

December 15, 2018

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

2017-2018 Annual Monitoring Report

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

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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 2017 to June 2018 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 5-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 and is current as of November 20, 2018.

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 in the text of this report represent group status in October 2018. Per the October 2018 membership rolls, VCAILG represents 1,469 Ventura County agricultural landowners and 83,259 irrigated acres. According to the Ventura County Assessor’s records, there are an estimated 393 landowners not enrolled in VCAILG. Therefore, VCAILG represents 79 percent of agricultural landowners in Ventura County covering approximately 90 percent of the estimated irrigated acreage. This is a two 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
Jared Bouchard, Pleasant Valley Co. Water District*	N/A	N/A
Jonathan Chase, Hailwood, Inc.	Strawberries, Vegetables	Calleguas Creek
Robert Crudup, BrightView Tree Co.	Nursery Stock	Santa Clara River
Paul DeBusschere, DeBusschere Ranch	Strawberries, Avocados	Calleguas Creek
Mike Friel, Laguna Grove Service	Citrus	Calleguas Creek
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
Craig Held, Rancho Gemelos/Held Ranches	Orchards	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
Mike Sullivan, Essick Farm Management	Orchards	Ventura River
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 October 2018

Watershed	Landowner Count	Parcel Count	Irrigated Acres
Calleguas Creek	726	1,542	43,901
Santa Clara River	533	1,272	29,819
Oxnard Coastal	65	126	4,558
Ventura River	209	413	4,982
<i>Total</i>	<i>1,533</i>	<i>3,353</i>	<i>83,259</i>

1. There are 1,469 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 92,250 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 32,000), Ventura River Watershed (approximately 5,400), and finally the Oxnard Plain and Coastal Watersheds (approximately 4,800).¹

Agriculture is a major industry in Ventura County, generating over \$2.1 billion in gross sales for 2017, placing the county 8th in a statewide ranking of California's 58 counties.² This gross value is a decrease of 0.4% from 2016.³ Strawberries were the number one grossing crop type, lemons were the second highest grossing crop, and celery was the third highest grossing crop in Ventura County in 2017. Table 3 lists the County's ten leading crops in gross value for 2017. 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 2016-2017*. Agricultural Statistics Overview.

³ Ventura County Agricultural Commissioner. *Ventura County's Crop and Livestock Report 2017*. July 31, 2018.

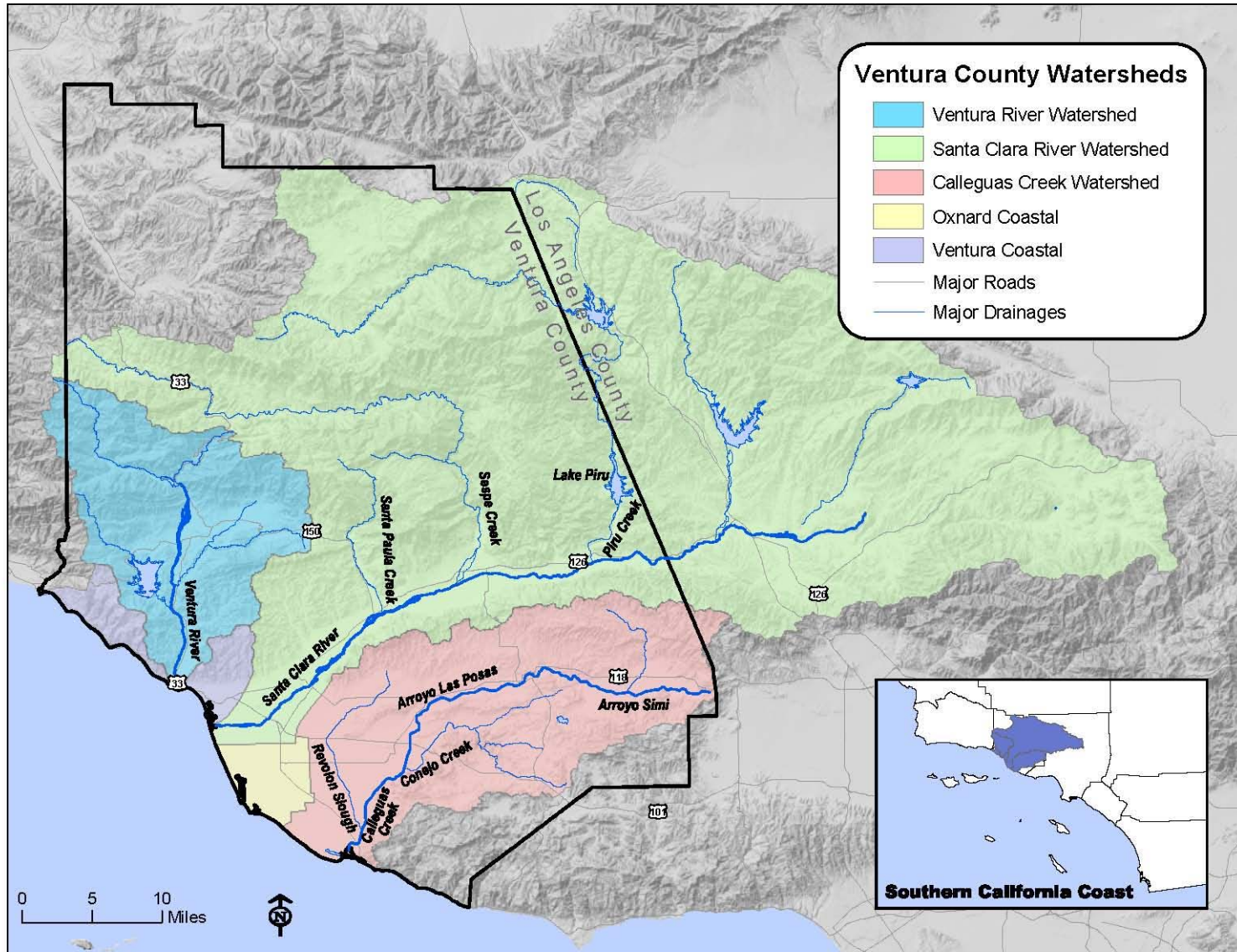


Figure 1. Ventura County Watersheds

Table 3. Ventura County’s Leading Agricultural Commodities–2017

Commodity	Gross Value (\$)
1. Strawberries	654,312,000
2. Lemons	258,602,000
3. Celery	210,408,000
4. Nursery Stock	197,969,000
5. Raspberries	166,725,000
6. Avocados	118,680,000
7. Cut Flowers	49,904,000
8. Tomatoes	47,507,000
9. Peppers	45,809,000
10. Cabbage	33,919,000

Source: Ventura County Agricultural Commissioner. *Ventura County’s Crop and Livestock Report 2017*. July 31, 2018.

Calleguas Creek Watershed and Oxnard Plain

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. Additionally, Oxnard Drain #3 is a drainage channel that discharges to the western arm of Mugu Lagoon. A separate EPA developed TMDL for pesticides, PCBs, and sediment toxicity has been adopted.

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 row crops, including strawberries, raspberries, peppers, 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.

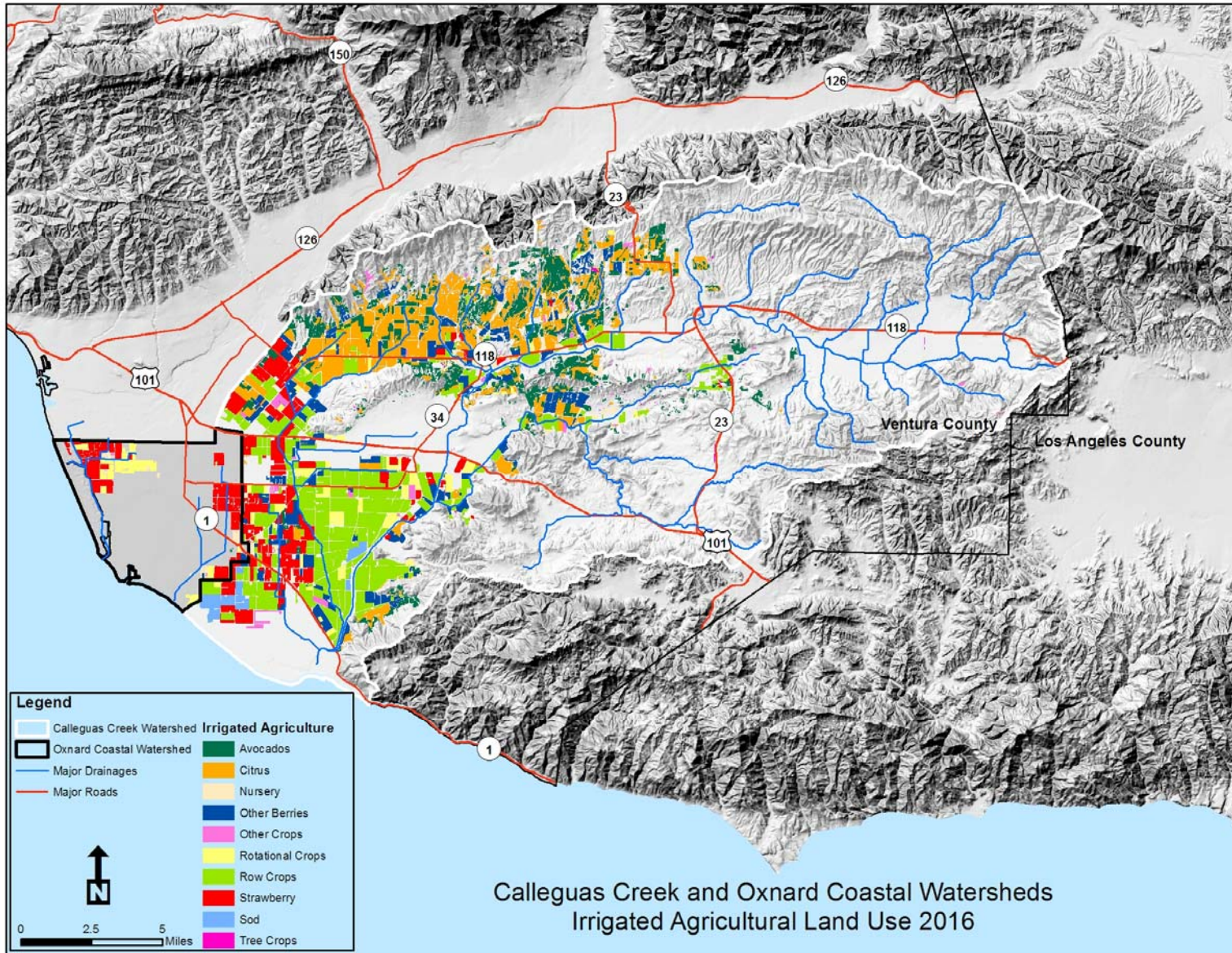


Figure 2. Calleguas Creek and Oxnard Coastal Watersheds Agricultural Land Use

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*.

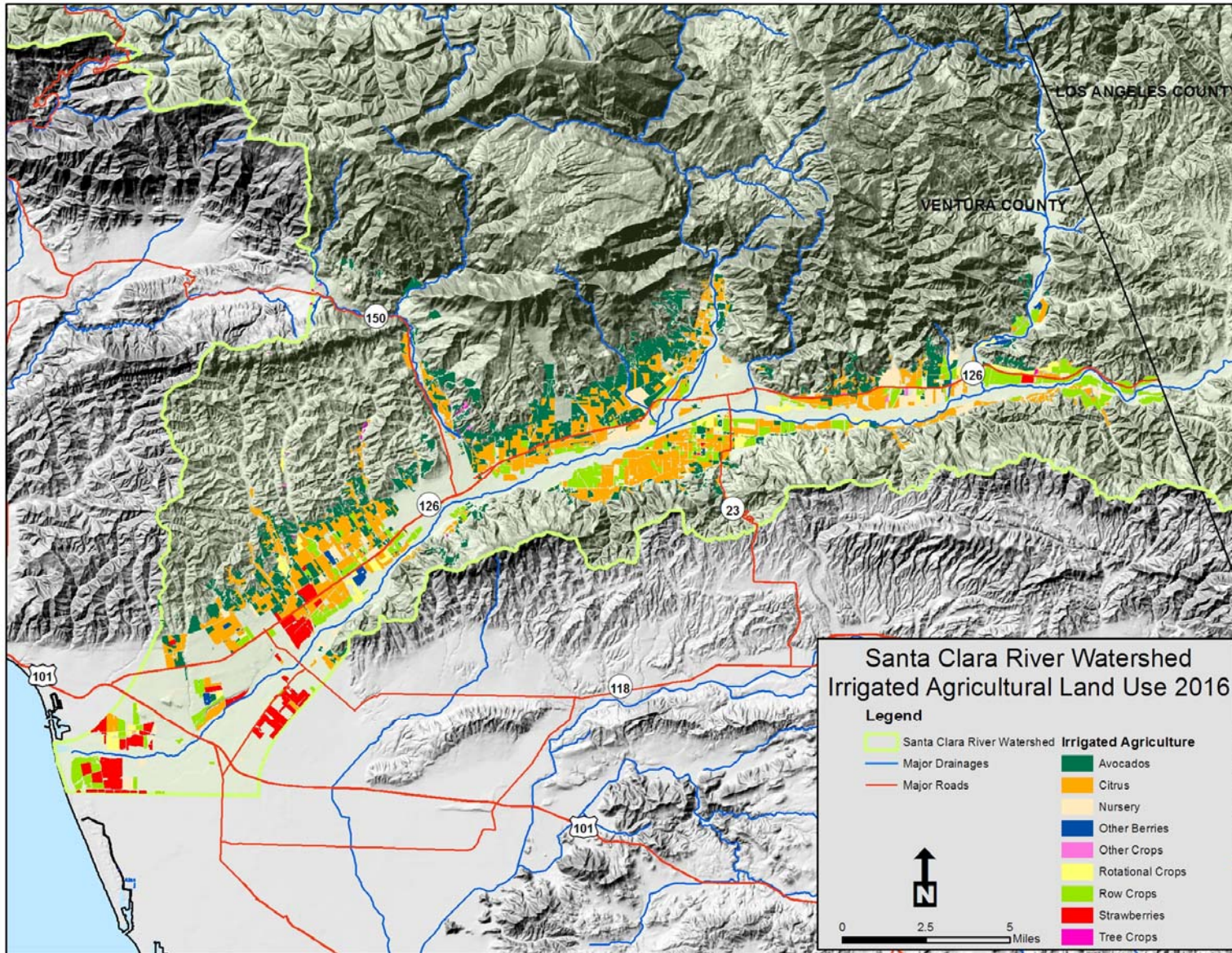


Figure 3. Santa Clara River Watershed Agricultural Land Use

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.

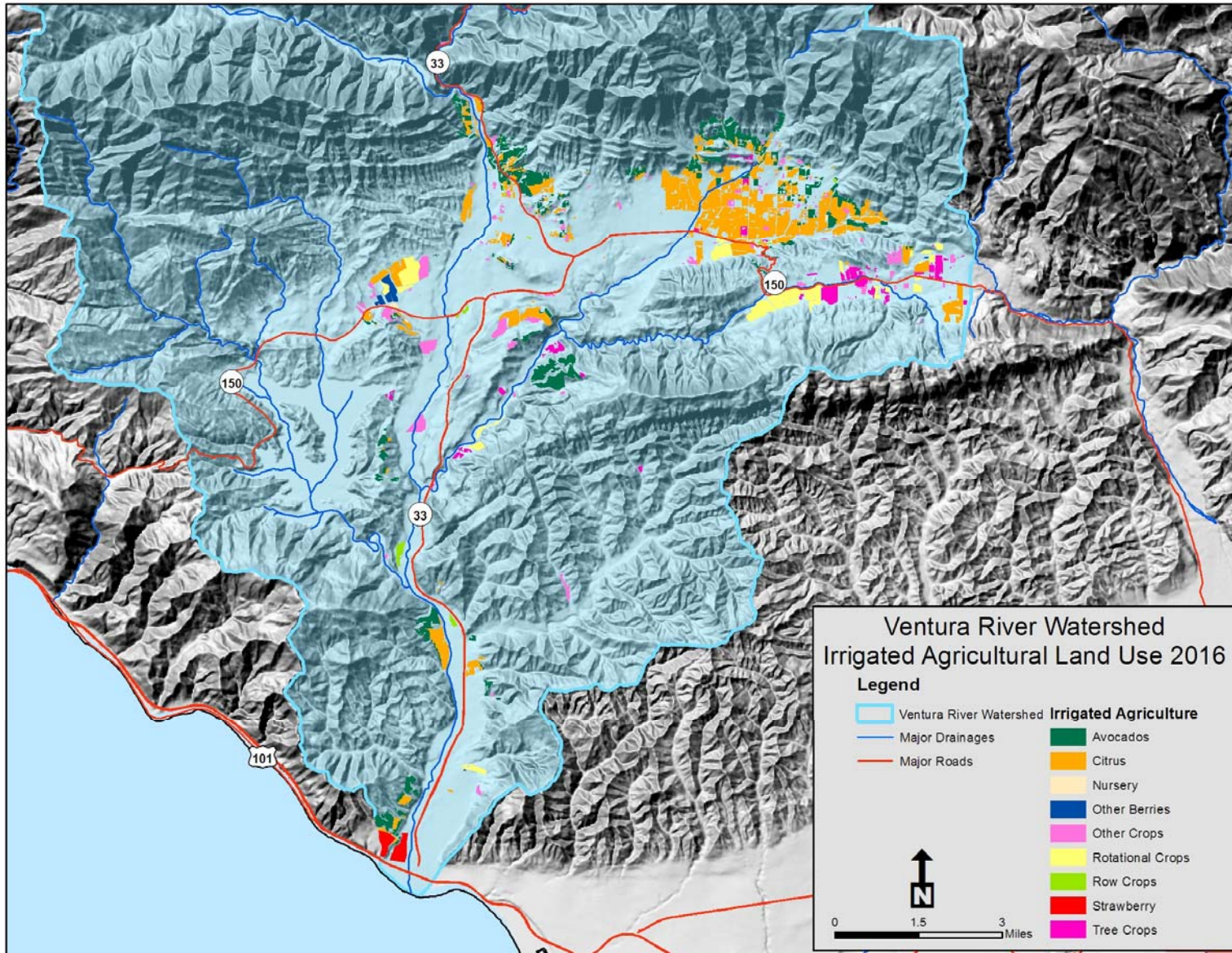


Figure 4. Ventura River Watershed Agricultural Land Use

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_EDI	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
	S02T_ELLS	2	T	Ellsworth Barranca at Telegraph Rd.	34.306805	-119.141275
Santa Clara River	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
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.

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

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).

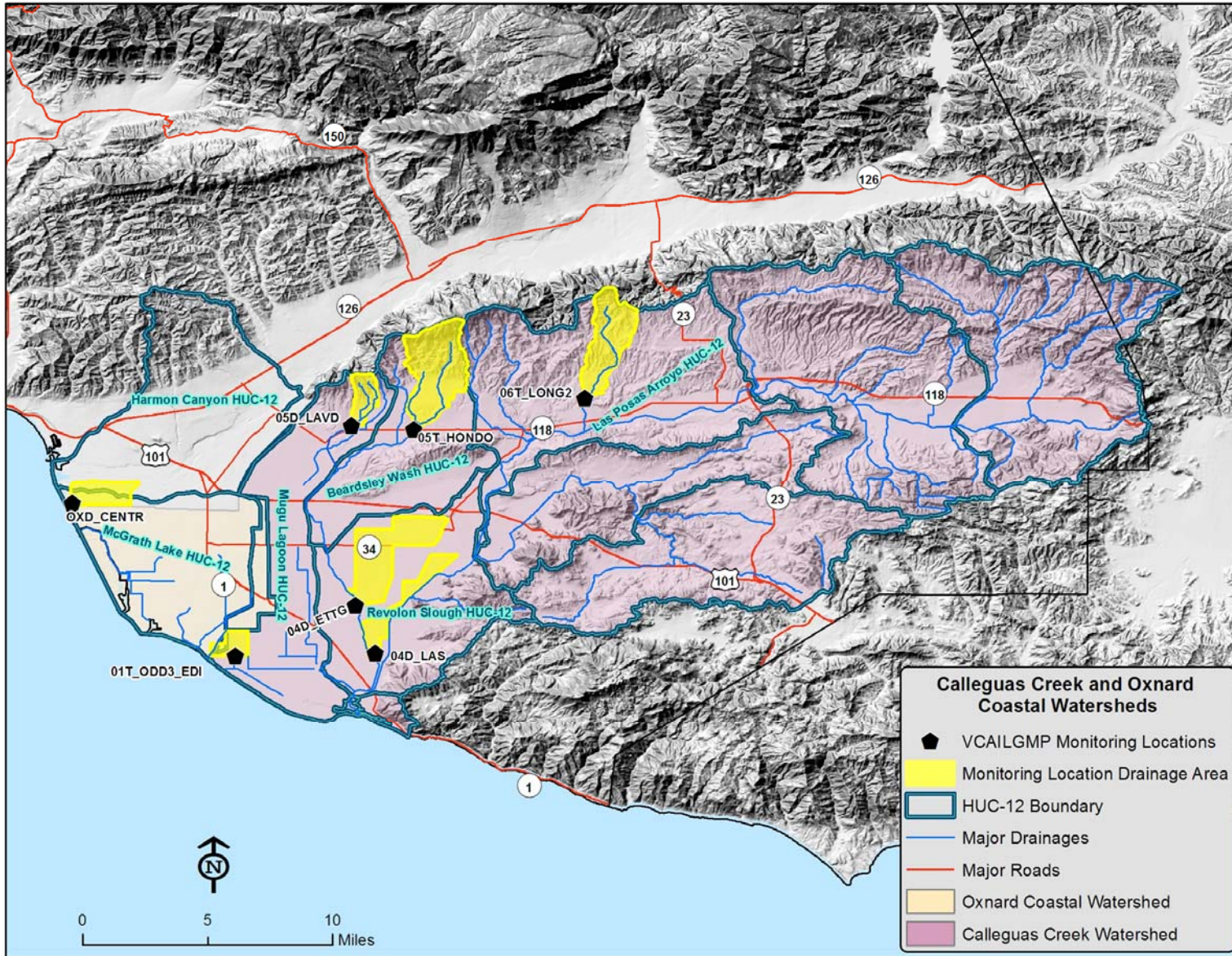


Figure 5. VCAILG Monitoring Sites in the Calleguas Creek/Oxnard Coastal Watersheds

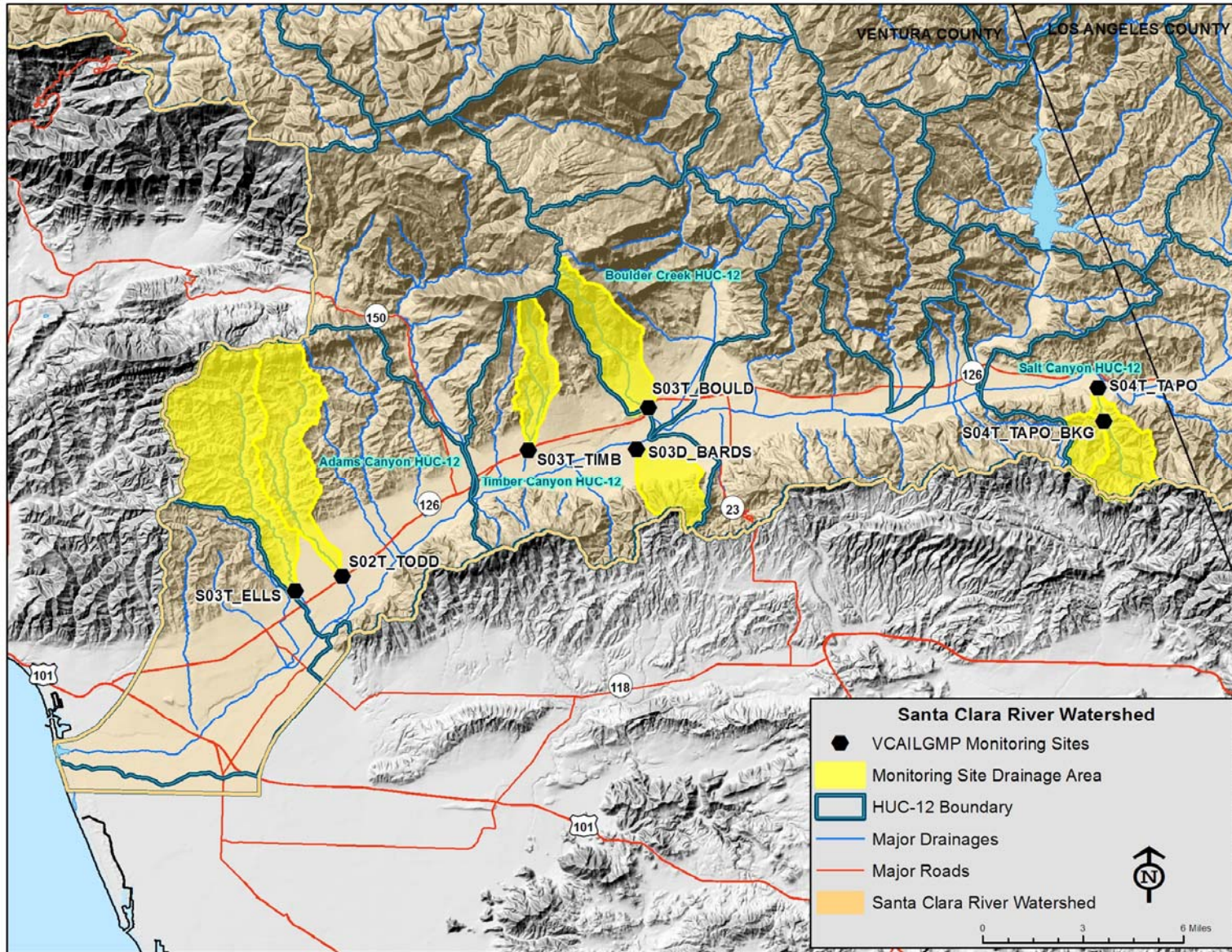


Figure 6. VCAILG Monitoring Sites Located in the Santa Clara River Watershed

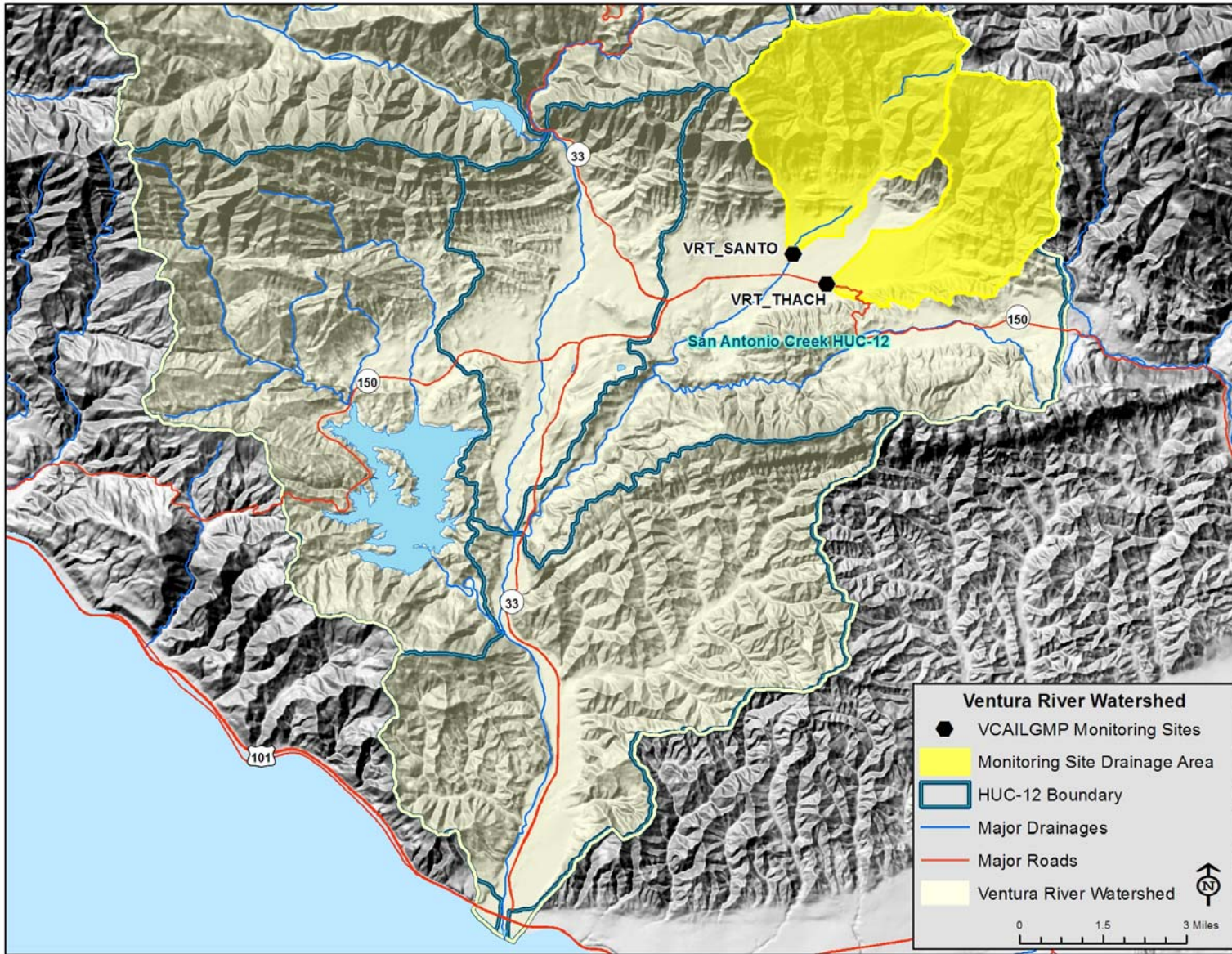


Figure 7. VCAILG Monitoring Sites Located in the Ventura River Watershed

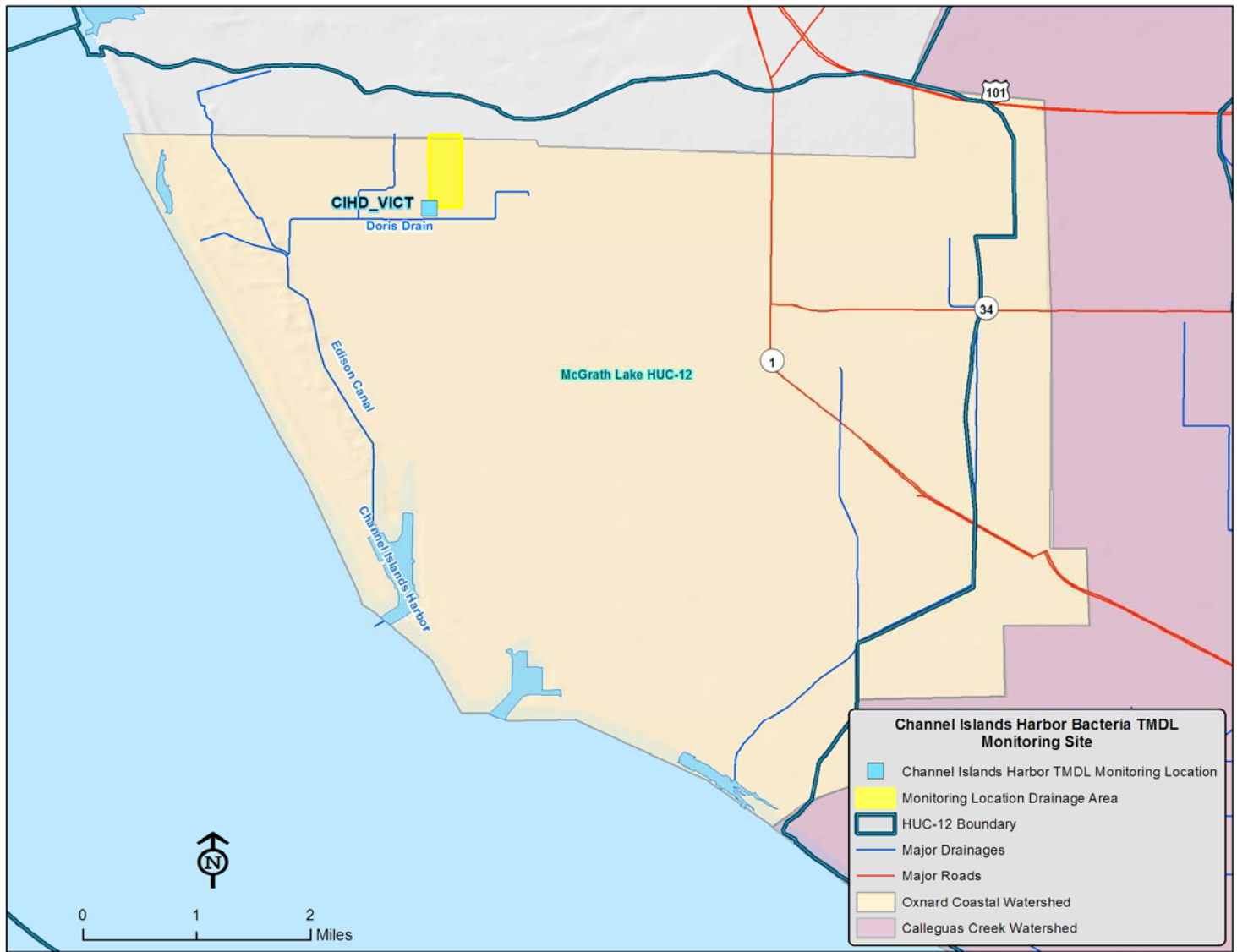


Figure 8. Channel Islands Harbor Bacteria TMDL Monitoring Site

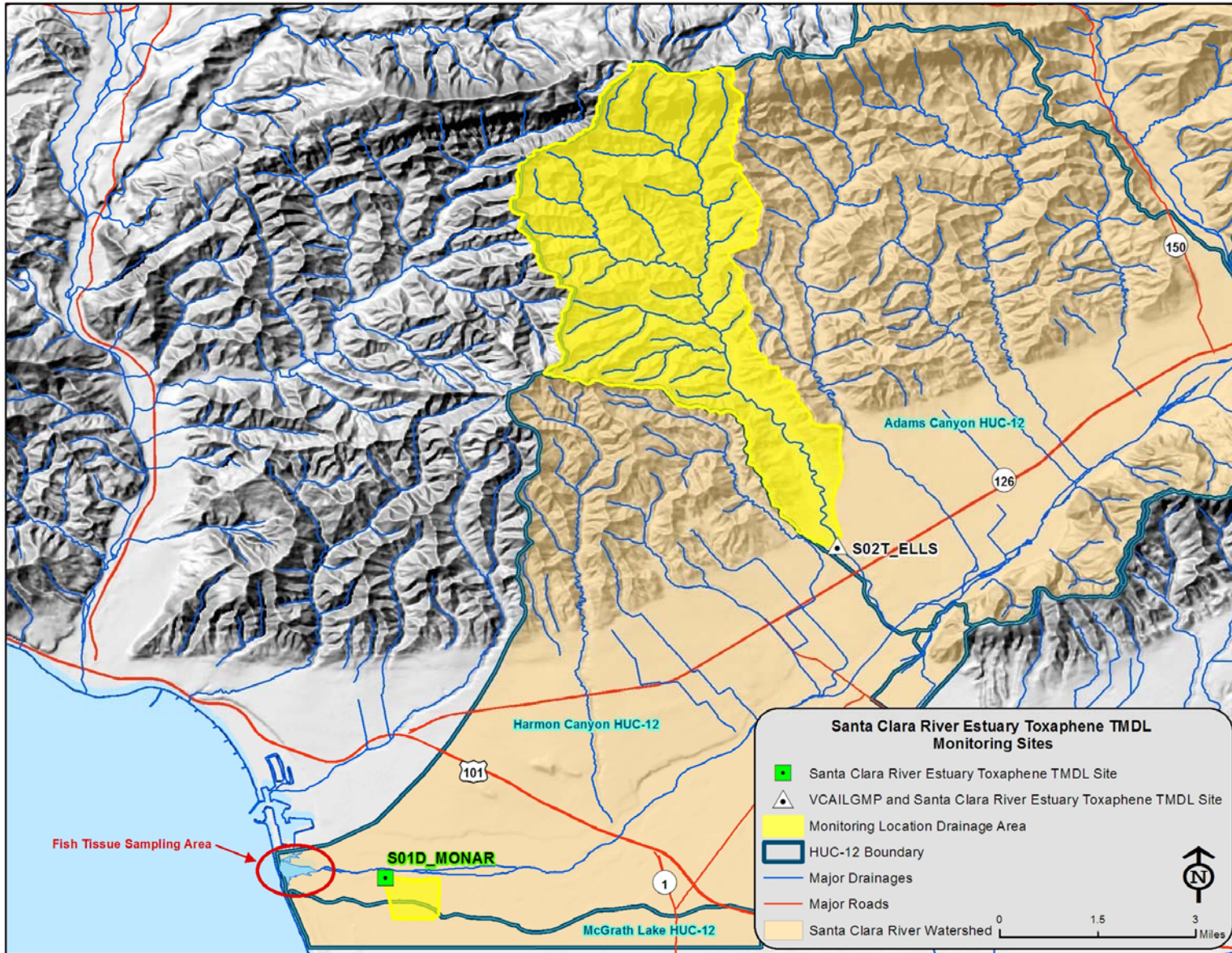


Figure 9. Santa Clara River Estuary Toxaphene TMDL Monitoring Sites

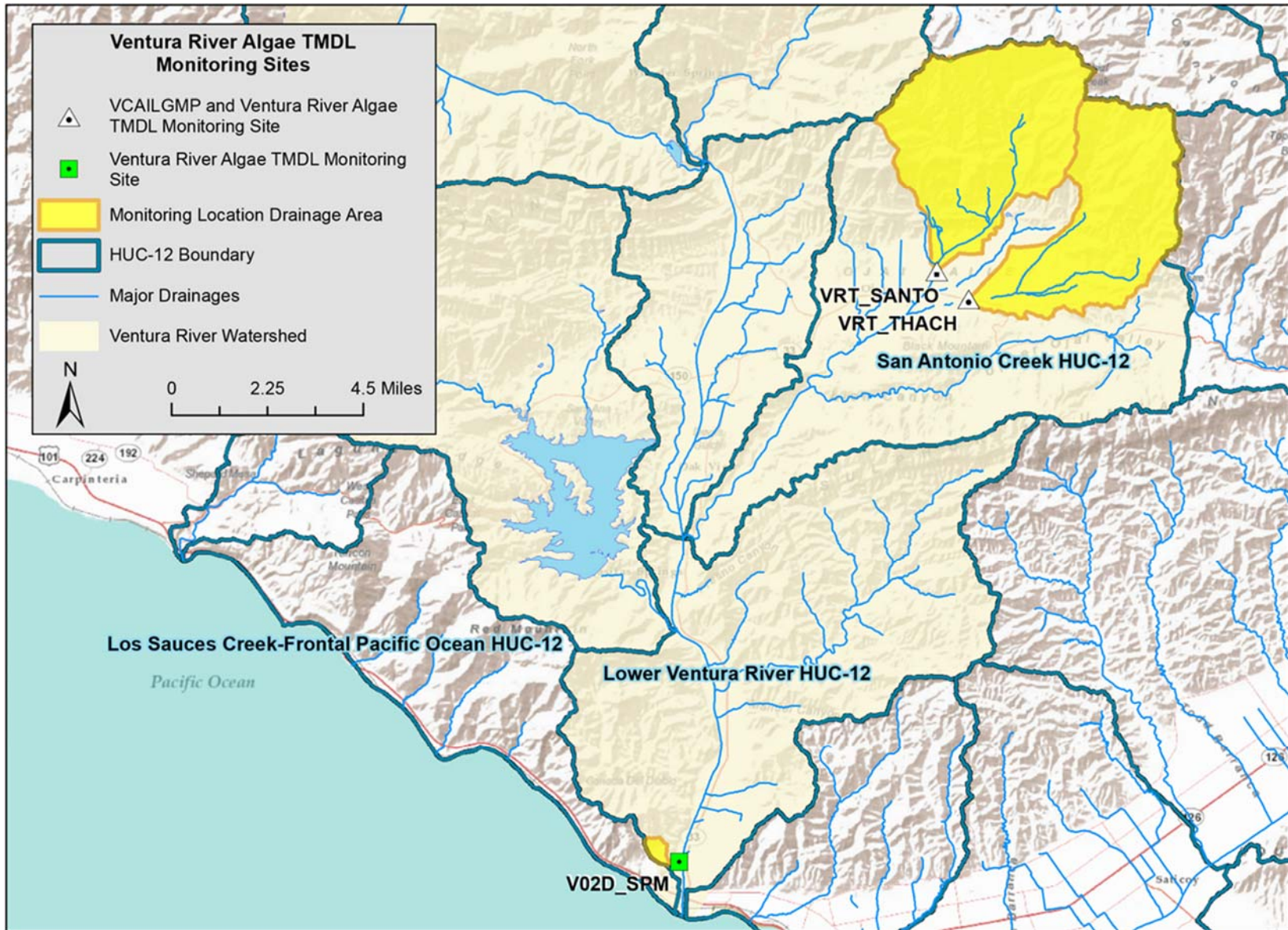


Figure 10. Ventura River Algae TMDL Monitoring Sites

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_EDI	95						345			643
04D_ETTG	2,445	80			75	124			129	3,309
04D_LAS	847						26	2		1,339
05D_LAVD	59	341	211			22				877
05T_HONDO	19	1,643	620	2				25	111	3,928
06T_LONG2	38	476	709			199		75		2,813
OXD_CENTR ³	193							69		1,243
S02T_ELLS ³	52	577	646	1					2	9,015
S02T_TODD	143	824	224			41		62	9	5,748
S03D_BARDS	58	793	148					14	2	2,214
S03T_BOULD	1	166	937							3,764
S03T_TIMB	31	250	496	2		1				2,183
S04T_TAPO	54	97						53		3,686
VRT_SANTO		284	249	17						7,220
VRT_THACH	6	736	157	13				3		6,003
V02D_SPM ⁴	151	41			94					137
S01D_MONAR ⁴	340				352					209
CIHD_VICT ⁴					34					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. This site is monitored for 2016 *Conditional Waiver* Appendix 1, Table 1 constituents and for an applicable TMDL.

4. 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 2017-2018, storm monitoring occurred on March 11, 2018 and March 22, 2018. Dry weather monitoring occurred on August 29, 2017 and June 4, 2018. Wet weather toxicity samples were collected during Event 35 on March 11, 2018. Dry weather toxicity samples were collected during the second dry weather event on June 4, 2018. Fish were collected from the Santa Clara River Estuary on May 30, 2018.

Table 8 provides a summary of monitoring sites and constituents that were monitored during the wet and dry weather monitoring events in 2017 and 2018. Field measurements were also collected at the sites where samples were collected.

Table 7. Constituents and Monitoring Frequency for the 2016 Conditional Waiver VCAILG-MP

Constituent ¹	Frequency ²
Field Measurements	
Flow, pH, Temperature, Dissolved Oxygen, Conductivity, Turbidity	
General Water Quality Constituents (GWQC)	
Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Hardness, Chloride, Sulfate, Turbidity ³	
Nutrients	
Total Ammonia-N, Nitrate-N, Total Nitrogen, Orthophosphate, Total Phosphorus	
Pesticides	
Organochlorine Pesticides ⁴ , Organophosphorus Pesticides ⁵ , Pyrethroid Pesticides ⁶	2 dry events; 2 wet events
Metals	
Total and Dissolved Copper	
Trash	
Trash observations	
Bacteria	
<i>E. coli</i>	
Aquatic Chronic Toxicity	
<i>Ceriodaphnia dubia</i> ⁷	First 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. Turbidity was measured by the lab because the field meter would not pass calibration for Event 34 and Event 37.
4. 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.
5. Organophosphorus Pesticides include: bolstar, chlorpyrifos, demeton, diazinon, dichlorvos, dimethoate, disulfoton, ethoprop, fenclorophos, fensulfothion, 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.
6. Pyrethroid Pesticides include: allethrin, bifenthrin, cyfluthrin, cypermethrin, danitol, deltamethrin, esfenvalerate, fenvalerate, lambda-cyhalothrin, permethrin, and prallethrin.
7. If sample conductivity exceeded 3000 µs/cm, *hyalella azteca* was used for toxicity testing.

Table 8. VCAILG Sites Monitored and Constituents Sampled in 2017-2018

Watershed / Subwatershed	Site ID	Reach	Yearly Events ¹			
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Calleguas Creek / Mugu Lagoon	01T_ODD3_EDI ²	1	WQ	WQ, TOX	WQ	WQ, TOX
Calleguas Creek / Revolon Slough	04D_ETTG	4	WQ	WQ, TOX	WQ	WQ, TOX
	04D_LAS	4	WQ	WQ, TOX	WQ	WQ, TOX
Calleguas Creek / Beardsley Channel	05D_LAVD	5	WQ ³	WQ, TOX ³	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	WQ, TOX	WQ	WQ, TOX ³
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 ³	WQ	WQ, TOX ³
	S03T_BOULD	3	WQ ³	WQ, TOX	WQ	WQ, TOX ³
	S03D_BARDS	3	WQ ³	WQ, TOX ³	WQ	WQ, TOX ³
	S04T_TAPO	4	WQ	WQ, TOX	WQ	WQ, TOX
	Ventura River	VRT_THACH	--	WQ ³	WQ, TOX	WQ ⁴
VRT_SANTO		--	WQ ³	WQ, TOX	WQ ⁴	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. The 01T_ODD3_EDI site replaced the 01T_ODD3_ARN site last year.
3. No samples collected due to insufficient flow/dry conditions.
4. Site not visited due to being in a voluntary evacuation zone due to flash flood and mudslide warnings after the Thomas Fire.

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 Tenth 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. 2018. Calleguas Creek Watershed TMDL Compliance Monitoring Program Tenth Year Annual Monitoring Report. December 15, 2018.

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)	First Dry event of the 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)	2 wet events
Santa Clara River Bacteria TMDL ⁷	S01D_MONAR ⁷	Fecal coliform, total coliform, enterococcus	Weekly samples, every other month for one year
	S03D_BARDS ⁸	<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 VCAILG-MP 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. Samples collected and reported this year; the next collection will be in spring/summer 2021.
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. 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.
7. This is the closest site to the Santa Clara River Estuary. Data will be compared to load allocations for the estuary.
8. 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 2017-2018

TMDL	Site ID	Yearly Events			
		Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Santa Clara River Estuary Toxaphene TMDL	S01D_MONAR	OC-W TSS ¹	OC-W OC-S TSS ¹	OC-W OC-S TSS	OC-W TSS ¹
	S02T_ELLS	OC-W TSS ¹	OC-W OC-S TSS	OC-W OC-S TSS	OC-W TSS ¹
	Santa Clara River Estuary	NA	NA	NA	OC-T ³
Channel Islands Harbor Bacteria TMDL	CIHD_VICT	Bact ¹	Bact ¹	Bact ¹	Bact ¹
Oxnard Drain #3 Pesticides, PCBs, and Sediment Toxicity TMDL	01T_ODD3_ED1	PP-W, PP-S	PP-W	PP-W	PP-W
Malibu Creek Watershed Sedimentation and Nutrients TMDL	05T-HONDO	TN, TP ¹	TN, TP, NO ₃ , NO ₂ ¹	TN, TP, NO ₃ , NO ₂	TN, TP ¹
McGrath Lake PCBs, Pesticides and Sediment Toxicity TMDL	OXD_CENTR	OC-PCB-W TOC TSS	OC-PCB-W OC-PCB-S TOC TSS	OC-PCB-W OC-PCB-S TOC TSS	OC-PCB-W TOC TSS
Ventura River Algae TMDL	VRT_THACH	TN, TP ¹	NO ₃ , NO ₂	NO ₃ , NO ₂ ²	TN, TP ¹
	VRT_SANTO	TN, TP ¹	NO ₃ , NO ₂	NO ₃ , NO ₂ ²	TN, TP ¹
	V02D_SPM	TN, TP ¹	NO ₃ , NO ₂ ¹	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-T = Chlordane, Dieldrin, and Toxaphene in tissue

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

NA – Tissue samples are only required once every three years.

1. Site not sampled due to insufficient flow/dry conditions.
2. Site not visited due to being in a voluntary evacuation zone due to flash flood and mudslide warnings.
3. Fish tissue collected May 30, 2018.

Table 11. Santa Clara River Bacteria TMDL Sites Sampled in 2017 during this reporting year

Month/Site	Monitoring Events				
Month 4	7/31/17	8/7/17	8/14/17	8/21/17	8/28/17
S01D_MONAR ¹	X	X	X	NS	NS
S03D_BARDS ²	NS	NS	NS	NS	NS
Month 5	10/2/17	10/10/17	10/16/17	10/23/17	10/30/17
S01D_MONAR ¹	NS	NS	NS	NS	NS
S03D_BARDS ²	NS	NS	NS	NS	NS
Month 6	11/27/17	12/4/17	12/11/17	12/18/17	12/26/17
S01D_MONAR ¹	NS	NS	NS	NS	NS
S03D_BARDS ²	NS	NS	NS	NS	NS

'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. Photo documentation of each monitoring site for all four events is also included 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 in this Annual Report as Appendix E.

ANALYTICAL METHODS

Table 12 provides a summary of analytical methods used by contract laboratories for analyzing samples collected for 2016 *Conditional Waiver* constituents during the 2017-2018 monitoring year. Table 13 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
Turbidity	EPA 180.1
Nutrients	
Total Ammonia-N	SM 4500-NH ₃ D
Nitrate-N	EPA 300.0
Total Nitrogen	Direct Method
Phosphate (Total Orthophosphate as P)	SM 4500PE
Total Phosphorus	SM 4500PE
Metals	
Total and Dissolved Copper	EPA 200.8
Organic Constituents³	
Organochlorine Pesticides ⁴	EPA 625
Organophosphorus Pesticides	EPA 625
Pyrethroid Pesticides	EPA 625-NCI
PCB Congeners/Aroclors	EPA 625
Bacteria	
<i>E. coli</i>	SM 9223B

1. The 2017 MRP/QAPP calls for *Ceriodaphnia dubia* for Chronic toxicity at all sites.

2. If sample conductivity exceeded 3000 μ S/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 5310B
Total organic carbon (TOC) (sediment)	EPA 9060
Nutrients	
Nitrite-N	EPA 300.0
PCB Aroclors and Organochlorine Pesticides	
PCBs (water)	EPA 625
PCBs (sediment)	EPA 8270D
OC Pesticides (filtered sediment)	EPA 8270D
OC Pesticides (fish tissue)	EPA 8270D
OC Pesticides (sediment)	EPA 8270D
Bacteria	
Enterococcus	SM 9230D
Total coliform	SM 9223B
Fecal coliform	SM 9221B

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 2017-2018 monitoring year. An evaluation of the data quality for the Calleguas Creek Watershed TMDL monitoring program is included as Appendix D as part of the tenth 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 2017-2018 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 Tenth Year Annual Monitoring Report.” December 15, 2018.

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 Benchmark for Bifenthrin

Constituent	CC, OXD, SCR, VR Watersheds	
	Unit	Benchmark
Bifenthrin	µg/L	0.0006

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

Table 20. Conditional Waiver Water Quality Benchmark for *E. coli*

Constituent	CC, OXD, SCR, VR Watersheds	
	Unit	Benchmark
<i>E. coli</i>	MPN/100mL	235

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

Table 21. 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 2017-2018. 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 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 2017-2018 as Appendix F – Monitoring Data. All hard copy laboratory reports are also provided. Results summarized in this section are compared with standard water quality benchmarks from Appendix 4 of the 2016 *Conditional Waiver* and specified in Table 14 through Table 21, 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 2017-2018 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.

Thomas Fire Monitoring Modifications and Impacts

Beginning on December 4, 2017, the Thomas fire began burning north of the City of Santa Paula in the Santa Clara River Watershed. It continued to burn east to Fillmore, west into Ventura, north through Ojai and the Ventura River Watershed and all the way up into Santa Barbara County. Until recently it was the largest California wildfire on record having burned 281,893 acres. Six VCAILG monitoring sites, two in the Ventura River Watershed and four in the Santa Clara River Watershed, had significant portions of their site drainages burned (Figure 11).

On January 5, 2018, the VCAILG submitted a request for suspension of wet-weather monitoring requirements due to the Thomas Fire. In this letter, the VCAILG cited safety concerns due to landslides, mudslides, or debris flows, samples not being representative of agricultural discharges but rather the fire effects, and confounding results particularly related to toxicity. Due to these concerns, particularly the safety of monitoring crews, the VCAILG did not perform any wet weather sampling until a response from the Regional Board was received February 23, 2018.

Between the delivery of the VCAILG letter and receipt of the Regional Board's response, the mudslides in Montecito and Carpinteria occurred.

Per the February 23, 2018 letter received by VCAILG from the Regional Board, this section of the AMR documents fire impacts and unsafe conditions that prevented sampling at certain sites. The first storm sampled during the 2017-18 monitoring year took place on March 11, 2018. Rainfall rates and amounts were not great enough to trigger mudslides or debris flows and all sites were visited during that storm event. The second storm event, which was sampled on March 22, 2018 was described as the "largest storm of the season with major concern for recent burn areas" by the National Weather Service. Post-Thomas Fire mud and debris flow warnings were issued along with recommended evacuation areas; this information is documented in the figures below. The two Ventura River monitoring sites located near Ojai were within the evacuation and warning areas, therefore these two sites were not visited during Event 36. Documentation of the National Weather Service warnings, forecast, and USGS evacuation areas relative to the Ojai monitoring sites are provided below.

In regards to the post-fire monitoring data, it was expected that metals, PCBs, nutrients, *E. coli*, TSS, turbidity, and possibly salts would all be higher as well as more significant toxic effects. A general summary of what was observed in the post-fire data at the sites with significant burn areas draining to the monitoring location are as follows, with site specific information in the individual data tables:

- Higher than normal total copper results.
- Phos-Check is around ten percent ammonium phosphate and sulfate Total phosphorus ranged from double to an order of magnitude higher than the recent pre-fire events. These compounds are also salts, so the higher TDS and sulfate concentrations were also expected. Ammonium is a form of nitrogen and since nitrogen cycling varies with temperature, moisture, etc. the various nitrogen forms were also likely to be elevated.
- TSS was extremely high due to loss of vegetation and decreased infiltration causing greater susceptibility to erosion.
- 0% survival in one of the samples impacted by the fire. The other sites draining burned areas all exhibited significant reproduction toxicity in their samples.
- While we don't have a long record of *E. coli* data, the MPN values were generally much higher at the fire impacted sites.
- Indirectly, concentrations of pesticides are higher via the increased erosion and sediment transport.

The constituents above are noted with a ** in the data tables for the fire impacted sites. Additionally, any exceedances of the benchmark of a ** site are NOT shown in bold font due to the inability of VCAILG to relate the results to on-farm management and activities.

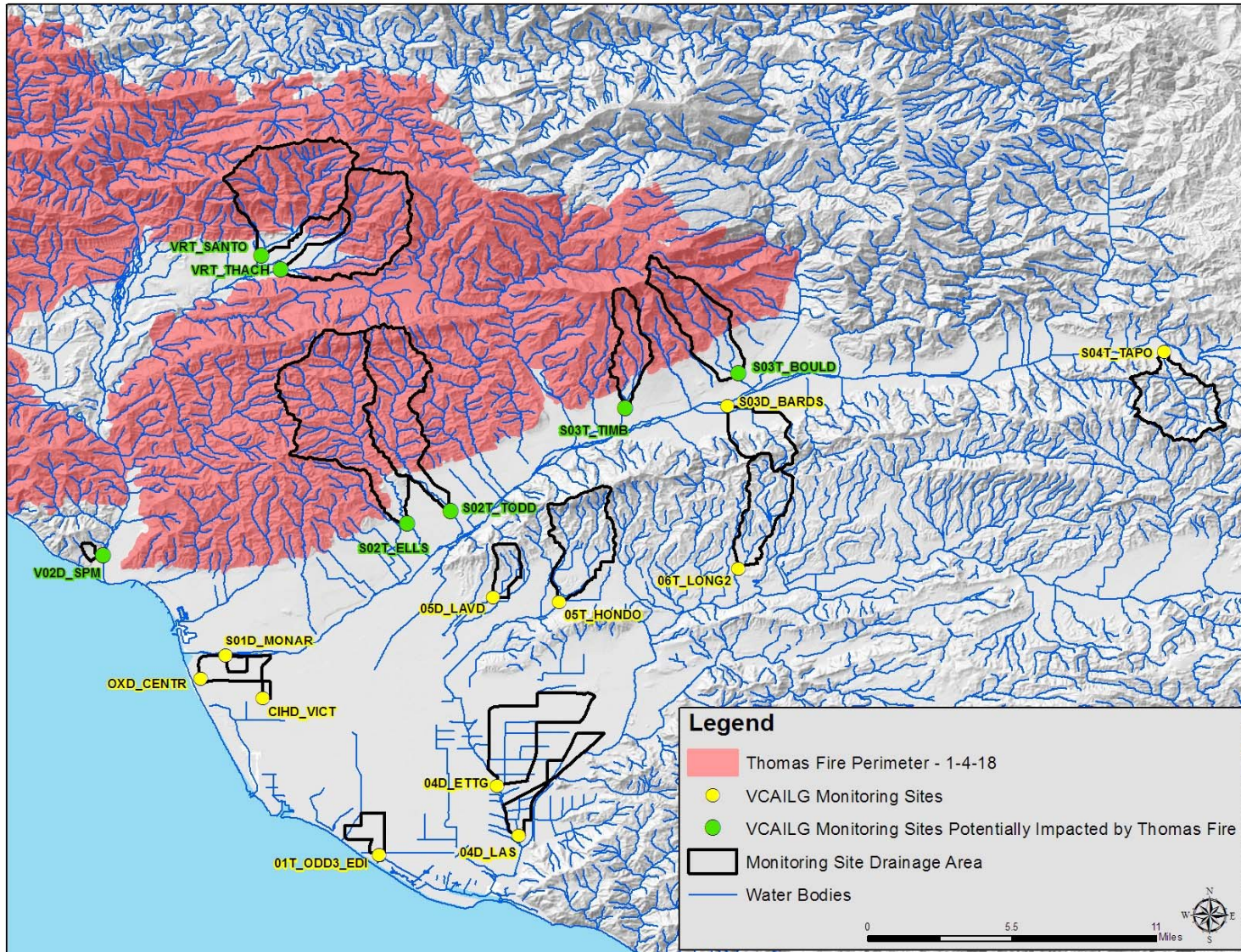


Figure 11. Thomas Fire Burn Area in Relation to VCAILG Monitoring Sites and Drainage Areas

Debris Flows Likely Across Recent Burn Areas Tue-Thu

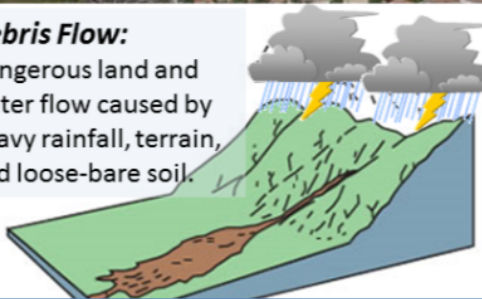


POTENTIALLY DANGEROUS SITUATION ACROSS RECENT BURN AREAS!

- Thomas, Creek, and LaTuna Burn Areas - *Mod-high risk of debris flows*
- 5-10" rain expected for foothills & Mtns with high hourly rainfall rates
- *Flash flooding also possible outside burn areas due to sustained heavy rainfall*
- **Stay alert to the forecast and listen to your local emergency managers**

Debris Flow:

Dangerous land and water flow caused by heavy rainfall, terrain, and loose-bare soil.



NWS photo



Weather Forecast Office
Los Angeles/Oxnard, CA

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A long-duration significant storm system is expected to move into Southern California on Tuesday. Due to the recent fires including the Thomas, Creek and LaTuna Fires, there is a heightened danger for debris flows to occur in and near these burn areas. A sustained period of steady rain is expected with high hourly rainfall rates. People should prepare early for this upcoming event, especially if you live below or around these burn areas. Stay alert to the forecasts over the next few and information from your emergency managers if they have you evacuate. Debris flows can occur quickly with little or no warning.

Figure 12. National Weather Service Debris Flow Warning for March 22, 2018 Storm

Area Forecast Discussion

National Weather Service Los Angeles/Oxnard CA
324 AM PDT Tue Mar 20 2018

.SYNOPSIS...19/858 PM.

A subtropical fetch of moisture ahead of an approaching trough of low pressure will likely bring periods of moderate to heavy rain to the area late Tuesday through Thursday. Cooler than normal temperatures will prevail through Thursday due to the unsettled weather. This will be followed by a trough of low pressure expected to linger over the area into this weekend, with dry and slightly milder conditions.

&&

.SHORT TERM (TDY-THU)...20/323 AM.

LARGEST STORM OF THE SEASON WITH MAJOR CONCERN FOR RECENT BURN AREAS

It all starts today. The season`s largest storm will begin to affect the Central Coast this morning and will then bring rain (heavy at times) to the entire forecast area through early Friday morning.

A 540 DM upper low is 1000 miles west of the Bay Area. This is an atypical location for upper lows which are usually further east and north. Due to the position of this low there is a very long fetch of west flow extending from under the low to SRN CA. This flow pattern has entrained a plume of subtropical moisture which will advect of the area over the next 72 hours. This plume has impressive precipitable water values with .5 to 1.0 inches just off the coast and 1.5 to an impressive 2.0 inches in the heart of the plume.

Current mdl consensus is that the axis of the plume and thus the heaviest rainfall will be over western SBA county which is a little further north than some earlier forecasts. If this is true then LA county will not see the worst effects of this system. The NAM is the outlier and it directs the plume at the City of SBA.

This kind of storm is classified as an Atmospheric River or AR. The rainfall produced by an atmospheric river rarely of constant intensity and quite frankly the current state of the art computer modeling is incapable of forecasting these variations in intensity. People in SBA and VTA and to a lesser degree SLO and LA county can expect to see rainfall rates ramping up and down during this event.

The orientation of the AR is very important as it determines the amount of the orthogonal component of the AR to coastal slopes. If the AR lines up nearly parallel coastal slopes there will be little enhanced precipitation. If...however...it is almost perpendicular to the slopes the rainfall rates/amounts could be three to 4 times as great as the values across the flatter terrain.

the current rainfall estimates still look good for the area 60 miles either side of the axis of the AR with forecasted amounts of 2-5 inches of rain across the coasts and valleys and 5-10 inches of rain in the foothills and mountains. The higher amounts should be over SBA county and western VTA County. If the axis sets up north of Pt Conception amounts in the LA area could be under an inch. Peak rainfall intensities of 0.5 to 0.75 inches per hour are expected with potentially higher rates in the SBA/VTU Co foothills.

Peak rainfall will shift from SBA county later Thursday and LA county will see their heaviest rain from late Thursday Morning into the early evening.

Due to the prolonged period of rain it is possible there will be small stream and urban flooding in addition to debris flows in burn areas. Currently there is a flash flood watch out for the recent burn areas. Will have to see how this event plays out but there may well be a need for a flash flood watch for non burn areas as well.

Figure 13. March 22, 2018 Storm Forecast Including Flash Flood and Debris Flow Warnings



Figure 14. March 21 through 22, 2018 USGS Evacuation Areas

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_EDI

Rio de Santa Clara / Oxnard Drain No. 3. Per approval of the 2017 QAPP, the 01T_ODD3_ARN site was changed to 01T_ODD3_EDI following Event 31. The 01T_ODD3_ARN monitoring site was previously located on an agricultural drain just upstream from the Arnold Road Bridge. Relocation of the site ensures access during wet weather events and the ability to collect sediment samples required by the Oxnard Drain #3 TMDL. The 01T_ODD3_EDI 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_EDI



Site Map



Flow was present at this site during all 2017-2018 monitoring events. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire, though this site does not capture drainage from any burn areas. Table 22 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks.

Exceedances of nitrate-N, dissolved copper, 4,4'-DDE, and toxaphene occurred during all four 2017-2018 monitoring events. Exceedances of 4,4'-DDD, 4,4'-DDT, and *E. coli* occurred during Events 34, 35, and 36. Total chlordane and bifenthrin exceedances occurred during wet weather Event 36. The dissolved oxygen benchmark was not met during wet weather Event 35.

Sod and some row crops are the primary crop types in the vicinity of this site. Table 23 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.

Table 22. 2017-2018 VCAILG Monitoring Data v. Waiver Benchmarks: 01T_ODD3_ED1

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ^{1,5}	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS		0.6	1.4	20.8	0.7
pH		6.5 ≤ pH ≤ 8.5	7.0	7.7	7.5	6.8
Temperature	°C		21.2	14.6	15.3	19.1
Dissolved Oxygen	mg/L	≥ 5	6.7	4.8	7.2	8.5
Turbidity	NTU		3.9	75.3	108.1	1.0
Conductivity	µS/cm		4145.0	2090.0	1168.0	4188.0
General Water Quality						
TDS	mg/L		3550	1220	710	3690
TSS	mg/L		7	100	120	4
Total Hardness as CaCO ₃	mg/L		1810	702	410	2000
Chloride	mg/L		250	170	59	190
Sulfate	mg/L		1710	470	309	1720
Nutrients						
Ammonia-N	mg/L	6.79/ 2.23/ 3.32/ 12.56 ²	5.31	1.43	0.71	0.14
Nitrate-N	mg/L	10 ³	66.70	19.60	12.30	86.70
Total Nitrogen	mg/L		176.00	41.00	19.00	132.00
Total Orthophosphate	mg/L		0.58	2.21	1.57	0.61
Total Phosphorus	mg/L		0.27	0.92	0.99	0.24
Metals						
Dissolved Copper	µg/L	3.10 ⁴	4.27	5.40	5.42	4.95
Total Copper	µg/L		5.84	9.37	9.06	6.63
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
trans-Nonachlor	µg/L		ND	DNQ	0.00518	ND
Chlordane-alpha	µg/L		DNQ	DNQ	0.00573	ND
Chlordane-gamma	µg/L		DNQ	DNQ	DNQ	ND
Total Chlordane	µg/L	0.00059	DNQ	DNQ	0.00573	ND
2,4'-DDD	µg/L		DNQ	0.00516	0.00847	ND
2,4'-DDT	µg/L		ND	DNQ	0.01160	ND
4,4'-DDD	µg/L	0.00084	0.00620	0.01990	0.02700	DNQ
4,4'-DDE	µg/L	0.00059	0.01280	0.06450	0.09770	0.00575
4,4'-DDT	µg/L	0.00059	0.00540	0.02210	0.09430	DNQ
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 34	Event 35 ¹	Event 36 ^{1,5}	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Endrin	µg/L	0.036	ND	ND	ND	ND
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	0.08850	0.15700	0.73900	0.06540
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	ND	ND	0.004	ND
Diazinon	µg/L	0.1	ND	ND	ND	ND
Ethoprop	µg/L		ND	0.012	ND	ND
Malathion	µg/L		ND	ND	0.013	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	ND	ND	0.0280	ND
Danitol	µg/L		ND	ND	0.0038	ND
Bacteria						
<i>E. coli</i>	MPN/100 mL	235	517	22,470	198,630	100

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

1. Event occurred after the Thomas Fire.
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.
5. Pumping water out of field adjacent to the monitoring site, and into the channel.

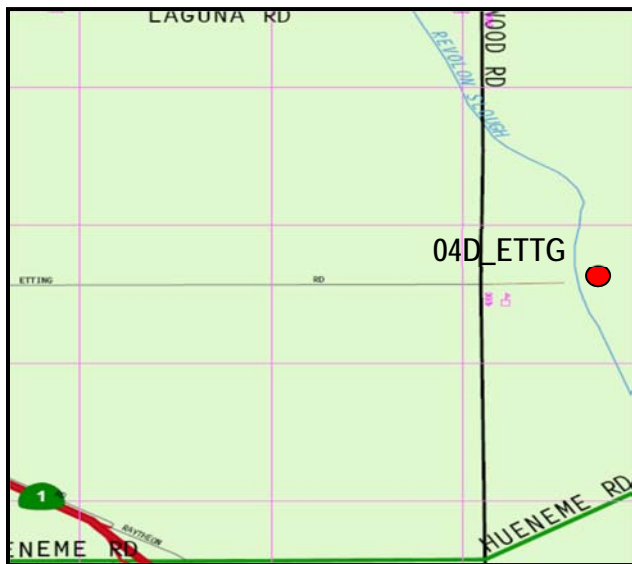
Table 23. 2017-2018 Trash Observations for 01T_ODD3_ED1

Event	Count	Types
Event 34	2	Irrigation pipe, can
Event 35	10+	Plastic, bottles, Styrofoam, ag trash
Event 36	10+	Ag trash, Styrofoam
Event 37	2	Lid, Styrofoam

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 2017-2018 monitoring events. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire, though this site does not drain any portion of burned area. Table 24 contains a summary of concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks.

Exceedances of nitrate-N, dissolved copper, 4,4'-DDE, and toxaphene occurred during all four monitoring events. The *E. coli* benchmark was exceeded during Events 34, 35, and 36. Exceedances of 4,4'-DDD and 4,4'-DDT occurred during dry weather Event 34 and wet weather Event 36. The bifenthrin benchmark was exceeded during wet weather Events 35 and 36.

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. The approximate amount and types of trash observed at this site is listed in Table 25.

Table 24. 2017-2018 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_ETTG

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS		3.7	3.4	42.7	2.2
pH		6.5 < pH < 8.5	7.9	7.9	7.7	7.9
Temperature	°C	≤ 26.67°C ²	23.3	15.6	15.5	23.0
Dissolved Oxygen	mg/L	≥ 5	6.7	6.9	7.6	14.0
Turbidity	NTU		21.8	3.9	130.7	2.5
Conductivity	µS/cm		3412.0	4004.0	2361.0	4891.0
General Water Quality						
TDS	mg/L		2810	3370	1720	4300
TSS	mg/L		20	26	259	9
Total Hardness as CaCO ₃	mg/L		1430	1750	942	2260
Chloride	mg/L		280	340	160	380
Sulfate	mg/L		1250	1510	750	2040
Nutrients						
Ammonia-N	mg/L	1.59/ 2.61/ 3.36/ 1.62 ³	0.24	0.16	0.11	0.09
Nitrate-N	mg/L	10 ⁴	48.20	66.30	40.80	77.00
Total Nitrogen	mg/L		98.40	131.00	56.90	123.00
Total Orthophosphate	mg/L		6.10	1.48	2.98	2.73
Total Phosphorus	mg/L		2.53	1.04	0.38	1.12
Metals						
Dissolved Copper	µg/L	3.10 ⁵	5.10	9.00	6.83	8.55
Total Copper	µg/L		5.47	11.30	15.20	27.90
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	DNQ	ND
Chlordane-gamma	µg/L		ND	ND	DNQ	ND
Total Chlordane	µg/L	0.00059	ND	ND	DNQ	ND
2,4'-DDD	µg/L		DNQ	DNQ	0.01410	ND
2,4'-DDE	µg/L		DNQ	DNQ	0.00786	ND
2,4'-DDT	µg/L		DNQ	DNQ	0.03780	ND
4,4'-DDD	µg/L	0.00084	0.00740	DNQ	0.04480	DNQ
4,4'-DDE	µg/L	0.00059	0.02750	0.02190	0.29000	0.01150
4,4'-DDT	µg/L	0.00059	0.00860	DNQ	0.24800	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 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Endrin	µg/L	0.036	ND	ND	ND	ND
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	0.23000	0.08390	1.06000	0.13300
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	DNQ	ND	0.013	ND
Diazinon	µg/L	0.1	ND	ND	ND	ND
Dichlorvos	µg/L		ND	0.099	0.026	ND
Dimethoate	µg/L		0.060	ND	ND	ND
Malathion	µg/L		ND	0.420	0.019	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	ND	0.0128	0.0504	ND
Cypermethrin	µg/L		ND	ND	0.0244	ND
Danitol	µg/L		ND	ND	0.0022	ND
cis-Permethrin	µg/L		ND	ND	0.0283	ND
trans-Permethrin	µg/L		ND	ND	0.1130	ND
Bacteria						
<i>E. coli</i>	MPN/100 mL	235	579	1340	1600	100

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. 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.
5. The copper benchmark for saltwater applies at this site as prescribed in Table 16.

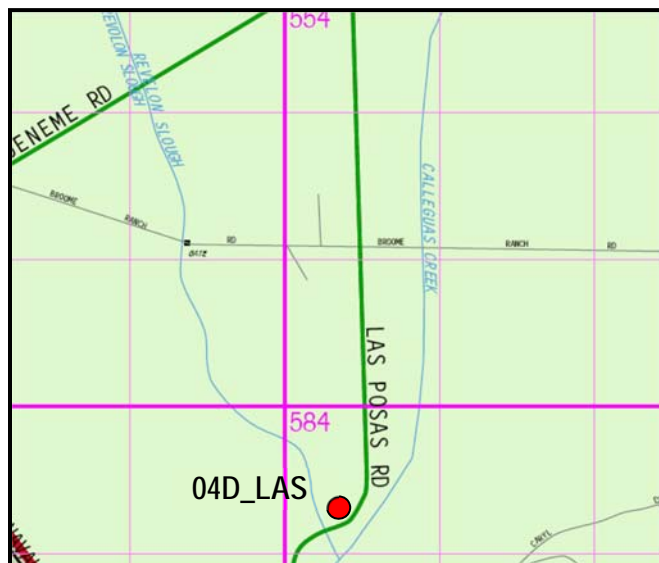
Table 25. 2017-2018 Trash Observations for 04D_ETTG

Event	Count	Types
Event 34	10	Styrofoam plate, bags (plastic), cans, gallon jugs, cups, plastic bottles
Event 35	1	Can
Event 36	30+	Plastic bottles, Styrofoam, cans, ag trash
Event 37	10-15	Plates, bottles, bag of clothes

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 all four 2017-2018 monitoring events. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire. Table 26 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks.

Exceedances of nitrate-N, 4,4'-DDE, and toxaphene occurred during all four monitoring events. The 4,4'-DDD, 4,4'-DDT, and *E. coli* benchmarks were exceeded during Event 34, 35, and 36. The dissolved copper benchmark was exceeded during Events 35, 36, and 37. The chlorpyrifos, and bifenthrin benchmarks were exceeded during wet weather Event 36. The pH benchmark was exceeded during dry weather Event 34.

Row crops are the primary crop type grown in the vicinity of this site. Table 27 quantifies and describes trash found at this site.

Table 26. 2017-2018 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_LAS

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS		2.2	3.8	17.0	2.0
pH		6.5 < pH < 8.5	9.0	7.9	7.7	7.7
Temperature	°C	≤ 26.67°C ²	23.5	15.0	15.1	21.7
Dissolved Oxygen	mg/L	≥ 5	15.1	6.6	7.1	11.1
Turbidity	NTU		16.9	22.0	126.5	13.8
Conductivity	µS/cm		3841.0	3408.0	2769.0	3868.0
General Water Quality						
TDS	mg/L		3210	2620	1980	3050
TSS	mg/L		48	50	237	21
Total Hardness as CaCO ₃	mg/L		1430	1210	972	1430
Chloride	mg/L		530	390	280	450
Sulfate	mg/L		1250	1010	780	1190
Nutrients						
Ammonia-N	mg/L	0.27/ 2.71/ 3.45/ 2.25 ³	0.05	0.41	0.25	0.11
Nitrate-N	mg/L	10 ⁴	47.20	44.70	44.00	40.20
Total Nitrogen	mg/L		80.00	89.70	59.30	68.90
Total Orthophosphate	mg/L		0.61	2.06	2.79	1.71
Total Phosphorus	mg/L		0.40	0.81	1.18	0.62
Metals						
Dissolved Copper	µg/L	3.10 ⁵	3.08	6.39	6.43	3.52
Total Copper	µg/L		3.48	7.69	13.40	10.80
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		DNQ	DNQ	DNQ	ND
Chlordane-gamma	µg/L		DNQ	DNQ	DNQ	ND
Total Chlordane	µg/L	0.00059	DNQ	DNQ	DNQ	ND
2,4'-DDD	µg/L		DNQ	DNQ	0.00625	DNQ
2,4'-DDT	µg/L		ND	DNQ	0.00937	DNQ
4,4'-DDD	µg/L	0.00084	0.00650	0.00542	0.02180	DNQ
4,4'-DDE	µg/L	0.00059	0.01920	0.02590	0.10300	0.01820
4,4'-DDT	µg/L	0.00059	0.00610	0.00750	0.07120	DNQ
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

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	0.09520	0.17200	0.54600	0.14500
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.008	0.018	0.040	ND
Diazinon	µg/L	0.1	ND	0.037	0.078	ND
Dichlorvos	µg/L		ND	0.020	0.016	ND
Dimethoate	µg/L		ND	0.021	ND	ND
Ethoprop	µg/L		ND	0.015	0.055	ND
Malathion	µg/L		ND	0.148	1.250	ND
Methyl parathion	µg/L		ND	0.010	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	ND	ND	0.0180	ND
Cypermethrin	µg/L		ND	0.0158	0.1010	ND
Danitol	µg/L		ND	ND	0.0042	ND
Esfenvalerate	µg/L		ND	ND	0.0134	ND
Fenvalerate	µg/L		ND	ND	0.0108	ND
Bacteria						
	MPN/100					
<i>E. coli</i>	mL	235	816	1,710	1,890	<100

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. 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.
5. The copper benchmark for saltwater applies at this site as prescribed in Table 16.

Table 27. 2017–2018 Trash Observations for 04D_LAS

Event	Count	Types
Event 34	1	Cup
Event 35	10+	Plastic, Styrofoam, bottles
Event 36	10	Plastic, cans, Styrofoam, ag trash
Event 37	0	

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 during wet weather Event 36. Flow was not present at the site during Events 34, 35, and 37. Table 28 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During wet weather Event 36, the dissolved copper, total chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toxaphene, chlorpyrifos, and bifenthrin benchmarks were exceeded.

Citrus, avocados, and berries (other than strawberries) are the major crop types that drain to this monitoring location. Table 29 quantifies and describes trash found at this site.

Table 28. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: 05D_LAVD

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS				16.3	
pH		6.5 ≤ pH ≤ 8.5			7.9	
Temperature	°C	≤ 26.67°C ²			14.9	
Dissolved Oxygen	mg/L	≥ 5			10.1	
Turbidity	NTU				1154.0	
Conductivity	µS/cm				168.8	
General Water Quality						
TDS	mg/L	850			100	
TSS	mg/L				3210	
Total Hardness as CaCO ₃	mg/L				71	
Chloride	mg/L	150			5	
Sulfate	mg/L	250			33	
Nutrients						
Ammonia-N	mg/L	NS/ NS/ 2.73/ NS ³			0.31	
Nitrate-N	mg/L	10 ⁴			1.80	
Total Nitrogen	mg/L				3.47	
Total Orthophosphate	mg/L				2.26	
Total Phosphorus	mg/L				7.40	
Metals						
Dissolved Copper	µg/L	NS/ NS/ 6.68/ NS ⁵	NS	NS	7.02	NS
Total Copper	µg/L				178.00	
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	
trans-Nonachlor	µg/L				0.00870	
Chlordane-alpha	µg/L				0.01010	
Chlordane-gamma	µg/L				0.00707	
Total Chlordane	µg/L	0.00059			0.01717	
2,4'-DDD	µg/L				0.00775	
2,4'-DDT	µg/L				0.02290	
4,4'-DDD	µg/L	0.00084			0.05450	
4,4'-DDE	µg/L	0.00059			0.36900	
4,4'-DDT	µg/L	0.00059			0.19900	
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	

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Endrin	µg/L	0.036			ND	
Endrin Aldehyde	µg/L	0.81			ND	
Toxaphene	µg/L	0.00075			0.50400	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025			0.286	
Diazinon	µg/L	0.1			ND	
Malathion	µg/L				0.091	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006			0.0500	
Cyfluthrin	µg/L				0.0500	
Cypermethrin	µg/L				0.2140	
Danitol	µg/L				0.2320	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235			N/A	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

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

N/A – Sample not analyzed; sample bottle sent to incorrect lab.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. 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.
5. 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 29. 2017–2018 Trash Observations for 05D_LAVD

Event	Count	Types
Event 34	10	Cups, plastic
Event 35	0	
Event 36	0	
Event 37	2	Bottles

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 36. The site was dry during Events 34, 35, and 37. Table 30 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During wet weather Event 36, the dissolved copper, total chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toxaphene, chlorpyrifos, bifenthrin, and *E. coli* benchmarks were exceeded.

The site is located directly adjacent to Hwy 118 and drains land planted primarily with citrus and avocado orchards. Table 31 quantifies and describes trash found at this site.

Table 30. 2017-2018 VCAILG Monitoring Data v. Waiver Benchmarks: 05T_HONDO

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS				23.7	
pH		6.5 ≤ pH ≤ 8.5			7.9	
Temperature	°C	≤ 26.67°C ²			14.5	
Dissolved Oxygen	mg/L	≥ 5			10.1	
Turbidity	NTU				295.0	
Conductivity	µS/cm				209.4	
General Water Quality						
TDS	mg/L	850			160	
TSS	mg/L				3910	
Total Hardness as CaCO ₃	mg/L				91	
Chloride	mg/L	150			11	
Sulfate	mg/L	250			34	
Nutrients						
Ammonia-N	mg/L	NS/ NS/ 2.80/ NS ³			0.52	
Nitrate-N	mg/L	10			3.54	
Total Nitrogen	mg/L				5.57	
Total Orthophosphate	mg/L				5.24	
Total Phosphate	mg/L				9.25	
Metals						
Dissolved Copper	µg/L	NS/ NS/ 8.26/ NS ⁴	NS	NS	8.61	NS
Total Copper	µg/L				182.00	
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				0.01040	
trans-Nonachlor	µg/L				0.01390	
Chlordane-alpha	µg/L				0.01650	
Chlordane-gamma	µg/L				0.01230	
Total Chlordane	µg/L	0.00059			0.02880	
2,4'-DDD	µg/L				0.08130	
2,4'-DDE	µg/L				0.03060	
2,4'-DDT	µg/L				0.08350	
4,4'-DDD	µg/L	0.00084			0.36600	
4,4'-DDE	µg/L	0.00059			2.03000	
4,4'-DDT	µg/L	0.00059			0.32200	
Dieldrin	µg/L	0.00014			ND	
Endosulfan-I	µg/L	0.056			ND	

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
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			1.90000	
Organophosphorus Pesticide						
Chlorpyrifos	µg/L	0.025			0.217	
Diazinon	µg/L	0.1			ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006			0.0860	
Cyfluthrin	µg/L				0.0347	
Cypermethrin	µg/L				0.1270	
Danitol	µg/L				0.5840	
Esfenvalerate	µg/L				0.0581	
Fenvalerate	µg/L				0.0336	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235			13,340	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

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

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The benchmarks for copper are listed in order of monitoring event and were calculated for freshwater at this site as prescribed in Table 16.

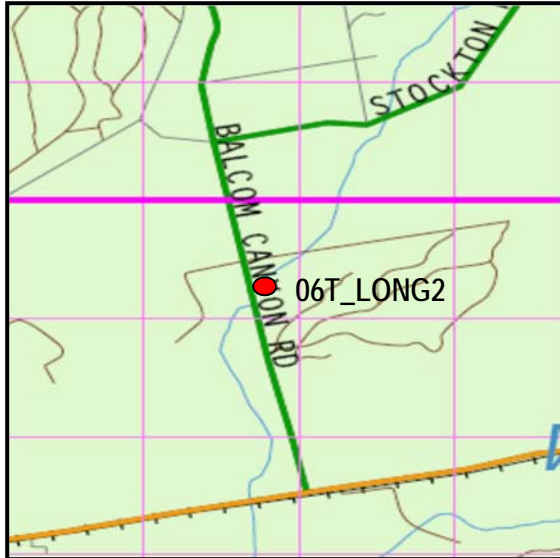
Table 31. 2017–2018 Trash Observations for 05T_HONDO

Event	Count	Types
Event 34	15-20	Cups, plastic, ag pipes, cardboard boxes
Event 35	60+	Bottle, urban trash, ag trash, Styrofoam
Event 36	50+	Sleeping bag, plastic, Styrofoam, bottles, urban trash
Event 37	20-30	Urban trash, bottles, plates, cups

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 collected at this site during wet weather monitoring Event 36. Flow was not present during Events 34, 35, and 37. Table 32 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. Exceedances of total chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toxaphene, chlorpyrifos, and *E. coli* occurred during wet weather Event 36.

Table 33 quantifies and describes trash found at this site. The drainage area for this monitoring site consists mostly of citrus and avocado orchards, with small portions used for growing cane berries.

Table 32. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: 06T_LONG2

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS				29.9	
pH		6.5 ≤ pH ≤ 8.5			7.9	
Temperature	°C	≤ 26.67°C ²			14.4	
Dissolved Oxygen	mg/L	≥ 5			10.2	
Turbidity	NTU				2232.0	
Conductivity	µS/cm				171.9	
General Water Quality						
TDS	mg/L	850			120	
TSS	mg/L				3800	
Total Hardness as CaCO ₃	mg/L				87	
Chloride	mg/L	150			4	
Sulfate	mg/L	250			24	
Nutrients						
Ammonia-N	mg/L	NS/ NS/ 2.82/ NS ³			0.32	
Nitrate-N	mg/L	10			1.31	
Total Nitrogen	mg/L				3.57	
Total Orthophosphate	mg/L				3.03	
Total Phosphorus	mg/L				10.90	
Metals			NS	NS		NS
Dissolved Copper	µg/L	NS/ NS/ 7.95/ NS ⁴			7.27	
Total Copper	µg/L				153.00	
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				0.00557	
trans-Nonachlor	µg/L				0.01060	
Chlordane-alpha	µg/L				0.00875	
Chlordane-gamma	µg/L				0.00684	
Total Chlordane	µg/L	0.00059			0.01559	
2,4'-DDT	µg/L				0.00704	
4,4'-DDD	µg/L	0.00084			0.04310	
4,4'-DDE	µg/L	0.00059			0.14700	
4,4'-DDT	µg/L	0.00059			0.04090	
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	

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Endrin	µg/L	0.036			ND	
Endrin Aldehyde	µg/L	0.81			ND	
Toxaphene	µg/L	0.00075			0.05320	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025			0.033	
Diazinon	µg/L	0.1			ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006			ND	
Cyfluthrin	µg/L				0.0415	
Danitol	µg/L				0.4640	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235			12,230	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

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

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. 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 33. 2017–2018 Trash Observations for 06T_LONG2

Event	Count	Types
Event 34	5-6	Bottles, cups, PVC pipe
Event 35	1	Plastic bottle
Event 36	4+	Plastic, Styrofoam cup
Event 37	0	

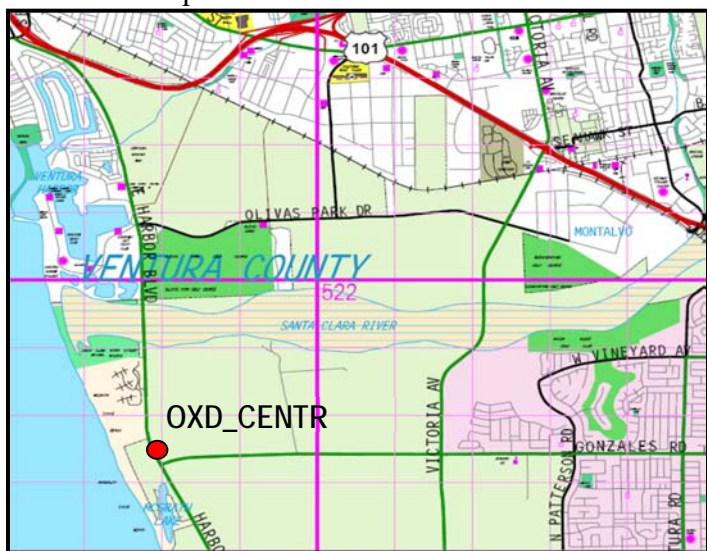
Oxnard Coastal Watershed

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 2017-2018 monitoring events. The site was sampled during Events 34, 35, and 36, and was dry during dry weather Event 37. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire, though this site does not capture drainage from any of the burned areas. Table 34 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks.

Exceedances of nitrate-N, dissolved copper, and toxaphene occurred during Events 34, 35, and 36. Exceedances of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT occurred during wet weather Events 35 and 36. The benchmarks for total chlordane and bifenthrin were exceeded during wet weather Event 36. The benchmark for *E. coli* was exceeded during dry weather Event 34.

Row crops and nurseries are the crop types that drain to this monitoring location.

Table 35 quantifies and describes trash found at this site.

Table 34. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: OXD_CENTR

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹	
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018	
Flow	CFS		2.0	0.3	4.2	NS	
pH		6.5 ≤ pH ≤ 8.5	7.5	7.6	7.6		
Temperature	°C		23.6	15.3	15.6		
Dissolved Oxygen	mg/L	≥ 5	9.4	7.5	9.1		
Turbidity	NTU		3.8	8.2	210.0		
Conductivity	µS/cm		3492.0	3429.0	1227.0		
General Water Quality							
TDS	mg/L		3140	2850	880		
TSS	mg/L		4	13	224		
Total Hardness as CaCO ₃	mg/L		1710	1500	628		
Chloride	mg/L		170	190	47		
Sulfate	mg/L		1640	1300	489		
Nutrients							
Ammonia-N	mg/L	2.43/ 3.78/ 3.71/ NS ²	0.38	1.87	0.25		
Nitrate-N	mg/L	10 ³	30.50	62.20	11.10		
Total Nitrogen	mg/L		68.40	121.00	17.80		
Total Orthophosphate	mg/L		0.18	3.06	3.43		
Total Phosphorus	mg/L		0.11	1.14	2.03		
Metals							
Dissolved Copper	µg/L	3.10 ⁴	3.99	6.04	6.85		
Total Copper	µg/L		3.73	9.77	18.70		
Organochlorine Pesticides							
Aldrin	µg/L	0.00014	ND	ND	ND		
BHC-alpha	µg/L	0.013	ND	ND	ND		
BHC-beta	µg/L	0.046	ND	ND	ND		
BHC-gamma	µg/L	0.063	ND	ND	ND		
Chlordane-alpha	µg/L		ND	ND	0.00524		
Chlordane-gamma	µg/L		ND	ND	DNQ		
Total Chlordane	µg/L	0.00059	ND	ND	0.00524		
2,4'-DDD	µg/L		DNQ	DNQ	0.04380		
2,4'-DDE	µg/L		ND	DNQ	0.00849		
2,4'-DDT	µg/L		ND	DNQ	0.03250		
4,4'-DDD	µg/L	0.00084	DNQ	0.00664	0.19600		
4,4'-DDE	µg/L	0.00059	DNQ	0.02780	0.36500		
4,4'-DDT	µg/L	0.00059	ND	0.02480	0.17700		
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 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	
Toxaphene	µg/L	0.00075	0.12200	0.15600	1.47000	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	ND	ND	0.003	
Diazinon	µg/L	0.1	ND	ND	ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006	ND	ND	0.0779	
Danitol	µg/L		ND	0.0038	0.0970	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235	259	200	200	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

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

1. Event occurred after the Thomas Fire.
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 was applied for saltwater at this site as prescribed in Table 16.

Table 35. 2017–2018 Trash Observations for OXD_CENTR

Event	Count	Types
Event 34	15+	Plastic, ag waste, bottles, cups
Event 35	25+	Ag trash, plastic, Styrofoam, buckets, trash bags
Event 36	50+	Plastic bottles, ag trash, paper, Styrofoam
Event 37	20-30	Can, Styrofoam cups, bottles, ag trash, pallet

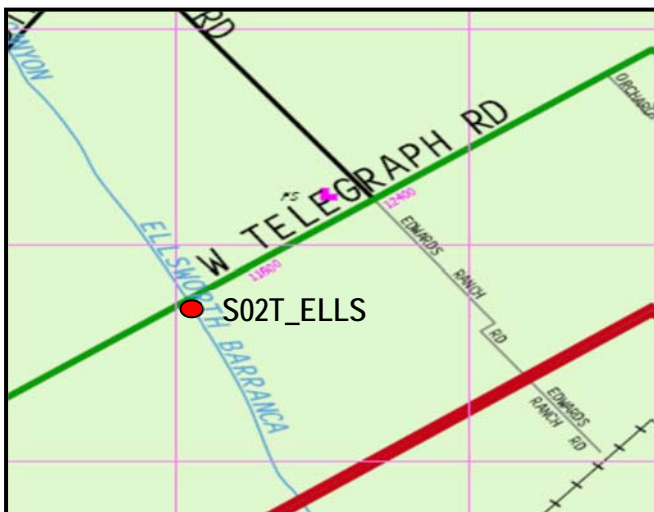
Santa Clara River Watershed

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. Significant portions of the drainage areas for four of the monitoring sites in this watershed were burned during the Thomas Fire. Event 35 was pre-fire with the remaining three events all occurring after fire containment.

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 2017-2018 monitoring events. The site was dry and therefore not sampled during dry weather Events 34 and 37. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire and a significant portion of the drainage area for this monitoring site was burned. Table 36 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. Exceedances of *E. coli* occurred during wet weather Events 35 and 36. Exceedances of TDS, chloride, sulfate occurred during wet weather Event 35. The 4,4'-DDE benchmark was exceeded during wet weather Event 36.

Citrus and avocados are the primary crop types associated with this site. Table 37 describes trash found at this site.

Table 36. 2017– 2018 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_ELLS

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2018	Wet 3/11/2017	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS			0.5	N/A	
pH		6.5 ≤ pH ≤ 8.5		8.2	8.1	
Temperature	°C	≤ 26.67°C ²		15.2	14.3	
Dissolved Oxygen	mg/L	≥ 6		9.3	10.0	
Turbidity**	NTU			1073	2901	
Conductivity**	µS/cm			3619.0	1119.0	
General Water Quality						
TDS**	mg/L	1200		2510	790	
TSS**	mg/L			1530	26600	
Total Hardness as CaCO ₃	mg/L			833	398	
Chloride	mg/L	150		545	60	
Sulfate**	mg/L	600		910	425	
Nutrients						
Ammonia-N**	mg/L	NS/ 1.72/ 2.13/ NS ³		0.16	1.05	
Nitrate-N**	mg/L	10		1.02	1.05	
Total Nitrogen**	mg/L			4.26	5.56	
Total Orthophosphate**	mg/L			0.44	0.89	
Total Phosphorus **	mg/L			3.96	61.60	
Metals						
Dissolved Copper**	µg/L	NS/ 29.28/ 29.15/ NS ⁴	NS	7.85	4.44	NS
Total Copper**	µg/L			57.70	581	
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	0.02560	
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	DNQ	

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2018	Wet 3/11/2017	Wet 3/22/2018	Dry 6/4/2018
Organophosphorus Pesticides						
Chlorpyrifos**	µg/L	0.025		ND	0.010	
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		46,110	48,840	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

** - Constituent concentrations could be impacted by fire; any post-fire exceedances are NOT shown in bold.

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

N/A – Flow unsafe to measure.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The copper benchmarks are listed in order of monitoring event and were calculated for freshwater at this site as prescribed in Table 16.

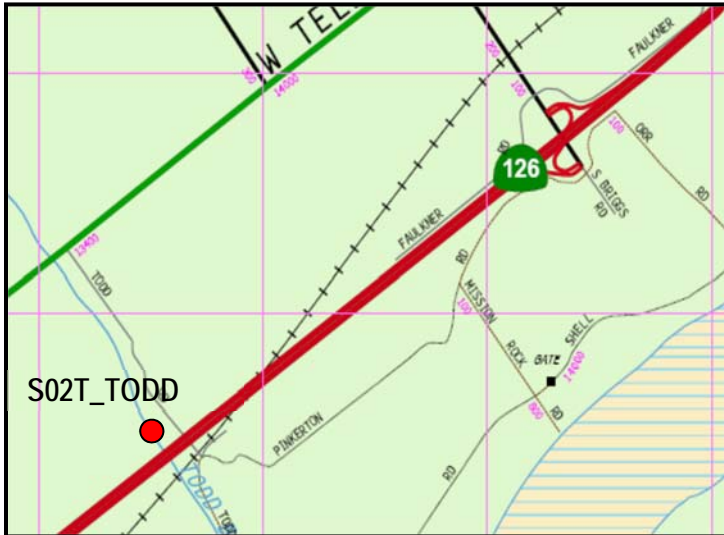
Table 37. 2017–2018 Trash Observations for S02T_ELLS

Event	Count	Types
Event 34	0	
Event 35	3	Bottle, cup, beverage containers
Event 36	12	Cans, bottles, metal, wrappers, paper
Event 37	0	

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 2017-2018 monitoring events. Table 38 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. Monitoring Events 35, 36, and 37 occurred after the Thomas Fire. This monitoring site had a significant portion of its drainage area burn. The *E. coli* benchmark was exceeded during Events 34, 35, and 36. The TDS and sulfate benchmarks were exceeded during Events 34, 35, and 37. The nitrate benchmark was exceeded during the first dry event. Exceedances of toxaphene and bifenthrin occurred during wet weather Event 36.

Citrus and avocados are the primary crop types associated with this site, along with portions used for row crops. Table 39 lists trash observations made at the site.

Table 38. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_TODD

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS		0.3	0.4	77.9	0.4
pH		6.5 ≤ pH ≤ 8.5	7.9	7.1	7.9	8.1
Temperature	°C	≤ 26.67°C ²	21.8	15.7	14.5	19.8
Dissolved Oxygen	mg/L	≥ 5	7.9	7.4	9.3	9.8
Turbidity**	NTU		0.9 ⁵	812	2901	1.1
Conductivity	µS/cm		2957.0	1856.0	762.8	2270.0
General Water Quality						
TDS**	mg/L	1200	2500	1390	520	1910
TSS**	mg/L		2	830	21100	ND
Total Hardness as CaCO ₃	mg/L		1380	720	324	1030
Chloride	mg/L	150	140	94	20	93
Sulfate**	mg/L	600	1270	625	280	891
Nutrients						
Ammonia-N**	mg/L	1.75/ 5.25/ 2.80/ 1.49 ³	0.05	0.52	1.38	0.03
Nitrate-N**	mg/L	10	10.60	2.63	1.34	6.89
Total Nitrogen**	mg/L		24.50	12.60	6.23	12.40
Total Orthophosphate**	mg/L		0.12	2.63	5.73	0.12
Total Phosphorus**	mg/L		0.10	4.01	30.90	0.04
Metals						
Dissolved Copper**	µg/L	29.28/ 29.28/ 24.45/ 29.28 ⁴	2.42	8.34	3.29	2.68
Total Copper**	µg/L		2.45	23.50	405.00	2.74
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	ND	ND
Chlordane-gamma**	µg/L		ND	ND	ND	ND
Total Chlordane**	µg/L	0.00059	ND	ND	ND	ND
4,4'-DDD**	µg/L	0.00084	ND	ND	ND	ND
4,4'-DDE**	µg/L	0.00059	ND	ND	ND	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	0.09350	ND

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
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	0.0487	ND
Cyfluthrin**	µg/L		0.0037	ND	0.0160	ND
Danitol**	µg/L		ND	ND	0.0187	ND
cis-Permethrin**	µg/L		0.0316	ND	ND	ND
trans-Permethrin**	µg/L		0.0269	ND	ND	ND
Bacteria						
	MPN/100 mL					
<i>E. coli</i> **		235	517	>241,960	>241,960	200

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

** - Constituent concentrations could be impacted by fire, any post-fire exceedances are NOT shown in bold.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The copper benchmark was calculated for freshwater at this site as prescribed in Table 16.
5. Turbidity meter malfunction while in the field, result provided is lab result.

Table 39. 2017–2018 Trash Observations for S02T_TODD

Event	Count	Types
Event 34	5	Plastic, bags, cup
Event 35	1	Water bottle
Event 36	20	Gloves, boxes, bottles, wrappers, cups
Event 37	3	Wrappers, cups

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 Event 36. The site was dry during Events 34, 35, and 37. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire, which burned a significant portion of this site's drainage area. Table 40 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, sulfate, and *E. coli* were exceeded during wet weather Event 36.

This site drains mostly avocado and citrus orchards. Trash observations are provided in Table 41.

Table 40. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_TIMB

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS				N/A	
pH		6.5 ≤ pH ≤ 8.5			8.1	
Temperature	°C	≤ 26.67°C ²			14.2	
Dissolved Oxygen	mg/L	≥ 5			9.9	
Turbidity**	NTU				2901.0	
Conductivity**	µS/cm				2496.0	
General Water Quality						
TDS**	mg/L	1300			1770	
TSS**	mg/L				115,000	
Total Hardness as CaCO ₃	mg/L				460	
Chloride	mg/L	100			110	
Sulfate**	mg/L	650			1080	
Nutrients						
Ammonia-N**	mg/L	NS/ NS/ 2.14/ NS ³			0.85	
Nitrate-N**	mg/L	5			1.35	
Total Nitrogen**	mg/L				6.49	
Total Orthophosphate**	mg/L				1.62	
Total Phosphorus**	mg/L				139	
Metals			NS	NS		NS
Dissolved Copper**	µg/L	NS/ NS/ 29.28/ NS ⁴			6.79	
Total Copper**	µg/L				846.00	
Organochlorine Pesticides						
Aldrin**	µg/L	0.00014			ND	
BHC-alpha**	µg/L	0.013			ND	
BHC-beta**	µg/L	0.046			ND	
BHC-gamma**	µg/L	0.063			ND	
Chlordane-alpha**	µg/L				ND	
Chlordane-gamma**	µg/L				ND	
Total Chlordane**	µg/L	0.00059			ND	
4,4'-DDD**	µg/L	0.00084			ND	
4,4'-DDE**	µg/L	0.00059			ND	
4,4'-DDT**	µg/L	0.00059			ND	
Dieldrin**	µg/L	0.00014			ND	
Endosulfan-I**	µg/L	0.056			ND	
Endosulfan-II**	µg/L	0.056			ND	
Endosulfan Sulfate**	µg/L	240			ND	
Endrin**	µg/L	0.036			ND	
Endrin Aldehyde**	µg/L	0.81			ND	
Toxaphene**	µg/L	0.00075			ND	

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Organophosphorus Pesticides						
Chlorpyrifos**	µg/L	0.025			0.007	
Diazinon**	µg/L	0.1			ND	
Pyrethroid Pesticides						
Bifenthrin**	µg/L	0.0006			ND	
Danitol**	µg/L				0.0104	
Bacteria						
<i>E. coli</i> **	MPN/100 mL	235			64,880	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

** - Constituent concentrations could be impacted by fire; any post-fire exceedances are NOT shown in bold.

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

N/A – Flow unsafe to measure.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The copper benchmark was calculated for freshwater at this site as prescribed in Table 16.

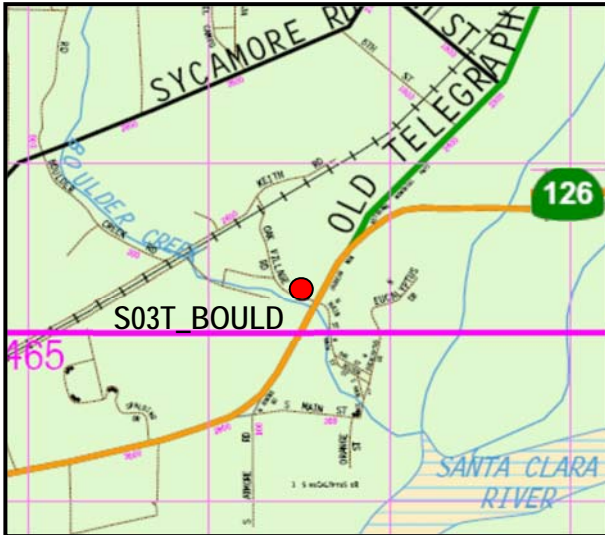
Table 41. 2017–2018 Trash Observations for S03T_TIMB

Event	Count	Types
Event 34	25-30	Plastic, bottles, metal, glass, rubber
Event 35	0	
Event 36	15+	Cans, wrappers, hub cap, bottles
Event 37	8	Paint can, paper, wrappers, Styrofoam, cups

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 2017-2018 season was present during wet weather Events 35 and 36. The site was dry during dry weather Events 34 and 37. Monitoring Events 35, 36, and 37 occurred after the Thomas Fire, which burned a significant portion of the land draining to this site. Table 42 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks.

Exceedances of bifenthrin and *E. coli* occurred during wet weather Events 35 and 36. The 4,4'-DDE objective was exceeded during wet weather Event 36.

Mostly avocados, some citrus, and nurseries are the primary crop types associated with this site. Trash observations for this site can be found in Table 43.

Table 42. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_BOULD

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS			0.6	N/A	
pH		6.5 ≤ pH ≤ 8.5		8.2	7.9	
Temperature	°C	≤ 26.67°C ²		13.8	14.0	
Dissolved Oxygen	mg/L	≥ 5		10.2	10.0	
Turbidity**	NTU			130.1	2901.0	
Conductivity**	µS/cm			940.9	57.6	
General Water Quality						
TDS**	mg/L	1300		670	330	
TSS**	mg/L			100	12300	
Total Hardness as CaCO ₃	mg/L			389	263	
Chloride	mg/L	100		29	6	
Sulfate**	mg/L	650		285	137	
Nutrients						
Ammonia-N**	mg/L	NS/ 1.88/ 2.89/ NS ³		0.32	2.53	
Nitrate-N**	mg/L	5		1.49	0.83	
Total Nitrogen**	mg/L			3.32	7.42	
Total Orthophosphate**	mg/L			0.23	14.95	
Total Phosphorus**	mg/L			0.45	44.80	
Metals						
Dissolved Copper**	µg/L	NS/ 28.59/ 20.46/ NS ⁴	NS	5.74	2.07	NS
Total Copper**	µg/L			5.73	303.00	
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	0.01550	
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 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Organophosphorus Pesticides						
Chlorpyrifos**	µg/L	0.025		ND	ND	
Diazinon**	µg/L	0.1		ND	ND	
Pyrethroid Pesticides						
Bifenthrin**	µg/L	0.0006		0.0056	0.0538	
Danitol**	µg/L			0.0038	0.0307	
Bacteria						
<i>E. coli</i> **	MPN/100 mL	235		3,890	17,250	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

** - Constituent concentrations could be impacted by fire; any post-fire exceedances are NOT shown in bold.

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

N/A – Flow unsafe to measure.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The copper benchmark was calculated for freshwater at this site as prescribed in Table 16.

Table 43. 2017–2018 Trash Observations for S03T_BOULD

Event	Count	Types
Event 34	35+	Cans, paper, plastic, water bottles, automotive trash, ag trash
Event 35	18	Beverage container, bottles, cans
Event 36	15+	Cans, bottles, paper, glass
Event 37	9	Cup, kiddie pool, bag, gloves, wrappers

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 during the 2017-2018 season was only present during wet weather Event 36, which occurred after the Thomas fire. This is one of the few sites in the SCR Watershed outside of the burn area. The site was dry during Events 34, 35, and 37. Table 44 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. Exceedances of total chlordane, 4,4'-DDD, 4,4'-DDE, toxaphene, chlorpyrifos, bifenthrin, and *E. coli* occurred during wet weather Event 36.

This site drains mostly citrus and avocado orchards. Trash observations for S03D_BARDS are provided below in Table 45.

Table 44. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: S03D_BARDS

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS				30.1	
pH		6.5 ≤ pH ≤ 8.5			8.3	
Temperature	°C	≤ 26.67°C ²			14.4	
Dissolved Oxygen	mg/L	≥ 5			9.6	
Turbidity	NTU				2497.0	
Conductivity	µS/cm				224.1	
General Water Quality						
TDS	mg/L	1300			120	
TSS	mg/L				4600	
Total Hardness as CaCO ₃	mg/L				99	
Chloride	mg/L	100			5	
Sulfate	mg/L	650			40	
Nutrients						
Ammonia-N	mg/L	NS/ NS/ 1.54/ NS ³			0.42	
Nitrate-N	mg/L	5			2.45	
Total Nitrogen	mg/L				4.52	
Total Orthophosphate	mg/L				7.51	
Total Phosphorus	mg/L				22.00	
Metals						
Dissolved Copper	µg/L	NS/ NS/ 8.88/ NS ⁴	NS	NS	4.36	NS
Total Copper	µg/L				240.00	
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				0.01670	
trans-Nonachlor	µg/L				0.04760	
Chlordane-alpha	µg/L				0.03530	
Chlordane-gamma	µg/L				0.02710	
Total Chlordane	µg/L	0.00059			0.06240	
4,4'-DDD	µg/L	0.00084			0.02210	
4,4'-DDE	µg/L	0.00059			0.23300	
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 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Endrin Aldehyde	µg/L	0.81			ND	
Toxaphene	µg/L	0.00075			0.11500	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025			0.127	
Diazinon	µg/L	0.1			ND	
Mevinphos	µg/L				0.035	
Pyrethroid Pesticides						
Bifenthrin	µg/L	0.0006			0.1360	
Cyfluthrin	µg/L				0.0851	
Cypermethrin	µg/L				0.1930	
Danitol	µg/L				0.0421	
cis-Permethrin	µg/L				0.0770	
trans-Permethrin	µg/L				0.1910	
Bacteria						
<i>E. coli</i>	MPN/100 mL	235			16,160	

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

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

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The copper benchmark was calculated for freshwater at this site as prescribed in Table 16.

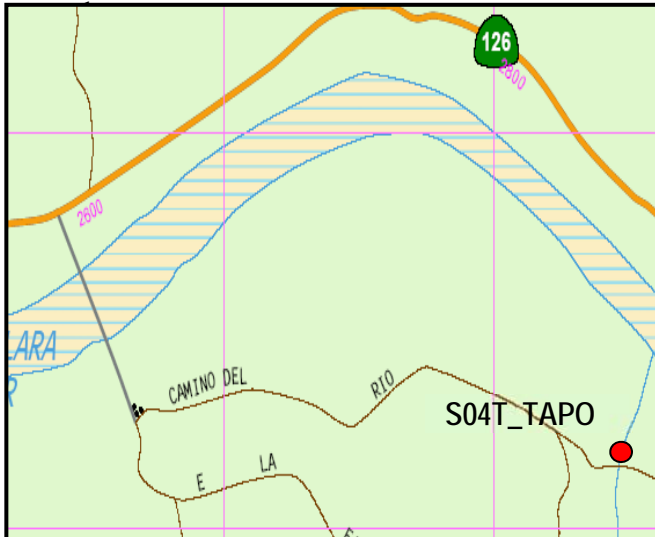
Table 45. 2017–2018 Trash Observations for S03D_BARDS

Event	Count	Types
Event 34	25-30	Cardboard, cans, buckets, plastic, bike frame
Event 35	1	Barrel
Event 36	5	Bottles, bag, wrapper
Event 37	12	Bucket, pipe, bags, cups, paper

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 2017-2018 monitoring events. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire. This is the second SCR Watershed site that is outside the burn area. Table 46 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks.

Exceedances of the chloride benchmark occurred during all four monitoring events. The TDS and sulfate objective were exceeded during dry weather Event 34 and wet weather Event 36. The *E. coli* benchmark was exceeded during wet weather Events 35 and 36. The nitrate-N objective was exceeded during dry weather Event 34. The 4,4'-DDE and bifenthrin benchmarks were exceeded during wet weather Event 36.

Row crops, citrus, and nursery stock are grown in the vicinity of this monitoring site. Table 47 summarizes trash observations for this site.

Table 46. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: S04T_TAPO

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS		0.2	3.2 ⁵	3.0 ⁵	0.2
pH		6.5 ≤ pH ≤ 8.5	7.6	8.0	8.2	7.5
Temperature	°C	≤ 26.67°C ²	23.3	17.4	14.1	20.1
Dissolved Oxygen	mg/L	≥ 5	8.2	8.9	10.0	9.4
Turbidity	NTU		0.1 ⁶	17.3	379.0	1.3
Conductivity	µS/cm		3745.0	722.6	2784.0	1848.0
General Water Quality						
TDS	mg/L	1300	3080	1280	2110	1240
TSS	mg/L		1	26	740	2
Total Hardness as CaCO ₃	mg/L		1450	662	841	618
Chloride	mg/L	100	270	126	150	133
Sulfate	mg/L	600	1380	487	871	478
Nutrients						
Ammonia-N	mg/L	2.26/ 2.02/ 1.84/ 3.05 ³	0.05	DNQ	0.07	DNQ
Nitrate-N	mg/L	5	16.00	2.80	2.84	4.47
Total Nitrogen	mg/L		36.20	5.31	4.84	7.35
Total Orthophosphate	mg/L		0.06	0.22	1.67	0.10
Total Phosphorus	mg/L		0.10	0.17	1.84	0.03
Metals						
Dissolved Copper	µg/L	29.28 ⁴	14.90	5.59	8.30	2.23
Total Copper	µg/L		16.50	8.95	243.00	2.32
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	DNQ	ND
Chlordane-gamma	µg/L		ND	ND	DNQ	ND
Total Chlordane	µg/L	0.00059	ND	ND	DNQ	ND
4,4'-DDD	µg/L	0.00084	ND	ND	ND	ND
4,4'-DDE	µg/L	0.00059	ND	DNQ	0.13200	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 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
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	0.0143	ND
Cypermethrin	µg/L		ND	ND	0.0318	ND
Danitol	µg/L		ND	ND	0.0914	ND
cis-Permethrin	µg/L		ND	ND	0.1100	ND
trans-Permethrin	µg/L		ND	ND	0.3120	ND
Bacteria						
	MPN/100 mL					
<i>E. coli</i>		235	65	860	6130	<100

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

1. Event occurred after the Thomas Fire
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The copper benchmark was calculated for freshwater at this site as prescribed in Table 16. It was the same for all four events.
5. Calculation completed using the pipe calculation method.
6. Turbidity meter malfunction while in the field, result provided is lab result.

Table 47. 2017–2018 Trash Observations for S04T_TAPO

Event	Count	Types
Event 34	0	
Event 35	0	
Event 36	0	
Event 37	3	Bag, bottle, glove

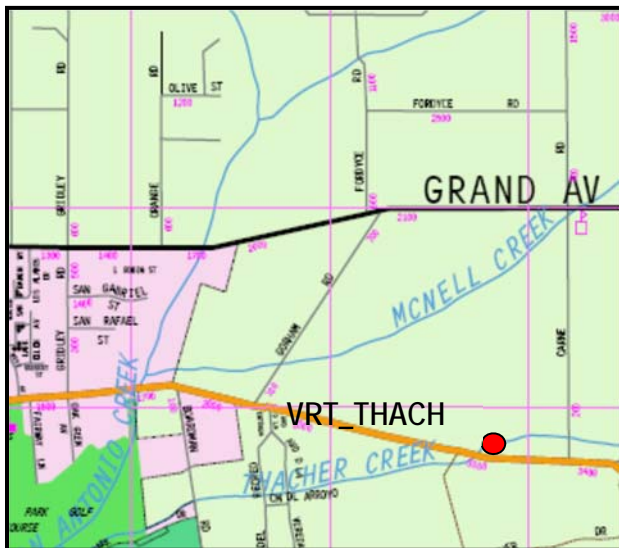
Ventura River Watershed

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



This site was sampled once during the 2017-2018 monitoring season. The site was sampled during wet weather Event 35 and was dry during Events 34 and 37. During wet weather Event 36, the site was located in an evacuation area and therefore inaccessible. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire, which burned a significant portion of the site drainage area. Table 48 contains a summary of concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. The benchmarks for sulfate, and *E. coli* were exceeded during wet weather Event 35.

Citrus and some 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 49.

Table 48. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: VRT_THACH

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2018	Wet 3/11/2017	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS			0.03		
pH		6.5 ≤ pH ≤ 8.5		8.3		
Temperature	°C	≤ 26.67°C ²		14.8		
Dissolved Oxygen	mg/L	≥ 7		9.9		
Turbidity**	NTU			246.8		
Conductivity**	µS/cm			1014.0		
General Water Quality						
TDS**	mg/L	800		760		
TSS**	mg/L			200		
Total Hardness as CaCO ₃	mg/L			539		
Chloride	mg/L	60		7		
Sulfate**	mg/L	300		382		
Nutrients						
Ammonia-N**	mg/L	NS/ NS/ 1.50 / NS ³		0.18		
Nitrate-N**	mg/L	5		0.53		
Total Nitrogen**	mg/L			1.34		
Total Orthophosphate**	mg/L			ND		
Total Phosphorus**	mg/L			0.58		
Metals						
Dissolved Copper**	µg/L	NS/ 29.28/ NS/ NS ⁴	NS	1.19	N/A	NS
Total Copper**	µg/L			5.61		
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			ND		
Chlordane-gamma**	µg/L			ND		
Total Chlordane**	µg/L	0.00059		ND		
4,4'-DDD**	µg/L	0.00084		ND		
4,4'-DDE**	µg/L	0.00059		ND		
4,4'-DDT**	µg/L	0.00059		ND		
Dieldrin**	µg/L	0.00014		ND		
Endosulfan-I**	µg/L	0.056		ND		
Endosulfan-II**	µg/L	0.056		ND		
Endosulfan Sulfate**	µg/L	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 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2018	Wet 3/11/2017	Wet 3/22/2018	Dry 6/4/2018
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		520		

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

** - Constituent concentrations could be impacted by fire; any post-fire exceedances are NOT shown in bold.

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

N/A – Site located in evacuation area, not visited.

1. Event occurred after the Thomas Fire.
2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).
3. 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.
4. The copper benchmark was calculated for freshwater at this site as prescribed in Table 16.

Table 49. 2017–2018 Trash Observations for VRT_THACH

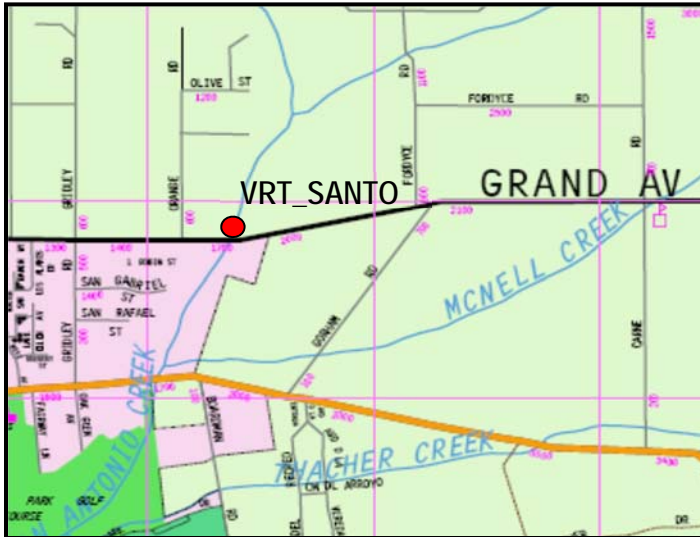
Event	Count	Types
Event 34	7	Aluminum can, Styrofoam cup, bags, paper
Event 35	0	
Event 36	N/A	
Event 37	7	Bag, foil, cup, cardboard, plastic

N/A – Site located in evacuation area, not visited.

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



This site was sampled once during the 2017-2018 monitoring season. The site was sampled during wet weather Event 35 and was dry during dry weather Events 34 and 37. During wet weather Event 36, the site was located in an evacuation area and was therefore inaccessible. It is noted that monitoring Events 35, 36, and 37 occurred after the Thomas Fire, which burned a significant portion of the drainage area. Table 50 contains a summary of the concentrations for select constituents and provides a comparison of measured concentrations with applicable water quality benchmarks. During wet weather Event 35, there were exceedances of TDS, sulfate, and *E. coli*.

Citrus and avocado orchards are the crop types that drain to this monitoring site. Table 51 includes the number and types of trash observed at the monitoring site.

Table 50. 2017–2018 VCAILG Monitoring Data v. Waiver Benchmarks: VRT_SANTO

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Field Measurements						
Flow	CFS			1.0		
pH		6.5 ≤ pH ≤ 8.5		8.4		
Temperature	°C	≤ 26.67°C ²		15.5		
Dissolved Oxygen	mg/L	≥ 7		9.9		
Turbidity**	NTU			305.2		
Conductivity**	µS/cm			1149.0		
General Water Quality						
TDS**	mg/L	800		880		
TSS**	mg/L			263		
Total Hardness as CaCO ₃	mg/L			574		
Chloride	mg/L	60		27		
Sulfate**	mg/L	300		379		
Nutrients						
Ammonia-N**	mg/L	NS/ 1.21/ N/A/ NS ³		0.04		
Nitrate-N**	mg/L	5		0.79		
Total Nitrogen**	mg/L			1.85		
Total Orthophosphate**	mg/L			DNQ		
Total Phosphorus**	mg/L			1.58		
Metals						
			NS		N/A	NS
Dissolved Copper**	µg/L	NS/ 29.28/ N/A/ NS ⁴		1.26		
Total Copper**	µg/L			8.93		
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			ND		
Chlordane-gamma**	µg/L			ND		
Total Chlordane**	µg/L	0.00059		ND		
4,4'-DDD**	µg/L	0.00084		ND		
4,4'-DDE**	µg/L	0.00059		ND		
4,4'-DDT**	µg/L	0.00059		ND		
Dieldrin**	µg/L	0.00014		ND		
Endosulfan-I**	µg/L	0.056		ND		
Endosulfan-II**	µg/L	0.056		ND		
Endosulfan Sulfate**	µg/L	110		ND		
Endrin**	µg/L	0.036		ND		
Endrin Aldehyde**	µg/L	0.76		ND		

Constituent	Units	Benchmark	Event 34	Event 35 ¹	Event 36 ¹	Event 37 ¹
			Dry 8/29/2017	Wet 3/11/2018	Wet 3/22/2018	Dry 6/4/2018
Toxaphene**	µg/L	0.00075		ND		
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		410		

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

Table 35 through Table 41 for a list of benchmarks applicable to this site.

** - Constituent concentrations could be impacted by fire; any post-fire exceedances are NOT shown in bold.

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

N/A – Site located in evacuation area, not visited.

1. Event occurred after the Thomas Fire.

2. The temperature limit for waterbodies designated as WARM is 80°F (26.7°C).

3. 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.

4. The copper benchmark was calculated for freshwater at this site as prescribed in Table 16.

Table 51. 2017–2018 Trash Observations for VRT_SANTO

Event	Count	Types
Event 34	9	Tire, glass bottle, paper, bags, Styrofoam cups, cardboard
Event 35	0	
Event 36	N/A	
Event 37	0	

N/A – Site located in evacuation area, not visited.

CHRONIC TOXICITY TEST RESULTS

During the 2017-2018 monitoring year, Pacific EcoRisk (PER) performed single-species short-term chronic toxicity tests for samples collected during the first wet weather event (Event 35) and second dry weather event (Event 37). 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 also provided for download from Dropbox.

Event 35 and 37 toxicity testing took place according to the QAPP and MRP procedures, 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.

Table 52 summarizes the chronic toxicity results from storm event 35 and dry weather event 37. Both toxicity events took place post-Thomas fire. It should be noted that fire effects are anticipated to influence the toxicity testing results. Sites impacted by the Thomas fire are indicated with a **.

Table 52. Chronic Toxicity Results 2017-2018

Event	Site	<i>Ceriodaphnia dubia</i> ¹			<i>Hyalella</i> ²	TIE? Triggered
		Survival Toxicity	Reprod. Toxicity	Reprod. % Red.	Survival Toxicity	
35: 3/11/18	S02T_TODD**	YES	YES	100% ³		Yes
	S02T_ELLS**				NO	--
	S03T_BOULD**	NO	YES	24.4% ³		--
	S04T_TAPO	NO	NO	--		--
	01T_ODD3_EDI	NO	YES	18.5% ³		--
	04D_LAS				YES ³	YES
	04D_ETTG				YES ³	YES
	OXD_CENTR				YES ³	NO ⁴
	VRT_SANTO**	NO	YES	25.5% ³		--
	VRT_THACH**	NO	YES	33.2% ³		--
37: 6/4/2018	S02T_TODD**	NO	YES	28.1% ³		--
	S04T_TAPO	NO	YES	32.0% ³		--
	01T_ODD3_EDI				NO	--
	04D_LAS				NO	--
	04D_ETTG				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.

Event 35: TIE Results

Event 35 was the first sampling event following the Thomas Fire. S02T_TODD is one of the sites where a significant portion of the drainage area was burned. Complete mortality occurred in this sample and a TIE was performed. Survival toxicity was removed by centrifugation indicating that the issue with survival was due to the high level of sediment and likely ash in the sample. Reproduction toxicity was not removed by centrifugation alone, suggesting that some of the toxicity was due to particulate-associated contaminants. There was removal of toxicity with the centrifugation + C₁₈ SPE treatment, suggesting that toxicity could be due to a weak or non-polar organic material. This is further confirmed by the reduction in toxicity from the centrifugation + Phenomenex LC WCX, indicating removal or partial removal of a weak cationic material or adsorption onto the column by a highly hydrophobic organic contaminant. As centrifugation is a pretreatment for the C₁₈ SPE and Phenomenex LC WCX treatments, this should be taken into consideration when interpreting the results of this test. Toxicity was not removed or reduced with the addition of PBO (piperonyl butoxide) suggesting that the contaminant does not need to be metabolically activated by the organism in order to cause toxicity. These results likely rule out organophosphate pesticides as a cause for the toxicity, but hint toward other hydrophobic organic contaminants (e.g., pyrethroids) and potentially cationic contaminants.

For the TIE performed on the 04D_LAS sample, there was a reduction in survival in the Baseline TIE treatment, indicating that toxicity was persistent, although to a lesser extent than in the initial test. There were blank interferences present in the centrifugation + C₁₈ SPE blank, 50 µg/L PBO blank, carboxylesterase blank, and the BSA blank with respect to the Lab Control; most of the blank interference was correlated with low dissolved oxygen in the blank treatments. Toxicity was increased in the PBO and low temperature treatments, indicating that a contaminant that is detoxified through the cytochrome P-450 enzyme system and is metabolized through enzyme systems, respectively, were at least partially responsible for the toxicity. Although blank interference was present, toxicity in the site water was removed in the centrifugation treatment, centrifugation + C₁₈ SPE treatment, carboxylesterase treatment, and the BSA treatment, indicating that a dissolved-phase nonpolar 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 04D_ETTG sample, there was a similar reduction in survival in the Baseline TIE treatment compared to the initial test indicating that the toxicity was persistent. There were blank interferences present in the centrifugation + C₁₈ SPE blank, 50 µg/L PBO blank, carboxylesterase blank, and the BSA blank with respect to the Lab Control; most of the blank interference was correlated with low dissolved oxygen in the blank treatments. Toxicity in the site water was partially removed in the centrifugation treatment and completely removed in the centrifugation + C₁₈ SPE treatment, indicating that a particulate associated contaminant and a dissolved-phase non-polar organic was responsible for the toxicity. Toxicity was removed in the carboxylesterase treatment, indicating that a compound with an ester bond was at least partially responsible for the toxicity. Due to the nearly complete mortality in the baseline sample, the PBO and low temperature treatments were inconclusive since the interpretation of these treatments relies on increasing the toxicity. The weight of evidence from this TIE is suggestive of a pyrethroid insecticide as the cause of the toxicity.

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 Tenth Year Annual Monitoring Report – July 2017 to June 2018” is being provided with the VCAILG AMR. The report includes summaries of the sampling events, data summaries, and a compliance comparison to the allocations for five of the 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)

The Revolon Slough and Beardsley Wash Trash TMDL is addressed through a separate monitoring and reporting program. For additional information, refer to the “2019 Revolon Slough/Beardsley Wash Trash TMDL TMRP/MFAC Annual Report”, which will be submitted in January 2019.

Santa Clara River Watershed

Effective TMDLs for the Santa Clara River Watershed are discussed below. Monitoring data and a comparison to the Santa Clara River TMDL benchmarks are included below as part of this 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 53. 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 53. 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 54 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. None of the post-fire samples exceeded the LA.

Table 54. Nitrogen Load Allocations Compared to SCR VCAILGMP Site Data

Site	Constituent	LA ¹ (mg/L)	Event 34 Dry Aug-2017	Event 35 ² Wet Mar-2018	Event 36 ² Wet Mar-2018	Event 37 ² Dry Jun-2018
S02T_ELLS**	Ammonia-N + Nitrate-N	10	NS	1.18	2.10	NS
S02T_TODD**	Ammonia-N + Nitrate-N	10	10.65	3.15	2.72	6.92
S03T_TIMB**	Ammonia-N + Nitrate-N	10	NS	NS	2.20	NS
S03T_BOULD**	Ammonia-N + Nitrate-N	10	NS	1.81	3.36	NS
S03D_BARDS	Ammonia-N + Nitrate-N	10	NS	NS	2.87	NS
S04T_TAPO	Ammonia-N + Nitrate-N	10	16.05	2.80	2.91	4.47

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

NS = Not Sampled; site dry.

** - Significant portion of site drainage area burned.

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.
2. Event occurred after the Thomas fire.

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 55. 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. All 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 56. Chloride Load Allocation Compared to S04T_TAPO Site Data

Site	Constituent	LA ¹ (mg/L)	Event 34 Dry Aug-2017	Event 35 Wet Mar-2018	Event 36 Wet Mar-2018	Event 37 Dry Jun-2018
S04T_TAPO	Chloride	100	270	126	150	133

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 57. 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 last collected in spring 2015 and results were reported in the 2014-15 AMR; therefore, fish collection and analysis were required for the 2017-2018 monitoring year. Fish were collected May 30, 2018 in the Santa Clara River Estuary.

The results of water and suspended sediment monitoring for the Santa Clara River Estuary Toxaphene TMDL are presented in Table 58. The results of the fish tissue monitoring for the Santa Clara River Estuary Toxaphene TMDL are presented in Table 59. Please note that a significant portion of the S02T_ELLS site drainage area was burned in the Thomas Fire. The high TSS concentrations are likely due to increased erosion following the fire.

Table 58. Santa Clara River Estuary Toxaphene TMDL Monitoring Data: Water and Suspended Sediment

Site	Constituent	Units	Load Allocation	Event 34 Dry Aug-2017	Event 35 Wet Mar-2018	Event 36 Wet Mar-2018	Event 37 Dry Jun-2018	
S02T_ELLS	<i>Water</i>							
	TSS	mg/L	---	NS ²	1,530	26,600	NS ²	
	Chlordane ¹	µg/L	---	NS ²	ND	ND	NS ²	
	Dieldrin	µg/L	---	NS ²	ND	ND	NS ²	
	Toxaphene	µg/L	---	NS ²	ND	DNQ	NS ²	
	<i>Suspended Sediment</i>							
	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	
	S01D_MONAR	<i>Water</i>						
TSS		mg/L	---	NS ²	NS ³	471	NS ²	
Chlordane ¹		µg/L	---	NS ²	NS ³	0.04	NS ²	
Dieldrin		µg/L	---	NS ²	NS ³	ND	NS ²	
Toxaphene		µg/L	---	NS ²	NS ³	2.17	NS ²	
<i>Suspended Sediment</i>								
Chlordane ¹		µg/dry kg	---	NR	NS ³	20	NR	
Dieldrin		µg/dry kg	---	NR	NS ³	ND	NR	
Toxaphene		µg/dry kg	0.1	NR	NS ³	640	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 dry.
3. Site not sampled due to site being ponded.

Table 59. Santa Clara River Estuary Toxaphene TMDL Monitoring Data: Fish Tissue

Fish Species & Sample	Fish Tissue			
	Constituent	Units	Interim LA	Collected on 5/30/18
Topsmelt #1	Chlordane ¹	µg/kg	--	ND
	Dieldrin	µg/kg	--	ND
	Toxaphene	µg/kg	6.1	ND
Topsmelt #2	Chlordane ¹	µg/kg	--	ND
	Dieldrin	µg/kg	--	ND
	Toxaphene	µg/kg	6.1	DNQ
Topsmelt #3	Chlordane ¹	µg/kg	--	ND
	Dieldrin	µg/kg	--	ND
	Toxaphene	µg/kg	6.1	ND
Topsmelt #4	Chlordane ¹	µg/kg	--	ND
	Dieldrin	µg/kg	--	ND
	Toxaphene	µg/kg	6.1	ND
Topsmelt #5	Chlordane ¹	µg/kg	--	ND
	Dieldrin	µg/kg	--	ND
	Toxaphene	µg/kg	6.1	ND
Topsmelt #6	Chlordane ¹	µg/kg	--	ND
	Dieldrin	µg/kg	--	ND
	Toxaphene	µg/kg	6.1	ND

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

Santa Clara River Bacteria TMDL

The Santa Clara River Bacteria TMDL includes monitoring and reporting requirements as well as TMDL numeric targets and allowable exceedance days, which were included in the 2016 *Conditional Waiver* as water quality benchmarks. The TMDL identifies two different sets of targets: those applicable to the Santa Clara River Estuary which is monitored at site S01D_MONAR, and those 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 60 provides the numeric targets for bacteria. Table 61 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 60. 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 61. Santa Clara River Bacteria TMDL, Interim Allowable Exceedance Days¹

Time Period	Santa Clara River Estuary	Santa Clara River Reaches 3,5,6, & 7
	S01D_MONAR	S03D_BARDS
Dry Weather	Not Applicable	17 allowable exceedance days of single sample objectives
Wet Weather ²	62 allowable exceedance days of single sample objectives	61 allowable exceedance days of single sample objectives
Summer Dry Weather (April 1 – October 31)	150 allowable exceedance days of single sample objectives	Not Applicable
Winter Dry Weather (November 1 – March 31)	49 allowable exceedance days of single sample objectives	Not Applicable

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. 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 during this monitoring year. No samples were collected at the S03D_BARDS monitoring location as the location was dry during all 15 sampling events. Due to no samples being taken, there are no exceedances of the *E. coli* numeric target at this location. As an agricultural drain site, no flow indicates zero irrigation runoff. Samples were collected three times at the S01D_MONAR site, with the site being dry the other 12 sampling events. Exceedances were observed for enterococcus, fecal coliform, and total coliform for the three sampling events at S01D_MONAR when water was present. Monitoring results for Santa Clara River TMDL are listed in Table 62.

Table 63 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 62.

Table 62. 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
7/31/2017 ^{SD}	795	3,300	160,000	NS
8/7/2017 ^{SD}	1,127	1,400	92,000	NS
8/14/2017 ^{SD}	861	2,800	160,000	NS
8/21/2017 ^{SD}	NS	NS	NS	NS
8/28/2017 ^{SD}	NS	NS	NS	NS
10/2/2017 ^{SD}	NS	NS	NS	NS
10/10/2017 ^{SD}	NS	NS	NS	NS
10/16/2017 ^{SD}	NS	NS	NS	NS
10/23/2017 ^{SD}	NS	NS	NS	NS
10/30/2017 ^{SD}	NS	NS	NS	NS
11/27/2017 ^{WD}	NS	NS	NS	NS
12/4/2017 ^{WD}	NS	NS	NS	NS
12/11/2017 ^{WD}	NS	NS	NS	NS
12/18/2017 ^{WD}	NS	NS	NS	NS
12/26/2017 ^{WD}	NS	NS	NS	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 dry.

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 63. SCR Bacteria TMDL Exceedance Days: Allowable Exceedance Days, and Exceeded Days

Events/Exceedances	Santa Clara River Estuary			Santa Clara River Reaches 3,5,6, & 7	
	S01D_MONAR			S03D_BARDS	
	Summer Dry Weather (April 1 – October 31)	Winter Dry Weather (November 1 – March 31)	Wet Weather	Dry Weather	Wet Weather
Number of 2017 sampling events	10	5	0	15	0
Allowable exceedance days (ratio applied) ^{1,2}	6	1	NA	1	NA
Days Exceeded (2017)	3	0	0	0	0

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

- 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)
 - Number of days during 1995: Wet days = 81; Dry days = 284
- 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).

Ventura River Watershed

Effective TMDLs for the Ventura River Watershed are discussed below. A separate report is submitted on behalf of the responsible parties for the Ventura River Algae TMDL receiving water sampling.

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 2017-2018 monitoring year, which is the second year of ag monitoring that has been 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 64 and wet weather LAs are provided in Table 65. Monitoring results for the Ventura River Algae TMDL are presented in Table 66 and Table 67, there were no exceedances of the LA at any of the sites. Please note that the Thomas Fire burned significant portions of the drainage area for the two upper watershed monitoring locations. Fire retardant includes both nitrogen and phosphorus compounds as ingredients, however the post-fire data did not exceed the LAs. These two sites were not visited during the second storm event because the sites were located within the USGS voluntary evacuation area for mudslides and debris flows.

Table 64. 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 65. 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 66. Dry Weather Ventura River Algae TMDL Site Data

Site	Constituent	Units	Load Allocation	Event 34 Dry Aug-2017	Event 37 Dry Jun-2018
VRT_THACH	Total Nitrogen	lbs/day	16	NS ¹	NS ¹
	Total Phosphorus	lbs/day	0.12		
VRT_SANTO	Total Nitrogen	lbs/day	16	NS ¹	NS ¹
	Total Phosphorus	lbs/day	0.12		
V02D_SPM	Total Nitrogen	lbs/day	16	NS ²	NS ²
	Total Phosphorus	lbs/day	0.12		

NS = Not sampled.

1. Site dry.

2. Site ponded.

Table 67. Wet Weather Ventura River Algae TMDL Site Data

Site	Constituent	Units	Load Allocation	Event 35 Wet Mar-2017	Event 36 Wet Mar-2017
VRT_THACH	Nitrate-N + Nitrite-N	mg/L	5	0.53 ³	NS ¹
VRT_SANTO	Nitrate-N + Nitrite-N	mg/L	5	0.79 ³	NS ¹
V02D_SPM	Nitrate-N + Nitrite-N	mg/L	10	NS ²	9.41

NS = Not Sampled.

1. Site located in evacuation area.

2. Site dry.

3. Nitrite-N value is not detected (ND).

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 “2017-2018 Ventura River Estuary Trash TMDL TMRP/MFAC Annual Report”. The next annual report is due January 30, 2019.

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 not present at this site during the 2017-2018 monitoring season. Table 68 provides monitoring information results.

Table 68. Harbor Beaches of Ventura County Bacteria TMDL Monitoring Data

Event	Bacteria Concentrations (MPN/100mL)			
	<i>E. coli</i>	Fecal Coliform	Total Coliform	Enterococcus
34: 8/29/2017	NS			
35: 3/11/2018				
36: 3/22/2018				
37: 6/4/2018				

NS = Not Sampled due to the site being dry

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.

TMDL Monitoring and Load Allocations

The McGrath Lake PCBs, Pesticides, and Sediment Toxicity TMDL includes the following LAs (Table 69).

Table 69. 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. Water quality data and suspended sediment data are presented in Table 70 and Table 71, respectively. Per the QAPP, water column sampling is to occur during every monitoring event and sampling for suspended sediment is to take place during wet weather.

Exceedances of the 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT water column LAs occurred during wet weather Events 35 and 36. The total chlordane water column LA was exceeded during Event 36. Suspended sediment samples were collected during wet weather Events 35 and 36. There were no detections in suspended sediment of dieldrin or PCBs, but exceedances occurred for the remaining TMDL constituents.

Table 70. McGrath Lake TMDL Central Ditch Monitoring Data in Water: OXD_CENTR

Constituents in Water	Units	Water LA	Event 34 Dry 8/29/2017	Event 35 Wet 3/11/2018	Event 36 Wet 3/22/2018	Event 37 Dry 6/4/2018
TOC	mg/L	---	3.5	5.9	4.1	NS
TSS	mg/L	---	4	13	224	
Total PCBs ¹	µg/L	0.00017	ND	ND	ND	
4,4'-DDD	µg/L	0.00084	DNQ	0.00664	0.19600	
4,4'-DDE	µg/L	0.00059	DNQ	0.02780	0.36500	
4,4'-DDT	µg/L	0.00059	ND	0.02480	0.17700	
Dieldrin	µg/L	0.00014	ND	ND	ND	
Total Chlordane ²	µg/L	0.00059	ND	ND	0.00524	

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

NS = Not Sampled; site dry.

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

Constituents in Sediment	Units	Sediment LA	Event 34 Dry 8/29/2017	Event 35 Wet 3/11/2018	Event 36 Wet 3/22/2018	Event 37 Dry 6/4/2018
TOC	% Dry Weight	---	NR ³	4.15	2.56	NR ³
Total PCBs ¹	µg/dry kg	22.7		ND	ND	
4,4'-DDD	µg/dry kg	2		220	185	
4,4'-DDE	µg/dry kg	2.2		1430	454	
4,4'-DDT	µg/dry kg	1		2470	ND	
Dieldrin	µg/dry kg	0.02		ND	ND	
Total Chlordane ²	µg/dry kg	0.5		81.8	13	
Total DDT	µg/dry kg	1.58		4727	691	

NR = Not Required

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. 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. This TMDL includes LAs for water and sediment, which are presented in Table 72. Sampling is conducted during four monitoring events for the water allocations, and during one monitoring event for the sediment allocation.

Table 72. Oxnard Drain No. 3 TMDL Load Allocations

Constituents	Water Allocations (µg/L)	Sediment (µg/dry kg) ^{1,2}	Alternate Sediment (µg/dry kg) ^{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	-	No significant chronic 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).

Monitoring Results

Monitoring data for water quality are provided in Table 73. Exceedances of water allocations for 4,4'-DDE and toxaphene occurred during all four monitoring events. Exceedances of 4,4'-DDT and 4,4'-DDD water allocations occurred during Events 34, 35, and 36. The bifenthrin water allocation was exceeded during Event 36. Sediment monitoring results are provided in Table 74, the results showed exceedances in sediment only for the DDT compounds.

Table 73. Oxnard Drain No. 3 TMDL Monitoring Data in Water: 01T_ODD3_ED1¹

Constituents	Water Allocations (µg/L)	Event 34 Dry 8/29/2017	Event 35 Wet 3/11/2018	Event 36 Wet 3/22/2018	Event 37 Dry 6/4/2018
Bifenthrin	0.0006	ND	ND	0.0280	ND
Chlordane, total	0.00059	DNQ	DNQ	0.00573	ND
Chlorpyrifos	0.0056	ND	ND	0.00439	ND
4,4'-DDT	0.00059	0.00540	0.02210	0.09430	DNQ
4,4'-DDE	0.00059	0.01280	0.06450	0.09770	0.00575
4,4'-DDD	0.00084	0.00620	0.01990	0.02700	DNQ
Dieldrin	0.00014	ND	ND	ND	ND
PCBs, total ²	0.00017	ND	ND	ND	ND
Toxaphene	0.0002	0.08850	0.15700	0.73900	0.06540

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

ND = Not Detected at the applicable reporting limit.

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).

Table 74. Oxnard Drain No. 3 TMDL Monitoring Data in Sediment: 01T_ODD3_ED1

Constituents	Sediment Allocations (µg/dry kg)	Event 34 Dry 8/29/2017	Event 35 Wet 3/11/2018	Event 36 Wet 3/22/2018	Event 37 Dry 6/4/2018
Chlordane, total	0.5	DNQ			
4,4'-DDT	1	12.1			
4,4'-DDE	2.2	57.8			
4,4'-DDD	2	9.8			
Dieldrin	0.02	ND			
PCBs, total ²	22.7	ND			
Toxaphene	0.1	DNQ			
Sediment Toxicity	No significant chronic sediment toxicity	No significant chronic sediment toxicity	NR	NR	NR

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

ND = Not Detected at the applicable reporting limit.

NR = Not Required

DNQ = Detected, not qualified.

1. 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 75 and Table 76 respectively.

Table 75. 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 76. 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

Monitoring results for the Benthic TMDL are provided in Table 77. Exceedances of the total nitrogen and total phosphorus LAs occurred during winter Event 36. Monitoring results for the Nutrients TMDL are presented in Table 78. No exceedances for the Nutrients TMDL occurred during 2017-2018 monitoring.

Table 77. Malibu Creek and Lagoon Benthic TMDLs Monitoring Data: 05T_HONDO

Constituent	Event	Season	Load Allocation (mg/L)	Result (mg/L)
Total Nitrogen	34: 8/29/2017	Summer	0.65	NS
	35: 3/11/2018	Winter	1.00	NS
	36: 3/22/2018	Winter	1.00	5.57
	37: 6/4/2018	Summer	0.65	NS
Total Phosphorus	34: 8/29/2017	Summer	0.10	NS
	35: 3/11/2018	Winter	0.10	NS
	36: 3/22/2018	Winter	0.10	9.25
	37: 6/4/2018	Summer	0.10	NS

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

NS = Not Sampled; site dry.

Table 78. Malibu Creek Watershed Nutrients TMDL Monitoring Data: 05T_HONDO

Constituent	Event	Season	Load Allocation	Units	Result
Total Nitrogen	34: 8/29/2017	Summer	3	lbs/day	NS
	37: 6/4/2018	Summer	3	lbs/day	NS
Total Phosphorus	34: 8/29/2017	Summer	0.2	lbs/day	NS
	37: 6/4/2018	Summer	0.2	lbs/day	NS
Nitrogen (nitrate-N + nitrite-N)	35: 3/11/2018	Winter	8	mg/L	NS
	36: 3/22/2018	Winter	8	mg/L	3.54

NS = Not Sampled; site dry.

Conclusions

Submittal of this report fulfills the Annual Monitoring Report requirements specified 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 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 concurrently with this report on December 15, 2018. In addition to the iterative WQMP process for monitoring sites that exceed Water Quality Benchmarks, beginning with this 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. These additional requirements take the form of Source Investigations for the purpose of identifying sources of exceedances and evaluating management practice effectiveness. The VCAILG Source Investigation Work Plan was submitted to the Regional Board October 1, 2018. Implementation of the plan will begin upon approval.

In addition, the VCAILG will implement the WQMP submitted alongside this AMR 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 2017 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>. The website also includes a special section dedicated to the WQMP, detailing the responsibility areas and including 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/management>. This is also where VCAILG members may download or print the compliance summary for their specific responsibility area. Content on these pages will be updated upon approval of the 2018 WQMP.

Education opportunities have their own dedicated section of the website here:

<http://www.farmbureauvc.com/issues/water-issues/water-quality/education>. This page is continuously updated as additional classes become available.

SURVEY COMPLETION

The 2016 *Conditional Waiver* requires that the second WQMP be based on completion of a second set of surveys to begin June 2018. The online management practice survey was open for

almost two months between mid-May and mid-July 2018. 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 second year education hours need to be completed between December 1, 2017 and November 30, 2018 to align with AMR reporting. Appendix L lists the number of education hours each VCAILG member has obtained during this time period.

Eleven education classes have been offered during the second year of implementation. Table 79 lists the approved education classes and the hours of credit for each class.

Table 79. Courses Approved for Education Credit – December 1, 2017 through November 30, 2018

Date	Course Title	Education Hours
4/18/2018	Old and New Smart Agriculture	2
5/10/2018	Vegetable Production Meeting	2
5/15/2018	Introduction to Nutrient Management	2
5/18/2018	Fumigants and Non-Fumigant Alternatives: regulatory and Research Updates	2
6/6/2018	Irrigation Technology and Reading Water Reports	2
6/6/2018	CropManage Hands-On Workshop	3
6/13/2018	Stormwater and Sediment Management in Plasticulture Tunnels	2
9/11/2018	Integrated Pest Management in Avocados	2
9/18/2018	Agricultural Technology Fair	3
10/2/2018	Nitrogen Management Plan Workshop	4
11/27/2018 ¹	Introduction to Nutrient Management	2

1. Meeting rescheduled from November 15th due to location being used for fire crew staging.