ODD3_ED1 during Event 32 per the approved 2017 MRP and QAPP. The site was relocated upstream to ensure site access during wet weather events.
2. Total PCBs include the 7 aroclors identified in CTR (1016, 1221, 1232, 1242, 1248, 1254, 1260).

Malibu Creek Watershed

Two TMDLs exist for the Malibu Creek Watershed: the Malibu Creek and Lagoon TMDLs for Sedimentation and Nutrients to Address Benthic Community Impairments (Benthic TMDLs), and the Malibu Creek Watershed Nutrients TMDL (Nutrients TMDL).

TMDL Monitoring and Load Allocations

Load allocations for the Malibu Creek Watershed TMDLs were incorporated into the 2016 *Conditional Waiver*. At this time, a very small number Ventura County farmers may be operating in the Malibu Creek Watershed; as such, “proxy” results are provided from monitoring site 05T_HONDO for application to farmers in this watershed. LAs for the Benthic TMDLs and the Nutrients TMDL are provided in Table 72 and Table 73 respectively.

Table 72. Malibu Creek and Lagoon TMDLs for Sedimentation and Nutrients Load Allocations

Constituent	Season	Load Allocation (mg/L)
Total Nitrogen	Summer	0.65
	Winter	1.00
Total Phosphorus	Summer	0.10
	Winter	0.10

Table 73. Malibu Creek Watershed Nutrients TMDL Load Allocations

Constituent	Season	Load Allocation	Units
Total Nitrogen	Summer	3	lbs/day
Total Phosphorus		0.2	lbs/day
Nitrogen (nitrate-N + nitrite-N)	Winter	8	mg/L

Monitoring Results

Due to the fact that the QAPP was submitted in October 2016, but did not receive approval until December and further revised in February 2017, monitoring for these TMDLs began with Event 32, mid-way through the monitoring year. For the Benthic TMDLs, samples were only collected during winter season Event 32, for which exceedances of both total nitrogen, and total phosphorus occurred. Monitoring results for this TMDL are presented in Table 74. For the Nutrients TMDL, samples were collected only during winter season Event 32, for which there were no exceedances. Monitoring results for this TMDL are presented in Table 75.

Table 74. Malibu Creek and Lagoon Benthic TMDLs Monitoring Data: 05T_HONDO

Constituent	Event	Season	Load Allocation (mg/L)	Result (mg/L)
Total Nitrogen	30: 8/24/2016	Summer	0.65	NR
	31: 12/16/2016	Winter	1.00	NR
	32: 1/22/2017	Winter	1.00	3.27
	33: 5/31/2017	Summer	0.65	NS
Total Phosphorus	30: 8/24/2016	Summer	0.10	NR
	31: 12/16/2016	Winter	0.10	NR
	32: 1/22/2017	Winter	0.10	11.69
	33: 5/31/2017	Summer	0.10	NS

Bold numbers indicate the value is greater than the Load Allocation.
 NR = Not Required; approval of QAPP not received prior to sampling date.
 NS = Not Sampled; site dry.

Table 75. Malibu Creek Watershed Nutrients TMDL Monitoring Data: 05T_HONDO

Constituent	Event	Season	Load Allocation	Units	Result
Total Nitrogen	30: 8/24/2016	Summer	3	lbs/day	NR
	33: 5/31/2017	Summer	3	lbs/day	NS
Total Phosphorus	30: 8/24/2016	Summer	0.2	lbs/day	NR
	33: 5/31/2017	Summer	0.2	lbs/day	NS
Nitrogen (nitrate-N + nitrite-N)	31: 12/16/2016	Winter	8	mg/L	NR
	32: 1/22/2017	Winter	8	mg/L	1.11 ¹

NR = Not Required; approval of QAPP not received prior to sampling date.
 NS = Not Sampled; site dry.

1. Results include nitrate-N only. Nitrite-N was inadvertently omitted from the requested analyses for this site.

Conclusions

Submittal of this report fulfills the Annual Monitoring Report requirements specified in Appendix 1 of the 2010 *Conditional Waiver* and the requirements contained in Appendix 3 of the 2016 *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 2010 *Conditional Waiver* and 2016 *Conditional Waiver* as benchmarks. Unlike previous AMRs, benchmark exceedances do not automatically trigger the requirement to develop a WQMP. Instead, WQMPs are to be developed and implemented according to the schedule set forth in the 2016 *Conditional Waiver*.

The next WQMP is due December 15, 2018. In addition to the iterative WQMP process for monitoring sites that exceed Water Quality Benchmarks, beginning with the second WQMP submitted under the 2016 *Conditional Waiver* term, there are additional requirements if these sites do not show decreasing trends in the concentrations of constituents that exceed Water Quality Benchmarks. If a monitoring site does not show a decreasing trend in concentrations of constituents that exceed Water Quality Benchmarks, then the VCAILG must investigate the source(s) of the constituents that exceed Water Quality Benchmarks. If this occurs, the VCAILG will submit a work plan for the investigation to the Executive Officer for approval by October 1, 2018.

In addition, the VCAILG will implement the WQMP submitted in April 2017 and assist its members to achieve the water quality benchmarks set forth in the 2016 *Conditional Waiver*.

WQMP Progress Report

The 2016 *Conditional Waiver* specifies that a WQMP Progress Report include the following components:

- Copies of outreach materials
- Report on members who have and have not completed surveys
- Report on members who have and have not completed education requirements
- *Report on individual discharge monitoring results, if chosen (not applicable since none of the benchmark compliance deadlines have passed)*

OUTREACH MATERIALS

During the reporting period for this annual report, VCAILG members have been sent mailed and electronic communications informing them of their responsibilities to comply with the 2016 *Conditional Waiver* and keep them apprised of the overall program activities. Communications can be summarized as follows:

- Notifications of the requirement to complete a management practice survey as well as reminders and updates on the survey process.
- Education meeting notices and handouts
- VCAILG newsletter
- Website updates

Copies of the mailings and emails are included as **Appendix J**. VCAILG has been implementing the Outreach Plan outlined in the Water Quality Management Plan (WQMP). Detailed information regarding VCAILG, links to past reports, and information regarding the next management practice survey can be accessed from the Farm Bureau website here: <http://www.farmbureauvc.com/issues/water-issues/water-quality/vcailg>. Since submitting the WQMP, a special section has been added to the website detailing the responsibility areas and includes maps and a lookup file for farmers to determine the correct responsibility area for their farm: <http://www.farmbureauvc.com/issues/water-issues/water-quality/wq-mgmt>. This is also where VCAILG members may download or print the compliance summary for their specific responsibility area. These compliance summaries were submitted to the Regional Board with the revised WQMP on October 9, 2017.

SURVEY COMPLETION

VCAILG was required to begin surveying its members within eight months of adoption of the 2016 *Conditional Waiver* (December 14, 2016). The online management practice survey remained open until the end of January 2017. The list of VCAILG members that have and have not completed the survey is provided as **Appendix K**.

EDUCATION REQUIREMENTS

The 2016 *Conditional Waiver* requires that dischargers obtain a minimum of two hours of educational training every year. Regional Board staff provided written confirmation on September 23, 2016 that the timeframe during which the first two hours of education need to be completed is between April 14, 2016 and November 30, 2017 to align with AMR reporting.

Appendix L lists the number of education hours each VCAILG member has obtained during this time period.

Since adoption of the 2016 *Conditional Waiver*, twelve classes have been offered. Table 76 lists the approved education classes and the hours of credit for each class.

Table 76. Courses Approved for Education Credit

Date	Course Title	Education Hours
7/28/2016	Irrigation and Nutrient Management Meeting for Berry and Vegetable Crops	3.15
9/27/2016	Agricultural Water Use Efficiency Education Program and Kickoff Event	2
9/28/2016	ABCs of Fertilizers and Plan Nutrition	4
9/29/2016	ABCs of Fertilizers and Plan Nutrition (Spanish)	4
5/11/2017	Hands-on CropManage Workshop	2.5
6/15/2017	CropManage Field Demonstration	2
7/18/2017	Agricultural Waiver Water Quality Workshop	2
7/27/2017	2017 California Nursery Conference	2
8/16/2017	2017 Irrigation and Nutrient Management Meeting for Berry and Vegetable Crops	3.5
9/26/2017	Agricultural Waiver Water Quality Workshop	2
10/18/2017	Agricultural Waiver Water Quality Workshop	2
11/14/2017	Agricultural Waiver Water Quality Workshop	2