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

2012 Annual Monitoring Report

DRAFT

submitted to:

**LOS ANGELES REGIONAL WATER QUALITY
CONTROL BOARD**

prepared by:

LARRY WALKER ASSOCIATES

On behalf of the

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



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Acronyms

BMP	Best Management Practice
CC	Calleguas Creek
CCW	Calleguas Creek Watershed
CCWTMP	Calleguas Creek Watershed TMDL Monitoring Program
CWA	Clean Water Act
DNQ	Detected Not Quantified
DPR	Department of Pesticide Regulation
DQO	Data Quality Objective
EPA	Environmental Protection Agency
EST	Estimated
IR	Instrument Resolution
LARWQCB	Los Angeles Regional Water Quality Control Board (Regional Board)
MDL	Method Detection Limit
MRP	Monitoring and Reporting Plan
NA	Not Applicable
ND	Not Detected
NM	Not Measured
NOA	Notice of Applicability
NOI	Notice of Intent
NS	Not Sampled
OC	Organochlorine
OP	Organophosphorus
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCD	Resource Conservation District
RL	Reporting Limit
SCR	Santa Clara River
SCRW	Santa Clara River Watershed
SOP	Standard Operating Procedure
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UCCE	University of California Cooperative Extension
VCAILG	Ventura County Agricultural Irrigated Lands Group
VR	Ventura River
VRW	Ventura River Watershed
WQMP	Water Quality Management Plan

Introduction

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

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

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

Under the previous Conditional Waiver (Order No. R4-2005-0080) four Annual Monitoring Reports were submitted by the VCAILG to the Regional Board on February 15th in 2008, 2009, 2010, and 2011. This document serves as the first Annual Monitoring Report (AMR) summarizing data collected under the 2010 Conditional Waiver (Order No. R4-2010-0186). This report provides a detailed summary of activities of the VCAILG during 2011-2012, including administration of the VCAILG, an overview of farming in Ventura County, coursework offered to VCAILG members to fulfill the Conditional Waiver’s education requirement, a list of education hours completed to date by each member, and monitoring data collected during the wet and dry monitoring events conducted. Also included is a discussion of monitoring results that exceeded water quality benchmarks. In addition, a WQMP will be submitted by March 15, 2013 in response to water quality benchmark exceedances that occurred during the 2011-2012

monitoring year and will detail a plan to reduce water quality impacts from irrigated agricultural discharges.

Group Membership and Setting

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

Table 1. VCAILG Steering Committee Membership

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

N/A = Not Applicable

1. An asterisk denotes Executive Committee membership

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

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

- Landowner Name
- Mailing Address
- Parcel number(s)

- Irrigated acres per parcel
- Watershed associated with each parcel

Table 2 contains a summary of VCAILG membership statistics, including the number of landowners and parcels enrolled, as well as irrigated acreage enrolled in each watershed. All membership statistics represent group status at the end of 2012. At that time, VCAILG represented 1,213 Ventura County agricultural landowners and 79,033 irrigated acres. According to the Ventura County Assessor’s records, there are an estimated 429 landowners not enrolled in VCAILG. Therefore, VCAILG represents 74 percent of agricultural landowners in Ventura County covering 86 percent of the irrigated acreage.

Table 2. VCAILG Membership Statistics as of December 31, 2012

Watershed	Landowner Count	Parcel Count	Irrigated Acres
Calleguas Creek	554	1,164	42,350
Oxnard Coastal	55	109	3,920
Santa Clara River	487	1,115	27,717
Ventura River	178	321	5,046
<i>Total</i>	<i>1,274</i> ¹	<i>2,709</i>	<i>79,033</i>

1. There are 1,213 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 259,055¹ acres of agricultural land in the county, there are approximately 91,000 acres of irrigated land. The Calleguas Creek Watershed contains the highest number of irrigated acres (roughly 48,000), followed by the Santa Clara River Watershed (approximately 32,000), Ventura River Watershed (approximately 6,600), and finally the Oxnard Plain Coastal Watershed (approximately 4,400).²

Agriculture is a major industry in Ventura County, generating over \$1.84 billion in gross sales for 2011³. This gross value is down one percent from 2010⁴. Table 3 lists the County’s ten leading crops in gross value for 2011. Ventura County was ranked as one of the top five counties in California for twelve agricultural commodities in 2011. Table 4 lists the commodities for which Ventura County ranked in the top five of California’s 58 counties for 2011.

¹ Estimated agricultural acreage from: U.S. Department of Agriculture-National Agricultural Statistics Service, *2007 Census of Agriculture*. Washington D.C.: Updated September 2009.

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

³ Ventura County Agricultural Commissioner. Ventura County Crop Report 2011. July 24, 2012.

⁴ Ventura County Agricultural Commissioner. Ventura County Crop Report 2011. July 24, 2012.

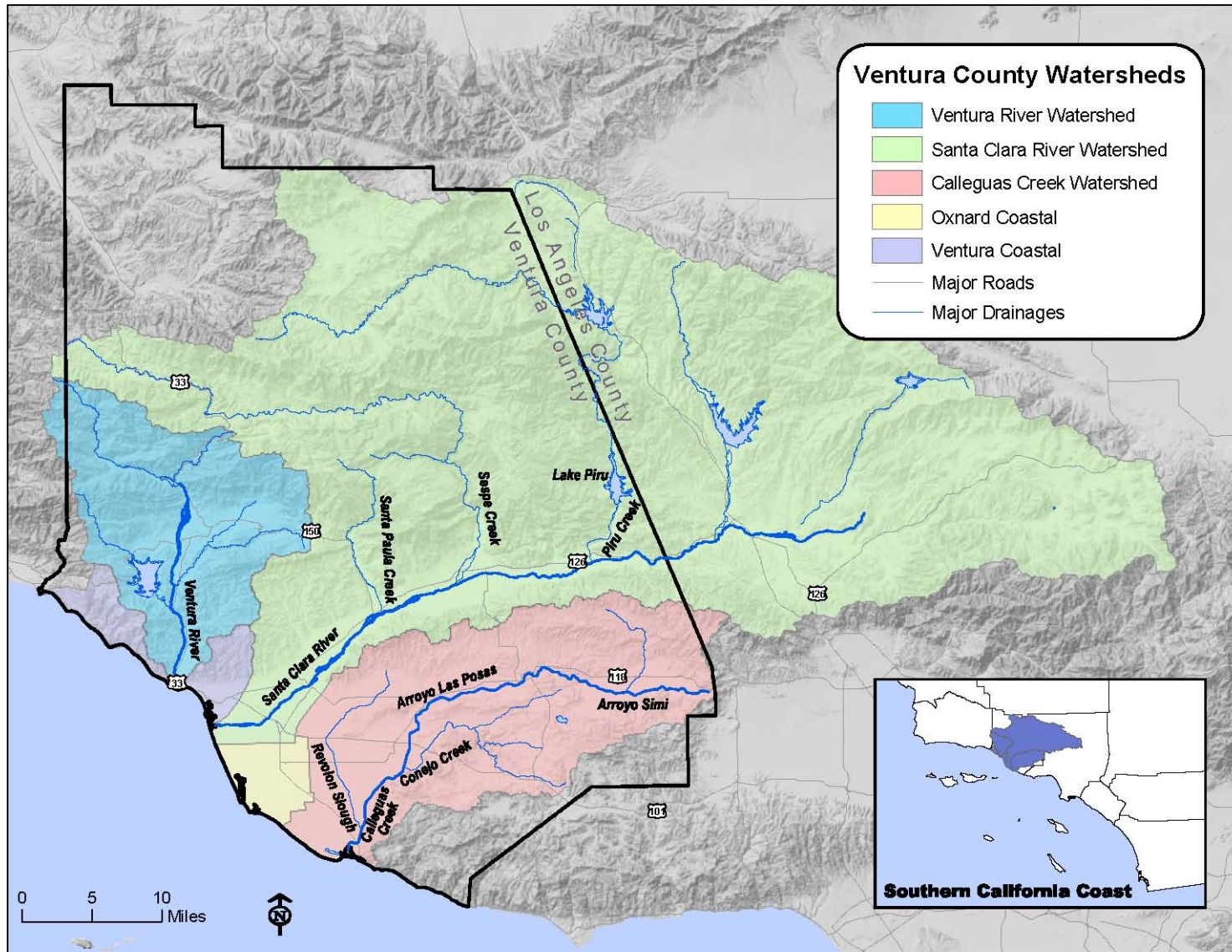


Figure 1. Ventura County Watersheds

Table 3. Ventura County's Leading Agricultural Commodities--2011

Commodity	Gross Value (\$)
1. Strawberries	625,509,000
2. Raspberries	185,400,000
3. Lemons	174,937,000
4. Nursery Stock	163,793,000
5. Celery	154,584,000
6. Tomatoes	99,468,000
7. Avocados	91,849,000
8. Cut Flowers	52,217,000
9. Peppers	41,701,000
10. Greens	20,717,000

Source: Ventura County Agricultural Commissioner. *County of Ventura Agricultural Crop Report 2011*. July 24, 2012.

Table 4. Ventura County's Statewide Commodity Rank by Gross Value – 2011

Commodity	Ventura County Rank Among 58 CA Counties	% of CA Total
Lemons	1	39.6
Celery	2	37.1
Raspberries	1	51.0
Strawberries	2	29.1
Cabbage	2	22.3
Avocados	2	20.5
Nursery Products	4	6.6
Bell Peppers	3	14.9
Spinach	4	5.5
Oranges	4	1.9
Flowers/Foliage	4	6.5
Dry Beans	2	8.2

Source: USDA, NASS, CA Field Office. *Summary of California County Agricultural Commissioners' Reports, 2010-2011*. December 17, 2012.

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

Calleguas Creek Watershed

The Calleguas Creek Watershed (Figure 2) is approximately 30 miles long, 14 miles wide, and drains an area of approximately 343 square miles or 219,520 acres. Cities within the watershed include Camarillo, Thousand Oaks, Moorpark, and Simi Valley. The main surface water system drains from the mountains in the northeast part of the watershed toward the southwest, where it flows through the Oxnard Plain before emptying into the Pacific Ocean through Mugu Lagoon. The main waterbodies in the watershed include Calleguas Creek, Revolon Slough, Beardsley

Channel, Conejo Creek, Arroyo Santa Rosa, Arroyo Las Posas and Arroyo Simi. All of these waterbodies appear on the federal 303(d) list of impaired waterbodies, triggering the requirement to develop Total Maximum Daily Loads (TMDLs) for specified pollutants identified as causing impairments. Runoff from irrigated agricultural lands has been identified as one of the sources of these water quality impairments for specified pollutants. To date, TMDLs have been adopted for Nitrogen Compounds, Trash, Organochlorine Pesticides, Polychlorinated Biphenyls (PCBs) and Siltation, Toxicity, Metals and Selenium, and Salts.

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

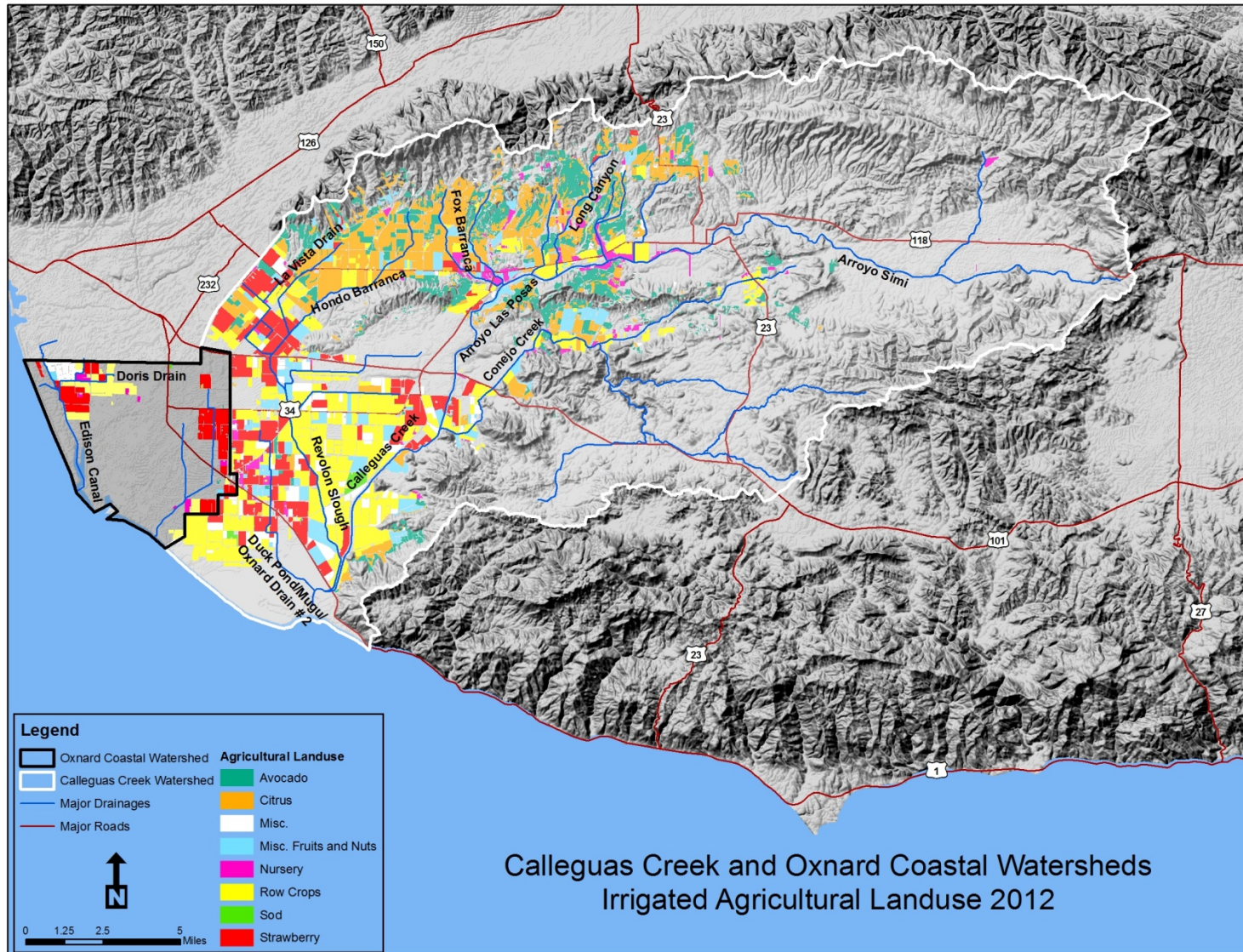


Figure 2. Calleguas Creek Watershed Agricultural Land Use

Santa Clara River Watershed

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

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

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

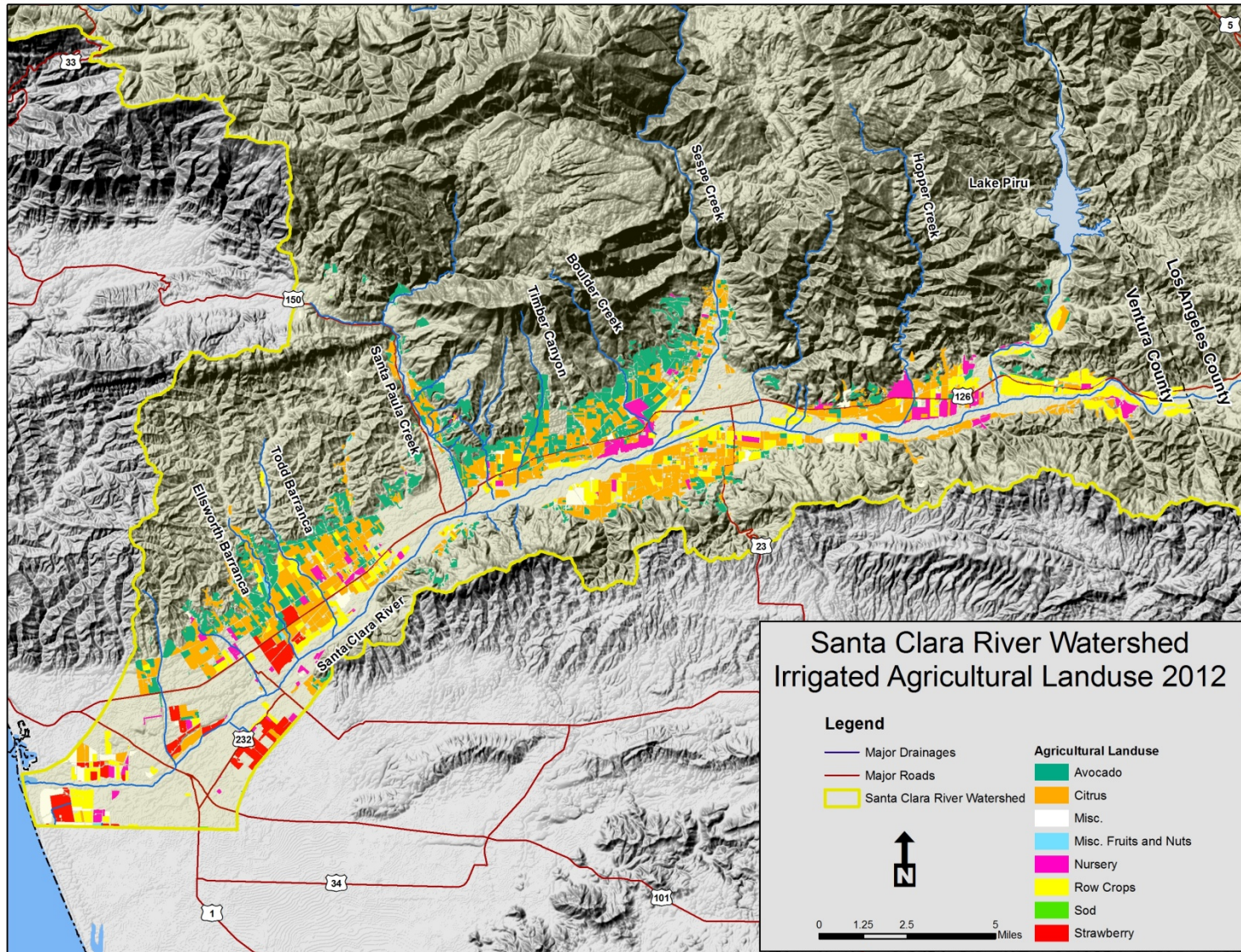


Figure 3. Santa Clara River Watershed Agricultural Land Use

Ventura River Watershed

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

Several Ventura River reaches and tributaries appear on the federal 303(d) list of impaired waterbodies due to Algae/Eutrophic Conditions, Bacteria, Pumping/Water Diversion, and Trash. The Ventura River Estuary Trash TMDL became effective in 2008. An Algae TMDL was adopted by the Regional Board on December 6, 2012. The EPA is in the process of adopting a TMDL to address the pumping/water diversion listing.

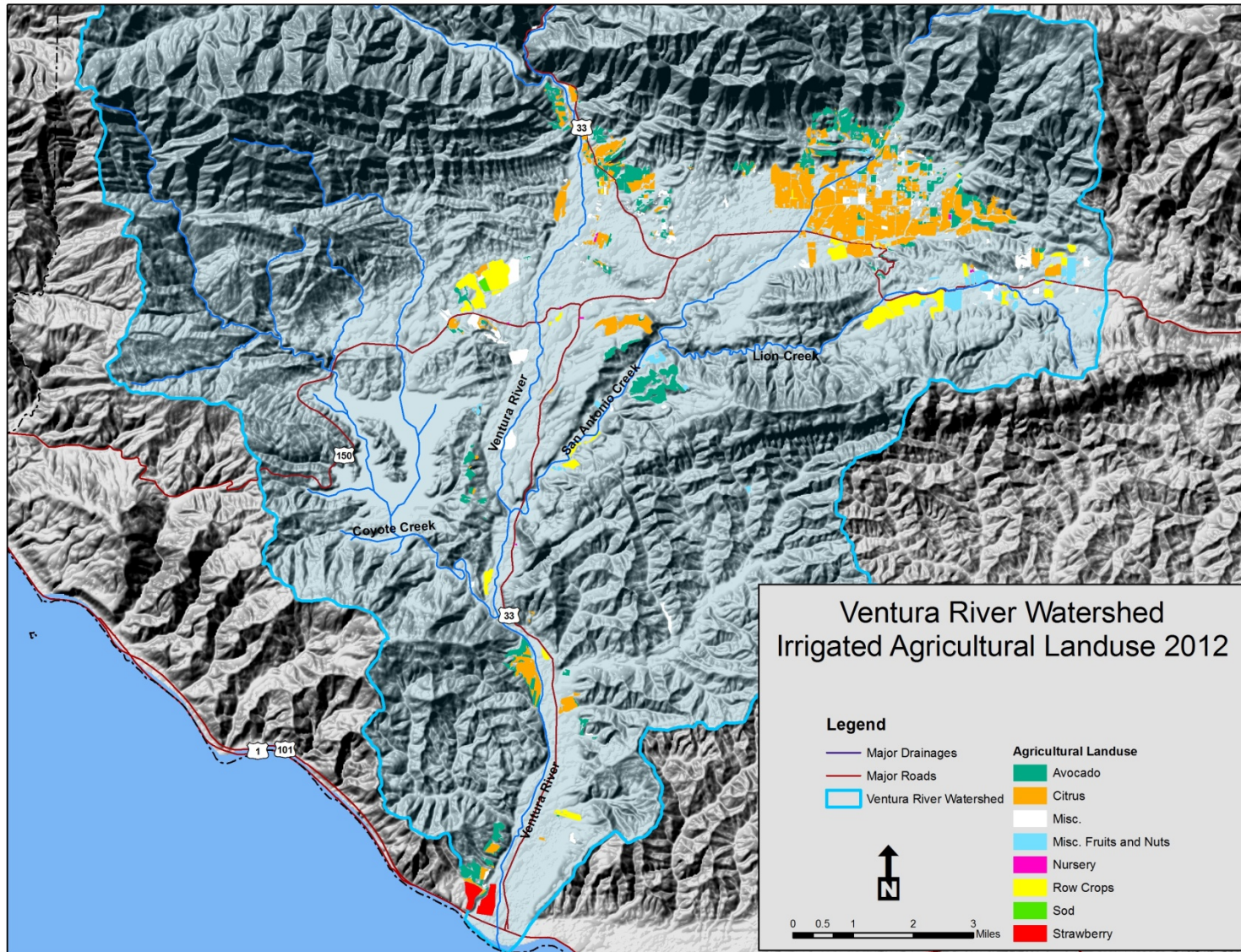


Figure 4. Ventura River Watershed Agricultural Land Use

VCAILG PARTICIPATION IN TMDLS

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

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

Water Quality Monitoring

MONITORING OBJECTIVES

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

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

MONITORING SITE SELECTION

The first step toward fulfilling monitoring program objectives was selecting appropriate monitoring sites. Because the focus of the program is on impacts to surface waterbodies from discharges from irrigated agricultural lands, monitoring sites were selected to best characterize agricultural inputs and are generally located at the lower ends of mainstem tributaries or agricultural drainages in areas associated primarily with agricultural activity. In some cases, sites were also located to facilitate distinguishing agricultural inputs from other sources, such as golf courses or landscaped areas – these are referred to herein as “background” (“BKGD”) sites. 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 5 lists monitoring sites selected in each watershed and associated global positioning system (GPS) coordinates for sampling Conditional Waiver Appendix 1, Table 1 constituents. Table 6 lists monitoring sites and GPS coordinates for effective TMDL monitoring locations. Figure 5 through Figure 11 show site locations for all monitoring sites within each watershed.

The format for the monitoring site ID/code is 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 5. VCAILGMP Monitoring Locations for Conditional Waiver Constituents

Watershed / Subwatershed	Station ID	Reach	Waterbody Type ¹	Station Location	GPS Coordinates ²	
					Latitude	Longitude
Calleguas Creek / Mugu Lagoon	01T_ODD3_ARN	1	T	Rio de Santa Clara/Oxnard Drain #3 at Arnold Rd.	34.123564	-119.156514
Calleguas Creek / Calleguas Creek	02D_CSUCI	2	B	02D_BROOM background site near CSUCI	34.159860	-119.049375
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_SANT_BKGD	5	B	05D_SANT_VCWPD background site near the golf course	34.263213	-119.111314
	05D_LAVD	5	T	La Vista Drain at La Vista Ave.	34.265950	-119.093589
	05T_HONDO	5	T	Hondo Barranca at Hwy. 118	34.263608	-119.057431
Calleguas Creek / Arroyo Las Posas	06T_LONG2	6	T	Long Canyon at Balcom Canyon Rd. crossing	34.281721	-118.958565
Oxnard Coastal	OXD_CENTR	--	D	Central Ditch at Harbor Blvd.	34.220555	-119.254983
Santa Clara River	S02T_ELLS	2	T	Ellsworth Barranca at Telegraph Rd.	34.306805	-119.141275
	S02T_TODD	2	T	Todd Barranca at Hwy. 126	34.313584	-119.117095
	S03T_TIMB	3	T	Timber Canyon at Hwy. 126	34.370172	-119.020939
	S03T_BOULD	3	T	Boulder Creek at Hwy. 126	34.389578	-118.958738
	S03D_BARDS	3	D	Discharge along Bardsdale Ave. upstream of confluence with Santa Clara River	34.371535	-118.964470
	S04T_TAPO	4	T	Tapo Canyon Creek	34.401717	-118.723706
	S04T_TAPO_BKGD	4	B	S04T_TAPO background site upstream of agricultural operations	34.387316	-118.7204509
Ventura River	VRT_THACH	--	T	Thacher Creek at Ojai Avenue	34.446719	-119.210893
	VRT_SANTO	--	T	San Antonio Creek at Grand Avenue	34.454455	-119.221723

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

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

Table 6. Monitoring Locations for Effective TMDLs

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

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

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

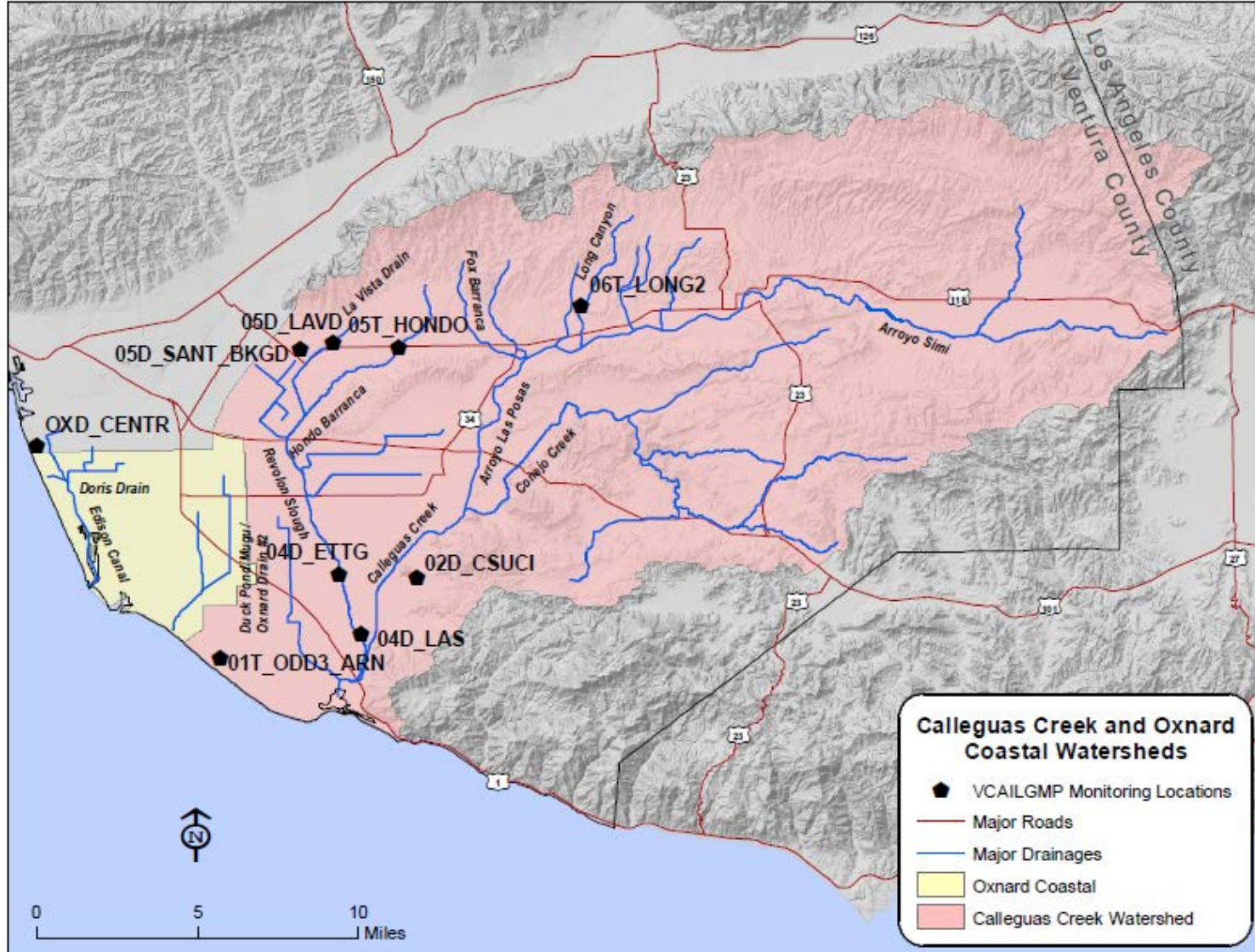


Figure 5. VCAILG Monitoring Sites in the Calleguas Creek/Oxnard Coastal Watersheds

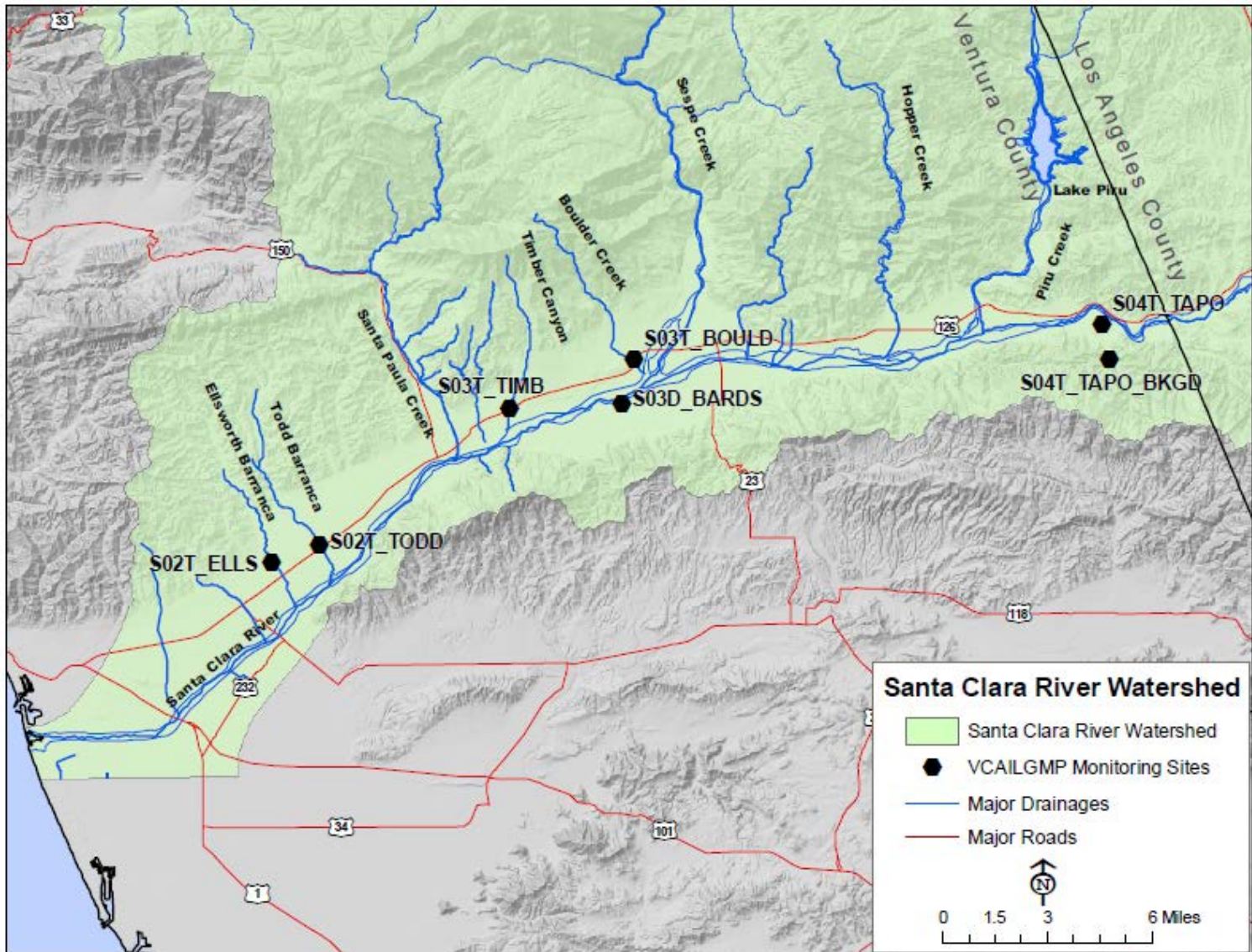


Figure 6. VCAILG Monitoring Sites Located in the Santa Clara River Watershed

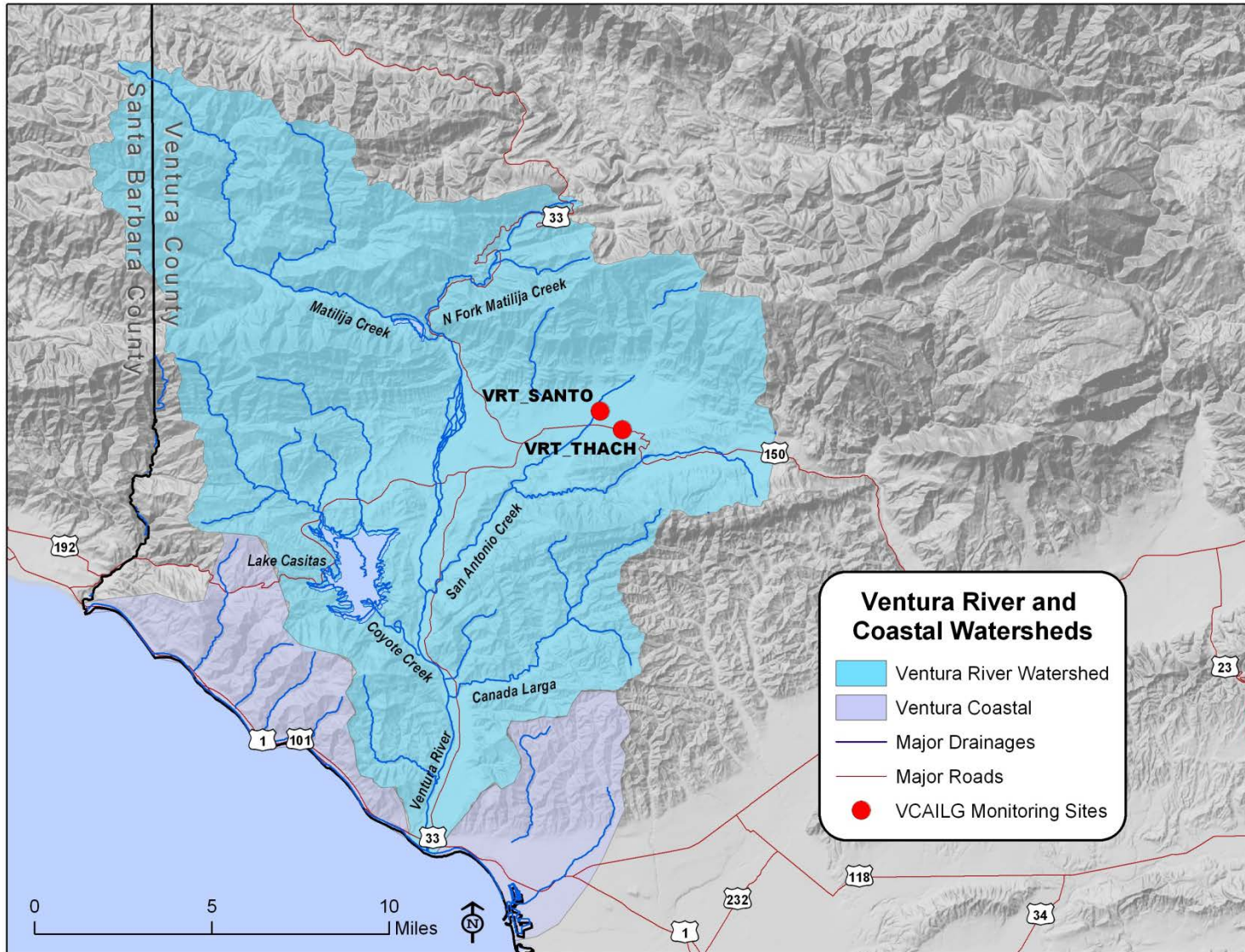


Figure 7. VCAILG Monitoring Sites Located in the Ventura River Watershed

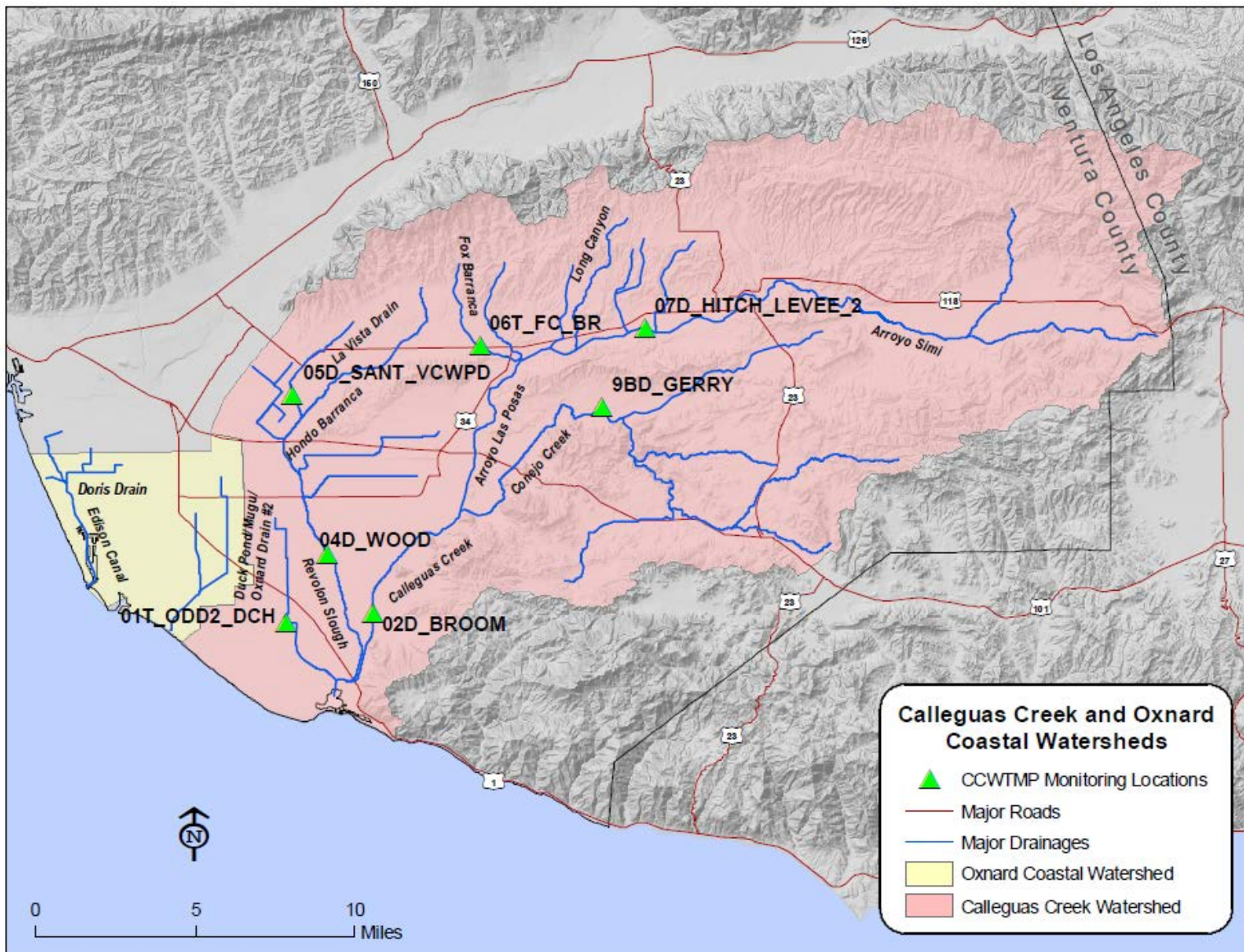


Figure 8. CCWTMP Monitoring Sites

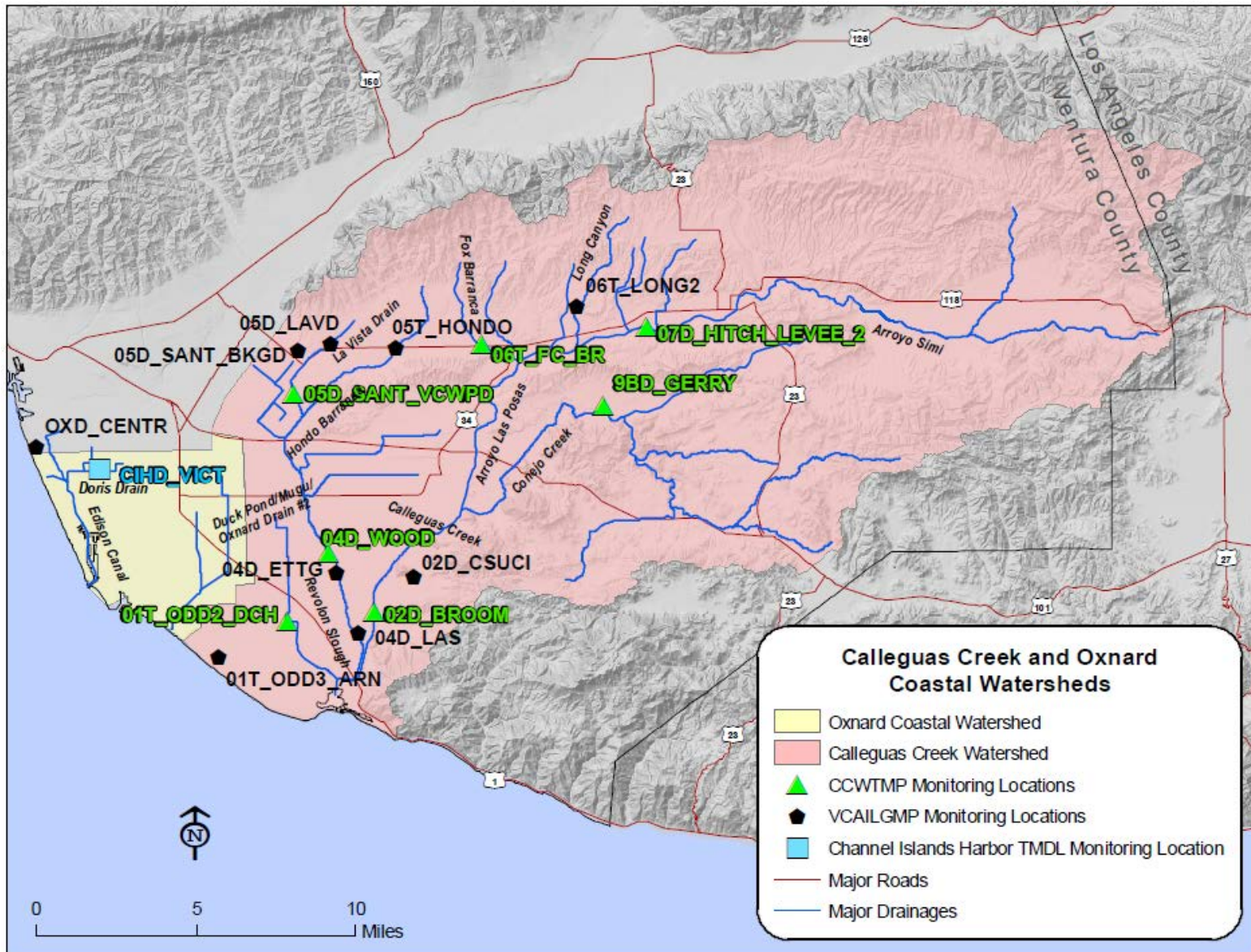


Figure 9. Calleguas Creek and Oxnard Coastal Watershed Monitoring Sites for All Programs

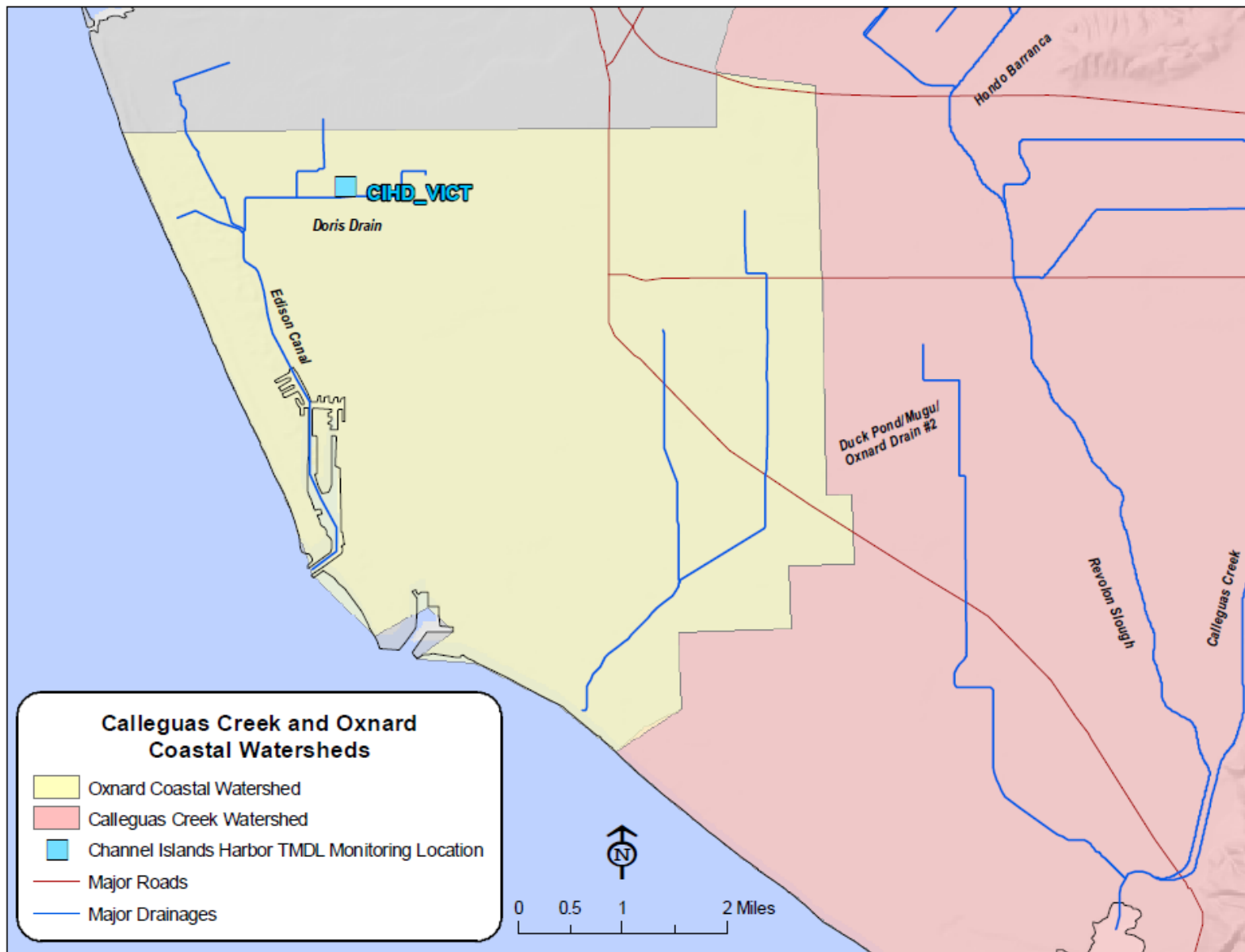


Figure 10. Channel Islands Harbor Bacteria TMDL Monitoring Site

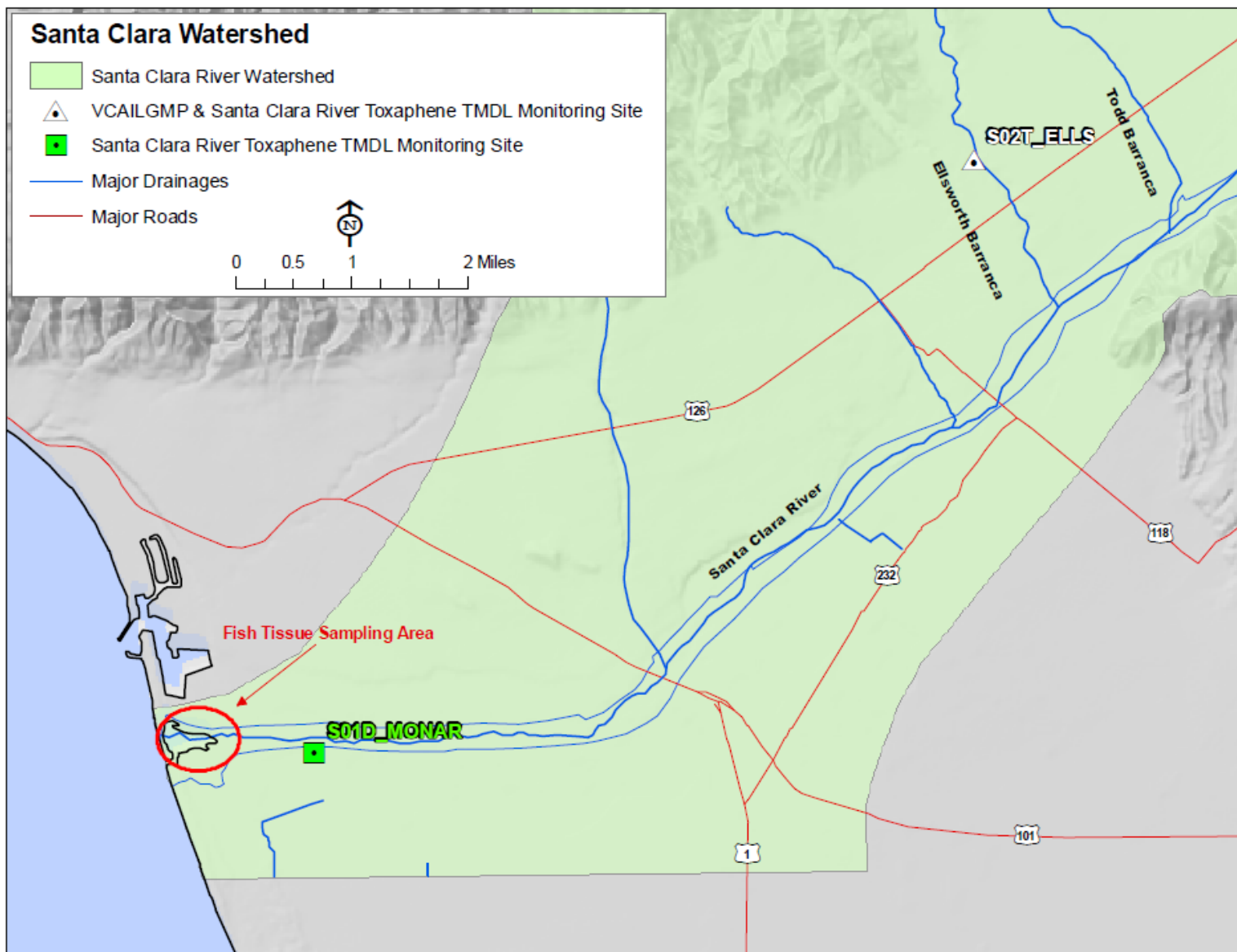


Figure 11. Santa Clara River Estuary Toxaphene TMDL Monitoring Sites

Table 7. Estimated Irrigated Acreage Represented at VCAILG Monitoring Sites

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

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

Table 8. Estimated Irrigated Acreage Represented at TMDL Monitoring Sites

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

1. Sites OXD_CENTR and S02T_ELLS are also monitored for specific TMDL constituents; their drainage area and crop type information is listed in the previous table.
2. Data Source Ventura County Agricultural Commissioner's Office
3. Some acreage is double or triple counted due to multi-cropping practices.

PARAMETERS MONITORED AND MONITORING FREQUENCY

Conditional Waiver Monitoring Constituents and Frequency

The Conditional Waiver specifies the constituents to be monitored during each monitoring event (Table 9) 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 2012, storm monitoring occurred on January 23rd and March 18th. The January storm was the first storm of the year significant enough to initiate runoff. In addition, wet weather toxicity monitoring was completed during the January 23rd event. Dry weather monitoring occurred on May 24th and July 17th with dry weather toxicity monitoring completed during the July 17th event.

Table 10 provides a summary of monitoring sites and constituents that were monitored during the wet and dry weather monitoring events in 2012. Field measurements were also collected at the sites where samples were collected.

Table 9. Constituents and Monitoring Frequency for the VCAILGMP

CONSTITUENT	FREQUENCY ¹
FIELD MEASUREMENTS	2 dry events; 2 wet events
Flow, pH, Temperature, Dissolved Oxygen, Turbidity, Conductivity	
GENERAL WATER QUALITY CONSTITUENTS (GWQC)	
Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Hardness, Chloride, Sulfate	
NUTRIENTS	
Total Ammonia-N, Nitrate-N, Phosphate	
PESTICIDES	
Organochlorine Pesticides ² , Organophosphorus Pesticides ³ , Pyrethroid Pesticides ⁴	
METALS	
Dissolved Copper, Total Copper	
TRASH	1 wet event; second dry event
Trash observations	
AQUATIC CHRONIC TOXICITY	

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

Table 10. VCAILG Sites Monitored and Constituents Sampled in 2012

WATERSHED / SUBWATERSHED	SITE ID	REACH	YEARLY EVENTS ¹			
			WET 1/23/12	WET 3/18/12	DRY 5/24/12	DRY 7/17/12
Calleguas Creek / Mugu Lagoon	01T_ODD3_ARN	1	TOX,WQ	WQ	WQ	TOX,WQ
Calleguas Creek / Calleguas Creek	02D_CSUCI ²	2	WQ ³	WQ ³	WQ ³	WQ ³
Calleguas Creek / Revolon Slough	04D_ETTG	4	WQ	WQ	WQ	WQ
	04D_LAS	4	WQ	WQ	WQ	WQ
Calleguas Creek / Beardsley Channel	05D_SANT_BKGD ¹	5	WQ	WQ ³	WQ ³	WQ ³
	05D_LAVD	5	TOX,WQ	WQ	WQ	TOX, WQ
	05T_HONDO	5	TOX,WQ	WQ ³	WQ ³	TOX,WQ ³
Calleguas Creek / Arroyo Las Posas	06T_LONG2	6	TOX,WQ	WQ ³	WQ ³	TOX,WQ ³
Oxnard Coastal	OXD_CENTR	--	WQ	WQ	WQ	WQ
	S02T_ELLS	2	TOX,WQ	WQ	WQ ³	TOX,WQ ³
	S02T_TODD	2	TOX,WQ	WQ	WQ	TOX,WQ
	S03T_TIMB	3	TOX,WQ ³	WQ ³	WQ	TOX,WQ ³
Santa Clara River	S03T_BOULD	3	TOX,WQ	WQ	WQ ³	TOX,WQ ³
	S03D_BARDS	3	WQ ³	WQ ³	WQ ³	WQ ³
	S04T_TAPO	4	TOX,WQ	WQ	WQ	TOX,WQ
	S04T_TAPO_BKGD ²	4	WQ ⁴	WQ ⁴	WQ ³	WQ ³
Ventura River	VRT_THACH	--	TOX,WQ ³	WQ ³	WQ ³	TOX,WQ ³
	VRT_SANTO	--	TOX,WQ ³	WQ ³	WQ ³	TOX,WQ ³

TOX = Toxicity

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

1. Toxicity testing is performed twice per monitoring year, as specified in the Conditional Waiver.
2. Background sites are only visited during storm events when the corresponding downstream site is sampled.
3. Site not sampled due to insufficient flow/dry conditions.
4. Site was inaccessible due to mud.

TMDL Monitoring Constituents and Frequency

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

Calleguas Creek Watershed TMDL monitoring was completed per the CCWTMP QAPP and is described in detail in the *Calleguas Creek Watershed TMDL Compliance Monitoring Program Fourth Year Annual Monitoring Report*.⁵ All efforts have been made to coordinate the VCAILG and CCWTMP monitoring programs when timing sampling events. CCWTMP monitoring is conducted quarterly with an additional two storm events each year.

Table 11. Constituents and Frequency for TMDL Monitoring Performed Under the VCAILGMP

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

1. This table only lists constituents necessary for data comparison with TMDL load allocations that are not already collected at the specified site as part of the Table 9 VCAILGMP sampling.
2. TMDL monitoring at OXD_CENTR is for compliance with the McGrath Lake TMDL, which became effective after the adoption of the Conditional Waiver. The monitoring frequency listed above represents what was collected during this reporting year. Future years will include water sampling at the same frequency as Conditional Waiver monitoring and twice per year sediment sampling.

⁵ Larry Walker Associates. 2013. Calleguas Creek Watershed TMDL Compliance Monitoring Program Fourth Year Annual Monitoring Report. February 26, 2013.

Table 12. TMDL Sites Monitored and Constituents Sampled in 2012

TMDL	Site ID	Yearly Events			
		Wet 1/23/12	Wet 3/18/12	Dry 5/24/12	Dry 7/17/12
Santa Clara River Estuary Toxaphene TMDL	S01D_MONAR	OC-W	OC-W	OC-W TSS ¹	OC-W TSS ¹
		OC-S TSS	OC-S TSS		
	S02T_ELLS	OC-W OC-S TSS	OC-W OC-S TSS ²	OC-W TSS	OC-W TSS
	Santa Clara River Estuary			OC-F ³	OC-F ³
Channel Islands Harbor Bacteria TMDL	CIHD_VICT	Bact	Bact ¹	Bact ¹	Bact ¹
McGrath Lake PCBs, Pesticides and Sediment Toxicity TMDL	OXD_CENTR	OC-PCB-W TOC TSS ⁴	OC-PCB-W TOC TSS ⁴	OC-PCB-W TOC TSS	OC-PCB-W TOC TSS OC-PCB-S

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

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

OC-F = OC pesticides toxaphene, chlordane, and dieldrin in fish tissue

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

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

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

TOC = Total Organic Carbon

TSS = Total Suspended Solids

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

2. Filtered sediment constituents not measured due to insufficient amounts of sediment.

3. Two attempts were made to collect fish; the first collection took place 5/23/12 and only goldfish were caught, a second attempt was made on 7/3/12 and resulted in the catch of Arroyo chub.

4. Only TMDL constituents that overlap with required Conditional Waiver constituents were analyzed since TMDL monitoring had not officially begun when this event took place.

SAMPLING METHODS

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

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

appropriate tool. Estimated flows are qualified as such in the field data (Appendix C) and site summary tables. *Flow estimates made during the wet event, therefore, should be regarded as gross estimates and used with discretion.*

During at least one wet event, samples taken from 01T_ODD3_ARN, 06T_LONG2, 05D_SANT_BKGD, 05D_LAVD, and S02T_ELLS were collected using intermediate containers; all other sites were sampled by direct immersion. For the dry weather event, intermediate containers were used at 01T_ODD3_ARN and 05D_LAVD for both of those events. Flow measurements were made according to the standard operating procedure included in Appendix C-1 of the QAPP, as previously noted.

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

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

Information entered on field log sheets is ultimately entered into the VCAILGMP database for reporting. Field data are included with this Annual Report in Appendix C, which can be found on the Annual Report Data CD. Field log sheets for fish collections are included as part of the Appendix B, but since water quality measurements are not made during these events, the information is not key-entered for inclusion in Appendix C. Photo documentation of each monitoring site for all four events is also included on the Annual Report Data CD as Appendix D.

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

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

ANALYTICAL METHODS

Table 13 provides a summary of analytical methods used by contract laboratories for analyzing samples collected for Conditional Waiver constituents in 2012. Table 14 lists analytical methods

for TMDL constituents monitored as part of the VCAILGMP. Refer to the CCWTMP QAPP for methods used on samples collected at CCW agricultural land use sites.

Table 13. Analytical Methods for Conditional Waiver Constituents

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

1. Chronic toxicity tests were performed on three species for the first toxicity monitoring event where water was present at each particular site, after which the most sensitive species was selected for use in subsequent monitoring events.
2. If sample conductivity exceeded 3000 uS/cm, *Hyalella azteca* was used for toxicity testing.
3. If sample conductivity exceeded 3000 uS/cm, *Menidia beryllina* was used for toxicity testing.
4. If sample conductivity exceeded 3000 uS/cm, *Thalassiosira pseudonana* was used for toxicity testing.
5. See Table 9 for the list of constituents in each pesticide group.
6. Toxaphene is analyzed using NCI/GCMS.

Table 14. TMDL Analytical Methods for Laboratory Analyses Performed Under the VCAILGMP

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

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

STANDARD WATER QUALITY BENCHMARKS

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

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

Table 15. Standard Water Quality Benchmarks Derived From Narrative Objectives and Toxicity

Constituent	Watershed ¹	Narrative Objective ²	Applicable Benchmark
pH	CC, OXD, SCR, VR	The pH of inland surface waters shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed by more than 0.5 pH units from natural conditions as a result of waste discharges.	6.5 ≤ pH ≤ 8.5 Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
	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
Temperature	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
	OXD	No single dissolved oxygen determination shall be less than 5 mg/L, except when natural conditions cause lesser concentrations.	≥ 5 mg/L
Dissolved Oxygen	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
	CC, OXD, SCR, VR	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.	No numeric benchmarks. Waterbody-specific benchmarks for nutrients are listed in Table 16.
Biostimulatory Substances	CC, OXD, SCR, VR	Wastes shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.	No numeric benchmarks.
Total Suspended Solids (TSS)	CC, OXD, SCR, VR	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.	No numeric benchmarks. Applicable benchmarks for specific pesticides are listed in Tables 18, 19, and 20.
Pesticides	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.
Toxicity	CC, OXD, SCR, VR		

1. CC = Calleguas Creek Watershed OXD = Oxnard Coastal Watershed SCR = Santa Clara River Watershed VR = Ventura River Watershed
2. Source: Water Quality Control Plan, Los Angeles Region (Basin Plan), 1994.
3. Source: "Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands," Order No. R4-2010-0186, Los Angeles Regional Water Quality Control Board, adopted October 7, 2010.

Table 16. 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 17. Standard Water Quality Benchmarks for Copper

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

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

Table 18. Standard Water Quality Benchmarks for Organochlorine Pesticides

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

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

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

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

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

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

Table 19. Standard Water Quality Benchmarks for Organophosphorus Pesticides

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

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

Table 20. Standard Water Quality Benchmarks for Pyrethroid Pesticides

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

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

WATER QUALITY MONITORING RESULTS

This section contains a summary of water quality monitoring data collected at VCAILG sites where flow was present during the four monitoring events conducted in 2012. Information presented for each VCAILG monitoring site includes the receiving water of the drainage monitored, a site location map, a site photo, and a narrative summary of which events were monitored, exceedances (if any) of standard water quality benchmarks, and unusual occurrences (if any) from each event. The predominant crop type(s) potentially contributing to the flow at each monitoring site is also noted in this section; this information is also listed in Table 7. All constituents listed in Appendix 2 of the Conditional Waiver are included in the data tables for each site. Additional constituents are listed only if they have been detected at a particular site. Non-detect data is included with all of the water quality monitoring data for 2012 as Appendix F on the Annual Report Data CD. All hard copy laboratory reports are also included on the Data CD. Results summarized in this section are compared with Conditional Waiver standard water quality benchmarks from Appendix 2 and specified in Table 15 through Table 20 where applicable, all exceedances are indicated in ***bold italic type*** in the data tables.

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

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

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

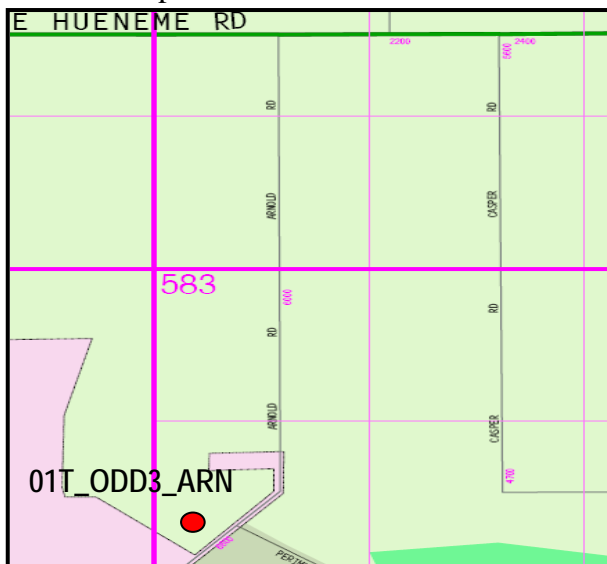
Calleguas Creek Watershed

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

01T_ODD3_ARN

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

Site Map



View downstream at sampling point



Samples were collected at this site during all four 2012 monitoring events. Table 21 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Flow is not measured at this site because it is unsafe to do so. Table 22 summarizes the trash observations for each event. This area is frequently used by bird watchers and others participating in non-contact recreation. The trash found near the monitoring site is not specific to agriculture.

Exceedances of the nitrate and DDT compounds benchmarks occurred during every 2012 monitoring event at this site. Exceedances were also observed for dissolved oxygen, toxaphene, and chlorpyrifos, but only during one or two events. The copper benchmark for saltwater was exceeded at this site during wet event 13 and dry event 15. Row crops and sod are the primary crop types in the vicinity of this site.

Table 21. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: 01T_ODD3_ARN

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		NM	NM	NM	NM
pH		6.5 ≤ pH ≤ 8.5	7.66	8	7.76	7.74
Temperature	°C		15.19	14.95	17.83	26.82
Dissolved Oxygen	mg/L	≥ 5	9.75	11.25	4.07	10.72
Turbidity	NTU		28.8	57.1	36.1	31.8
Conductivity	µS/cm		6033	5068	7550	8503
General Water Quality						
Total Dissolved Solids (TDS)	mg/L		4300	3360	4970	6170
Total Suspended Solids (TSS)	mg/L		27	66	41	59
Total Hardness as CaCO ₃	mg/L		1891.8	1473.3	2001.5	2085.9
Chloride	mg/L		1210	790	1340	2230
Sulfate	mg/L		1490	1340	1740	2370
Nutrients						
Ammonia-N	mg/L	2.36/ 1.11/ 1.66/ 0.85 ¹	0.24	1.59	0.39	19.45
Nitrate-N	mg/L	10 ²	36.56	36.47	31.27	44.41
Total Orthophosphate	mg/L		0.74	0.55	0.80	0.46
Metals						
Dissolved Copper	µg/L	3.1 ³	2.98	5.05	2.11	3.67
Total Copper	µg/L		4.03	4.97	2.6	3.72
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	ND	DNQ	DNQ
Chlordane-gamma	µg/L		DNQ	DNQ	DNQ	DNQ
Total Chlordane	µg/L	0.00059	DNQ	DNQ	DNQ	DNQ
2,4'-DDD	µg/L		DNQ	ND	0.0067	ND
2,4'-DDT	µg/L		0.0055	ND	DNQ	ND
4,4'-DDD	µg/L	0.00084	0.0112	0.0155	0.0186	0.011
4,4'-DDE	µg/L	0.00059	0.0342	0.0441	0.0706	0.0385
4,4'-DDT	µg/L	0.00059	0.0091	ND	0.0079	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

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
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	DNQ	0.07085	0.057	DNQ
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0326	ND	0.0031	ND
Diazinon	µg/L	0.1	0.0057	ND	ND	ND
Dichlorvos	µg/L		ND	ND	0.0095	ND
Disulfoton	µg/L		ND	ND	ND	0.0083
Pyrethroid Pesticides						
Bifenthrin	µg/L		DNQ	0.0023	ND	ND

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

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

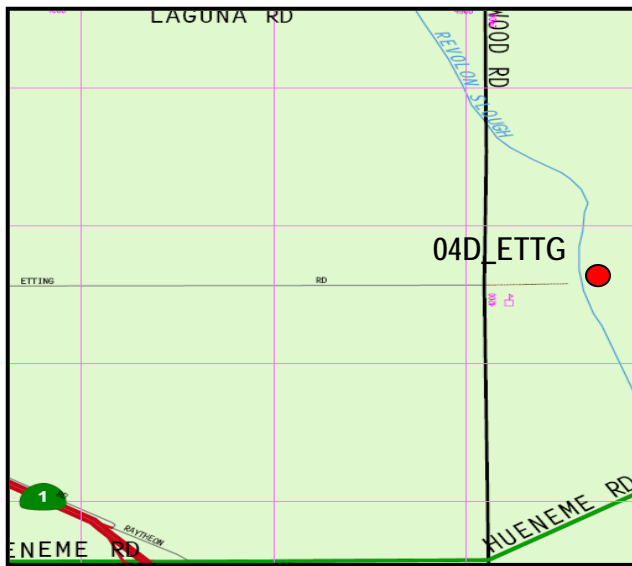
Table 22. 2012 Trash Observations for 01T_ODD3_ARN

Event	Count	Types
Event 12	>50	Tire, bags, cups
Event 13	>20	Styrofoam, 2 tires, paper & plastic cups, wrappers, rubber balls
Event 14	>25	Styrofoam cups, cans, bags
Event 15	>50	Cups, bottles, cans

04D_ETTG

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

Site Map



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



Flow was present at this site during every monitoring event. Table 23 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. The approximate amount and types of trash observed at this site is recorded in Table 24.

Concentrations of nitrate, copper, and DDT compounds exceeded benchmarks during all four monitoring events. The toxaphene benchmark was exceeded during both storm events. Two OP pesticides, chlorpyrifos and diazinon, had exceedances during the first storm, with an additional chlorpyrifos exceedance during the first dry event. Row crops are the most common crops grown within this site drainage area. Additional crop types include strawberries, other berries (such as raspberries or blueberries), and citrus.

Table 23. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_ETTG

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		59.85EST	7.08EST	4.35	3.24
pH		$6.5 \leq \text{pH} \leq 8.5$	7.67	7.9	7.94	8.06
Temperature	°C	$\leq 26.67^\circ\text{C}^1$	13.59	11.99	16.9	21.77
Dissolved Oxygen	mg/L	≥ 5	9.06	9.6	9.36	10.34
Turbidity	NTU		597	47.2	0.8	11.9
Conductivity	µS/cm		2919	4792	4744	3447
General Water Quality						
Total Dissolved Solids (TDS)	mg/L		2400	3940	3850	2840
Total Suspended Solids (TSS)	mg/L		569	55	6	19
Total Hardness as CaCO ₃	mg/L		1413.6	2211.2	2022.4	1534.7
Chloride	mg/L		171	320	250	244
Sulfate	mg/L		1140	2060	1870	1520
Nutrients						
Ammonia-N	mg/L	$3.93/ 3.29/ 2.27/ 1.4^2$	0.31	0.13	0.06	0.14
Nitrate-N	mg/L	10^3	53.11	91.68	54.78	32.83
Total Orthophosphate	mg/L		4.78	3.83	2.94	2.85
Metals						
Dissolved Copper	µg/L	3.1^4	4.24	5.71	4.5	4.18
Total Copper	µg/L		20.63	6.57	4.78	4.21
Organochlorine Pesticides						
Chlordane-alpha	µg/L		DNQ	ND	ND	ND
Chlordane-gamma	µg/L		DNQ	ND	ND	ND
Total Chlordane	µg/L	0.00059	DNQ	ND	ND	ND
2,4'-DDD	µg/L		0.0221	DNQ	DNQ	ND
2,4'-DDE	µg/L		0.221	ND	ND	ND
2,4'-DDT	µg/L		0.0319	ND	DNQ	ND
4,4'-DDD	µg/L	0.00084	0.0584	0.0088	DNQ	ND
4,4'-DDE	µg/L	0.00059	0.3284	0.0489	0.0157	0.0139
4,4'-DDT	µg/L	0.00059	0.0769	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

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Toxaphene	µg/L	0.00075	1.01368	0.13961	DNQ	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0958	0.0235	0.0572	0.0046
Diazinon	µg/L	0.1	0.1385	ND	ND	ND
Malathion	µg/L		0.0451	ND	DNQ	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L		0.0038	0.0031	ND	ND
Cypermethrin	µg/L		0.0047	DNQ	ND	ND

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

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

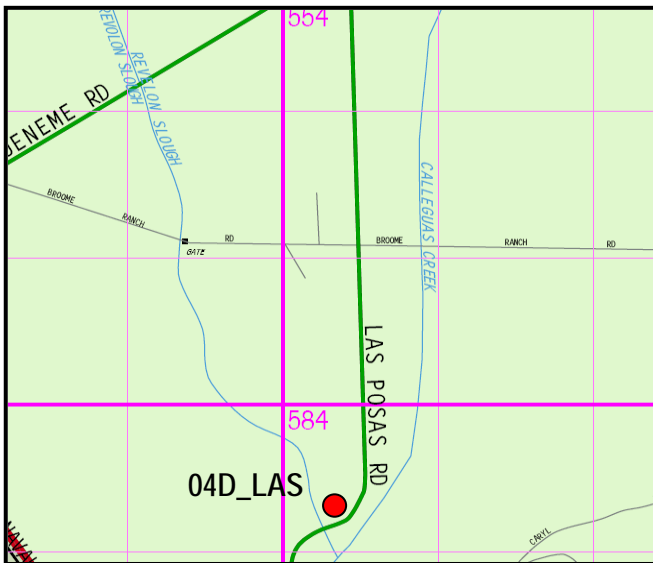
Table 24. 2012 Trash Observations for 04D_ETTG

Event	Count	Types
Event 12	<50	Urban trash, cups
Event 13	6	Ag bags, paper cup, styrofoam, paper wrapper, candy wrapper
Event 14	0	N/A
Event 15	10-20	Ag trash, plastic

04D_LAS

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

Site Map



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



Flow was present at this site during all four 2012 monitoring events. Table 25 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 26 quantifies and describes trash found at this site. As noted in the table, a few pieces of trash were observed during the first event, then none during the following three events. This monitoring site is located away from any roads or highways with gates limiting public access.

The nitrate-N benchmark was exceeded every event this year. The copper benchmark for saltwater was exceeded at this site during the two storm events. During the first storm, exceedances occurred in all three 4,4'-DDT compounds, toxaphene, and chlorpyrifos. The second storm only had detections and exceedances of the toxaphene and chlorpyrifos benchmarks. 4,4'-DDE was the only pesticide detected in pesticide samples from the first dry event. The second dry event had detections of 4,4'-DDD and 4,4'-DDE, but not 4,4'-DDT. Row crops are the primary crop type along with significant acreage of strawberries being grown in the vicinity of this site.

Table 25. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_LAS

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		5.23	2.04 EST	1.56	0.66
pH		6.5 ≤ pH ≤ 8.5	7.57	7.86	7.9	8.15
Temperature	°C	≤ 26.67°C ¹	14.16	14.97	16.09	25.05
Dissolved Oxygen	mg/L	≥ 5	10.31	12.79	9.57	21.29
Turbidity	NTU		87.6	10.7	0.7	30.7
Conductivity	µS/cm		3995	4352	4382	3862
General Water Quality						
Total Dissolved Solids (TDS)	mg/L		3110	3150	3250	3040
Total Suspended Solids (TSS)	mg/L		87	13	6	49
Total Hardness as CaCO ₃	mg/L		1647.6	1592.7	1667.6	1517.2
Chloride	mg/L		417	440	370	433
Sulfate	mg/L		1360	1400	1370	1350
Nutrients						
Ammonia-N	mg/L	4.19/ 2.86/ 2.53/ 0.98 ²	0.14	DNQ	0.09	ND
Nitrate-N	mg/L	10 ³	53.51	56.79	47.8	28.07
Total Orthophosphate	mg/L		1.90	1.38	1.16	1.50
Metals						
Dissolved Copper	µg/L	3.1 ⁴	4.03	4.2	2.55	2.93
Total Copper	µg/L		7.04	3.97	2.76	4.46
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	ND	ND	ND
Chlordane-gamma	µg/L		ND	ND	ND	ND
Total Chlordane	µg/L	0.00059	DNQ	ND	ND	ND
2,4'-DDD	µg/L		0.0056	ND	ND	ND
2,4'-DDT	µg/L		0.0058	ND	DNQ	ND
4,4'-DDD	µg/L	0.00084	0.012	ND	DNQ	0.0095
4,4'-DDE	µg/L	0.00059	0.0585	ND	0.0172	0.0311
4,4'-DDT	µg/L	0.00059	0.0097	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

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Endosulfan Sulfate	µg/L	240	ND	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND	ND
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	0.19705	0.05938	DNQ	DNQ
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.117	0.0329	0.0119	ND
Diazinon	µg/L	0.1	0.0053	ND	0.0914	ND

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

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

Table 26. 2012 Trash Observations for 04D_LAS

Event	Count	Types
Event 12	5-10	Cans, bag
Event 13	0	N/A
Event 14	0	N/A
Event 15	0	N/A

05D_LAVD

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

Site Map



View upstream (NE) from sampling location



Sufficient flow was present during all of the 2012 monitoring events. Table 27 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 28 quantifies and describes trash found at this site.

TDS and sulfate benchmarks were exceeded at this site during the two dry events as well as the second storm. The three 4,4'-DDT compounds, toxaphene, and chlorpyrifos exceeded their respective benchmarks during both storm events. Very few pesticides (1-2) were detected during the two dry events. Citrus, avocados, and berries (other than strawberries) are the major crop types that drain to this monitoring location.

Table 27. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: 05D_LAVD

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		8.72	0.04	0.02 EST	0.05
pH		6.5 ≤ pH ≤ 8.5	7.81	8.21	8.84	8.47
Temperature	°C	≤ 26.67°C ¹	10.34	7.56	19.54	21.47
Dissolved Oxygen	mg/L	≥ 5	10.6	12.38	12.31	11.86
Turbidity	NTU		1357	316.9	0	0
Conductivity	µS/cm		571.7	1468	2275	2203
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850	232	970	1510	1680
Total Suspended Solids (TSS)	mg/L		372	200	7	5
Total Hardness as CaCO ₃	mg/L		189.8	529.2	607.5	708.7
Chloride	mg/L	150	16.2	76	130	166
Sulfate	mg/L	250	101	470	840	973
Nutrients						
Ammonia-N	mg/L	4.11/ 2.76/ 0.45/ 0.73 ²	0.13	ND	ND	ND
Nitrate-N	mg/L	10	3.66	10.52	5.59	1.93
Total Orthophosphate	mg/L		3.71	2.30	DNQ	ND
Metals						
Dissolved Copper	µg/L	15.48/ 29.28 29.28/ 29.28 ³	4.81	6.25	1.89	2.34
Total Copper	µg/L		34.08	13.23	2.37	2.1
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	ND	ND
Chlordane-gamma	µg/L		ND	ND	ND	ND
Total Chlordane	µg/L	0.00059	DNQ	DNQ	ND	ND
2,4'-DDE	µg/L		0.0091	ND	ND	ND
2,4'-DDT	µg/L		0.014	0.0184	ND	ND
4,4'-DDD	µg/L	0.00084	0.0078	0.0202	ND	ND
4,4'-DDE	µg/L	0.00059	0.1439	0.1727	DNQ	ND
4,4'-DDT	µg/L	0.00059	0.0543	0.079	0.0946	0.1363
Dieldrin	µg/L	0.00014	ND	ND	ND	ND
Endosulfan-I	µg/L	0.056	ND	ND	ND	ND

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Endosulfan-II	µg/L	0.056	ND	ND	ND	ND
Endosulfan Sulfate	µg/L	240	ND	ND	ND	ND
Endrin	µg/L	0.036	ND	ND	ND	ND
Endrin Aldehyde	µg/L	0.81	ND	ND	ND	ND
Toxaphene	µg/L	0.00075	0.09874	0.13343	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.2818	0.085	ND	ND
Diazinon	µg/L	0.1	0.0085	ND	ND	ND
Dichlorvos	µg/L		ND	ND	0.0115	ND
Malathion	µg/L		0.0683	ND	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L		0.1393	0.0242	ND	ND
Cypermethrin	µg/L		0.0245	0.0159	ND	ND

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

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

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.

The benchmarks for copper are listed in order of monitoring event and were calculated for freshwater at this site as prescribed in Table 17.

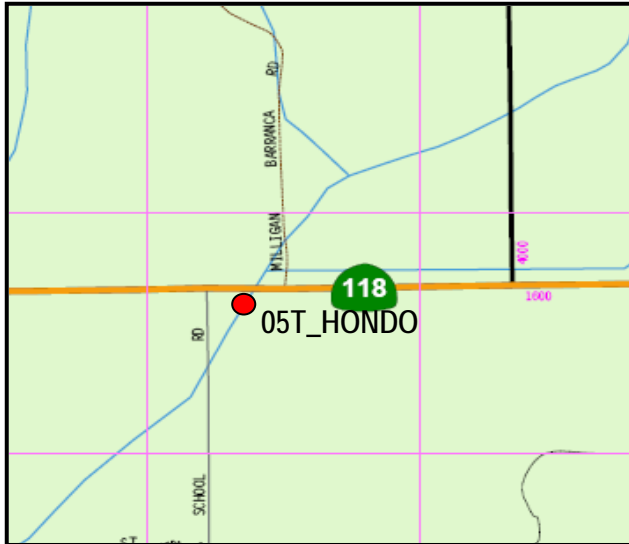
Table 28. 2012 Trash Observations for 05D_LAVD

Event	Count	Types
Event 12	0	N/A
Event 13	0	N/A
Event 14	1	Paper towel
Event 15	2	Wrappers

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 upstream (N) from sampling location toward Hwy 118 Bridge



Flow was only present at this site during the first storm event. Table 29 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 30 quantifies and describes trash found at this site. The site is located directly adjacent to Hwy 118 and as noted in the table, a significant portion of the trash does not appear to come from an agricultural source.

All observed exceedances at this site were for OC pesticides, including: total chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and toxaphene. OP pesticides chlorpyrifos and diazinon were detected, but not above their respective benchmarks. Hondo Barranca drains land planted primarily with citrus and avocado orchards.

Table 29. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: 05T_HONDO

Constituent	Units	Benchmark	Event 12 Wet 1/23/2012	Event 13 Wet 3/18/2012	Event 14 Dry 5/24/2012	Event 15 Dry 7/17/2012
Field Measurements						
Flow	CFS		5.64			
pH		6.5 ≤ pH ≤ 8.5	8.25			
Temperature	°C	≤ 26.67°C ¹	9.86			
Dissolved Oxygen	mg/L	≥ 5	10.96			
Turbidity	NTU		1745			
Conductivity	µS/cm		95.2			
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850	83.3			
Total Suspended Solids (TSS)	mg/L		3000			
Total Hardness as CaCO ₃	mg/L		206			
Chloride	mg/L	150	3.99			
Sulfate	mg/L	250	13			
Nutrients						
Ammonia-N	mg/L	2.23 ²	0.13			
Nitrate-N	mg/L	10	1.74			
Total Orthophosphate	mg/L		14.62			
Metals						
Dissolved Copper	µg/L	16.61 ³	6.51	Not Sampled; site dry	Not Sampled; site dry	No Sampled; site dry
Total Copper	µg/L		98.87			
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		0.0111			
trans-Nonachlor	µg/L		0.0308			
Chlordane-alpha	µg/L		0.027			
Chlordane-gamma	µg/L		0.0216			
Total Chlordane	µg/L	0.00059	0.0486			
2,4'-DDD	µg/L		0.0319			
2,4'-DDE	µg/L		1.215			
2,4'-DDT	µg/L		0.1445			
4,4'-DDD	µg/L	0.00084	0.2157			
4,4'-DDE	µg/L	0.00059	1.7998			
4,4'-DDT	µg/L	0.00059	0.6316			
Dieldrin	µg/L	0.00014	ND			

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Endosulfan-I	µg/L	0.056	ND	Not Sampled; site dry	Not Sampled; site dry	Not Sampled; site dry
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	1.44445			
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0204			
Diazinon	µg/L	0.1	0.0067			

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

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

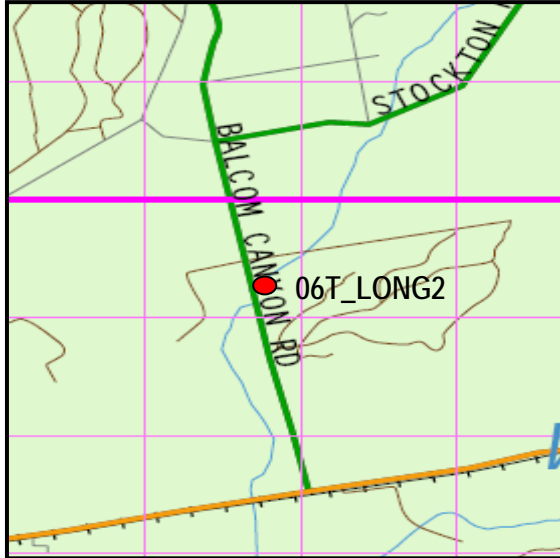
Table 30. 2012 Trash Observations for 05T_HONDO

Event	Count	Types
Event 12	>50	Cups, ag trash
Event 13	>100	Mostly cups, styrofoam, plastic wrappers, some ag trash, cardboard, oil can, antifreeze
Event 14	>25	Bags, urban trash, paper, cans, bottles,
Event 15	30-50	Cardboard, bottles, bags, cans, urban trash, bucket

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



06T_LONG2 view upstream



Flow was only present at this site during the first storm event. Table 31 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 32 quantifies and describes trash found at this site.

Only OC pesticides benchmark exceedances occurred at this site, which included: total chlordane and the three 4,4'-DDT compounds. The drainage area for this monitoring site consists mostly of citrus and avocado orchards, with small portions used for growing nursery stock, berries, and cut flowers.

Table 31. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: 06T_LONG2

Constituent	Units	Benchmark	Event 12 Wet 1/23/2012	Event 13 Wet 3/18/2012	Event 14 Dry 5/24/2012	Event 15 Dry 7/17/2012
Field Measurements						
Flow	CFS		0.39			
pH		6.5 ≤ pH ≤ 8.5	8.17			
Temperature	°C	≤ 26.67°C ¹	10.75			
Dissolved Oxygen	mg/L	≥ 5	10.53			
Turbidity	NTU		1053			
Conductivity	µS/cm		21			
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850	164			
Total Suspended Solids (TSS)	mg/L		1730			
Total Hardness as CaCO ₃	mg/L		129.1			
Chloride	mg/L	150	13.7			
Sulfate	mg/L	250	34.6			
Nutrients						
Ammonia-N	mg/L	2.4 ²	0.17			
Nitrate-N	mg/L	10	1.22			
Total Orthophosphate	mg/L		5.18			
Metals						
Dissolved Copper	µg/L	11.14 ³	3.87	Not Sampled; site dry	Not Sampled; site dry	Not Sampled; site dry
Total Copper	µg/L		25.01			
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		0.0063			
Chlordane-alpha	µg/L		0.0073			
Chlordane-gamma	µg/L		0.0058			
Total Chlordane	µg/L	0.00059	0.0131			
2,4'-DDD	µg/L		0.0137			
2,4'-DDE	µg/L		0.2414			
2,4'-DDT	µg/L		0.0344			
4,4'-DDD	µg/L	0.00084	0.0533			
4,4'-DDE	µg/L	0.00059	0.3574			
4,4'-DDT	µg/L	0.00059	0.1479			
Dieldrin	µg/L	0.00014	ND			
Endosulfan-I	µg/L	0.056	ND			

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Endosulfan-II	µg/L	0.056	ND	Not Sampled; site dry	Not Sampled; site dry	Not Sampled; site dry
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			
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0046			
Diazinon	µg/L	0.1	0.0305			

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

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

Table 32. 2012 Trash Observations for 06T_LONG2

Event	Count	Types
Event 12	1-3	Cups
Event 13	>10	Plastic bags, drink cups, glass bottles, garden hose, food wrappers, ag waste
Event 14	1	Glass bottle
Event 15	15-20	Styrofoam cups, bottles, plastic bags

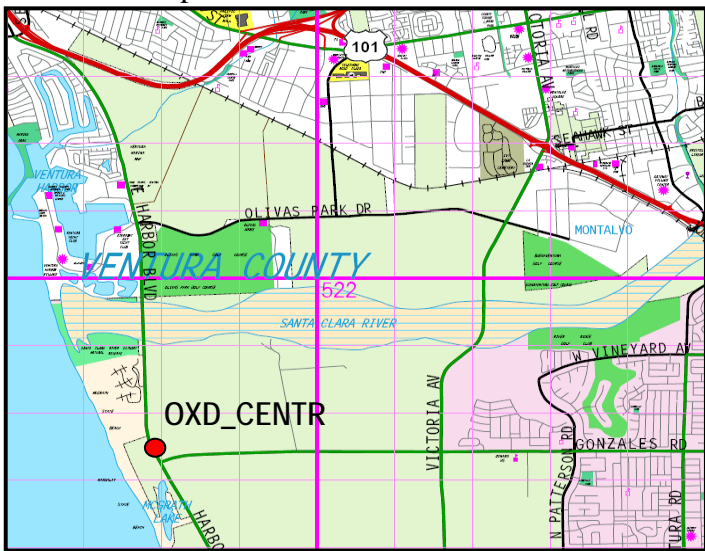
Oxnard Coastal Watershed

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

OXD_CENTR

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

Site Map



View looking downstream



Sufficient flow was present at this site during all four monitoring events. Table 33 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 34 quantifies and describes trash found at this site.

Most exceedances occurred during the first storm event, which included copper, five OC pesticides as well as chlorpyrifos. This was also the only event during which the nitrate-N benchmark was not exceeded. The number of benchmark exceedances then decreased with each of the following events from six during the first storm and down to only one for the final dry weather event. Strawberries and row crops are the predominant crop types that drain to this site.

Table 33. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: OXD_CENTR

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		16.65	0.98	0.64	0.36
pH		6.5 ≤ pH ≤ 8.5	7.52	7.44	6.83	7.44
Temperature	°C		13.95	13.74	18	18.54
Dissolved Oxygen	mg/L	≥ 5	9.49	8.85	8.49	5.25
Turbidity	NTU		875 EST	0	0	0
Conductivity	µS/cm		1056	3682	3575	3379
General Water Quality						
Total Dissolved Solids (TDS)	mg/L		764	2780	2650	2760
Total Suspended Solids (TSS)	mg/L		730	11	2	2
Total Hardness as CaCO ₃	mg/L		518.5	1634.6	1443.6	1509.9
Chloride	mg/L		45.8	230	230	270
Sulfate	mg/L		421	1460	1300	1380
Nutrients						
Ammonia-N	mg/L	4.45/ 4.82/ 4.99/ 3.54 ¹	0.15	0.07	0.13	0.17
Nitrate-N	mg/L	10 ²	9.84	27.2	15.81	11.58
Total Orthophosphate	mg/L		5.55	0.28	0.09	0.06
Metals						
Dissolved Copper	µg/L	3.1 ³	3.91	2.29	1.28	1.56
Total Copper	µg/L		33.88	2.29	1.46	1.44
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		0.0063	ND	ND	ND
Chlordane-alpha	µg/L		0.0119	ND	ND	ND
Chlordane-gamma	µg/L		0.01	ND	ND	ND
Total Chlordane	µg/L	0.00059	0.0219	ND	ND	ND
2,4'-DDD	µg/L		0.0616	ND	ND	ND
2,4'-DDE	µg/L		0.0214	ND	ND	ND
2,4'-DDT	µg/L		0.0903	DNQ	ND	ND
4,4'-DDD	µg/L	0.00084	0.1504	DNQ	ND	ND
4,4'-DDE	µg/L	0.00059	0.5308	0.0195	0.0135	ND
4,4'-DDT	µg/L	0.00059	0.2445	ND	ND	ND
Dieldrin	µg/L	0.00014	ND	ND	ND	ND

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
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	0.05981	0.07832	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	4.7386	0.1118	0.0061	ND
Diazinon	µg/L	0.1	ND	ND	ND	ND
Pyrethroid Pesticides						
Allethrin	µg/L		ND	ND	0.0023	ND
Bifenthrin	µg/L		0.0539	0.0024	0.1308	ND
Cyfluthrin	µg/L		ND	ND	0.06	ND
L-Cyhalothrin	µg/L		ND	DNQ	0.0256	ND
Cypermethrin	µg/L		ND	ND	0.0627	ND
Danitol	µg/L		0.027	DNQ	ND	ND
Deltamethrin	µg/L		ND	ND	0.0045	ND

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

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

Table 34. 2012 Trash Observations for OXD_CENTR

Event	Count	Types
Event 12	<25	Ag and urban trash
Event 13	2	Road trash (drink boxes, soda packs)
Event 14	5	Plastic bags, Styrofoam cup, wrappers
Event 15	<5	Bottle, paper

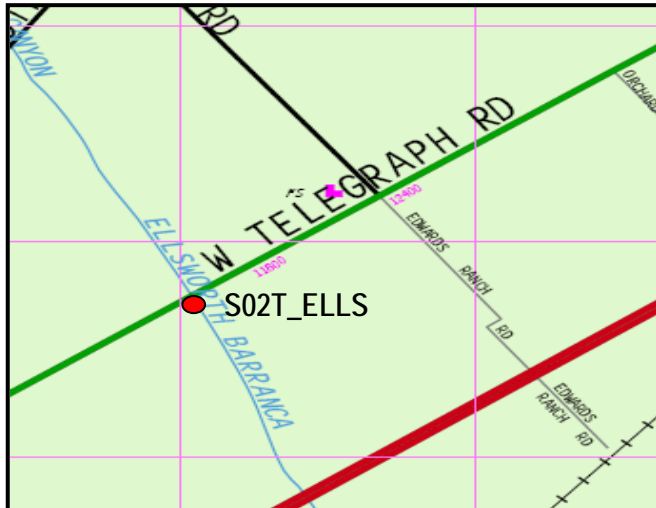
Santa Clara River Watershed

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

S02T_ELLS

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

Site Map



View upstream at the bridge pier



Flow was present at this site only during the two storm events. Table 35 contains a summary of constituents detected in one or more monitoring events and provides a comparison of measured concentrations with applicable water quality benchmarks. Table 36 describes trash found at this site.

During the first storm, exceedances were observed in multiple OC pesticides. Salts concentrations (TDS, sulfate, and chloride) were the only ones greater than their corresponding benchmarks during the second storm event. Citrus and avocados are the primary crop types associated with this site.

Table 35. VCAILG Monitoring Data v. Waiver Benchmarks: S02T_ELLS

Constituent	Units	Benchmark	Event 12 Wet 1/23/2012	Event 13 Wet 3/18/2012	Event 14 Dry 5/24/2012	Event 15 Dry 7/17/2012
Field Measurements						
Flow	CFS		0.81	0.56		
pH		6.5 ≤ pH ≤ 8.5	7.94	7.73		
Temperature	°C	≤ 26.67°C ¹	12.08	9.95		
Dissolved Oxygen	mg/L	≥ 6	10.49	11.04		
Turbidity	NTU		3000 EST	350.8		
Conductivity	µS/cm		681	2782		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1200	436	1690		
Total Suspended Solids (TSS)	mg/L		2000	218		
Total Hardness as CaCO ₃	mg/L		322.7	645.4		
Chloride	mg/L	150	23.7	320		
Sulfate	mg/L	600	192	680		
Nutrients						
Ammonia-N	mg/L	3.1/ 4.64 ²	0.21	0.2		
Nitrate-N	mg/L	10	8.63	0.82		
Total Orthophosphate	mg/L		6.99	3.31		
Metals						
Dissolved Copper	µg/L	24.37/ 29.28 ³	14.08	7.72	Not Sampled; site dry	Not Sampled; site dry
Total Copper	µg/L		125.85	12.56		
Organochlorine Pesticides						
Aldrin	µg/L	0.00014	ND	ND		
BHC-alpha	µg/L	0.013	ND	ND		
BHC-beta	µg/L	0.046	ND	ND		
BHC-gamma	µg/L	0.063	ND	ND		
cis-Nonachlor	µg/L		0.0065	ND		
trans-Nonachlor	µg/L		0.0133	ND		
Chlordane-alpha	µg/L		0.0179	ND		
Chlordane-gamma	µg/L		0.0142	ND		
Total Chlordane	µg/L	0.00059	0.0321	ND		
2,4'-DDD	µg/L		0.0062	ND		
2,4'-DDE	µg/L		ND	0.0355		
2,4'-DDT	µg/L		0.0252	ND		
4,4'-DDD	µg/L	0.00084	0.0308	ND		
4,4'-DDE	µg/L	0.00059	0.2362	ND		
4,4'-DDT	µg/L	0.00059	0.1431	ND		
Dieldrin	µg/L	0.00014	ND	ND		

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Endosulfan-I	µg/L	0.056	ND	ND	Not Sampled; site dry	Not Sampled; site dry
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	0.23274	ND		
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0944	ND		
Diazinon	µg/L	0.1	0.0132	ND		
Malathion	µg/L		0.0121	ND		
Methyl parathion	µg/L		0.154	ND		
Pyrethroid Pesticides						
Bifenthrin	µg/L		ND	0.0043		
Cypermethrin	µg/L		0.0233	ND		

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

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

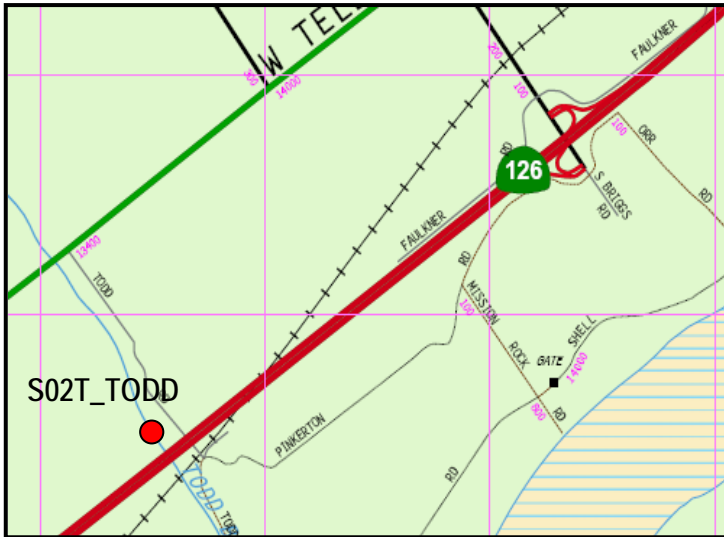
Table 36. 2012 Trash Observations for S02T_ELLS

Event	Count	Types
Event 12	<25	Cups, plastic bags, paper
Event 13	2	Cup, water bottle
Event 14	1	Trash bag
Event 15	0	N/A

S02T_TODD

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

Site Map



View upstream of the sampling site



Sufficient flow was present during all four 2012 monitoring events. Table 37 contains a summary of detected constituents and a comparison of concentrations with applicable water quality benchmarks. Table 38 lists trash observation made at the site.

During the first storm event there were five OC pesticides exceedances. The second storm resulted in only three exceedances: TDS, sulfate, and nitrate-N. Both dry weather events met almost every water quality benchmarks, there was just a single exceedance between those two events, which was for 4,4'-DDE (Event 14).

Table 37. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_TODD

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		3.9	0.12	1.24	3.76
pH		6.5 ≤ pH ≤ 8.5	8.05	7.05	7.84	7.79
Temperature	°C	≤ 26.67°C ¹	14.3	11.84	18.35	18.18
Dissolved Oxygen	mg/L	≥ 6	9.29	9.19	8.9	9.2
Turbidity	NTU		671 EST	28.8	0	0
Conductivity	µS/cm		1429	2780	1746	1574
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1200	1120	2010	1180	1160
Total Suspended Solids (TSS)	mg/L		556	35	ND	ND
Total Hardness as CaCO ₃	mg/L		723.6	1162.5	658.8	676.8
Chloride	mg/L	150	53.5	130	57	60.5
Sulfate	mg/L	600	552	1020	550	552
Nutrients						
Ammonia-N	mg/L	3.1/ 6.88/ 2.36/ 2.54 ²	0.15	ND	ND	DNQ
Nitrate-N	mg/L	10	4.38	12.41	2.17	1.91
Total Orthophosphate	mg/L		3.55	0.58	0.12	0.09
Metals						
Dissolved Copper	µg/L	29.28 ³	3.37	4.06	0.51	0.85
Total Copper	µg/L		51.69	4.06	0.7	0.75
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		0.0082	ND	ND	ND
Chlordane-gamma	µg/L		0.0084	ND	ND	ND
Total Chlordane	µg/L	0.00059	0.0166	ND	ND	ND
2,4'-DDD	µg/L		0.0064	ND	ND	ND
2,4'-DDE	µg/L		DNQ	0.0429	ND	ND
4,4'-DDD	µg/L	0.00084	0.0603	ND	ND	ND
4,4'-DDE	µg/L	0.00059	0.0533	ND	0.0095	ND
4,4'-DDT	µg/L	0.00059	0.0076	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

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
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
Mirex	µg/L		ND	0.0874	ND	ND
Toxaphene	µg/L	0.00075	0.18036	ND	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0251	ND	ND	ND
Diazinon	µg/L	0.1	0.0056	ND	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L		ND	0.0023	ND	ND
Cypermethrin	µg/L		0.0621	0.0043	ND	ND
Danitol	µg/L		ND	0.0026	ND	ND

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

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

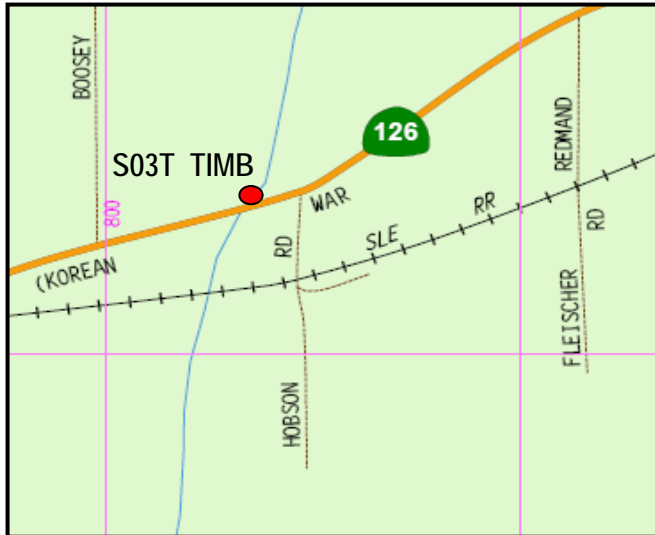
Table 38. 2012 Trash Observations for S02T_TODD

Event	Count	Types
Event 12	5	Plastic bags, urban trash
Event 13	2	Cups
Event 14	3	Plastic cup, water bottle, bag
Event 15	5	Plastic bag, plastic bottle, plastic cup, water hose

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 bridge



Flow was only present at this site during the first dry weather sampling event (Event 14). Table 39 lists results for the required constituents for benchmark comparison as well as any others that were detected. Trash observations are provided in Table 40.

Only a single exceedance occurred at this site, which was for 4,4'-DDE. This site drains mostly avocado and citrus orchards.

Table 39. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_TIMB

Constituent	Units	Benchmark	Event 12 Wet 1/23/2012	Event 13 Wet 3/18/2012	Event 14 Dry 5/24/2012	Event 15 Dry 7/17/2012
Field Measurements						
Flow	CFS				0.0083	
pH		6.5 ≤ pH ≤ 8.5			8.02	
Temperature	°C	≤ 26.67°C ¹			16.97	
Dissolved Oxygen	mg/L	≥ 5			8.88	
Turbidity	NTU				2.1	
Conductivity	µS/cm				1521	
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300			1030	
Total Suspended Solids (TSS)	mg/L				3	
Total Hardness as CaCO ₃	mg/L				581.9	
Chloride	mg/L	100			49	
Sulfate	mg/L	650			480	
Nutrients						
Ammonia-N	mg/L	2.02 ²			0.07	
Nitrate-N	mg/L	5			2.23	
Total Orthophosphate	mg/L				0.06	
Metals						
Dissolved Copper	µg/L	29.28 ³	Not Sampled; site dry	Not Sampled; site dry	0.86	Not Sampled; site dry
Total Copper	µg/L				1.51	
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			0.0117	
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	

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Toxaphene	µg/L	0.00075	Not Sampled; site dry	Not Sampled; site dry	ND	Not Sampled; site dry
<i>Organophosphorus Pesticides</i>						
Chlorpyrifos	µg/L	0.025			ND	
Diazinon	µg/L	0.1			ND	
<i>Pyrethroid Pesticides</i>						
Allethrin	µg/L				0.0064	
Bifenthrin	µg/L				0.0484	
Cyfluthrin	µg/L				0.1306	
L-Cyhalothrin	µg/L				0.008	
Cypermethrin	µg/L				0.1482	
Deltamethrin	µg/L		0.0033			
Fluvalinate	µg/L		0.021			

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

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

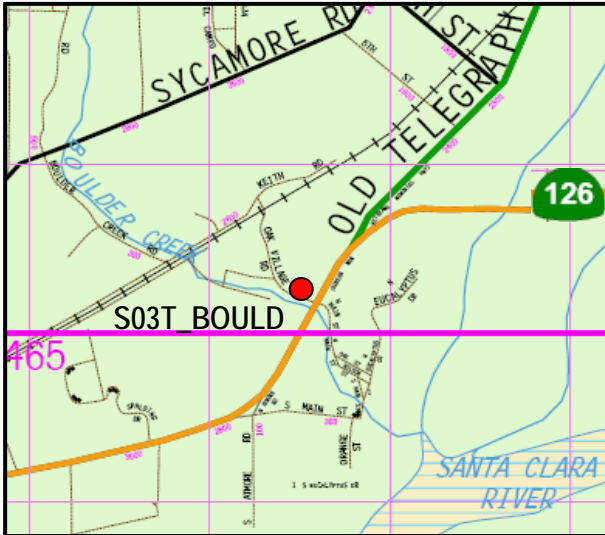
Table 40. 2012 Trash Observations for S03T_TIMB

Event	Count	Types
Event 12	0	N/A
Event 13	2	Wrappers
Event 14	30-40	Ball of trash downstream made up of ag and urban trash
Event 15	0	N/A

S03T_BOULD

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

Site Map



View of sampling location (upstream)



Sufficient flow was present at this site during both storm events. Table 41 contains a summary of detected constituents and comparisons to applicable water quality benchmarks. Trash observations for this site can be found in Table 42.

During the first storm event there were benchmark exceedances for nitrate-N and 4,4'-DDE. None of the applicable water quality benchmarks were exceeded during the second storm event. Citrus, avocados, and nurseries are the primary crop types associated with this site.

Table 41. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_BOULD

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		5.98	0.11		
pH		6.5 ≤ pH ≤ 8.5	8.17	7.79		
Temperature	°C	≤ 26.67°C ¹	10.24	6.81		
Dissolved Oxygen	mg/L	≥ 5	10.86	11.65		
Turbidity	NTU		705 EST	83.4		
Conductivity	µS/cm		1127	817		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300	858	500		
Total Suspended Solids (TSS)	mg/L		570	19		
Total Hardness as CaCO ₃	mg/L		570.7	318.9		
Chloride	mg/L	100	40	19		
Sulfate	mg/L	650	468	240		
Nutrients						
Ammonia-N	mg/L	2.48/ 5.30 ²	0.47	DNQ		
Nitrate-N	mg/L	5	12.66	3.32		
Total Orthophosphate	mg/L		2.88	0.28		
Metals						
Dissolved Copper	µg/L	29.28/ 24.13 ³	11.09	3.61	Not Sampled; site dry	Not Sampled; site dry
Total Copper	µg/L		48.82	3.91		
Organochlorine Pesticides						
Aldrin	µg/L	0.00014	ND	ND		
BHC-alpha	µg/L	0.013	ND	ND		
BHC-beta	µg/L	0.046	ND	ND		
BHC-gamma	µg/L	0.063	ND	ND		
Chlordane-alpha	µg/L		DNQ	ND		
Chlordane-gamma	µg/L		DNQ	ND		
Total Chlordane	µg/L	0.00059	DNQ	ND		
2,4'-DDD	µg/L		0.0146	ND		
2,4'-DDE	µg/L		0.0081	ND		
4,4'-DDD	µg/L	0.00084	DNQ	ND		
4,4'-DDE	µg/L	0.00059	0.007	ND		
4,4'-DDT	µg/L	0.00059	DNQ	ND		
Dieldrin	µg/L	0.00014	ND	ND		
Endosulfan-I	µg/L	0.056	ND	ND		

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Endosulfan-II	µg/L	0.056	ND	ND	Not Sampled; site dry	Not Sampled; site dry
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		
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0026	ND		
Diazinon	µg/L	0.1	0.0072	ND		
Methyl parathion	µg/L		0.0315	ND		
Pyrethroid Pesticides						
Bifenthrin	µg/L		0.0165	0.0078		
Danitol	µg/L		0.1814	0.0098		
Fluvalinate	µg/L		0.0648	ND		

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

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

Table 42. 2012 Trash Observations for S03T_BOULD

Event	Count	Types
Event 12	Very light	Paper, plastic bag
Event 13	5	Cups, bottles, 2 potting containers
Event 14	10-20	Food wrappers, plastic and paper cups, ag plastic, ag buckets
Event 15	0	N/A

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



Water was not present for sampling at this site during any of the 2012 monitoring events. Trash observations for S03D_BARDS are provided below in Table 43. This site drains mostly citrus orchards with small proportions of the area used for avocados and row crops.

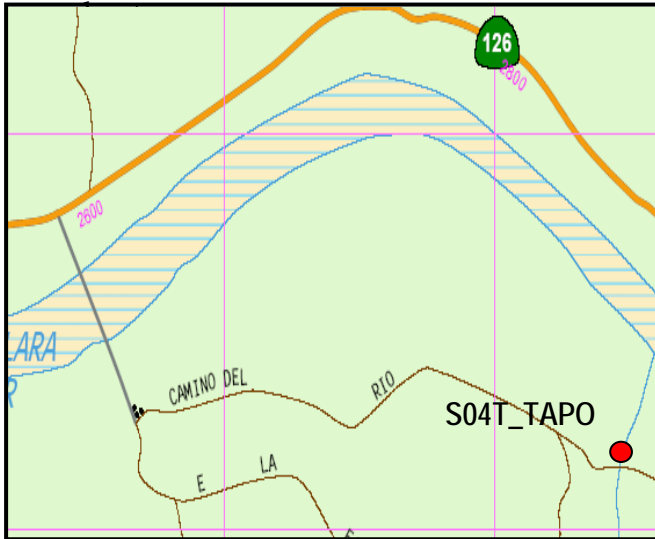
Table 43. 2012 Trash Observations for S03D_BARDS

Event	Count	Types
Event 12	50+	Heavy trash, ag and urban, buckets, plastic bags
Event 13	6	Bottle, potting tray, bucket, broken pipe
Event 14	1	Plastic cup
Event 15	2	Ag plastic, beer bottle

S04T_TAPO

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

Site Map



View upstream toward the sample site at the



Sufficient flow was present for sampling at this site during all four monitoring events. Table 44 contains a summary of detected constituents and a comparison of results with applicable water quality benchmarks. Table 45 summarizes trash observations for this site.

Salts exceedances occurred during three out of the four monitoring events. Elevated salts levels have previously been shown in samples from the background site, indicating natural sources for the salts detected at the VCAILG monitoring site. Unfortunately the background site was inaccessible during the two storm events and dry during events 14 and 15, so 2012 data is not available for S04T_TAPO_BKGD. During the first storm event, additional exceedances at S04T_TAPO included OC pesticides and nitrate-N. None of the water quality benchmarks were exceeded during the second storm. In addition to the salts exceedances, the nitrate-N benchmark was also exceeded. Pesticides benchmarks were not exceeded during the two dry events with the exception of 4,4'-DDE at Event 14. Citrus, row crops, and nursery stock are grown in the vicinity of this monitoring site.

Table 44. 2012 VCAILG Monitoring Data v. Waiver Benchmarks: S04T_TAPO

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Field Measurements						
Flow	CFS		0.43	3.06	0.04	0.23
pH		6.5 ≤ pH ≤ 8.5	8.13	8.14	8.11	7.9
Temperature	°C	≤ 26.67°C ¹	11.76	15.5	14.52	17.75
Dissolved Oxygen	mg/L	≥ 5	9.83	8.88	9.17	8.85
Turbidity	NTU		141 EST	0	0.6	0
Conductivity	µS/cm		3041	1760	3671	1931
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300	2400	1070	2710	1370
Total Suspended Solids (TSS)	mg/L		103	14	1	ND
Total Hardness as CaCO ₃	mg/L		1195.1	578	1234.3	718.1
Chloride	mg/L	100	164	92	190	123
Sulfate	mg/L	600	1150	440	1300	601
Nutrients						
Ammonia-N	mg/L	2.39/ 1.85/ 2.07/ 2.27 ²	ND	ND	0.12	ND
Nitrate-N	mg/L	5	9.22	2.8	10.16	5.19
Total Orthophosphate	mg/L		1.07	0.18	0.12	0.06
Metals						
Dissolved Copper	µg/L	29.28 ³	2.67	11.18	3.56	2.42
Total Copper	µg/L		5.69	15.64	4.51	2.23
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		0.0062	ND	ND	ND
Chlordane-gamma	µg/L		0.0055	ND	ND	ND
Total Chlordane	µg/L	0.00059	0.0117	ND	ND	ND
2,4'-DDD	µg/L		0.0252	ND	ND	ND
2,4'-DDE	µg/L		0.0638	ND	ND	ND
4,4'-DDD	µg/L	0.00084	0.1134	ND	ND	ND
4,4'-DDE	µg/L	0.00059	0.3399	DNQ	0.0097	ND
4,4'-DDT	µg/L	0.00059	0.0157	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	0.0163	ND	ND	ND

Constituent	Units	Benchmark	Event 12	Event 13	Event 14	Event 15
			Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
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
<i>Organophosphorus Pesticides</i>						
Chlorpyrifos	µg/L	0.025	ND	ND	ND	ND
Diazinon	µg/L	0.1	0.0146	ND	ND	ND
Malathion	µg/L		0.0142	ND	ND	ND
Methyl parathion	µg/L		0.3549	ND	ND	ND
<i>Pyrethroid Pesticides</i>						
Danitol	µg/L		ND	0.0032	ND	ND

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

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

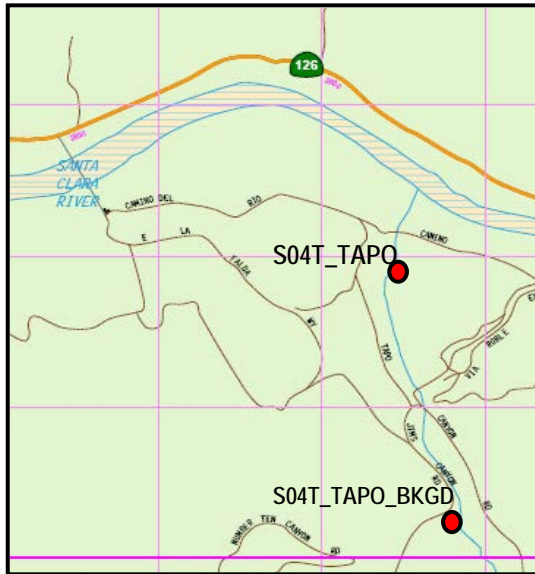
Table 45. 2012 Trash Observations for S04T_TAPO

Event	Count	Types
Event 12	0	N/A
Event 13	0	N/A
Event 14	0	N/A
Event 15	0	N/A

S04T_TAPO_BKGD

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

Site Map



View of monitoring location



This site was inaccessible during the two storm events by field personnel. There was no flow present during the May and July dry weather events; also, no trash was observed at this background location. Previous sampling events during the 2005 Conditional Waiver period have shown elevated salts at this background site, which confirms the natural source of salts that have been detected at the Tapo Canyon monitoring site.

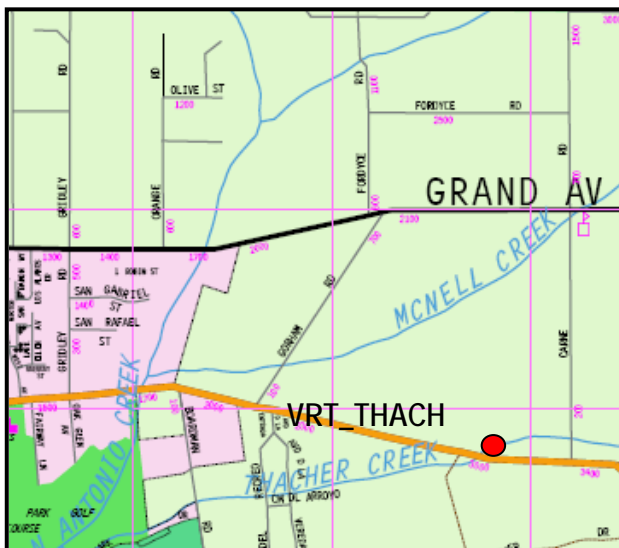
Ventura River Watershed

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



No flow was present at this site during the four 2012 monitoring events. Table 46 provides trash observations for this site. Avocados and citrus are the predominant crop types associated with this site.

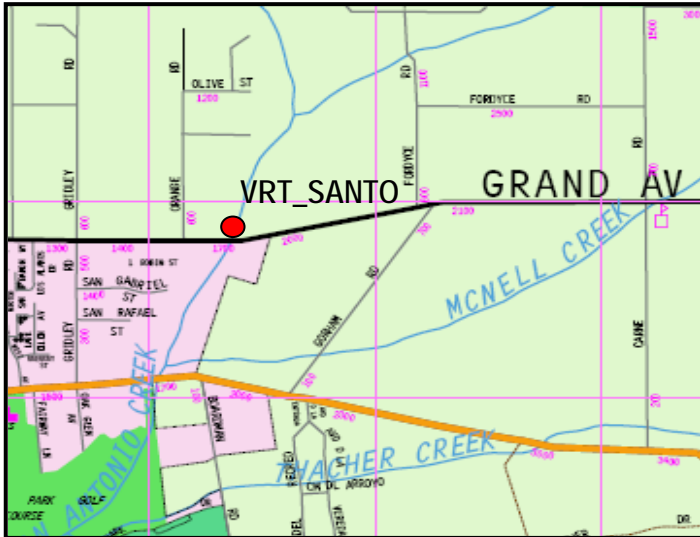
Table 46. 2012 Trash Observations for VRT_THACH

Event	Count	Types
Event 12	0	N/A
Event 13	2	Plastic bag, can
Event 14	<10	Bottles, cans, paper, plastic bucket, cardboard
Event 15	2	Plastic bag, sand bag

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 remained dry during the 2012 monitoring events. Table 47 includes the number and types of trash observed at the monitoring site. Citrus and avocados are the predominant crop types associated with this site.

Table 47. 2012 Trash Observations for VRT_SANTO

Event	Count	Types
Event 12	0	N/A
Event 13	3	Styrofoam cups, paper, box
Event 14	<10	Glove, paper, paper cup, cloth rag, can
Event 15	0	N/A

CHRONIC TOXICITY TEST RESULTS

During the 2012 monitoring year, three-species screenings and single-species tests were performed. Testing did not trigger the need for Toxicity Identification Evaluation (TIE) test procedures to identify toxicant(s). This section discusses the required types of tests in detail and includes a summary of toxicity data.

The Event 12 and Event 15 toxicity report submitted by the laboratory contains test results and raw data as well as a more detailed discussion of three-species screening test procedures. Two types of reports were submitted by the laboratory, an electronic data deliverable (EDD) that is Surface Water Ambient Monitoring Program (SWAMP) compatible and a narrative report. Both reports are included as Appendix G on the Annual Report Data CD.

Determination of Most Sensitive Species at Toxicity Monitoring Sites

There are 11 toxicity sites that are part of the VCAILGMP. The Conditional Waiver requires that three-species chronic toxicity testing be performed on samples collected at each site to determine the most sensitive species among the invertebrate, vertebrate, and algae; the most sensitive species is then used for subsequent toxicity testing for the duration of the VCAILGMP. Flow was present at 8 of the 11 toxicity sites during the first monitoring event in January, so the three-species screen was run on samples collected at those sites. The three remaining sites will be tested for the most sensitive species the when flow is present at the soonest toxicity monitoring event.

Based on the three-species screening tests, the Regional Board approved a single-species to be used at each toxicity site for the remainder of this Conditional Waiver in a June 28, 2012 letter. Sites with conductivity measures less than 3,000 $\mu\text{S}/\text{cm}$ at the time of sampling will be evaluated based on the survival and reproduction of the invertebrate *Ceriodaphnia dubia*. High conductivity sites ($>3,000 \mu\text{S}/\text{cm}$) will be tested using *Hyalella azteca* (Table 48).

Table 48. Most Sensitive Species Selected for Toxicity Testing

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

Three-species Screening Test Results

Chronic toxicity is defined as a significant difference in a deleterious effect (*e.g.*, reduced growth, reproduction) on an organism relative to a control. Organisms are exposed to aliquots of 100% environmental sample for a period of time defined in the method for each organism. When the test is complete, viable organisms are measured, counted, or weighed, and results are

evaluated statistically to determine whether effects on organisms exposed to environmental sample are significantly different from the same effects on organisms in lab water (*i.e.*, the control).

At freshwater sites (*i.e.*, conductivity <3,000 $\mu\text{S}/\text{cm}$), neither survival or biomass toxicity were observed in the vertebrate (*Pimephales promelas*) tests. Algae (*Selenastrum capricornutum*) testing resulted in a significant growth reduction of 21% at one site, 05D_LAVD. All invertebrate tests (*Ceriodaphnia dubia*) exhibited reproduction toxicity, but no effect on organism survival. Due to the reproduction reductions that were observed and the sensitivity of *Ceriodaphnia* to a range of agricultural chemicals, including metals, pesticides, and herbicides, this organism was determined to be most sensitive and will be used for future testing at the freshwater sites that have been evaluated.

At high-conductivity sites (*i.e.*, conductivity >3,000 $\mu\text{S}/\text{cm}$), no toxicity was detected. *Hyalella* was recommended for future single-species tests due to the fact that there are more well-established TIE procedures for this invertebrate as compared to the algae, which will aid in identifying any causes of toxicity in the future. Previous three-species screenings performed during the 2005 Conditional Waiver failed to show any survival toxicity in the fish species and more significant impacts were observed in past algae and invertebrate tests. Finally, algae toxicity testing can be confounded by the presence of nutrients, which can be present in high concentrations in agricultural discharges.

Summary tables of data from three-species toxicity testing for freshwater sites (Table 49) and high-conductivity sites (Table 50) are on the following page.

Table 49. Chronic Toxicity Results for 3-Species Screen at Freshwater Sites

Site	Event	<i>Selenastrum</i> ¹		<i>Ceriodaphnia</i> ²			<i>Pimephales. promelas</i> ³		TIE Triggered?
		Cell Growth Toxicity	Growth % Reduct.	Survival Toxicity	Reprod. Toxicity	Reprod. % Reduct.	Survival Toxicity	Biomass Toxicity	
S02T_TODD	12: 1/23/12	No	-----	No	Yes	42%	No	No	No
S02T_ELLS	12: 1/23/12	No	-----	No	Yes	52%	No	No	No
S03T_BOULD	12: 1/23/12	No	-----	No	Yes	18%	No	No	No
05D_LAVD	12: 1/23/12	Yes	21%	No	Yes	44%	No	No	No
05T_HONDO	12: 1/23/12	No	-----	No	Yes	55%	No	No	No
06T_LONG2	12: 1/23/12	No	-----	No	Yes	33%	No	No	No

1. *Selenastrum capricornutum* (algae) is evaluated for the growth endpoint.
2. *Ceriodaphnia dubia* (invertebrate – water flea) is evaluated for the survival and reproduction endpoints.
3. *Pimephales promelas* (vertebrate – fathead minnow) is evaluated for survival and biomass endpoints.

Table 50. Chronic Toxicity Results for 3-Species Screen at High-Conductivity Sites

Site	Event	<i>Thalassiosira</i> ¹	<i>Hyalella</i> ²	<i>Menidia</i> ³		TIE Triggered?
		Cell Growth Toxicity	Survival Toxicity	Survival Toxicity	Biomass Toxicity	
S04_TAPO	12: 1/23/12	No	No	No	No	No
01T_ODD3_ARN	12: 1/23/12	No	No	No	No	No

1. *Thalassiosira pseudonana* (algae) is evaluated for the growth endpoint.
2. *Hyalella azteca* (invertebrate – crustacean) is evaluated for the survival endpoint.
3. *Menidia beryllina* (vertebrate – inland silverside) is evaluated for the survival and biomass endpoints.

Single-Species Test Results

The second toxicity event for this monitoring year was Event 15. During this dry weather event, all toxicity sites with flow previously had three-species screening tests from Event 12; therefore, only single-species testing was performed.

None of the sites exhibited organism survival toxicity and only one site had slight reproduction toxicity. Accordingly, TIE testing was not triggered by these results. Single species test results for both freshwater and high-conductivity sites can be found in the table below

Table 51. Chronic Toxicity Results for Single-Species Testing for 2012

Site	Event	<i>Ceriodaphnia</i> ¹			<i>Hyalella</i> ²	TIE Triggered?
		Survival Toxicity	Reproduction Toxicity	Reproduction % Reduction	Survival Toxicity	
S02T_TODD	15: 7/17/12	No	No	-----		No
S04_TAPO	15: 7/17/12	No	No	-----		No
05D_LAVD	15: 7/17/12	No	No	-----		No
01T_ODD3_ARN	15: 7/17/12				No	No

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

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

Toxicity Identification Evaluation (TIE) Testing

As discussed in the VCAILG QAPP, significant toxicity is used to trigger further investigation and determine the cause of observed toxicity. If testing indicates the presence of significant toxicity in the sample, TIE procedures may be initiated to investigate the cause of toxicity. For the purpose of triggering a TIE, significant toxicity is defined as at least 50% mortality (*P. promelas* and *C. dubia*) or a 50% reduction in growth (*S. capricornutum*). The 50% threshold is consistent with the approach recommended in guidance published by U.S. EPA for conducting TIEs, which recommends a minimum threshold of 50% mortality because the probability of completing a successful TIE decreases rapidly for samples with less than this level of toxicity. A targeted Phase I TIE will be conducted to determine the general class of constituents (*e.g.*, non-polar organics) causing toxicity. The targeted TIE will focus on classes of constituents anticipated to be observed in drainages dominated by urban and agricultural discharges and those previously observed to cause toxicity. These classes of constituents have been determined to be primarily non-polar organics.

Significant toxicity was not observed at any of the VCAILG monitoring sites during either of the two toxicity events (Event 12 and Event 15). Therefore, no TIE testing was performed during the 2012 monitoring year.

Though no TIE testing was required, there were some exceedances of the 1.0 TU_c toxicity benchmark; these occurred during Event 12 only. While none of the samples caused survival toxicity, the following sites all exhibited *Ceriodaphnia* reproduction toxicity: S02T_TODD, S02T_ELLS, S03T_BOULD, 05D_LAVD, 05T_HONDO, and 06T_LONG2. Additionally, *Selenastrum* growth toxicity was observed with the 05_LAVD sample. No toxic responses occurred with exposure to any of the Event 15 samples.

TMDL LOAD ALLOCATIONS AND MONITORING RESULTS

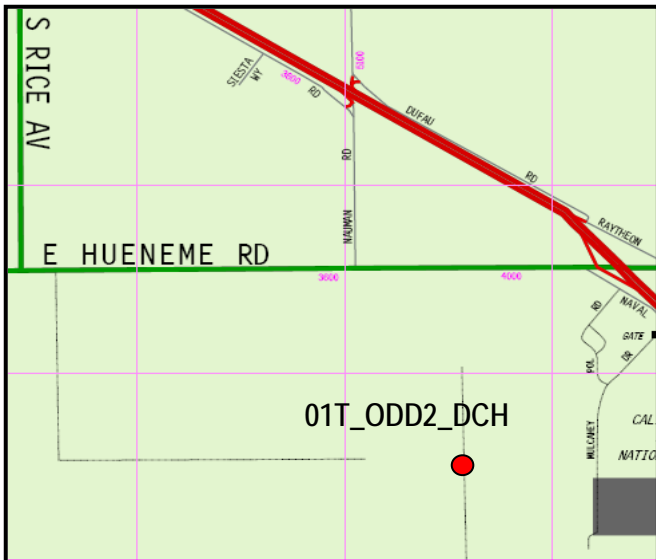
Calleguas Creek Watershed Agricultural Land Use Monitoring Sites

Seven agricultural land use sites are monitored under the CCWTMP. Site descriptions, maps, and photos are included below. Two additional background sites are monitored under the VCAILGMP and their site information is also included, however flow was not present during this year of sampling, so no data is provided. Following the site information are TMDL LAs and compliance information related to each of the CCW TMDLs that have benchmarks listed in the Conditional Waiver. Tables with all monitoring data collected at these sites can be found in the fourth year annual monitoring report for the CCWTMP.

01T_ODD2_DCH

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

Site Map



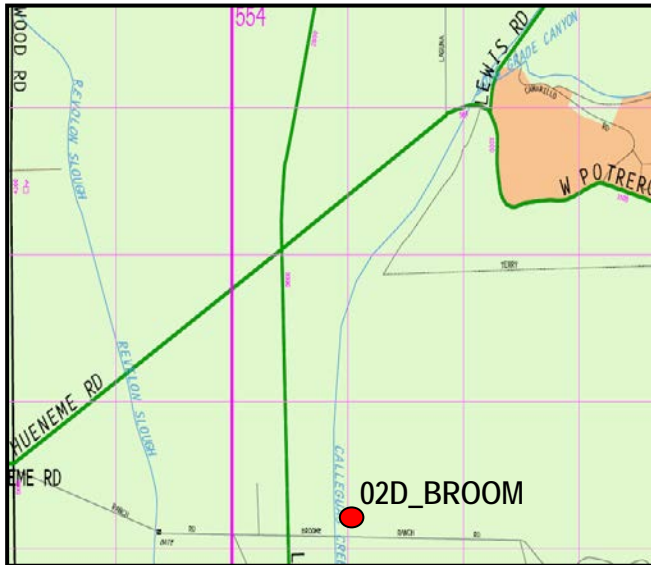
View toward the NE (looking downstream)



02D_BROOM

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

Site Map



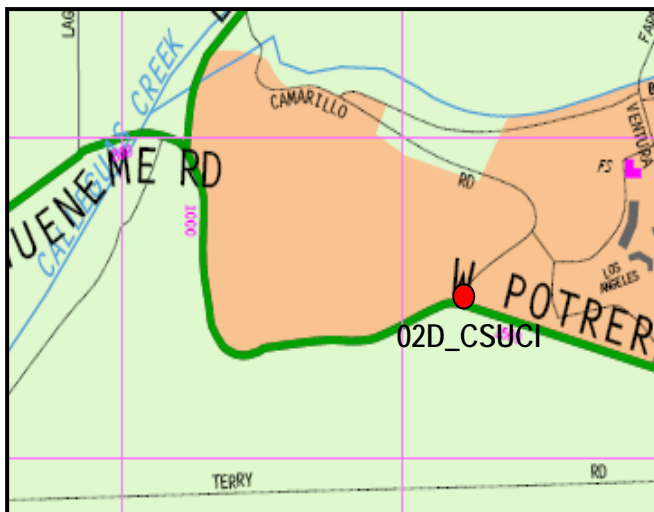
View of discharge (looking upstream on Calleguas Creek)



02D_CSUCI

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

Site Map



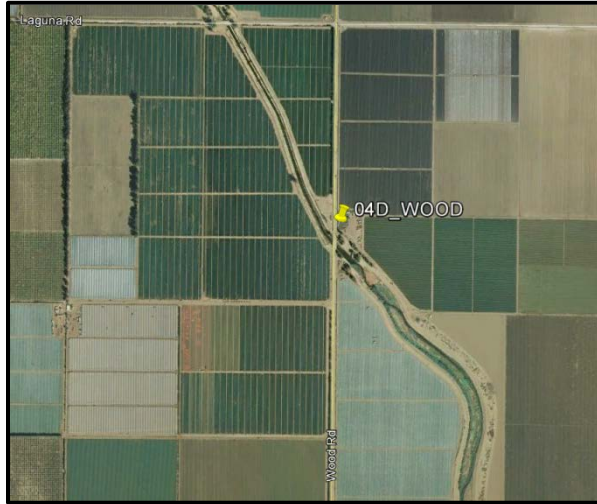
View toward SE of culvert draining runoff from CSUCI campus.



04D_WOOD

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

Site Map



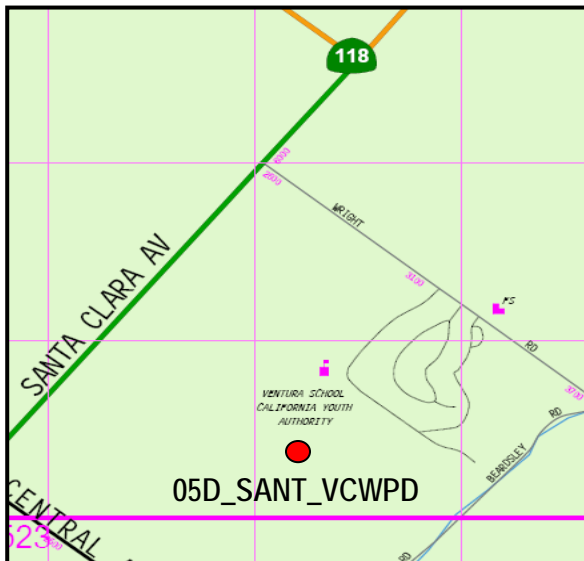
View at site looking upstream



05D_SANT_VCWPD

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

Site Map



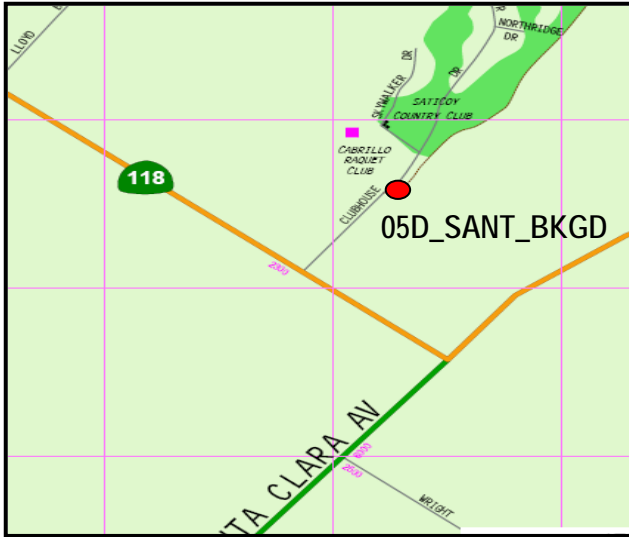
View upstream (NW) facing gage #781



05D_SANT_BKGD

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

Site Map



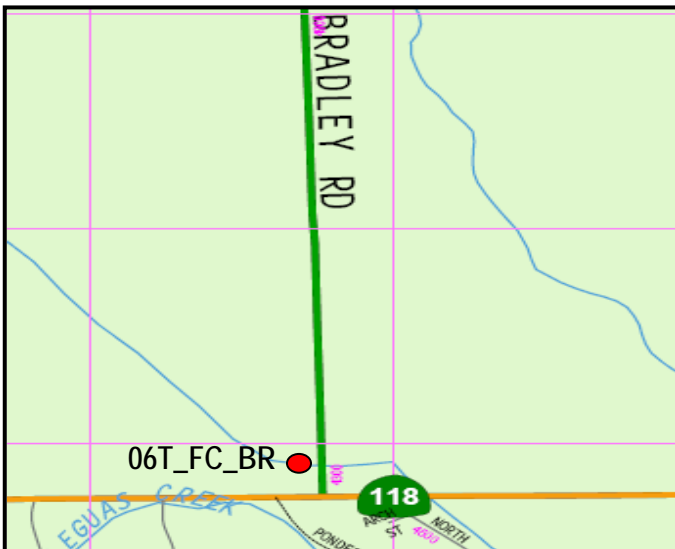
View of sampling location on channel upstream of Clubhouse Dr.



06T_FC_BR

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

Site Map



View downstream (E) from sampling location toward Bradley Road



07D_HITCH_LEVEE_2

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

Site Map



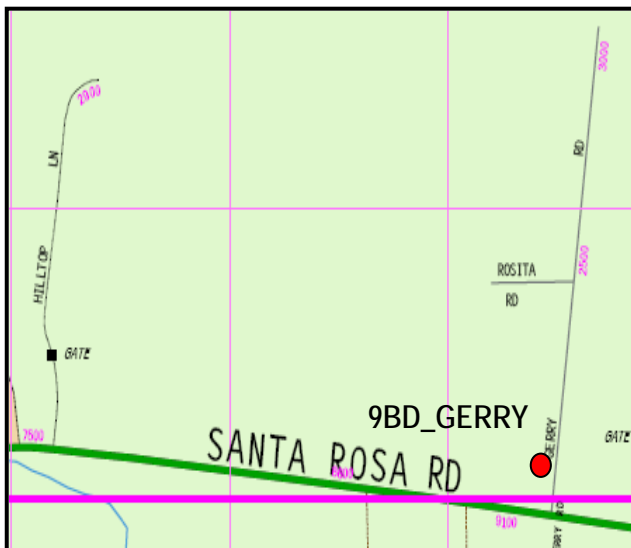
View of pipe discharging into Arroyo Simi



9BD_GERRY

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

Site Map



View (N) of the sampling site



Calleguas Creek Watershed and Mugu Lagoon OC Pesticides and PCBs TMDL

Interim Load Allocations

Interim sediment LAs are currently in effect for this TMDL (Table 52). Compliance with these LAs is measured at the base of each subwatershed.

Table 52. CCW OC Pesticides and PCBs Interim Sediment Load Allocations

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

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

Monitoring Results and Compliance

The following table includes sediment monitoring results from receiving waters at the base of each subwatershed. The data was collected as part of the CCWTMP. Additional information related to the sample collection and upstream land use data can be found in the "CCW TMDL Monitoring Program Annual Report: Year 4."

Table 53. OC Pesticides and PCBs TMDL Load Allocations Compared to Sediment Monitoring Data

Site & Constituent	Units	Interim LA ¹	Event 28 Aug-2011
Mugu Lagoon – Eastern Arm (01_BPT_3)			
Total Chlordane ²	ng/g dw	25	ND
4,4'-DDD	ng/g dw	69	ND
4,4'-DDE	ng/g dw	300	DNQ
4,4'-DDT	ng/g dw	39	ND
Dieldrin	ng/g dw	19	ND
PCBs ³	ng/g dw	180	ND
Toxaphene	ng/g dw	22,900	ND

Table continued on next page.

Site & Constituent	Units	Interim LA ¹	Event 28 Aug-2011
<i>Mugu Lagoon – Eastern Part of Western Arm (01_BPT_6)</i>			
Total Chlordane ²	ng/g dw	25	ND
4,4'-DDD	ng/g dw	69	ND
4,4'-DDE	ng/g dw	300	14.9
4,4'-DDT	ng/g dw	39	ND
Dieldrin	ng/g dw	19	ND
PCBs ³	ng/g dw	180	ND
Toxaphene	ng/g dw	22,900	ND
<i>Mugu Lagoon – Central Part of Western Arm (01_BPT_14)</i>			
Total Chlordane ²	ng/g dw	25	ND
4,4'-DDD	ng/g dw	69	ND
4,4'-DDE	ng/g dw	300	DNQ
4,4'-DDT	ng/g dw	39	ND
Dieldrin	ng/g dw	19	ND
PCBs ³	ng/g dw	180	ND
Toxaphene	ng/g dw	22,900	ND
<i>Mugu Lagoon – Central Lagoon (01_BPT_15)</i>			
Total Chlordane ²	ng/g dw	25	ND
4,4'-DDD	ng/g dw	69	ND
4,4'-DDE	ng/g dw	300	DNQ
4,4'-DDT	ng/g dw	39	ND
Dieldrin	ng/g dw	19	ND
PCBs ³	ng/g dw	180	ND
Toxaphene	ng/g dw	22,900	ND
<i>Mugu Lagoon – Central Lagoon, South of Drain #7 (01_SG_74)</i>			
Total Chlordane ²	ng/g dw	25	ND
4,4'-DDD	ng/g dw	69	ND
4,4'-DDE	ng/g dw	300	16.3
4,4'-DDT	ng/g dw	39	ND
Dieldrin	ng/g dw	19	ND
PCBs ³	ng/g dw	180	ND
Toxaphene	ng/g dw	22,900	ND

Table continued on next page.

Site & Constituent	Units	Interim LA ¹	Event 28 Aug-2011
<i>Calleguas Creek – Hwy 1 Bridge (02_PCH)</i>			
Total Chlordane ²	ng/g dw	17	ND
4,4'-DDD	ng/g dw	66	DNQ
4,4'-DDE	ng/g dw	470	ND
4,4'-DDT	ng/g dw	110	ND
Dieldrin	ng/g dw	3	ND
PCBs ³	ng/g dw	3,800	ND
Toxaphene	ng/g dw	260	ND
<i>Revolon Slough – Wood Road (04_WOOD)</i>			
Total Chlordane ²	ng/g dw	48	DNQ
4,4'-DDD	ng/g dw	400	5.7
4,4'-DDE	ng/g dw	1,600	39.2
4,4'-DDT	ng/g dw	690	ND
Dieldrin	ng/g dw	5.7	ND
PCBs ³	ng/g dw	7,600	ND
Toxaphene	ng/g dw	790	ND
<i>Calleguas Creek – University Drive CSUCI (03_UNIV)</i>			
Total Chlordane ²	ng/g dw	17	ND
4,4'-DDD	ng/g dw	66	ND
4,4'-DDE	ng/g dw	470	5.1
4,4'-DDT	ng/g dw	110	ND
Dieldrin	ng/g dw	3	ND
PCBs ³	ng/g dw	3,800	ND
Toxaphene	ng/g dw	260	ND
<i>Conejo Creek – Adolfo Road (9B_ADOLF)</i>			
Total Chlordane ²	ng/g dw	3.4	ND
4,4'-DDD	ng/g dw	5.3	ND
4,4'-DDE	ng/g dw	20	DNQ
4,4'-DDT	ng/g dw	2	ND
Dieldrin	ng/g dw	3	ND
PCBs ³	ng/g dw	3,800	ND
Toxaphene	ng/g dw	260	ND

Table continued on next page.

Site & Constituent	Units	Interim LA ¹	Event 28 Aug-2011
<i>Arroyo Las Posas – Somis Road (06_SOMIS)</i>			
Total Chlordane ²	ng/g dw	3.3	ND
4,4'-DDD	ng/g dw	290	ND
4,4'-DDE	ng/g dw	950	106.7
4,4'-DDT	ng/g dw	670	ND
Dieldrin	ng/g dw	1.1	ND
PCBs ³	ng/g dw	25,700	ND
Toxaphene	ng/g dw	230	169.4
<i>Arroyo Simi – Hitch Boulevard (07_HITCH)</i>			
Total Chlordane ²	ng/g dw	3.3	ND
4,4'-DDD	ng/g dw	14	ND
4,4'-DDE	ng/g dw	170	ND
4,4'-DDT	ng/g dw	25	ND
Dieldrin	ng/g dw	1.1	ND
PCBs ³	ng/g dw	25,700	ND
Toxaphene	ng/g dw	230	ND

ND=not detected; DNQ=detected not quantified

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

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

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

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

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

Interim Load Allocations

Interim LAs are currently in effect for this TMDL (Table 54). Compliance with these LAs is measured at the base of each subwatershed.

Table 54. CCW Toxicity, Chlorpyrifos, and Diazinon Interim Load Allocations

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

1. These TMDL load allocations apply to the receiving water at the base of each subwatershed.
2. Acute interim LAs are used for assessing wet-weather data.
3. Chronic interim LAs are used for assessing dry-weather data.

Monitoring Results and Compliance

The following table includes sediment monitoring results from receiving waters at the base of each subwatershed. The data was collected as part of the CCWTMP. Additional information related to the sample collection and upstream land use data can be found in the “CCW TMDL Monitoring Program Annual Report: Year 4.”

Table 55. Toxicity, Chlorpyrifos, and Diazinon TMDL Load Allocations Compared to Monitoring Data

Site & Constituent	Dry Units	Dry Interim LA ²	Event 28 Dry Aug-2011	Event 29 Dry Nov-2011	Event 31 Dry Feb-2012	Event 33 Dry May-2012	Wet Interim LA ²	Event 30 Wet Jan-2012	Event 32 Wet Mar-2012
<i>Mugu Lagoon – Ronald Reagan Bridge (01_RR_BR)</i>									
Chlorpyrifos	µg/L	0.81	0.0042	0.0908	ND	DNQ	2.57	0.0296	0.1459
Diazinon	µg/L	0.138	ND	ND	ND	ND	0.278	ND	ND
<i>Revolon Slough – Wood Road (04_WOOD)</i>									
Chlorpyrifos	µg/L	0.81	ND	0.0269	0.0203	0.0035	2.57	DNQ	0.0373
Diazinon	µg/L	0.138	0.0122	ND	DNQ	ND	0.278	ND	ND
<i>Calleguas Creek – University Drive CSUCI (03_UNIV)</i>									
Chlorpyrifos	µg/L	0.81	ND	ND	0.0143	ND	2.57	0.0146	0.1395
Diazinon	µg/L	0.138	ND	ND	ND	0.0435	0.278	ND	0.1876
<i>Conejo Creek – Adolfo Road (9B_ADOLF)</i>									
Chlorpyrifos	µg/L	0.81	ND	ND	ND	ND	2.57	ND	0.0368
Diazinon	µg/L	0.138	ND	ND	ND	0.1234	0.278	ND	ND
<i>Arroyo Las Posas – Somis Road (06_SOMIS)</i>									
Chlorpyrifos	µg/L	0.81	ND	0.0052	0.0134	0.0045	2.57	0.0107	0.1905
Diazinon	µg/L	0.138	ND	ND	ND	0.0259	0.278	ND	ND
<i>Arroyo Simi – Hitch Boulevard (07_HITCH)</i>									
Chlorpyrifos	µg/L	0.81	ND	ND	0.0062	0.0377	2.57	0.0146	0.0405
Diazinon	µg/L	0.138	ND	ND	ND	0.0481	0.278	ND	0.0478

ND=not detected; DNQ=detected not quantified

During year 4 of CCWTMP monitoring, there were no exceedances of the interim LAs for agriculture as measured at the sites located at the base of each subwatershed. If an exceedance of an interim load allocation occurs during future events, the contributing agricultural land use data will be assessed to evaluate whether agricultural discharges were potentially causing the exceedances.

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

Interim Dry Weather Load Allocations

Interim dry weather LAs are measured as in-stream monthly averages at the base of each subwatershed, except for chloride which is measured as an instantaneous maximum (Table 56). Dry weather LAs apply when flow rates are below the 86th percentile and there was no measurable precipitation in the previous 24 hour period.

Table 56. CCW Boron, Chloride, Sulfate, and TDS (Salts) Interim Dry Weather Load Allocations

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

Compliance

Since the effective date, various steps have been taken by the Stakeholders Implementing TMDLs in the Calleguas Creek Watershed to continue complying with the Salts TMDL. In June 2009 a monitoring approach (Salts Plan) was submitted to the Regional Board, which was conditionally approved in September 2011. Since then, a year of preliminary monitoring (including pilot testing of continuous monitoring equipment at five compliance sites) was performed from January to December 2011 and continued at two sites during April to June 2012. The September 2011 conditional approval from the Regional Board required the establishment of a final monitoring approach for salts based on the results of the preliminary monitoring. The final salt monitoring approach was submitted by the Stakeholders on June 29, 2012, and vetted with Regional Board staff shortly afterward. In accordance with the Salts TMDL and the final approach, compliance monitoring for salts began September 9, 2012, which is outside the reporting range for this AMR. Compliance monitoring results will be included in next year's VCAILG AMR.

For additional information related to the Salts TMDL monitoring and pilot testing data, please refer to the "Calleguas Creek Watershed TMDL Compliance Monitoring Program Fourth Year Annual Monitoring Report."

Calleguas Creek Watershed and Mugu Lagoon Metals and Selenium TMDL

Interim Load Allocations

Dry weather LAs apply to days when flows in the stream are less than the 86th percentile flow rate for each subwatershed. Wet weather LAs apply to days when flows in the stream exceed the

86th percentile flow rate for each subwatershed. Interim LAs for total recoverable metals and selenium are applied in the receiving water at the compliance points (Table 57).

Table 57. Interim Load Allocations for Total Recoverable Metals and Selenium

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

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

Interim LAs for mercury are evaluated based on suspended sediment measured in-stream at the base of Revolon Slough and Calleguas Creek (Table 58).

Table 58. Interim Load Allocations for Mercury in Suspended Sediment

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

Monitoring Results and Compliance

As shown in the table below, the interim allocations are being met in the receiving waters for all metals constituents; the exception is selenium in Revolon Slough. It has been noted in the current and previous CCW TMDL annual reports that rising groundwater is a large background source of selenium in the Revolon Slough subwatershed. There are two agricultural land use sites located in this subwatershed and their selenium monitoring results are provided below (Table 60). Of the two agricultural land use sites, 05D_SANT_VCWPD is located further upstream in the subwatershed and also has significantly higher selenium concentrations. Further investigation of selenium sources will be conducted through special studies as required by the TMDL.

Table 59. Metals and Selenium Interim Load Allocations Compared to Monitoring Data

Site & Constituent	Units	Dry Interim LA ¹	Event 28	Event 29	Event 31	Event 33	Wet Interim LA ²	Event 30	Event 32	Annual Average ³
			Dry Aug-2011	Dry Nov-2011	Dry Feb-2012	Dry May-2012		Wet Jan-2012	Wet Mar-2012	
Revolon Slough – Wood Road (04_WOOD)										
Total Copper	µg/L	19	3.01	5.9	3.34	3.04	1,390	6.11	18.39	0.11
Total Nickel	µg/L	42	5.14	7.0	6.94	5.65	---	6.36	3.77	
Total Selenium	µg/L	6	23.06	30.4	25.71	24.14	---	19.33	11.54	
Total Mercury ⁴	lbs/yr	2								
Calleguas Creek – University Drive CSUCI (03_UNIV)										
Total Copper	µg/L	19	1.94	3.2	3.35	3.25	1,390	8.26	84.17	0.73
Total Nickel	µg/L	42	6.5	6.2	5.81	5.78	---	7.97	74.55	
Total Selenium	µg/L	---	2.96	4.3	1.55	1.15	---	1.21	1.08	
Total Mercury ⁴	lbs/yr	3.9								

1. Dry interim LAs are listed as the dry monthly average concentrations.
2. Wet interim LAs are the daily maximum.
3. The mercury LA is assessed as an annual load in suspended sediment. The water column mercury concentrations were used in calculating the loads, conservatively assuming that all mercury is on suspended sediment rather than being dissolved. The loads at each site are based on estimated annual concentrations (average of all monitored events at each site) and total annual flow calculated from preliminary streamflow data received from the Ventura County Watershed Protection District (VCWPD) via email on 12/17/2012.
4. Interim LAs for mercury are expressed as annual loads. Total annual flow for 08/01/11 to 07/31/12 into Mugu Lagoon from Calleguas Creek and Revolon Slough was calculated as 7,704 Mgal/yr. As such, the interim LA corresponds to the flow range of 0 to 15,000.

Table 60. Selenium Interim Load Allocation Compared to Revolon Slough Receiving Water and Agricultural Land Use Monitoring Data

Site ID ¹	Dry Weather Events & Dates					Wet Weather Events & Dates		
	Interim LA ¹	28 Aug-11	29 Nov-11	31 Feb-12	33 May-12	Interim LA	30 Jan-12	32 Mar-12
04_WOOD	6	23.06	30.4	25.71	22.13	---	19.1	11.54
04D_WOOD	6	NS	8.4	6.88	NS	---	4.18	2.54
05D_SANT_VCWPD	6	62.11	72.1	53.25	63.34	---	52.45	39.7

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

Calleguas Creek Watershed Nitrogen Compounds TMDL

Load Allocations

The LA for the Calleguas Creek Watershed Nitrogen Compounds TMDL is expressed as the sum of nitrate-nitrogen and nitrite-nitrogen (Table 61).

Table 61. Load Allocations for Nitrogen Compounds

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

Monitoring Results and Compliance

Monitoring sites located in the lower part of the watershed consistently exceed the nitrogen LAs, whereas sites in the upper reaches are typically below the allocation. The following two tables include monitoring data from CCWTMP agricultural land use sites and VCAILGMP sites located within the Calleguas Creek Watershed for comparison to the Nitrogen TMDL LAs. The exception to this is the Reach 7 site, 07D_HITCH_LEVEE2, which had the highest concentration detected during this monitoring year as compared to all the agricultural sites.

Table 62. Nitrogen Load Allocations Compared to CCW TMDL Agricultural Land Use Site Data

Site	Constituent	Allocation (mg/L)	Event 31 Dry 2/1/2012	Event 32 Wet 3/17/2012	Event 33 Dry 5/23/2012
01T_ODD2_DCH	Nitrate-N + Nitrite-N	9	68.22	30.92	47.87
02D_BROOM	Nitrate-N + Nitrite-N	9	67.8	78.69	59.95
04D_WOOD	Nitrate-N + Nitrite-N	9	63.88	45.46	site dry
05D_SANT_VCWPD	Nitrate-N + Nitrite-N	9	40.26	35.76	34.39
06T_FC_BR	Nitrate-N + Nitrite-N	9	site dry	6.88	1.88
07D_HITCH_LEVEE_2	Nitrate-N + Nitrite-N	9	site dry	16.16	93.39
9BD_GERRY	Nitrate-N + Nitrite-N	9	site dry	2.86	site dry

Table 63. Nitrogen Load Allocations Compared to CCW VCAILGMP Site Data

Site	Constituent	Allocation (mg/L)	Event 12 Wet 1/23/2012	Event 13 Wet 3/18/2012	Event 14 Dry 5/24/2012	Event 15 Dry 7/17/2012
01T_ODD3_ARN	Nitrate-N	9	36.56	36.47	31.27	44.41
04D_ETTG	Nitrate-N	9	53.11	91.68	54.78	32.83
04D_LAS	Nitrate-N	9	53.51	56.79	47.8	28.07
05D_LAVD	Nitrate-N	9	3.66	10.52	5.59	1.93
05T_HONDO	Nitrate-N	9	1.74	site dry	site dry	site dry
06T_LONG2	Nitrate-N	9	1.22	site dry	site dry	site dry

Revolon Slough and Beardsley Wash Trash TMDL

Load Allocations

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

Compliance

Non-point source dischargers are complying with the Trash TMDL requirements through a program that includes a combination of a Minimum Frequency Assessment Collection (MFAC) Program and other BMPs. The MFAC program includes regular collection and counting of trash. VCAILG members are in compliance with the TMDL requirements to ensure zero trash immediately after each MFAC event. Additionally, VCAILG has implemented additional BMPs to control trash and reduce the accumulation of trash between collection events. The importance of collecting and properly disposing of trash has also been a reoccurring topic at multiple VCAILG education classes. The VCAILG WQMP Management Practice Survey has also included BMPs related to trash and property management. For additional information, please refer to the "2012 Revolon Slough/Beardsley Wash Trash TMDL TMRP/MFAC Annual Report."

Santa Clara River Nitrogen Compounds TMDL

Load Allocations

The LA for the Santa Clara River Nitrogen Compounds TMDL applicable to VCAILG monitoring sites is listed in Table 64.

Table 64. Load Allocations for Nitrogen Compounds

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

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

Monitoring Results and Compliance

Table 65 lists the VCAILGMP monitoring sites located within the Santa Clara River Watershed for comparison to the nitrogen load allocation. The allocation was exceeded three separate times, each time at a different monitoring location. Any exceedances of the LA during the 2012 monitoring year were sporadic and only slightly higher than the allocation.

Table 65. Nitrogen Load Allocations Compared to SCR VCAILGMP Site Data

Site	Constituent	LA ¹ (mg/L)	Event 12 Wet 1/23/12	Event 13 Wet 3/18/12	Event 14 Dry 5/24/12	Event 15 Dry 7/17/12
S02T_ELLS	Ammonia-N + Nitrate-N	10	8.84	1.05	site dry	site dry
S02T_TODD	Ammonia-N + Nitrate-N	10	4.53	12.41	2.17	1.91
S03T_TIMB	Ammonia-N + Nitrate-N	10	NS	site dry	2.3	site dry
S03T_BOULD	Ammonia-N + Nitrate-N	10	13.13	3.32	site dry	site dry
S03D_BARDS	Ammonia-N + Nitrate-N	10	site dry	site dry	site dry	site dry
S04T_TAPO	Ammonia-N + Nitrate-N	10	9.22	2.8	10.28	5.19

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

Ventura River Estuary Trash TMDL

Load Allocations

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

Compliance

Non-point source dischargers are complying with the Trash TMDL requirements through a program that includes a combination of a MFAC program and other BMPs. VCAILG members are in compliance with the TMDL requirements to ensure zero trash immediately after each MFAC event. Additionally, the VCAILG has implemented additional BMPs to control trash and reduce the accumulation of trash between collection events. The importance of collecting and properly disposing of trash has also been a reoccurring topic at multiple VCAILG education classes. The VCAILG WQMP Management Practice Survey has also included BMPs related to trash and property management. For additional information, please refer to the "2012 Ventura River Estuary Trash TMDL TMRP/MFAC Annual Report."

Santa Clara River Estuary Toxaphene TMDL

The Santa Clara River Estuary Toxaphene TMDL was adopted as a single regulatory action through the Conditional Waiver. Conditional Waiver Appendix 1, Monitoring and Reporting Requirements, specifies the following constituents be monitored as part of this TMDL: chlordane, dieldrin, and toxaphene. The constituents are also required to be analyzed in various media: fish tissue (every three years in the Estuary), water, and suspended sediment (during wet weather events). Two sites were selected to meet the TMDL requirements of having one water quality monitoring site representing agricultural discharges directly to the Estuary and one representative discharge to the Santa Clara River upstream of the Estuary. The existing VCAILGMP site S02T_ELLS is monitored as the upstream TMDL site by collecting additional sample volume for suspended sediment analysis, which is beyond normal Conditional Waiver monitoring. Site S01D_MONAR was selected to represent agricultural discharges to the

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

S01D_MONAR

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

Site Map



View downstream towards Estuary



Load Allocations

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

Table 66. Load Allocations for Toxaphene

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

Monitoring Data and Compliance

LAs for the Santa Clara River Estuary Toxaphene TMDL were established for toxaphene measured in fish tissue and suspended sediment. Additionally, monitoring of chlordane and dieldrin is required; however, these constituents do not have LAs. In the VCAILG QAPP, it was specified that if possible, targeted fish should be those that are commonly consumed by humans, but based on the results of other studies in the Estuary that may not be feasible. During the first fish tissue collection in May 2012, only goldfish were caught, which, are neither consumed by humans nor listed as target species in the QAPP. A second fish collection event was attempted in July 2012, which yielded a catch of arroyo chub. Since arroyo chub were one of the species used in evaluating the fish tissue impairment, they are considered a likely target for fish

collections in the Estuary. During this first year of TMDL monitoring, the LAs were met for both fish tissue and suspended sediment, as shown in the following two tables.

Table 67. Santa Clara River Estuary Toxaphene TMDL Monitoring Data: Water and Suspended Sediment

Site	Constituent	Units	Load Allocation	Event 12 Wet 1/23/2012	Event 13 Wet 3/18/2012	Event 14 Dry 5/24/2012	Event 15 Dry 7/17/2012
Water							
S01T_ELLS	TSS	mg/L	---	2000	218	Site dry	Site dry
	Chlordane ¹	µg/L	---	0.032	ND		
	Dieldrin	µg/L	---	ND	ND		
	Toxaphene	µg/L	---	0.233	ND		
Suspended Sediment							
S01D_MONAR	Chlordane ¹	µg/kg	---	ND	ND	NR	NR
	Dieldrin	µg/kg	---	ND	ND	NR	NR
	Toxaphene	µg/kg	0.1	ND	ND	NR	NR
Water							
S01D_MONAR	TSS	mg/L	---	940	21	7	3
	Chlordane ¹	µg/L	---	0.024	DNQ	ND	ND
	Dieldrin	µg/L	---	ND	ND	ND	ND
	Toxaphene	µg/L	---	1.385	0.036	0.181	0.081
Suspended Sediment							
S01D_MONAR	Chlordane ¹	µg/kg	---	ND	NS	NR	NR
	Dieldrin	µg/kg	---	ND	NS	NR	NR
	Toxaphene	µg/kg	0.1	ND	NS	NR	NR

TSS = Total Suspended Solids

NS = No sample results due to insufficient suspended sediment in water.

NR = Not Required

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

Table 68. Santa Clara River Estuary Toxaphene TMDL Monitoring Data: Fish Tissue

Site	Fish Tissue			Goldfish 5/23/2012	Arroyo Chub 7/3/2012
	Constituent	Units	Load Allocation		
Santa Clara River Estuary	Chlordane ¹	µg/kg	---	ND	ND
	Dieldrin	µg/kg	---	ND	ND
	Toxaphene	µg/kg	6.1	ND	ND

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

Harbor Beaches of Ventura County Bacteria TMDL

The Harbor Beaches of Ventura County Bacteria TMDL does not specify LAs for agricultural dischargers, but does include a provision for monitoring. The VCAILG QAPP specified a site,

monitoring frequency, and constituents to comply with the implementation actions specified for agricultural dischargers in the TMDL. A site description, map, and photo are provided below for the site used to evaluate agricultural discharges upstream of the Channel Islands Harbor.

CIHD_VICT

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

Site Map



View at sampling point looking upstream



Monitoring Data

As specified in the VCAILG QAPP, the CIHD_VICT site is visited at the same frequency as Conditional Waiver monitoring. At each event flow and field meter parameters are measured in addition to water samples collected for bacteria testing, as listed in the table below.

Table 69. Harbor Beaches of Ventura County Bacteria TMDL Monitoring Data

Constituent	Units	Event 12	Event 13	Event 14	Event 15
		Wet 1/23/2012	Wet 3/18/2012	Dry 5/24/2012	Dry 7/17/2012
Flow	cfs	1.128			
pH		6.76			
Temperature	°C	13.78			
Dissolved Oxygen	mg/L	2.63			
Turbidity	NTU	215.1	Site dry	Site dry	Site dry
Electrical Conductivity	µS/cm	668.2			
<i>E. coli</i>	MPN/100mL	63			
Enterococcus	MPN/100mL	1,180			
Total coliform	MPN/100mL	50,000,000			
Fecal coliform	MPN/100mL	1,100			

McGrath Lake PCBs, Pesticides, and Sediment Toxicity TMDL

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

The existing VCAILGMP site OXD_CENTR is located at the Central Ditch, which drains into McGrath Lake. Information and Conditional Waiver monitoring results related to this site can be found in the previous data compilation section. Using the OXD_CENTR site, attainment of TMDL LAs in the inflow to the lake can be assessed. At this time, until the incorporation of the McGrath Lake TMDL LAs (Table 70) as water quality benchmarks, exceedances of the LAs will not trigger the need for a WQMP. However, the existence of this TMDL will influence prioritization and BMP implementation within the McGrath Lake subwatershed.

TMDL Monitoring and Load Allocations

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

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

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

Sediment samples will be analyzed for the following:

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

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

Table 70. McGrath Lake Central Ditch Load Allocations

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

Monitoring Data

The QAPP and MRP revisions and Regional Board approval to incorporate the proposed monitoring for compliance with the McGrath Lake TMDL occurred midway through the 2012 monitoring year. Therefore, it was not until the final two events when all TMDL constituents in water were measured. One sediment collection took place during Event 15 of this monitoring year. Results applicable to this TMDL are reported in the tables below.

Table 71. McGrath Lake TMDL Central Ditch Monitoring Data in Water: OXD_CENTR

Constituents in Water	Units	Event 12 Wet 1/23/12	Event 13 Wet 3/18/12	Event 14 Dry 5/24/12	Event 15 Dry 7/17/12
TOC	mg/L	NS	NS	3.63	2.91
TSS	mg/L	730	11	2	2
Total PCBs ¹	µg/L	NS	NS	ND	ND
4,4'-DDD	µg/L	0.1504	DNQ	ND	ND
4,4'-DDE	µg/L	0.5308	0.0195	0.0135	ND
4,4'-DDT	µg/L	0.2445	ND	ND	ND
Dieldrin	µg/L	ND	ND	ND	ND
Total Chlordane ²	µg/L	0.0219	ND	ND	ND

NS = Not Sampled; TMDL sampling had not yet begun during this event.

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

Constituents in Sediment	Units	Event 15 Dry 7/17/12
TOC	% dry wt.	2.41
Total PCBs ¹	µg/dry kg	ND
4,4'-DDD	µg/dry kg	8.6
4,4'-DDE	µg/dry kg	72.1
4,4'-DDT	µg/dry kg	12
Total DDT ²	µg/dry kg	92.7
Dieldrin	µg/dry kg	ND
Total Chlordane ³	µg/dry kg	DNQ

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

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

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

EVALUATION OF DATA QUALITY

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

Data Quality Objectives

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

Detection Limits

Table 73. Analytical Methods and Project Reporting Limits for Field Measurements

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

NA = Not Applicable

Table 74. VCAILGMP Analytical Methods and Project Detection Limits / Project Reporting Limits for Laboratory Analyses

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
<i>Aquatic Chronic Toxicity</i>²						
<i>Pimephales promelas</i> (fathead minnow)	EPA-821-R-02-013 and EPA 600-4-91-002	N/A	N/A	N/A	N/A	N/A
<i>Ceriodaphnia dubia</i> (water flea)	EPA 821-R-02-013 and EPA 600-4-91-002	N/A	N/A	N/A	N/A	N/A
<i>Selenastrum capricornutum</i> (green algae)	EPA 821-R-02-013 and EPA 600-4-91-002	N/A	N/A	N/A	N/A	N/A
<i>General Water Quality Constituents</i>						
Total Dissolved Solids (TDS)	SM 2540C	mg/L	13	13	20	20
Total Suspended Solids (TSS)	SM 2540D	mg/L	0.4	0.4	1	1
Chloride	EPA 300.0	mg/L	0.04	0.12	1	1
Sulfate	EPA 300.0	mg/L	0.13	0.2	2	1
Hardness	SM 2340B	mg/L	1	1 (12) 0.1 (other)	5	5 (12) 0.5 (other)
<i>Nutrients</i>						
Total Ammonia-N	SM 4500-NH ₃ F	mg/L	0.03	0.03 (12) 0.02 (other)	0.06	0.06
Nitrate-N	EPA 300.0	mg/L	0.01	0.01	0.05	0.05
Total Orthophosphate-P	SM 4500-PE	mg/L	0.01	0.01	0.01	0.01 (12 & 13) 0.02 (14 & 15)
<i>Metals</i>						
Dissolved Copper	EPA 200.8	µg/L	0.4	0.05	0.8	0.25
Total Copper	EPA 200.8	µg/L	0.4	0.05	0.8	0.25

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
<i>Organochlorine Pesticides</i> ³						
Aldrin	EPA 625	ng/L	1	1	5	5
BHC-alpha	EPA 625	ng/L	1	1	5	5
BHC -beta	EPA 625	ng/L	1	1	5	5
BHC-delta	EPA 625	ng/L	1	1	5	5
BHC-gamma (Lindane)	EPA 625	ng/L	1	1	5	5
Chlordane-alpha	EPA 625	ng/L	1	1	5	5
Chlordane-gamma	EPA 625	ng/L	1	1	5	5
2,4'-DDD	EPA 625	ng/L	1	1	5	5
2,4'-DDE	EPA 625	ng/L	1	1	5	5
2,4'-DDT	EPA 625	ng/L	1	1	5	5
4,4'-DDD	EPA 625	ng/L	1	1	5	5
4,4'-DDE	EPA 625	ng/L	1	1	5	5
4,4'-DDT	EPA 625	ng/L	1	1	5	5
Dieldrin	EPA 625	ng/L	1	1	5	5
Endosulfan I	EPA 625	ng/L	1	1	5	5
Endosulfan II	EPA 625	ng/L	1	1	5	5
Endosulfan Sulfate	EPA 625	ng/L	1	1	5	5
Endrin	EPA 625	ng/L	1	1	5	5
Endrin Aldehyde	EPA 625	ng/L	1	1	5	5
Endrin Ketone	EPA 625	ng/L	1	1	5	5
Toxaphene	NCI/GCMS	ng/L	10	10	50	50
<i>Organophosphorus Pesticides</i>						
Bolstar	EPA 625	ng/L	2	2	4	4
Chlorpyrifos	EPA 625	ng/L	1	1	2	2
Demeton	EPA 625	ng/L	1	1	2	2
Diazinon	EPA 625	ng/L	2	2	4	4

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
Dichlorvos	EPA 625	ng/L	3	3	6	6
Dimethoate	EPA 625	ng/L	3	N/A	6	N/A
Disulfoton	EPA 625	ng/L	1	1	2	2
Ethoprop	EPA 625	ng/L	1	1	2	2
Fenclorphos	EPA 625	ng/L	2	2	4	4
Fensulfotion	EPA 625	ng/L	1	1	2	2
Fenthion	EPA 625	ng/L	2	2	4	4
Malathion	EPA 625	ng/L	3	3	6	6
Merphos	EPA 625	ng/L	1	1	2	2
Methyl Parathion	EPA 625	ng/L	1	1	2	2
Mevinphos	EPA 625	ng/L	8	8	16	16
Phorate	EPA 625	ng/L	6	6	12	12
Tetrachlorvinphos	EPA 625	ng/L	2	2	4	4
Tokuthion	EPA 625	ng/L	3	3	6	6
Trichloronate	EPA 625	ng/L	1	1	2	2
<i>Pyrethroid Pesticides</i>						
Allethrin	8270C (NCI)	ng/L	0.5	0.5	2	2
Bifenthrin	8270C (NCI)	ng/L	0.5	0.5	2	2
Cyfluthrin	8270C (NCI)	ng/L	0.5	0.5	2	2
Cypermethrin	8270C (NCI)	ng/L	0.5	0.5	2	2
Danitol	8270C (NCI)	ng/L	0.5	0.5	2	2
Deltamethrin	8270C (NCI)	ng/L	0.5	0.5	2	2
Esfenvalerate	8270C (NCI)	ng/L	0.5	0.5	2	2
Fenvalerate	8270C (NCI)	ng/L	0.5	0.5	2	2
L-Cyhalothrin	8270C (NCI)	ng/L	0.5	0.5	2	2
cis-Permethrin	8270C (NCI)	ng/L	5	5	25	25
trans-Permethrin	8270C (NCI)	ng/L	5	5	25	25

Parameter	Analytical Method ¹	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
Prallethrin	8270C (NCI)	ng/L	0.5	0.5	2	2

MDL = Method Detection Limit RL = Reporting Limit

Table 75. TMDL Analytical Methods and Project Method Detection Limits / Project Reporting Limits for Laboratory Analyses Performed Under the VCAILGMP

Parameter	Analytical Method	Units	Project MDL	Lab Reported MDL	Project RL	Lab Reported RL
Total Organic Carbon (TOC) (water)	SM 5310C	mg/L	0.2	0.23 (14) 0.15 (15)	0.3	0.5
Total Organic Carbon (TOC) (sediment)	EPA 9060A	% dry weight	0.01	0.01	0.05	0.02
OC Pesticides (filtered sediment)	EPA 8270C	ng/L	1 ¹	1	5 ¹	5
OC Pesticides (sediment)	EPA 8270C	ng/ dry g	1	1	5	5
OC Pesticides (fish tissue)	EPA 8270C	ng/wet g	1 ²	1	5 ²	5
PCBs (aroclor) (water)	EPA 625	ng/L	10	10	20	20
PCBs (aroclor) (sediment)	EPA 8270C	ng/ dry g	10	10	20	20
<i>E. coli</i>	9223B	MPN/100mL	<2	N/A	<2	N/A
Enterococcus	Indexx Enterolert	MPN/100mL	<1	0.5	<1	1
Total Coliform	9221B	MPN/100mL	<2	0.5	<2	1
Fecal Coliform	9221E	MPN/100mL	<2	1	<2	2

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

All project detection limits were met in 2012 for field measurements.

MDLs for chloride, sulfate were not met during 2012. However, RLs for these constituents were met, and levels of these analyses in environmental samples greatly exceeded the MDLs. Therefore, higher MDLs for these constituents are not considered quality control failures.

RL for total orthophosphate in Events 14 (May) and 15 (July) were not met. Orthophosphate was found to be higher than the MDL, but lower than the RL in only one sample in May. All other samples were found to be higher than the RL and therefore, this reporting limit is not considered quality control failures.

All project detection limits were met in 2012 for organophosphorus and organochlorine pesticides. The lab has dropped the analysis for dimethoate from their suite of organophosphorus pesticides.

Data Quality Objectives for Precision and Accuracy

Table 76 lists data quality objectives for precision and accuracy for field measurements and laboratory analyses.

Table 76. VCAILGMP Data Quality Objectives for Precision and Accuracy

Parameter	Accuracy	Precision	Recovery
Water Velocity (for Flow calc.)	± 2%	NA	NA
pH	± 0.2 pH units	± 0.5 pH units	NA
Temperature	± 0.5 °C	± 5%	NA
Dissolved Oxygen	± 0.5 mg/L	± 10%	NA
Turbidity	± 10%	± 10%	NA
Conductivity	± 5%	± 5%	NA
Aquatic Chronic Toxicity	¹	²	NA
Total Suspended Solids (TSS)	80-120%	25%	80-120%
Total Dissolved Solids (TDS)	80-120%	25%	80-120%
Hardness (as CaCO ₃)	80-120%	30%	80-120%
Chloride	80-120%	25%	80-120%
Sulfate	80-120%	25%	80-120%
Ammonia-Nitrogen	80-120%	30%	80-120%
Nitrate-Nitrogen	80-120%	30%	80-120%
Orthophosphate-P	80-120%	30%	80-120%
Dissolved Copper	75-125%	30%	80-120%
Total Copper	75-125%	30%	80-120%
Organochlorine Pesticides	80-120%	30% ³	50-150% ³
Organophosphorus Pesticides	80-120%	30% ³	50-150% ³
Pyrethroid Pesticides	80-120%	30% ³	50-150% ³
Trash	NA	NA	NA

NA = Not Applicable

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

Table 77. TMDL Specific Data Quality Objectives ¹

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

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

Field Data Quality

Hydrolab MS5 Data Sondes (field meters) were calibrated within 24 hours of each monitoring event, and calibration was verified for each probe by analyzing a mid-range standard. If a calibration failure occurred, the probe that failed calibration was not used for monitoring. At the end of each event, mid-range standards were re-run to verify that each probe was still in calibration. Calibration data are recorded on the calibration sheet in the field logbook, and ultimately entered into the VCAILG Monitoring Database. During event 12, one of the field meter's turbidity sensors did not meet the post sampling calibration check; therefore, turbidity results from that meter were flagged as estimates. All other calibration checks performed on field meters met data quality objectives for accuracy, signifying the validity of those field measurements.

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

Blank Contamination

Overall there was very little blank contamination detected during the 2012 monitoring year. The field blank hits were found across nutrients, metals, and OC pesticides. The lab blank hits were all detected in chloride and sulfate samples. These hits were at levels less than 10 times the expected levels found in all the field samples. Details of all the blank hits are reported in Table 78 below. The following lists a basic summary of the blank contamination results:

- Field Blanks – 282 analyzed – 6 detections above the RL (2.1%) (does not include surrogates)
- Laboratory Blanks – 663 analyzed – 35 detections above RL (5.3%) (does not include surrogates)

Table 78. Blank Sample Contamination Detected – 2012

Constituent	Matrix	Event	Lab Batch	Field Blank	Lab Blank	Program Qualifier	Comments
General Water Quality							
Chloride (ppm)	Water	012.0	2A1201280-013:A		0.11	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	012.0	2A1201280-025:A		1.86	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201280-025:A		0.28	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201280-037:A		0.00		
Chloride (ppm)	Water	012.0	2A1201280-049:A		0.19	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201280-061:A		0.24	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	012.0	2A1201280-073:A		1.09	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201280-073:A		0.95	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201280-085:A		0.23	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201280-097:A		0.32	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201280-110:A		0.21	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	012.0	2A1201568-025:A		0.05		
Chloride (ppm)	Water	012.0	2A1201568-037:A		0.04		
Chloride (ppm)	Water	013.0	2A1204225-002:A		0.17	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204225-013:A		0.07		
Chloride (ppm)	Water	013.0	2A1204225-025:A		0.12	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204225-037:A		0.27	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204225-049:A		0.36	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204225-061:A		0.25	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204225-073:A		0.16	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204225-085:A		0.22	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204225-097:A		0.22	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204171-002:A		0.08		
Chloride (ppm)	Water	013.0	2A1204171-013:A		0.09		

Constituent	Matrix	Event	Lab Batch	Field Blank	Lab Blank	Program Qualifier	Comments
Chloride (ppm)	Water	013.0	2A1204171-025:A		0.05		
Chloride (ppm)	Water	013.0	2A1204171-037:A		0.24	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204171-049:A		0.22	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204171-061:A		0.21	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204171-073:A		0.20	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	013.0	2A1204171-073:A		0.65	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204171-085:A		0.15	b	Analyte Found in Blank, below PQL
Chloride (ppm)	Water	013.0	2A1204171-096:A		0.11	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	014.0	2A1207749-037:A		1.03	b	Analyte Found in Blank, below PQL
Sulfate (ppm)	Water	014.0	2A1207749-049:A		0.14		
Sulfate (ppm)	Water	014.0	2A1207749-061:A		0.32	b	Analyte Found in Blank, below PQL
Nutrients							
Nitrate-N (mg/L)	Water	014.0	C-7029		0.10		
Total Orthophosphate as P (mg/L)	Water	012.0	C-5094		0.01		
Total Orthophosphate as P (mg/L)	Water	013.0	C-6006		0.01		
OC Pesticides							
4,4'-DDE (µg/L)	Water	014.0	O-3050		0.01	U	Associated environmental samples <5 times the blank concentration are qualified
PCBs							
None							
OP Pesticides							
None							
Pyrethroid Pesticides							
None							
Metals & Selenium							

Constituent	Matrix	Event	Lab Batch	Field Blank	Lab Blank	Program Qualifier	Comments
Total Copper (µg/L)	Water	012.0	E-3084	0.37			
Dissolved Copper (µg/L)	Water	013.0	E-2123	0.42			

Precision

The purpose of analyzing duplicates is to demonstrate precision of sample collection, preparation, and analytical methods. The relative percent difference (RPD) is reported for field duplicates, lab duplicates, blank spike duplicates, laboratory control spike (LCS) duplicates, and matrix spike duplicates. QA failures for precision are noted when the RPD between a sample and its duplicate are greater than the acceptance value. See Table 79 below for details of all the precision failures. See Table 76 and Table 77 for the VCAILG acceptance values for precision. The following list summarizes the precision analysis results:

- Field Duplicates – 292 analyzed – 8 failed RPD (2.7%) (does not include surrogates)
- Laboratory Duplicates – 466 analyzed – 17 failed RPD (4.6%) (includes surrogates)
- Blank Spike/LCS Duplicates – 437 analyzed – 1 failed RPD (0.23%) (includes surrogates)
- Matrix Spike Duplicates – 460 analyzed – 5 failed RPD (1.1%) (includes surrogates)

Table 79. Precision Control Failures – 2012

Constituent	Matrix	Event	Lab Batch	Site	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
General Water Quality										
Sulfate (mg/L)	Samplewater	015.0	2P1207962-026:B	S02T_TODD				28.9	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to RPD failure between MS/MSD
Total Hardness as CaCO3 (mg/L)	Samplewater	012.0	E-3084	S02T_TODD	50				FD RPD	FieldDup RPD Failed
Chloride (mg/L)	Samplewater	015.0	2P1207962-026:B	S02T_TODD				29.1	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to RPD failure between MS/MSD
Nutrients										
Ammonia-N (mg/L)	Samplewater	015.0	C-8114	S02T_TODD	100					
Ammonia-N (mg/L)	Samplewater	014.0	C-7115	S04T_TAPO	67					
OC Pesticides										
2,4'-DDD (µg/L)	Samplewater	013.0	O-3008	04D_ETTG	46					
2,4'-DDE (µg/dry g)	Sediment	015.0	O-3083	OXD_CENTR		45				
2,4'-DDE (µg/L)	Samplewater	012.0	O-2131	S02T_TODD	87					
2,4'-DDT (µg/dry g)	Sediment	015.0	O-3083	OXD_CENTR		43				
2,4'-DDT (µg/L)	Samplewater	012.0	O-2128	S02T_ELLS		32			LD RPD	LabDuplicate RPD Failed
4,4'-DDD (µg/dry g)	Sediment	015.0	O-3083	OXD_CENTR		46				
4,4'-DDD (µg/L)	Samplewater	012.0	O-2128	S02T_ELLS		41			LD RPD	LabDuplicate RPD Failed
4,4'-DDT (µg/dry g)	Sediment	015.0	O-3083	OXD_CENTR		50				
Chlordane-alpha (µg/dry g)	Sediment	015.0	O-3083	OXD_CENTR		31				

Constituent	Matrix	Event	Lab Batch	Site	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
Endrin aldehyde (µg/dry g)	Sediment	015.0	O-3083	OXD_CENTR				48		
Endrin aldehyde (µg/wet g)	Tissue	015.0	O-3070	SC_EST				200	EST MS/MSD	Estimate due to RPD failure between MS/MSD
trans-Nonachlor (µg/L)	Samplewater	012.0	O-2131	S02T_TODD		48				
PCBs										
(PCB030) (% Recovery)	Samplewater	012.0	O-2131	S02T_TODD		33				
(PCB030) (% Recovery)	Samplewater	015.0	O-3066	S02T_TODD		32				
(PCB112) (% Recovery)	Samplewater	012.0	O-2131	S02T_TODD		32				
(PCB112) (% Recovery)	Sediment	015.0	O-3083	OXD_CENTR		38				
(PCB198) (% Recovery)	Sediment	015.0	O-3083	OXD_CENTR		33				
(TCMX) (% Recovery)	Samplewater	015.0	O-3066	S02T_TODD		49				
OP Pesticides										
Demeton (µg/L)	Blankwater	015.0	O-3066	LABQA			34		EST BS/BSD	Estimate due to BS/BSD RPD failed
Malathion (µg/L)	Samplewater	012.0	O-2131	S02T_TODD		33				
Pyrethroid Pesticides										
Bifenthrin (µg/L)	Samplewater	013.0	O-3008	04D_ETTG	38					
Bifenthrin (µg/L)	Samplewater	013.0	O-3008	04D_ETTG		33				
L-Cyhalothrin (µg/L)	Samplewater	013.0	O-3008	04D_ETTG	43					
L-Cyhalothrin (µg/L)	Samplewater	013.0	O-3008	04D_ETTG		33				

Constituent	Matrix	Event	Lab Batch	Site	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
Permethrin, cis- (µg/L)	Samplewater	014.0	O-3050	S04T_TAPO				37	EST MS/MSD	Estimate due to RPD failure between MS/MSD
Metals and Selenium										
Dissolved Copper (µg/L)	Samplewater	015.0	E-4060	S02T_TODD	31				FD RPD	FieldDup RPD Failed

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

Accuracy

Percent recoveries of blank spike samples (BS), laboratory control spike samples (LCS), and matrix spike samples (MS) check the accuracy of lab reported sample concentrations. The BS samples that fell outside the acceptable range occurred in 2,4'-DDT in our March event (Event 13). The matrix spike samples that fell outside the acceptable range were mostly from July's event (Event 15) and all were in the pesticide samples. Table 80 summarizes the QA/QC sample results for accuracy that did not meet percent recovery objectives. The following lists the results of the accuracy analysis results:

- Blank Spike/LCS Samples – 1036 Analyzed – 2 fell outside the range (0.2%) (does not include surrogates)
- Matrix Spike Samples – 864 Analyzed – 32 fell outside the range (3.7%) (does not include surrogates)

Table 80. Accuracy Control Failures - 2012

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
General Water Quality											
Total Organic Carbon (mg/L)	Water	014.0	2P1205867-002:A	75	114	x	x	169	170		
Chloride (mg/L)	Water	015.0	2P1207962-026:B	86	128	101	x	104	77.3	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to RPD failure between MS/MSD
Sulfate (mg/L)	Water	015.0	2P1207962-026:B	78	137	99.4	x	102	76.5	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to RPD failure between MS/MSD
Nutrients											
None											
OC Pesticides											
4,4'-DDT (µg/L)	Water	012.0	O-2128	50	150	103	101	159	145		
2,4'-DDT (µg/dry g)	Water	013.0	O-3014	25	125	134	138	x	x		
Endosulfan-II (µg/dry g)	Sediment	015.0	O-3083	50	150	x	x	28	38		
Endosulfan-I (µg/dry g)	Sediment	015.0	O-3083	50	150	x	x	32	24		
PCBs											
None											
OP Pesticides											
Demeton (µg/L)	Water	012.0	O-2131	50	150	90	99	45	43		
Disulfoton (µg/L)	Water	012.0	O-2131	50	150	88	94	46	39		
Pyrethroid Pesticides											
Permethrin, cis- (µg/L)	Water	015.0	O-3066	50	150	89	103	41	48	MS <LL	MS failed lower limit
Permethrin, trans- (µg/L)	Water	015.0	O-3066	50	150	82	92	40	39	MS <LL	MS failed lower limit
Fluvalinate (µg/L)	Water	015.0	O-3066	50	150	101	116	49	45	MS <LL	MS failed lower limit

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Esfenvalerate (µg/L)	Water	015.0	O-3066	50	150	97	111	45	41	MS <LL	MS failed lower limit
Fenvalerate (µg/L)	Water	015.0	O-3066	50	150	90	101	43	38	MS <LL	MS failed lower limit
Cyfluthrin (µg/L)	Water	015.0	O-3066	50	150	92	100	45	43	MS <LL	MS failed lower limit
Cypermethrin (µg/L)	Water	015.0	O-3066	50	150	92	98	45	40	MS <LL	MS failed lower limit
Deltamethrin (µg/L)	Water	015.0	O-3066	50	150	109	120	48	44	MS <LL	MS failed lower limit
Danitol (µg/L)	Water	013.0	O-3008	50	150	127	129	132	161		
Prallethrin (µg/L)	Water	013.0	O-3008	50	150	126	129	140	155		
Resmethrin (µg/L)	Water	013.0	O-3008	50	150	148	150	150	173		
Metals and Selenium											
None											

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

Completeness

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

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

Table 81 lists the percent completeness of data collected during 2012 in comparison with the established data quality objective.

Table 81. VCAILG MP and Associated TMDL Data Completeness – 2012

Monitoring Element	Completeness Objective	Completeness Achieved
Field Measurements	90%	100%
General Water Quality Constituents	90%	100%
Total & Dissolved Copper	90%	100%
Organic Constituents - Pesticides	90%	100%
Organic Constituents - Tissue	90%	100%
Organic Constituents – Filtered Sediment	90%	75% ¹
Organic Constituents - Sediment	90%	100%
Bacteria	90%	100%
Aquatic Toxicity	90%	100%

1. An Event 13 filtered sediment sample was collected at S01D_MONAR; however it contained an insufficient amount of suspended solids for analysis.

Values listed for percent completeness achieved are based on successfully collecting samples at all VCAILG monitoring sites with sufficient flow present, and successfully generating analytical data for all planned constituents. For event 13, at one of the two sites, after filtering the sample, there was not enough sediment in the >63um fraction to run the required analysis.

Additional Program Requirements

Data quality is dependent on samples that are collected properly by following established protocols. To ensure that samples are collected properly, the QAPP requires field crews to receive sampling training prior to initiation of sampling. Refresher training is required annually thereafter.

The first sampling training event for the 2010 Conditional Waiver occurred on October 7, 2011 at FGL Environmental Laboratory. Larry Walker Associates (LWA) used a PowerPoint presentation to describe sampling procedures in detail and highlight important features of event preparation and the actual sampling event that could easily be overlooked. New sampling protocols and considerations necessary for the added TMDL monitoring components were discussed.

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

RECOMMENDED MONITORING PROGRAM CHANGES

In the Calleguas Creek Watershed, there are two background monitoring sites (05D_SANT_BKGD and 02D_CSUCI) that are for sites sampled under the CCWTMP. The background sites were established as part of the VCAILGMP during the 2005 Conditional Waiver. In developing the VCAILG QAPP and MRP for compliance with the 2010 Conditional Waiver, the two background sites were retained in the VCAILGMP. Though efforts are made to coordinate the VCAILGMP and CCWTMP monitoring events, it is not guaranteed that this is always possible. Therefore, it cannot be ensured that background sites will always be sampled at similar times to the downstream agriculture monitoring locations. An additional consideration is that the 02D_CSUCI site has only had observable flow and collected samples once during the entire VCAILGMP (Event 8). 05D_SANT_BKGD has been sampled twice, during events 5 and 10. Therefore, it is recommended that these background sites be removed from the VCAILGMP, with the option to resume sampling should site conditions change in the future.

Two of the typical site observations noted in the field logs are percent filamentous and percent periphyton algae. The values recorded in the field logs are not meant to be measurements, but simply qualitative observations. Recently, SWAMP procedures have been released for the collection of algae samples.⁶ In order to avoid the misuse of VCAILG site observations, it is proposed that the algae observations be removed from all VCAILG field logs. This change has been applied retroactively to the start of 2010 Conditional Waiver monitoring.

Summary of Water Quality Benchmark Exceedances

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

STANDARD WATER QUALITY BENCHMARK EXCEEDANCES

The following summarizes the exceedances of standard water quality benchmarks as specified in Conditional Waiver Appendix 2 or included by reference to narrative and numeric Basin Plan objectives and water quality standards from the California Toxics Rule. Any exceedances were

⁶ Fetscher, A.E., L. Busse, P.R. Ode. 2010. Standard Operating Procedures for Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California. SWAMP Surface Water Ambient Monitoring Program Bioassessment Procedures 2010.

previously noted in the data tables of each VCAILGMP site, the following is a compilation to evaluate the sites overall and by watershed.

Table 82 lists the exceedances that occurred at each site for each monitoring event. **Error! Reference source not found.** lists the constituent classes and identifies the sites which had exceedances for that particular category. The sites are also separated by watershed.

pH

There was one dry weather exceedance of the pH benchmark. The pH measured at 05D_LAVD (La Vista Drain) during event 14 was 8.84, which is above the acceptable pH range of 6.5 to 8.5.

Temperature

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

Dissolved Oxygen

One exceedance of the dissolved oxygen benchmark occurred at 01T_ODD3_ARN (Oxnard Drain #3, Arnold Rd.) during the first dry event.

Salts

Exceedances of the salts benchmarks (TDS, chloride, sulfate, or any combinations thereof) occurred at four monitoring sites, three of those sites are in the Santa Clara River Watershed.

Nitrogen

Exceedances of the nitrate-N benchmark occurred at seven monitoring sites. Only one site had an exceedance of the ammonia-N objective (01T_ODD3_ARN). Sites with nitrate-N exceedances were split between the watersheds with three sites located each in Calleguas Creek and Santa Clara River Watersheds. The remaining site with nitrate-N exceedances was the OXD_CENTR site located in the Oxnard Coastal Watershed.

Copper

Exceedances of the copper benchmarks only occurred at the brackish/saltwater sites. 04D_ETTG exceeded the copper saltwater benchmark during all four events. Most other sites had exceedances limited to storm events.

Pesticides

Pesticides, particularly OC pesticides were most commonly found in wet weather samples. In the Calleguas Creek Watershed, all six monitoring sites had at least one exceedance of an OC pesticide benchmark. Four sites in the Calleguas Creek Watershed exceeded the at least one of the OP pesticide benchmarks, with chlorpyrifos being the most common. The OXD_CENTR site had both OC and OP pesticide exceedances during wet weather and a single OC pesticide exceedance during the first dry event. In the Santa Clara River Watershed, an OP pesticide exceedance only occurred once at a single site during the first storm event. OC pesticides benchmarks were exceeded at five out of the six sites in this watershed.

Chronic Toxicity

Toxicity sampling took place during events 12 and 15. Three-species screening tests were performed during Event 12 and some exceedances of the 1.0 TU_c benchmark were observed. Fish survival or biomass toxicity was not observed at any of the tested sites. Algal cell growth toxicity was only observed at one location, 05D_LAVD. In regards to the invertebrate testing, high-conductivity sites tested using *Hyalella azteca* did not have any toxic effects. Results from freshwater sites for *Ceriodaphnia dubia* demonstrated no significant impacts on survival, but all sites did show reproduction toxicity. The sites with reproduction toxicity were split with three being located in the Santa Clara River Watershed and three in the Calleguas Creek Watershed.

Table 82. Exceedances of Standard Water Quality Benchmarks in 2012 – by Site and Event ¹

Site	Event 12 – Wet January 23, 2012	Event 13 – Wet March 18, 2012	Event 14 – Dry May 24, 2012	Event 15 – Dry July 17, 2012
01T_ODD3_ARN	Nitrate-N, DDD, DDE, DDT, Chlorpyrifos	Ammonia-N, Nitrate- N, Copper, DDD, DDE, Toxaphene	DO, Nitrate-N, DDD, DDE, DDT, Toxaphene	Ammonia-N, Nitrate-N, Copper, DDD, DDE
04D_ETTG	Nitrate-N, Copper, DDD, DDE, DDT, Toxaphene, Chlorpyrifos, Diazinon	Nitrate-N, Copper, DDD, DDE, Toxaphene,	Nitrate-N, Copper, DDE, Chlorpyrifos	Nitrate-N, Copper, DDE
04D_LAS	Nitrate-N, Copper, DDD, DDE, DDT, Toxaphene, Chlorpyrifos	Nitrate-N, Copper, Toxaphene, Chlorpyrifos	Nitrate-N, DDE	Nitrate-N, DDD, DDE
05D_LAVD	DDD, DDE, DDT, Toxaphene, Chlorpyrifos, Toxicity	TDS, Sulfate, Nitrate-N; DDD, DDE, DDT, Toxaphene, Chlorpyrifos	pH, TDS, Sulfate, DDT	TDS, Chloride, Sulfate, DDT
05T_HONDO	Chlordane, DDD, DDE, DDT, Toxaphene, Toxicity	NS	NS	NS
06T_LONG2	Chlordane, DDD, DDE, DDT, Toxicity	NS	NS	NS
OXD_CENTR	Chlordane, Copper, DDD, DDE, DDT, Toxaphene, Chlorpyrifos	Nitrate-N, DDE, Toxaphene, Chlorpyrifos	Nitrate-N, DDE,	Nitrate-N
S02T_ELLS	Chlordane, DDD, DDE, DDT, Toxaphene, Chlorpyrifos, Toxicity	TDS, Chloride, Sulfate	NS	NS
S02T_TODD	Chlordane, DDD, DDE, DDT, Toxaphene, Toxicity	TDS, Sulfate, Nitrate-N	DDE	None
S03T_TIMB	NS	NS	DDE	NS
S03T_BOULD	Nitrate-N, DDE, Toxicity	None	NS	NS
S03D_BARDS	NS	NS	NS	NS
S04T_TAPO	TDS, Chloride, Sulfate, Nitrate-N, Chlordane, DDD, DDE, DDT	None	TDS, Chloride, Sulfate, Nitrate- N, DDE	TDS, Chloride, Sulfate, Nitrate-N
VRT_SANTO	NS	NS	NS	NS
VRT_THACH	NS	NS	NS	NS
Total Number of Sites Sampled	11	9	8	7
Total Number of Sites with Exceedances	11	7	8	6

NS = Not Sampled; site dry

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

TMDL BENCHMARK EXCEEDANCES

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

Calleguas Creek Watershed and Mugu Lagoon OC Pesticides and PCBs TMDL

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

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

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

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

Compliance monitoring for this TMDL did not begin within the reporting period. Future Annual Monitoring Reports will include compliance monitoring results and an evaluation of data as compared to the interim LAs. The Salts TMDL also requires an agricultural WQMP, which will be addressed by VCAILG.

Calleguas Creek Watershed and Mugu Lagoon Metals and Selenium TMDL

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

Calleguas Creek Watershed Nitrogen Compounds TMDL

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

Revolon Slough and Beardsley Wash Trash TMDL

Non-point source dischargers are complying with the Trash TMDL requirements through a program that includes a combination of a MFAC program and other BMPs. VCAILG members are in compliance with the TMDL requirements to ensure zero trash immediately after each MFAC event. To ensure that trash doesn't accumulate to deleterious amounts, trash BMPs will be included in the WQMP.

Santa Clara River Nitrogen Compounds TMDL

The Santa Clara River Watershed LA for nitrogen was only exceeded three times during the monitoring year, considering all six VCAILG monitoring sites within the watershed. Each exceedance occurred at a different location and during different events. Though most sites are consistently meeting the TMDL, the observed exceedances do trigger a WQMP.

Ventura River Estuary Trash TMDL

Non-point source dischargers are complying with the Trash TMDL requirements through a program that includes a combination of a MFAC program and other BMPs. VCAILG members are in compliance with the TMDL requirements to ensure zero trash immediately after each MFAC event. To ensure that trash doesn't accumulate to deleterious amounts, trash BMPs will be included in the WQMP.

Santa Clara River Estuary Toxaphene TMDL

No exceedances of the suspended sediment or fish tissue allocations occurred during the monitoring year. Data collected during the AMR reporting period does not trigger the need for a WQMP.

Monitoring Trends

With multiple years of monitoring data completed, the following sections describe trends observed at the VCAILG monitoring sites. The sites are grouped and discussed based on their priority rankings in the VCAILG WQMPs developed for compliance with the 2005 Conditional Waiver.

It is important to note that not all constituents with standard water quality benchmarks are evaluated in this section. Field measurements (pH, DO, temperature), for example rarely exceed applicable benchmarks. Many of the OC pesticides are never or only very rarely detected. Considering all 2005 Conditional Waiver events and the first year of 2012 Conditional Waiver monitoring (Events 1-15), the following table lists the number of detections have occurred at VCAILG monitoring sites for OC pesticides not considered for trend analysis.

Table 83. Rarely Detected OC Pesticides with Water Quality Benchmarks

OC Pesticide	# of Detections Considering VCAILG Events 1-15
Aldrin	0
Alpha-BHC	0
Beta-BHC	1
Gamma-BHC	0
Endosulfan I	1
Endosulfan II	0
Endosulfan sulfate	2
Endrin	0
Endrin Aldehyde	0

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

FIRST PRIORITY SITES

Five sites were categorized as first tier priority for BMP implementation and outreach to address water quality benchmark exceedances observed during the 2005 Conditional Waiver. Water quality data for constituents with the most commonly exceeded benchmarks between 2007 and 2012 were analyzed to identify trends. First tier priority sites include:

05D_SANT_VCWPD	05D_LAVD	OXD_CENTR
S02T_TODD	S04T_TAPO	

Water quality data were analyzed for the following constituents:

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

Data trends are discussed below by constituent.

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

During dry weather, the majority of the samples collected for DDT after the 2010 Order did not contain any detectable levels of DDT. Of the samples collected, only three contained detectable levels of DDT. One sample was collected at 05D_SANT_VCWPD and two were collected at 05D_LAVD. The data indicate that DDT levels are decreasing except for at 05D_LAVD (Figure 12). In addition, none of the samples collected for DDD during dry weather after the 2010 Order contained any detectable levels of DDD (Figure 13). For DDE during dry weather, the data indicate concentrations have decreased over time, but are still being detected at most of the sites (Figure 14). Overall, based on the data collected for DDT, DDD, and DDE during dry weather from 2007-2012, it appears that DDT has been breaking down into its metabolites with DDE the most prevalent metabolite.

For DDT during wet weather, concentrations appear to be decreasing as compared to concentrations collected before the 2010 Order (Figure 15). For DDD and DDE, there do not appear to be any trends in the data.

Chlordane

During dry weather, there are no trends as chlordane has not been detected in any of the samples since September 2007. For chlordane during wet weather, there are no discernible trends as concentrations have increased and decreased variably throughout the monitoring time frame.

Dieldrin

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

Toxaphene

Overall, both wet and dry weather samples are showing improvement in regards to toxaphene. During dry weather, there appears to be a decreasing trend in the concentrations of toxaphene at all monitoring sites except for at 05D_SANT_VCWPD (Figure 16). In addition, during wet weather, there appears to be a slight decreasing trend in the concentrations of toxaphene (Figure 17).

Chlorpyrifos

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

Diazinon

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

Nitrate-N

Two first priority monitoring sites have shown significant Nitrate-N improvements during dry weather monitoring, S02T_TODD and S04T_TAPO (Figure 18). The average dry weather Nitrate-N concentration at S02T_TODD between 2007 and 2009 was 9.8 mg/L. Following WQMP implementation and the use of new BMPs by drainage area landowners, since 2010 the average Nitrate-N concentration for this site is now 2.2 mg/L. Regarding the Tapo Canyon site, S04T_TAPO, a large spike in Nitrate-N occurred during the 2009 dry weather event where the concentration was measured at 179.54 mg/L. Following this occurrence, VCAILG scheduled a site visit with the drainage area landowners and included NRCS staff. During the site visit a large potting mix stockpile was observed within close proximity to the waterway, upstream of the monitoring site. Relocating and containing the potting mix as well as other BMPs were discussed during the site visit. The landowners responded by removing the potting mix and vegetating many of the field edge ditches both upstream and also downstream of the Tapo Canyon monitoring site. Nitrate-N concentrations during 2012 dry weather sampling events were 10.16 and 5.19 mg/L.

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

Ammonia-N

Ammonia-N concentrations have been below 0.6 milligrams per liter for all samples collected following the adoption of the 2010 Order. During wet weather, there appears to be a slight decreasing trend (Figure 19). During dry weather, there does not appear to be any trends as concentrations have increased and decreased variably throughout the monitoring time frame.

TDS

During dry weather there appears to be a slight decrease in concentrations (Figure 20) and during wet weather a slight increase in concentrations (Figure 21). OXD_CENTR is not included in this graph since salts benchmarks are not applicable to this site.

Sulfate

During dry weather there appears to be a slight decrease in concentrations (Figure 22) and during wet weather there are no discernible trends as concentrations have increased and decreased variably throughout the monitoring time frame. OXD_CENTR is not included in this graph since salts benchmarks are not applicable to this site.

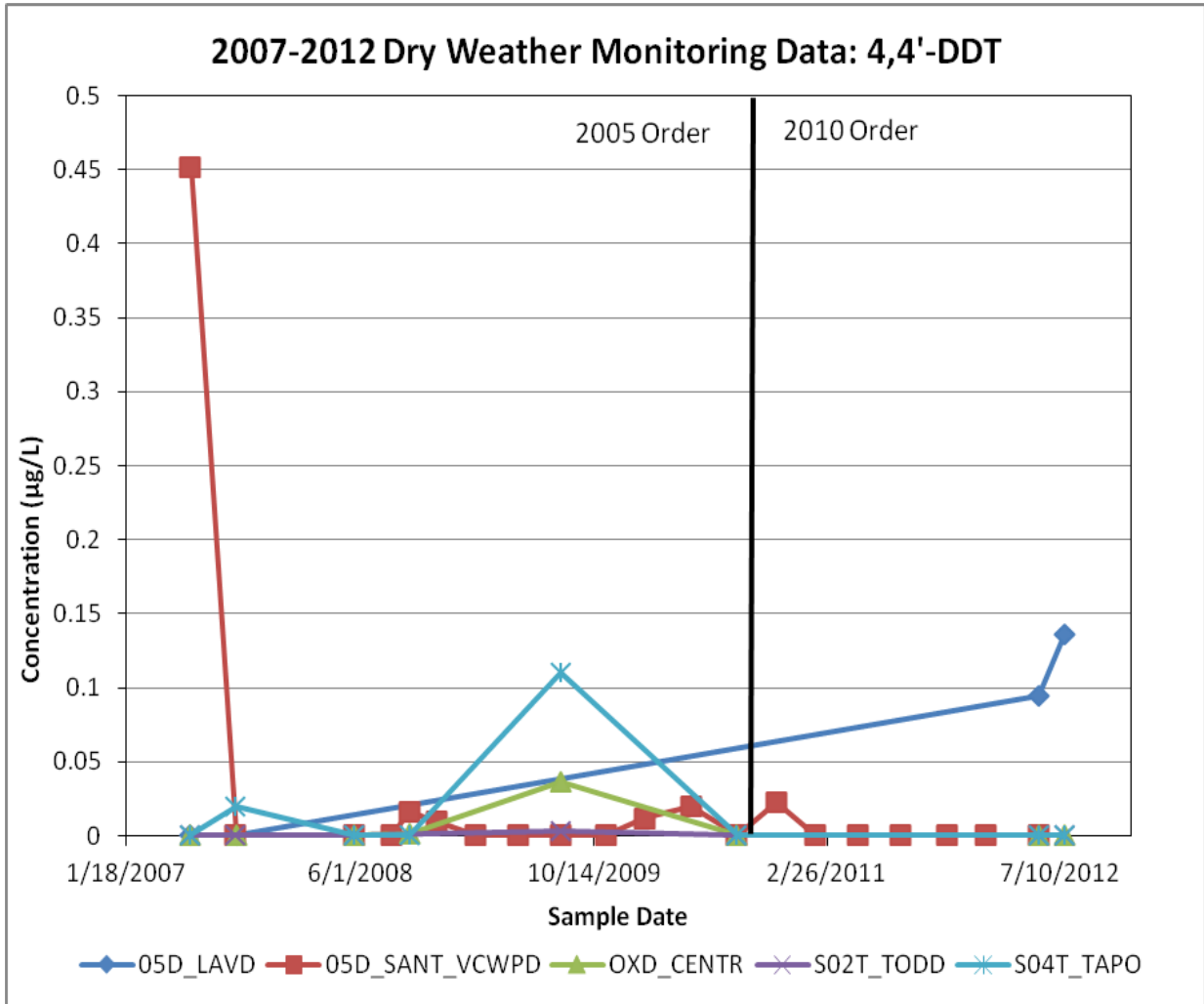


Figure 12. Dry weather DDT concentrations collected at first priority sites from 2007 to 2012

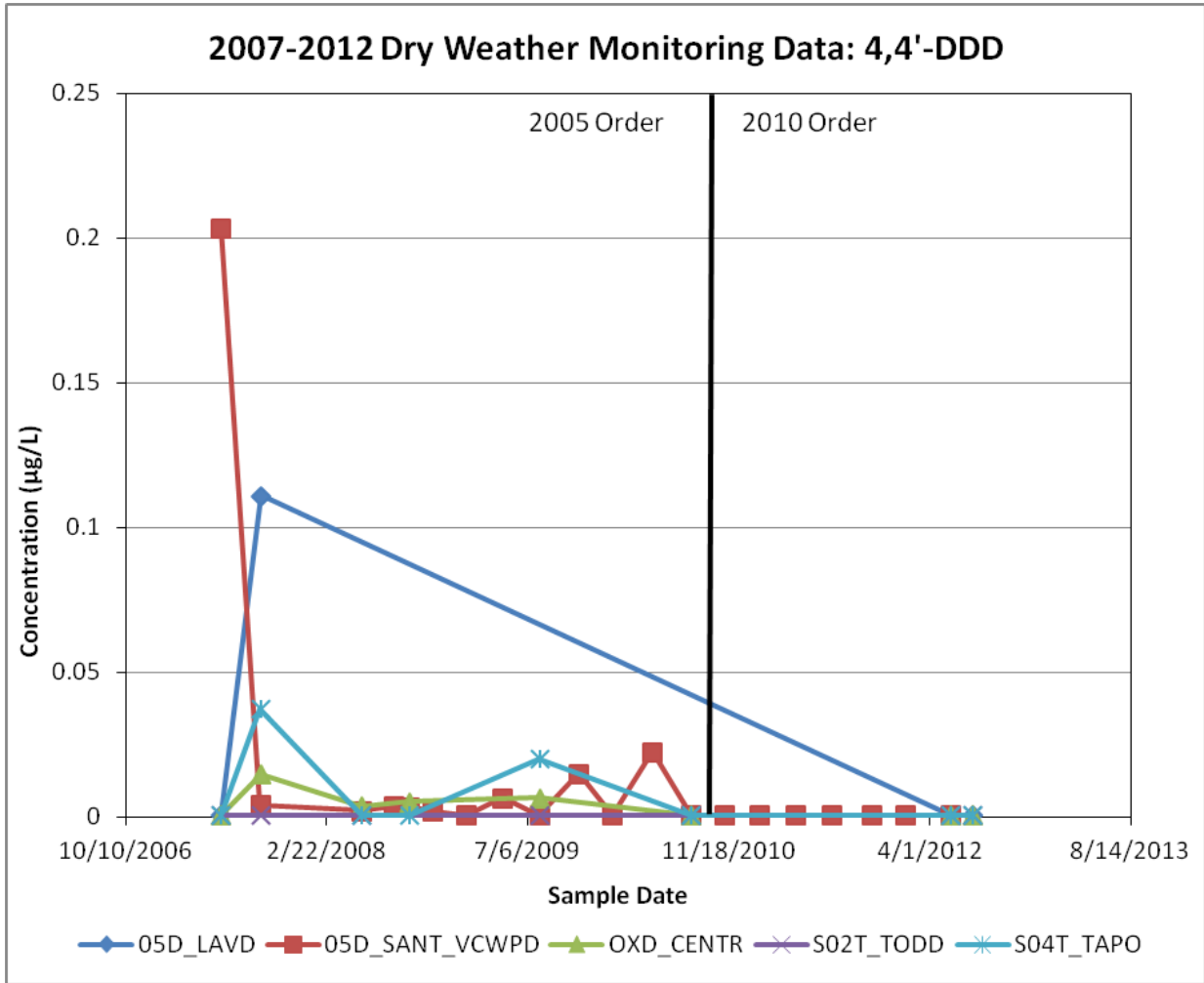


Figure 13. Dry weather DDD concentrations collected at first priority sites from 2007 to 2012

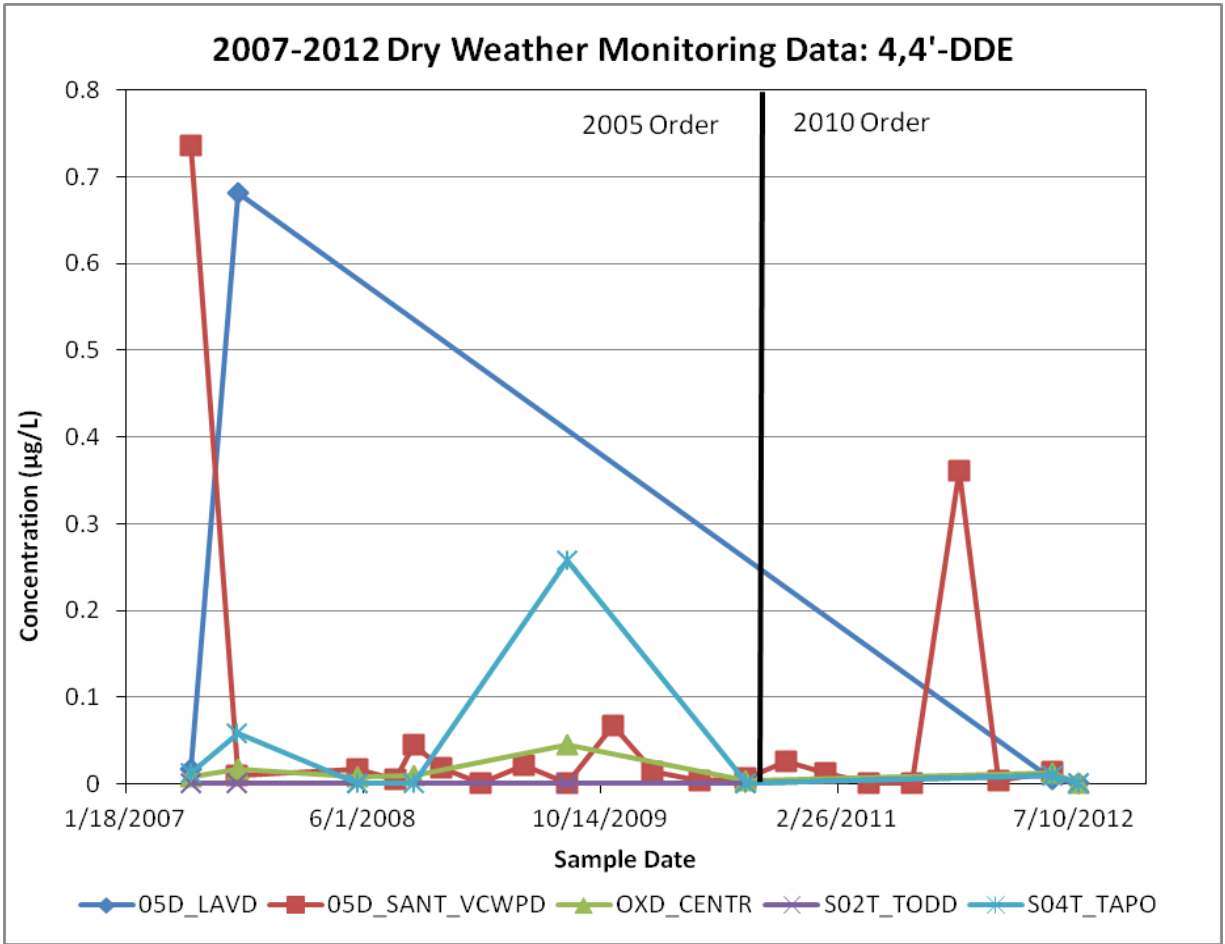


Figure 14. Dry weather DDE concentrations collected at first priority sites from 2007 to 2012

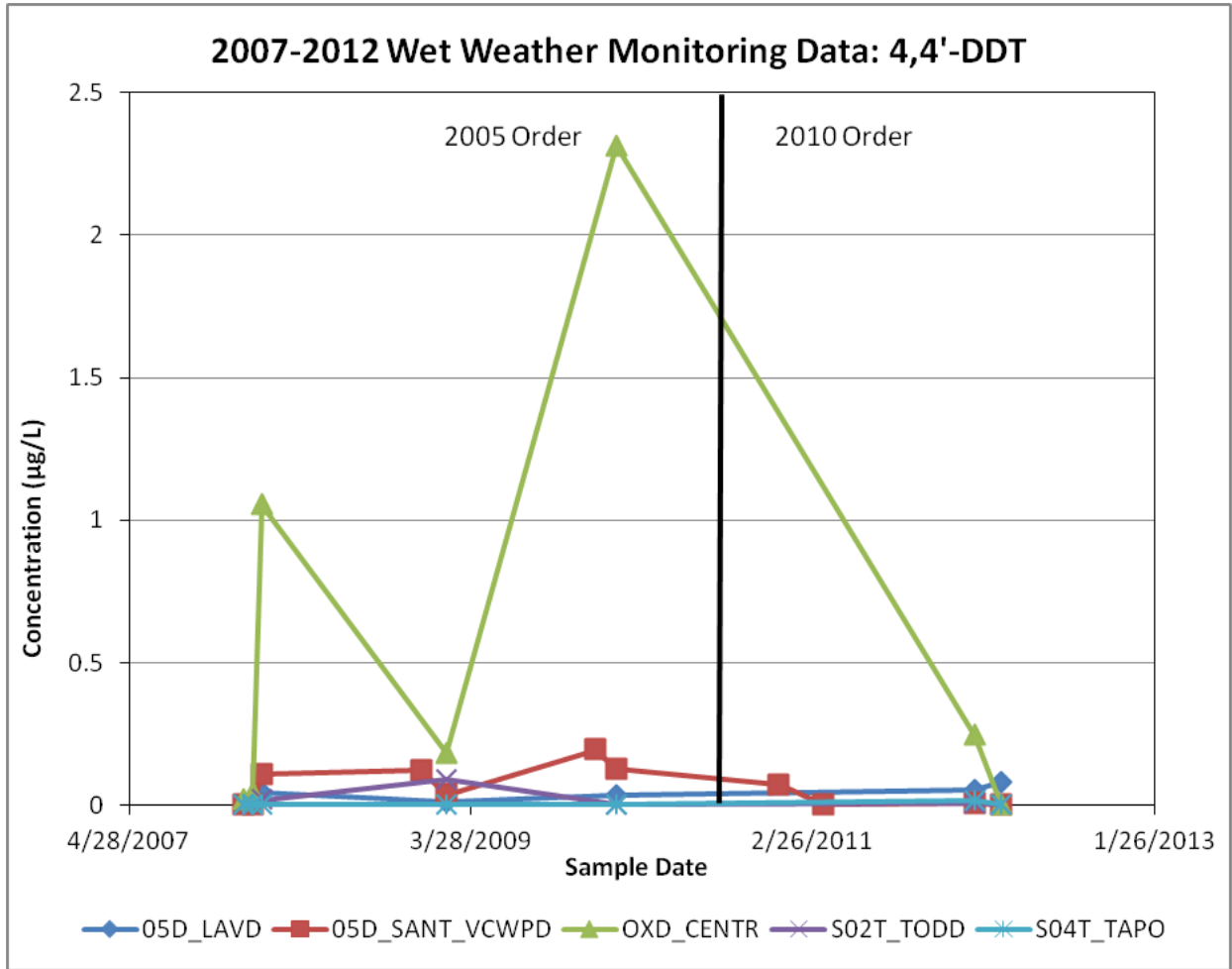


Figure 15. Wet weather DDT concentrations collected at first priority sites from 2007 to 2012

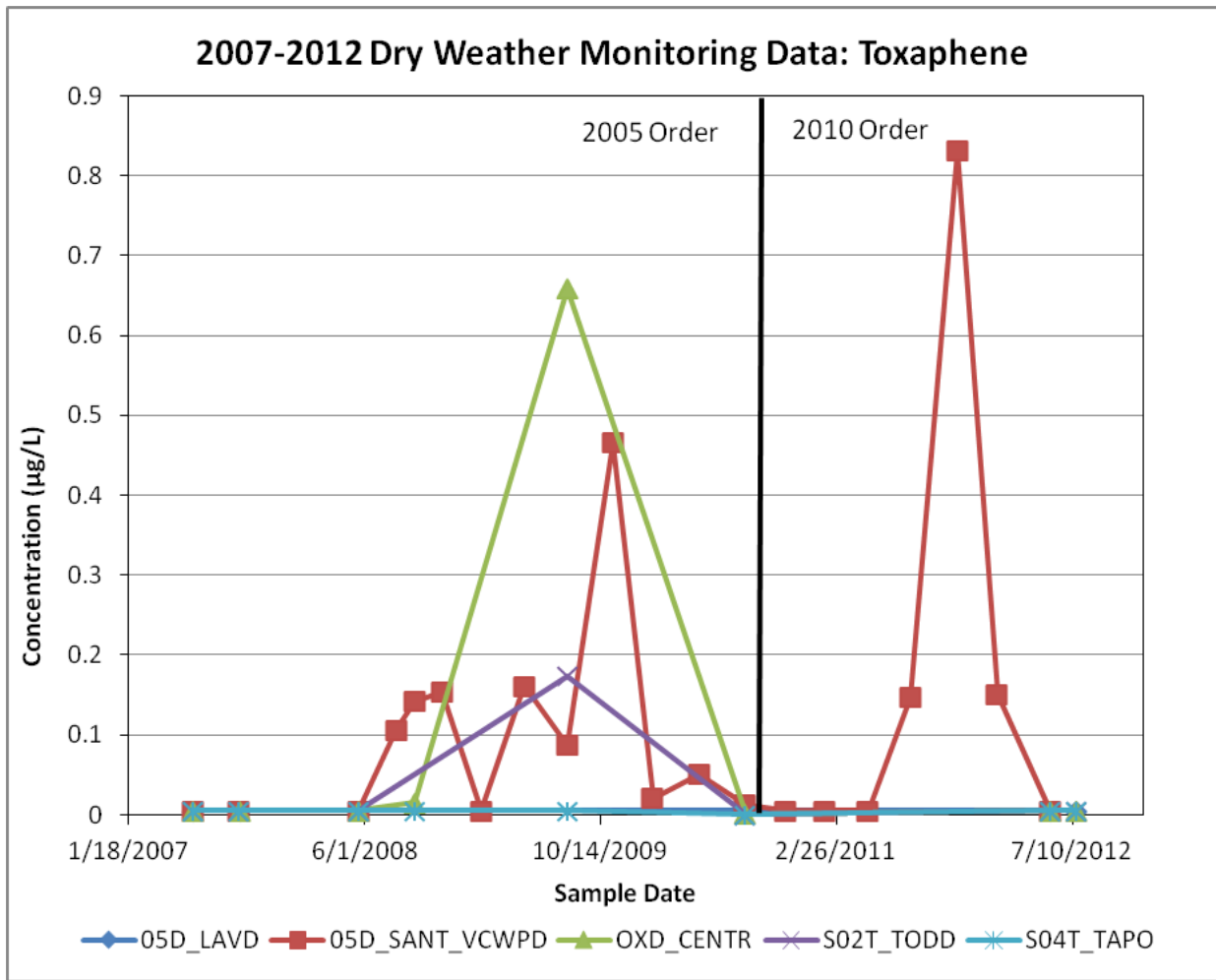


Figure 16. Dry weather toxaphene concentrations collected at first priority sites from 2007 to 2012

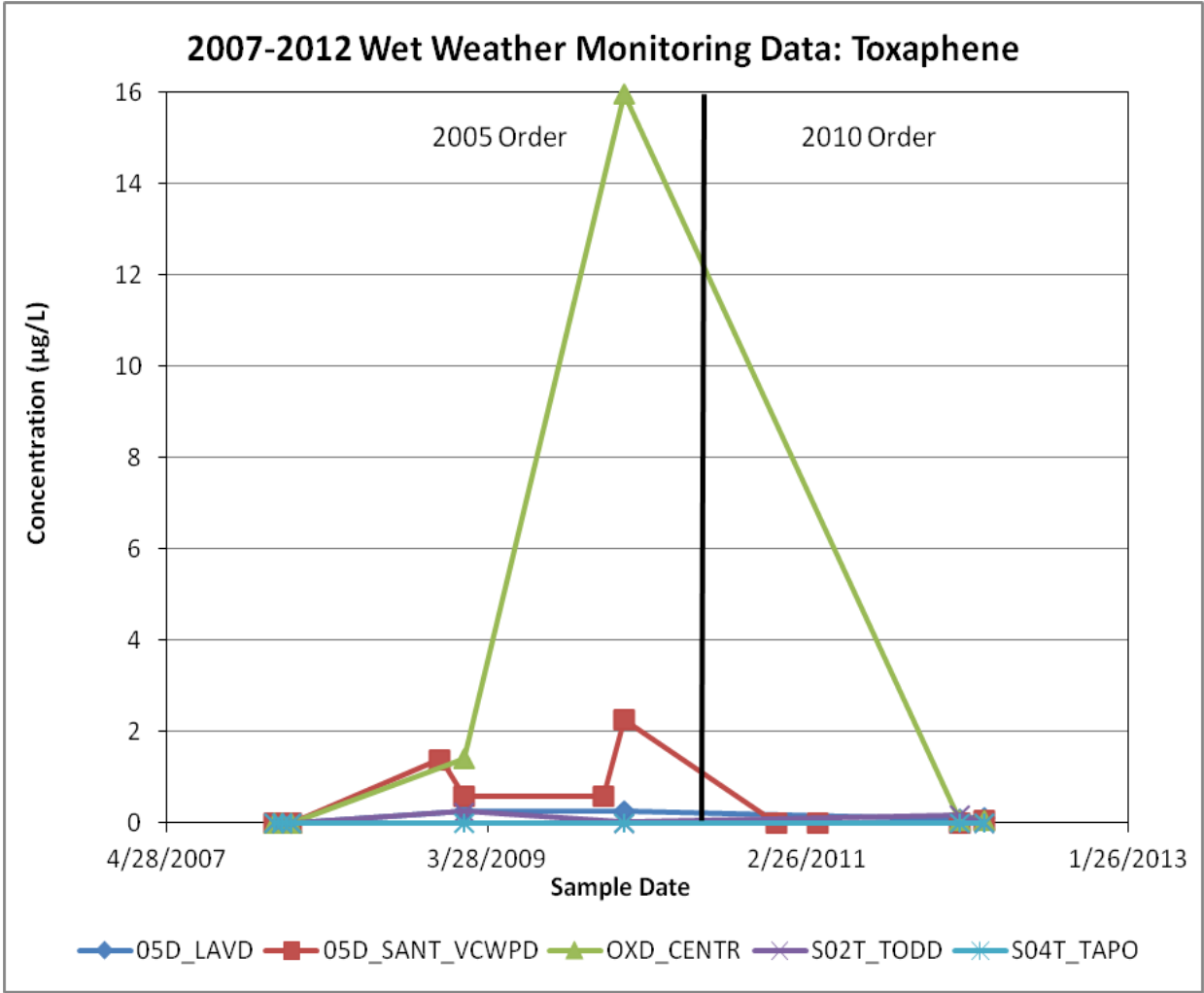


Figure 17. Wet weather toxaphene concentrations collected at first priority sites from 2007 to 2012

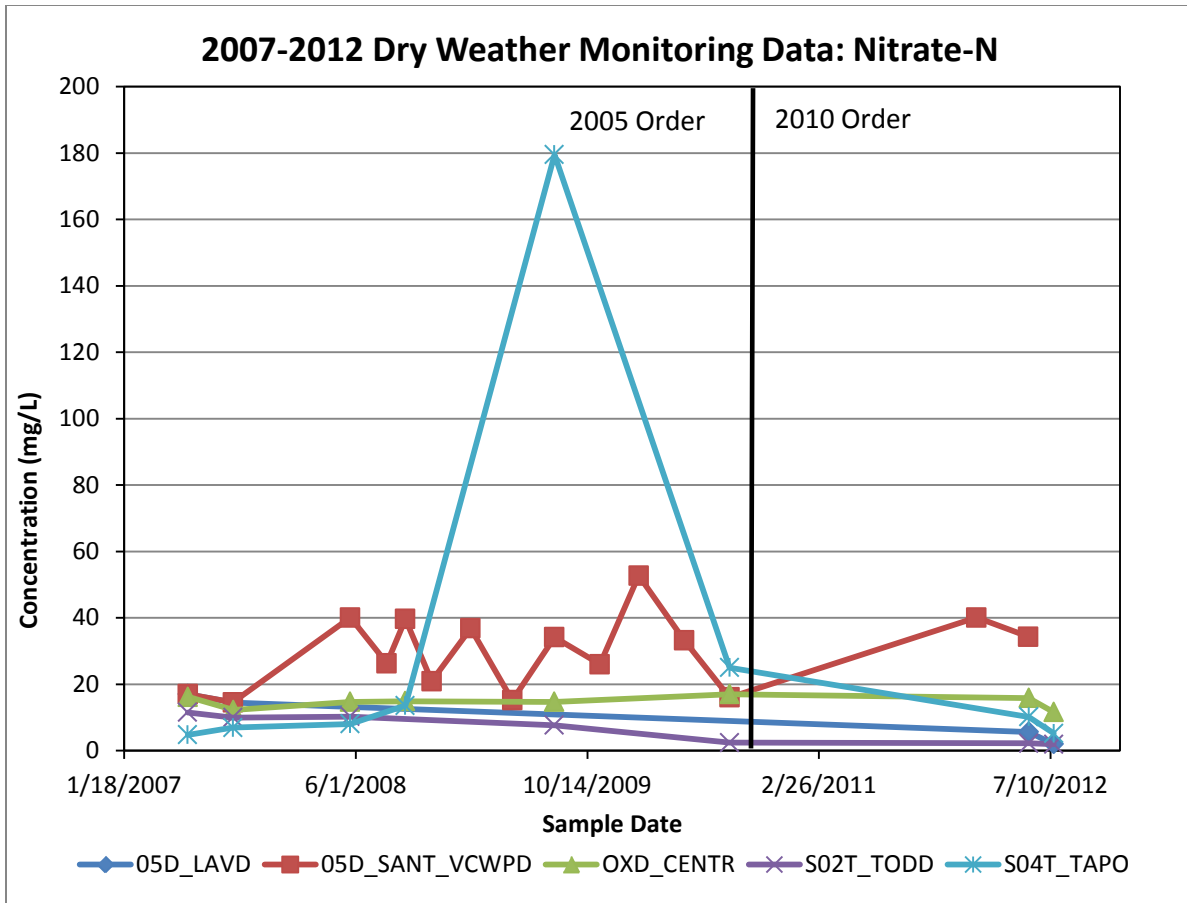


Figure 18. Dry weather Nitrate-N concentrations collected at first priority sites from 2007 to 2012

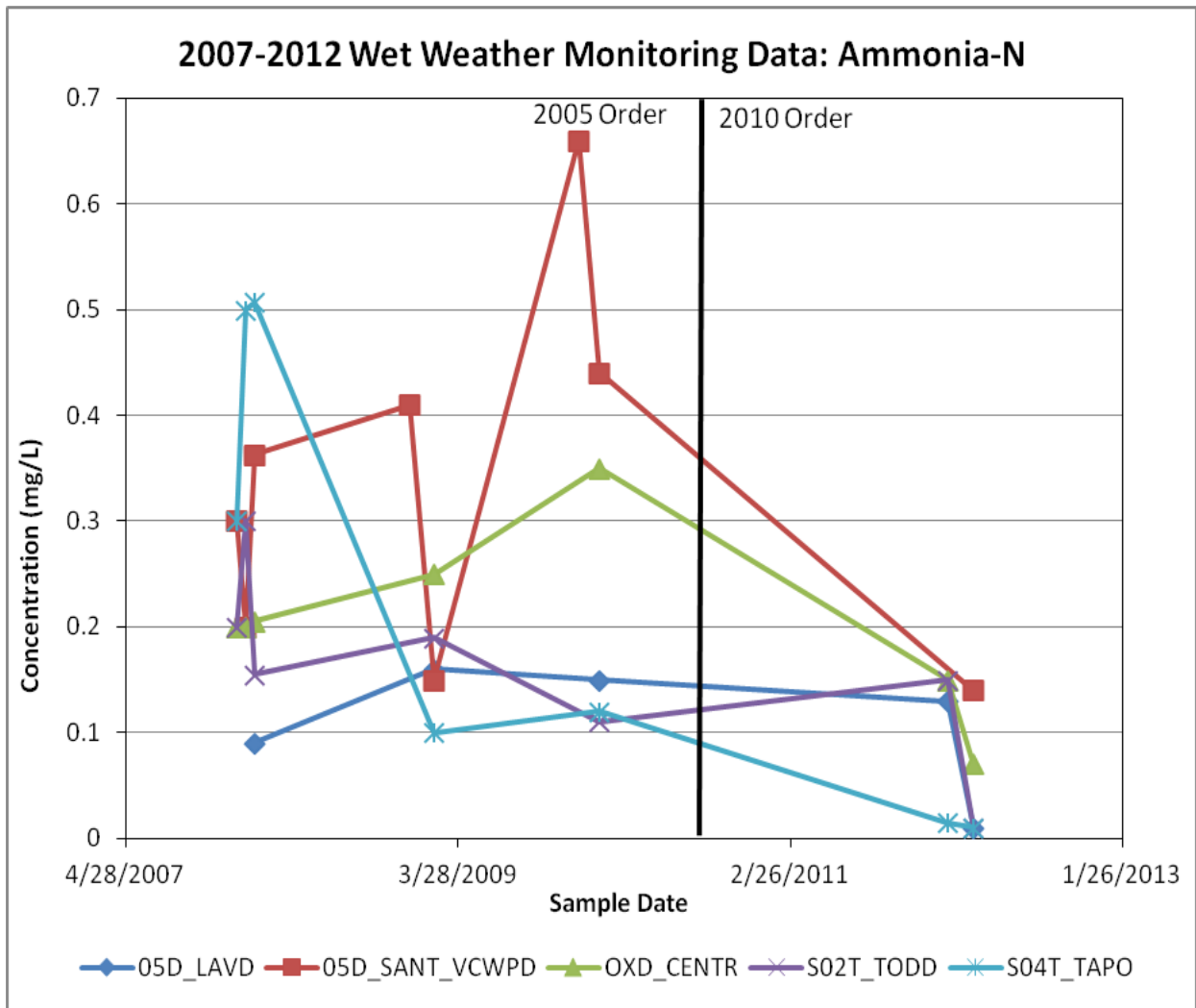


Figure 19. Wet weather Ammonia-N concentrations collected at first priority sites from 2007 to 2012

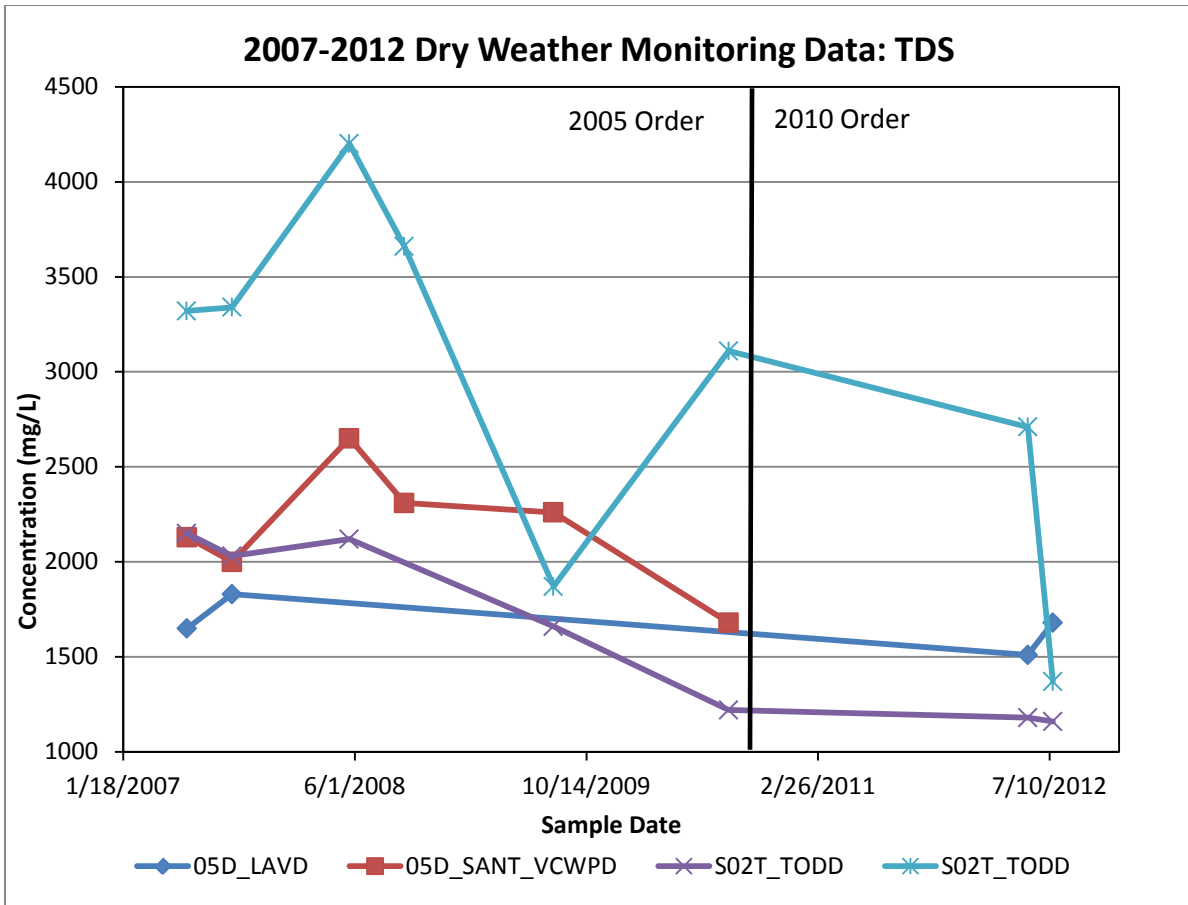


Figure 20. Dry weather TDS concentrations collected at first priority sites from 2007 to 2012

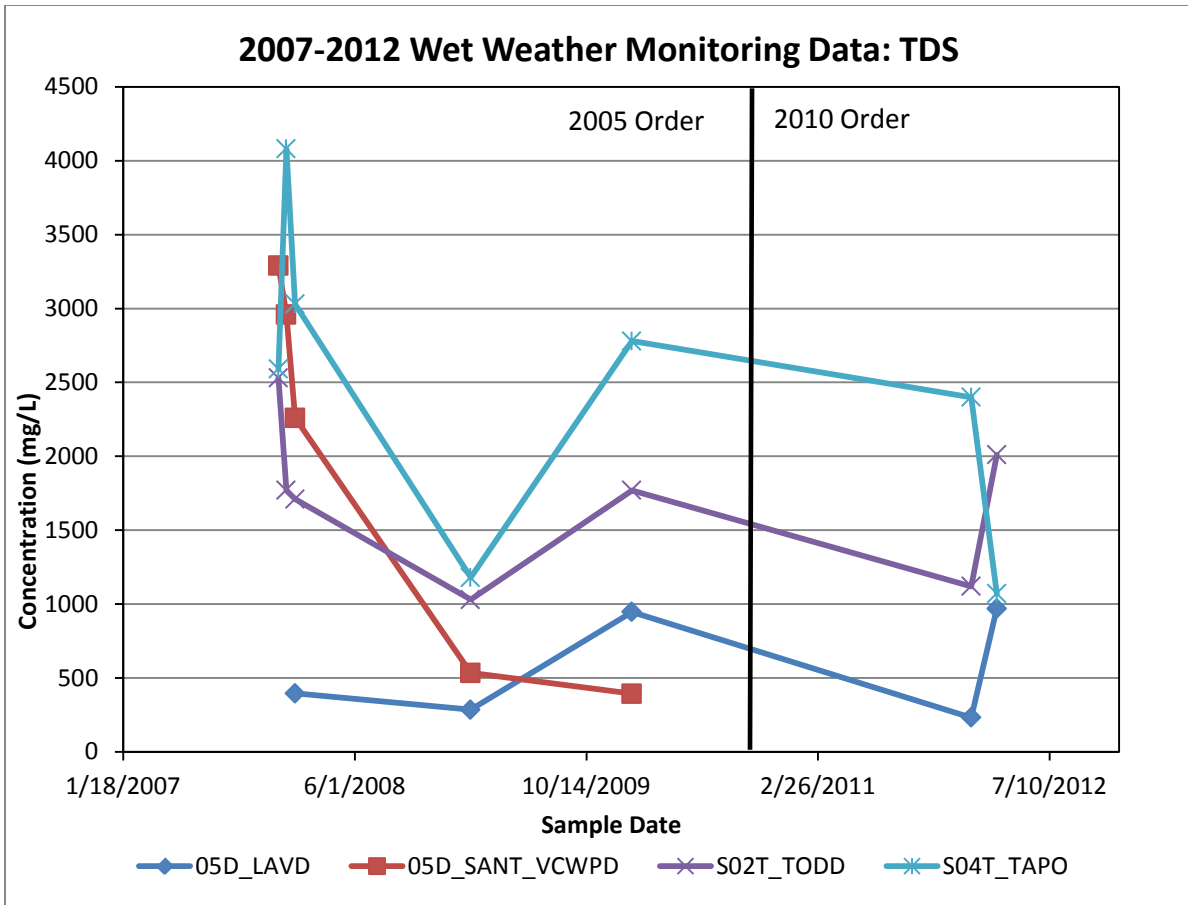


Figure 21. Wet weather TDS concentrations collected at first priority sites from 2007 to 2012

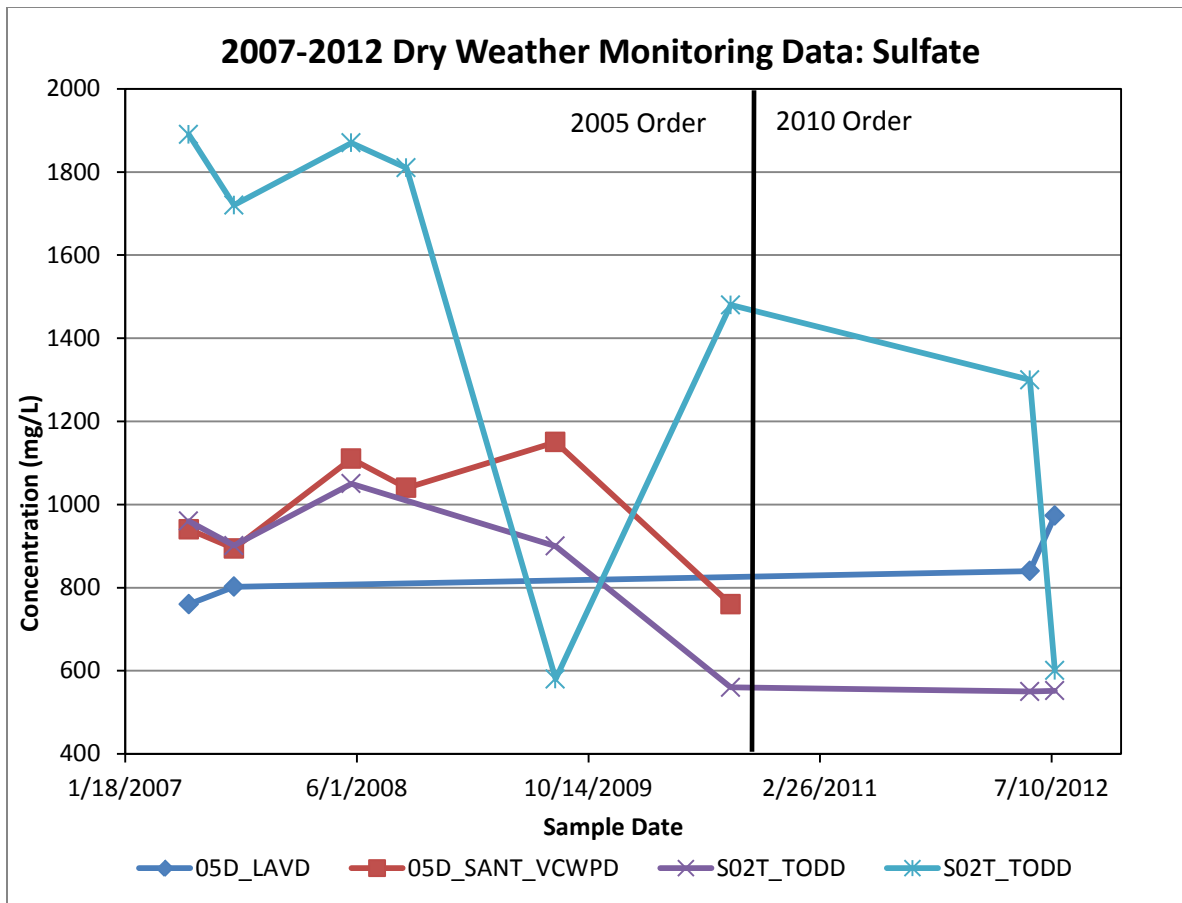


Figure 22. Dry weather sulfate concentrations collected at first priority sites from 2007 to 2012

SECOND PRIORITY SITES

Water quality data for constituents with benchmarks listed in the 2010 Order collected at second tier priority sites between 2007 and 2012 were analyzed to identify trends. Second tier priority sites include:

01T_ODD2_DCH 01T_ODD3_ARN 02D_BROOM
 04D_ETTG 04D_LAS

Water quality data were analyzed for the following constituents:

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

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

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

For DDT during dry weather, the data show a decreasing trend between samples collected prior to the 2010 Order and those collected after the 2010 Order except for at 01T_ODD3_ARN (Figure 12). For DDD and DDE, there do not appear to be any trends in the data. Overall, based on the data collected for DDT, DDD, and DDE during dry weather from 2007-2012, it appears that DDT has been breaking down into its metabolites with DDE the most prevalent metabolite.

For DDT during wet weather, concentrations appear to be decreasing slightly as compared to concentrations collected before the 2010 Order (Figure 15). For DDD and DDE during wet weather, there also appear to be decreasing trends in the data (Figure 26 and Figure 26, respectively).

Chlordane

During dry weather, there appears to be an increasing trend at 02D_BROOM and 01T_ODD3_ARN, while there is no trend at the other sites (Figure 27). For chlordane during wet weather, there appears to be a decreasing trend (Figure 28).

Dieldrin

Dieldrin has not been detected in any of the samples over the entire monitoring period during dry weather. Wet weather detections have not occurred since January 2008.

Toxaphene

During dry weather, there appears to be a decreasing trend in the concentrations of toxaphene except for two samples collected in August 2011 (Figure 29). In addition, during wet weather, there appears to be a slight decreasing trend in the concentrations of toxaphene (Figure 30).

Chlorpyrifos

For chlorpyrifos during dry weather, there is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame. However, during wet weather, there appears to be a decreasing trend in concentrations (Figure 31).

Diazinon

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

Nitrate-N

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

Ammonia-N

During dry and wet weather, there appears to be a slight downward trend except at 01T_ODD3_ARN due to two high values, one during dry weather and one during wet weather (Figure 32 and Figure 33, respectively).

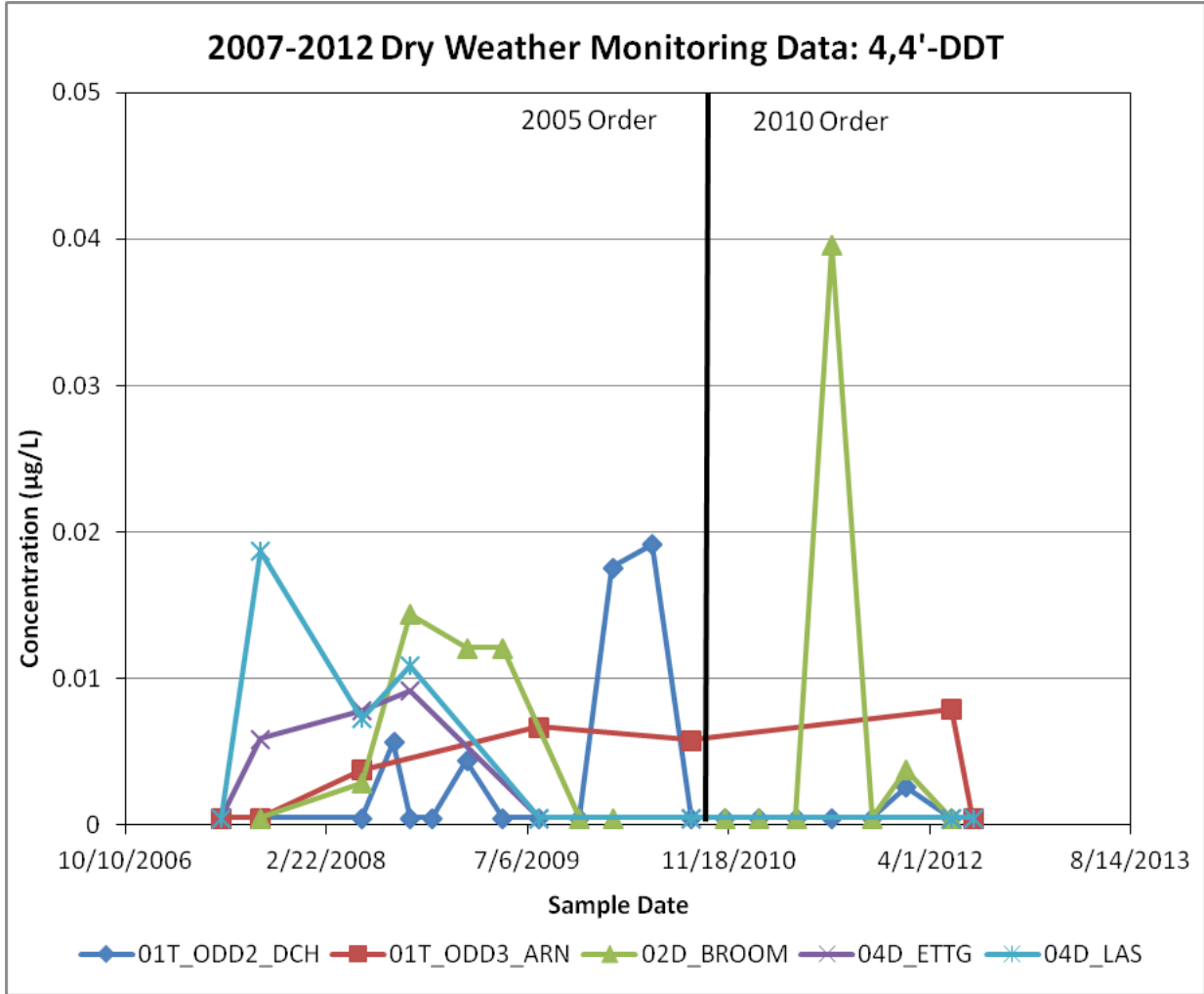


Figure 23. Dry weather DDT concentrations collected at second priority sites from 2007 to 2012

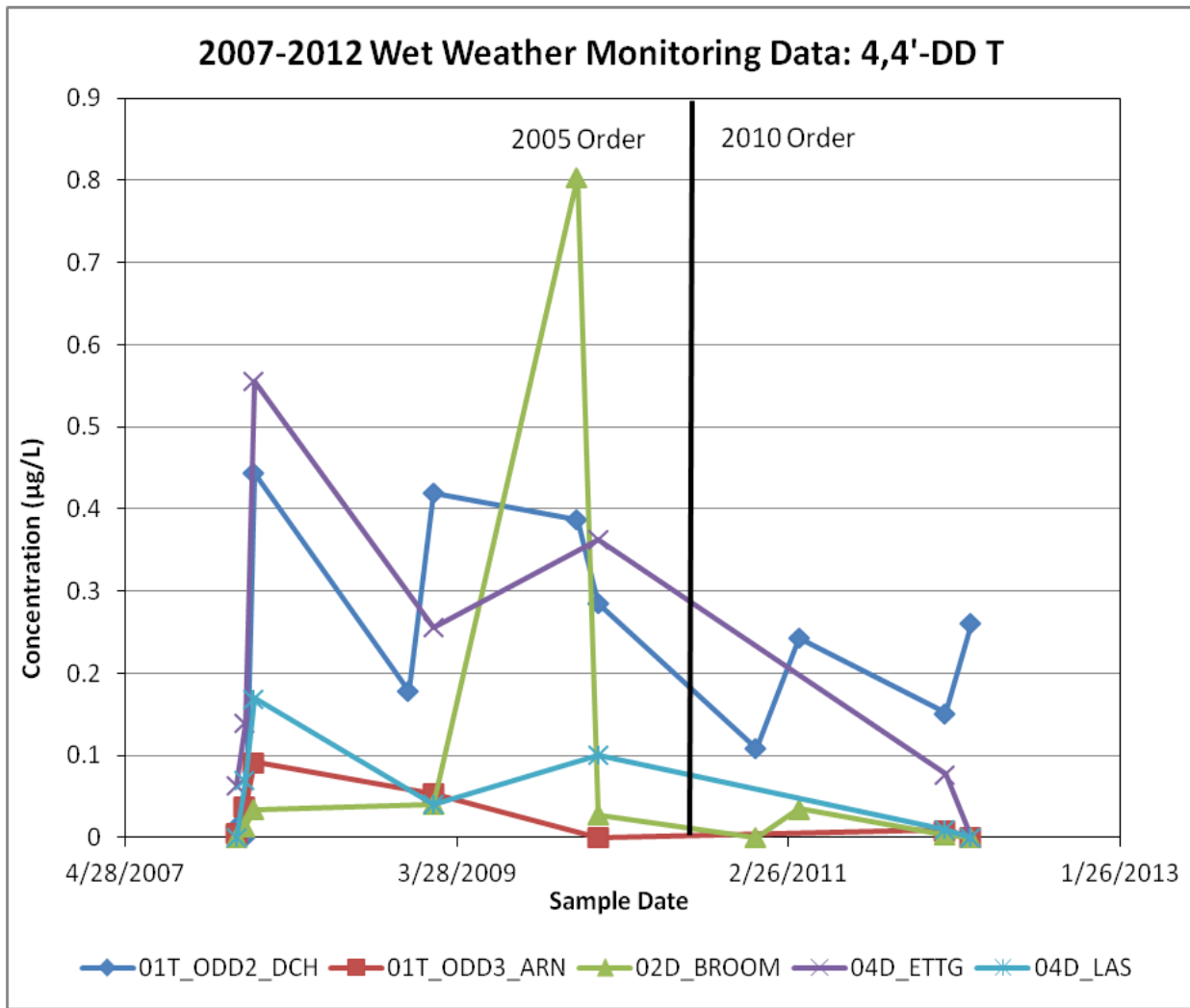


Figure 24. Wet weather DDT concentrations collected at second priority sites from 2007 to 2012

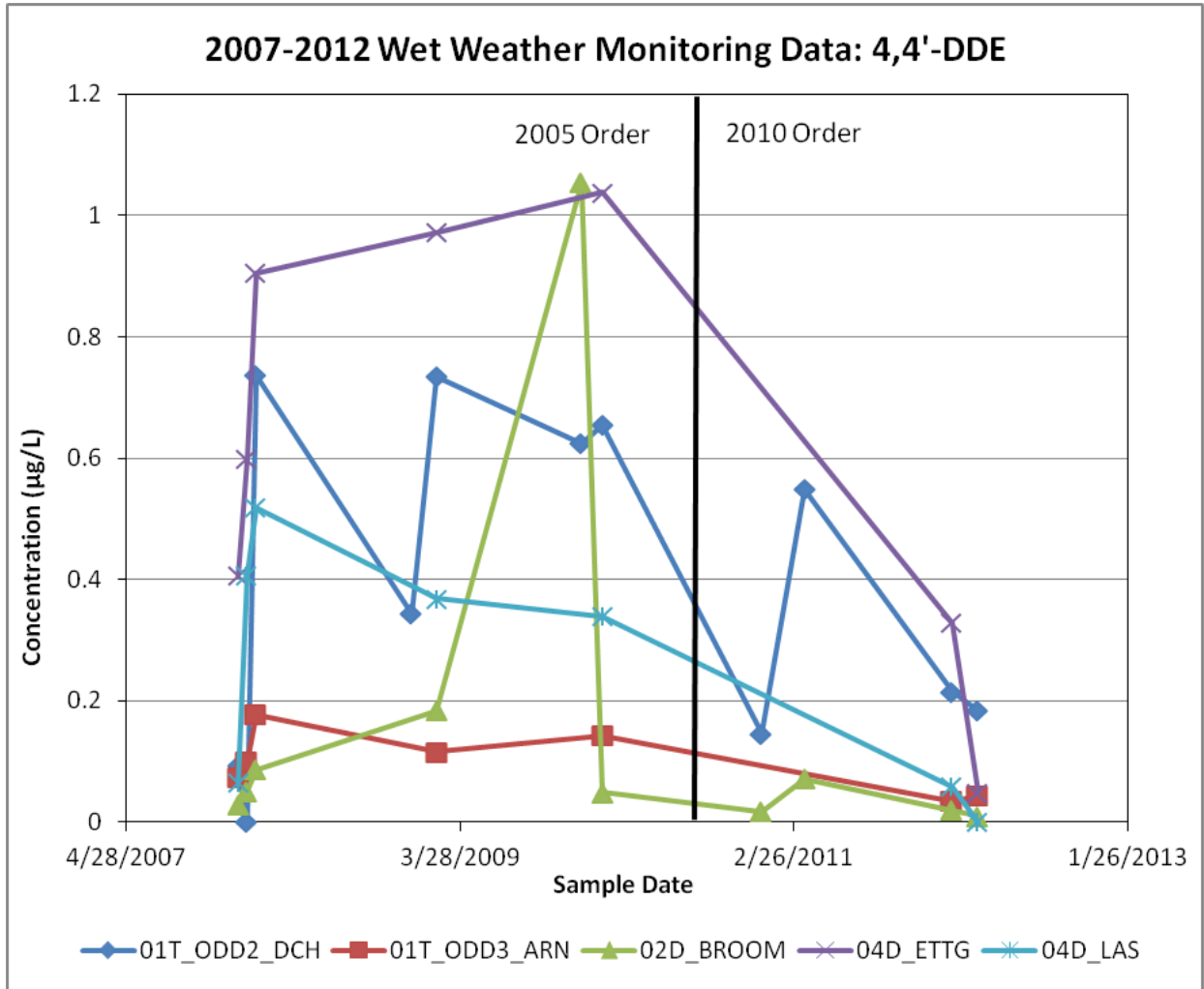


Figure 25. Wet weather DDE concentrations collected at second priority sites from 2007 to 2012

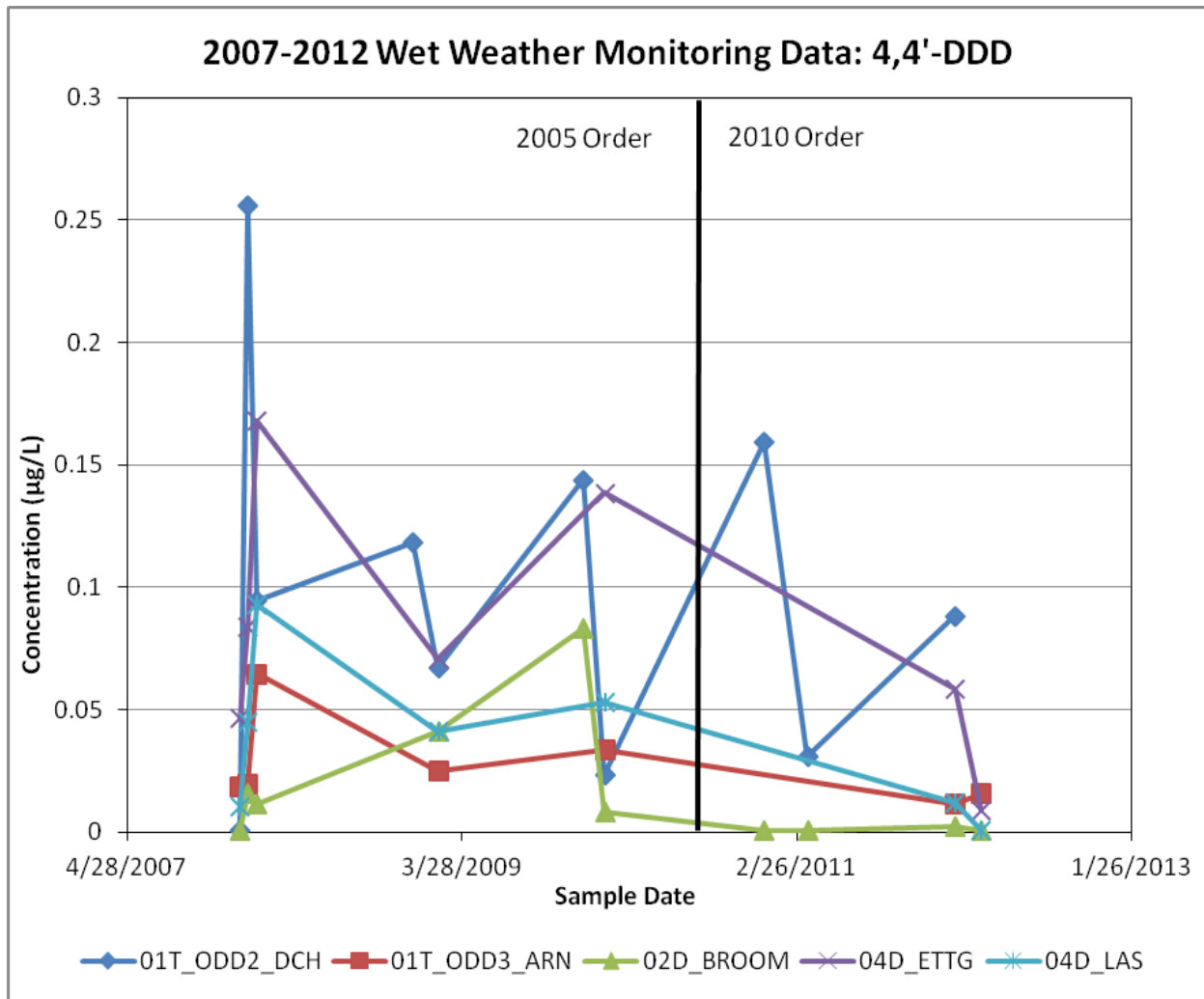


Figure 26. Wet weather DDD concentrations collected at second priority sites from 2007 to 2012

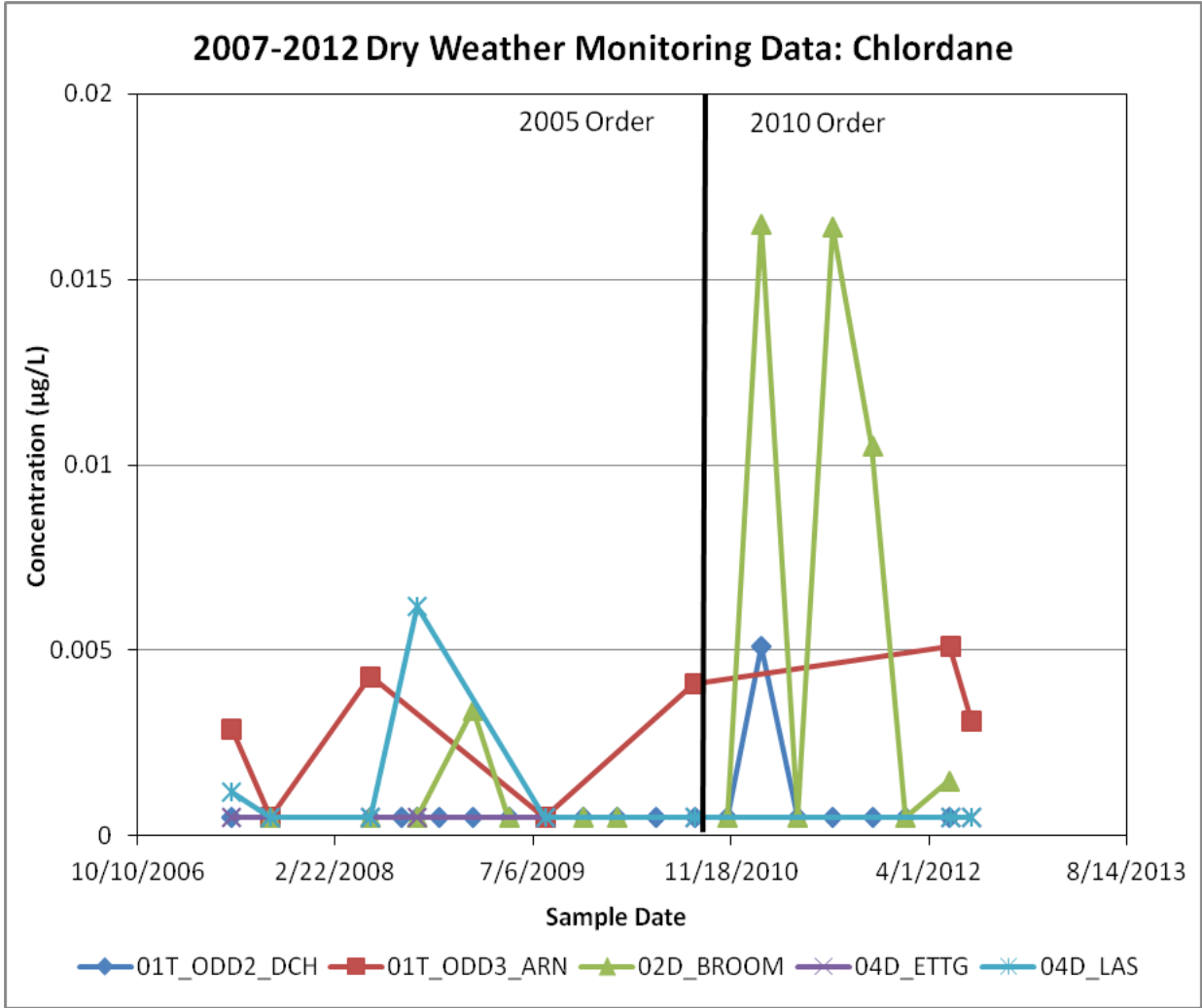


Figure 27. Dry weather chlordane concentrations collected at second priority sites from 2007-2012

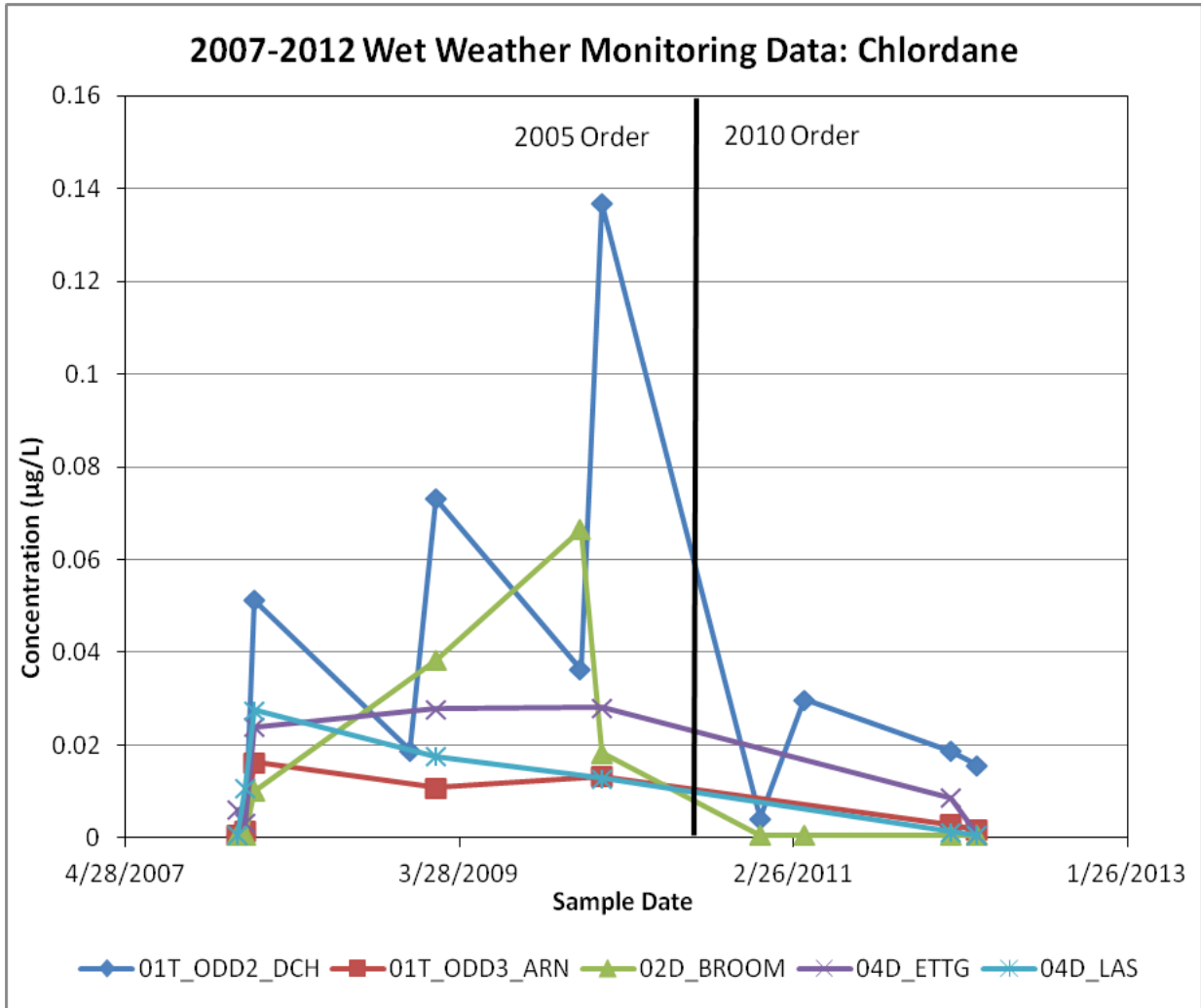


Figure 28. Dry weather chlordane concentrations collected at second priority sites from 2007-2012

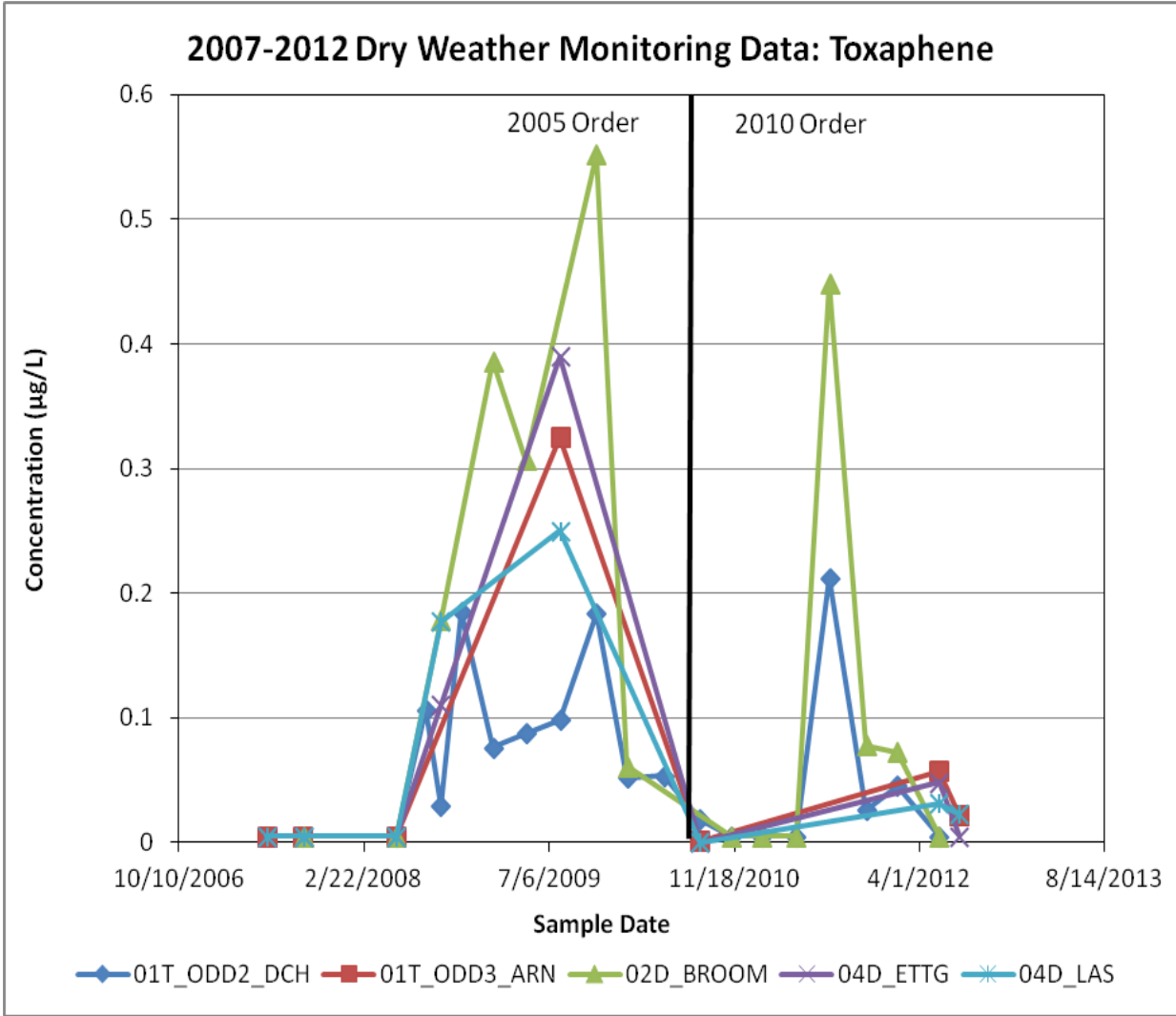


Figure 29. Dry weather toxaphene concentrations collected at second priority sites from 2007-2012

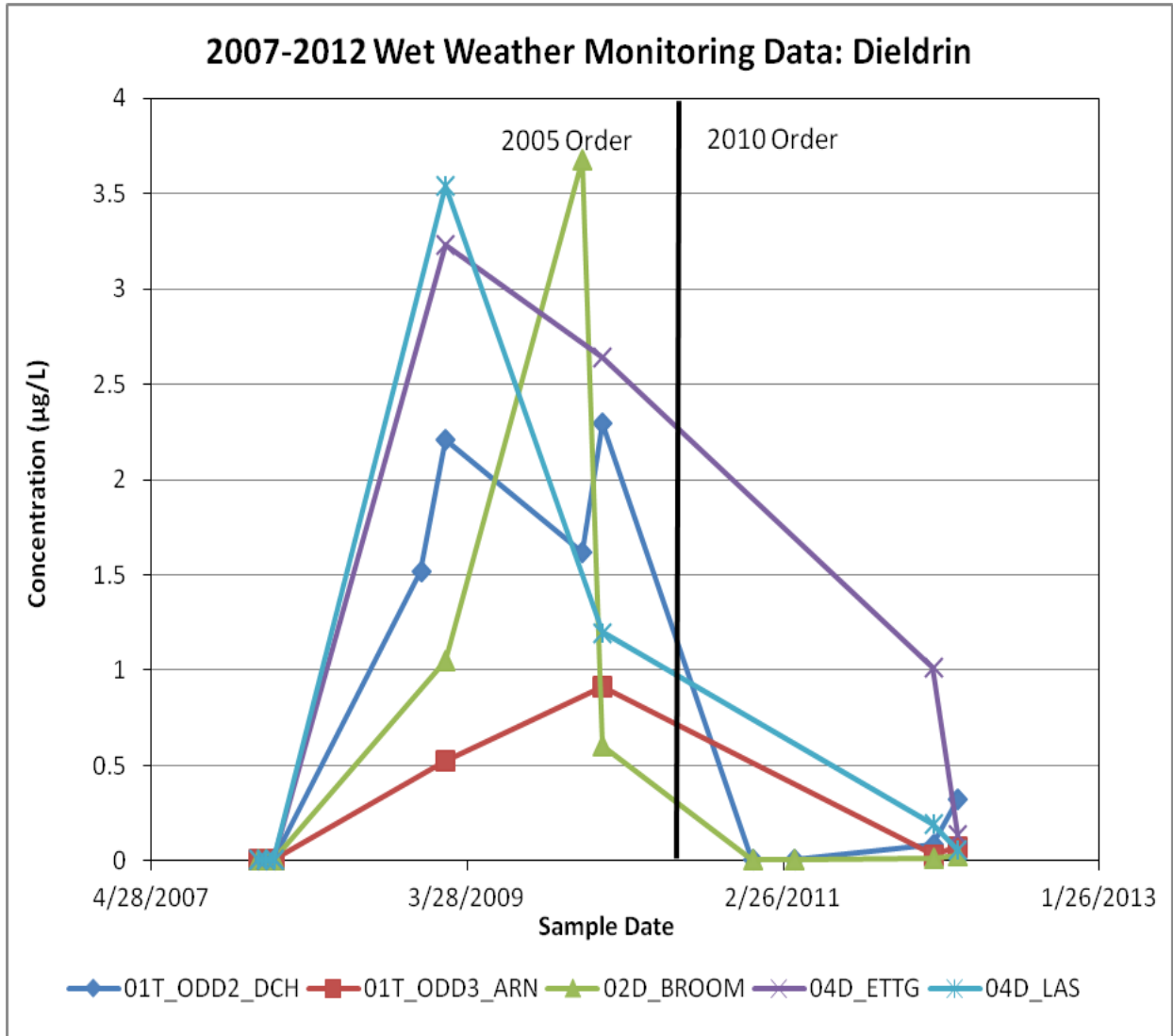


Figure 30. Wet weather toxaphene concentrations collected at second priority sites from 2007-2012

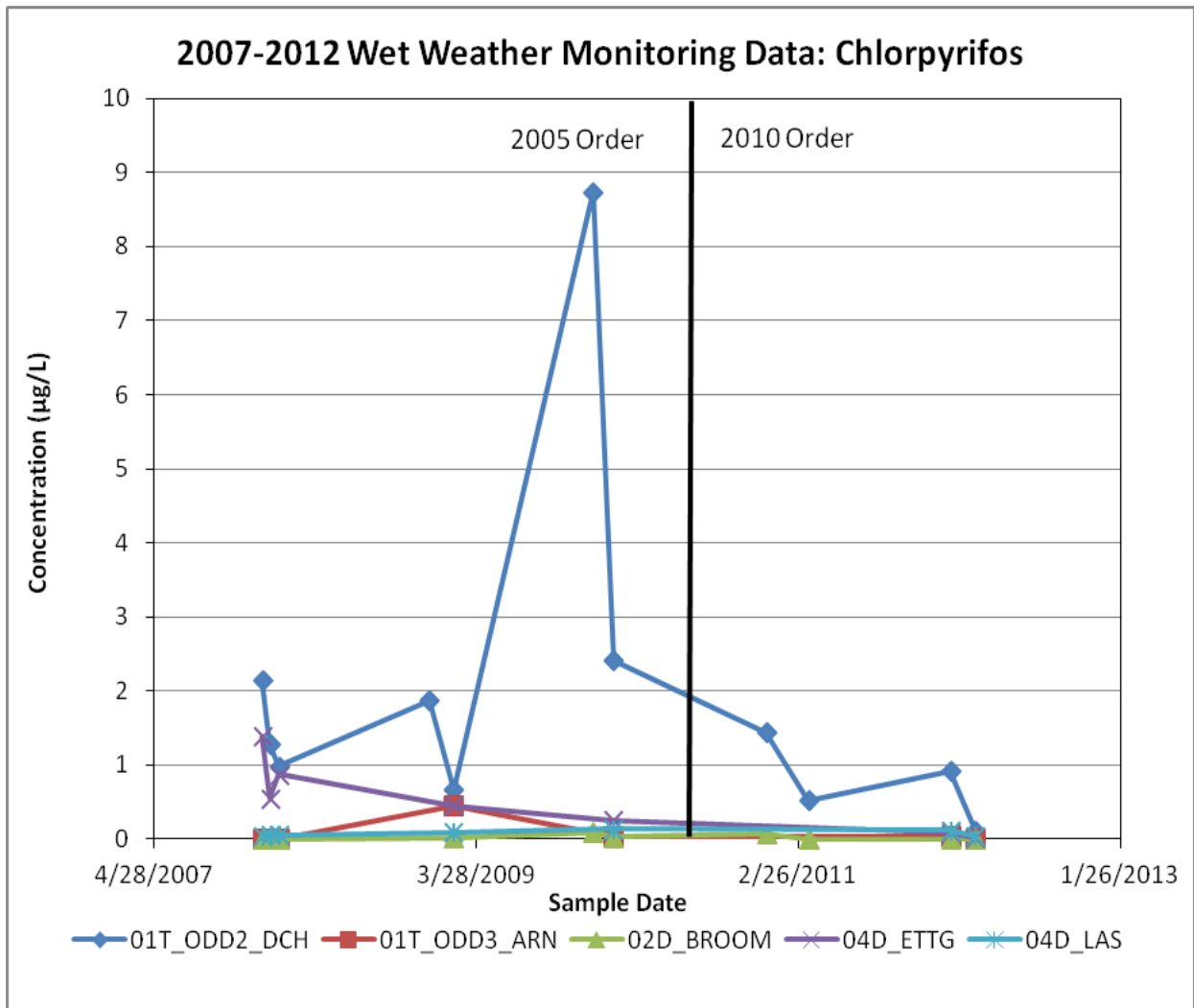


Figure 31. Wet weather chlorpyrifos concentrations collected at second priority sites from 2007-2012

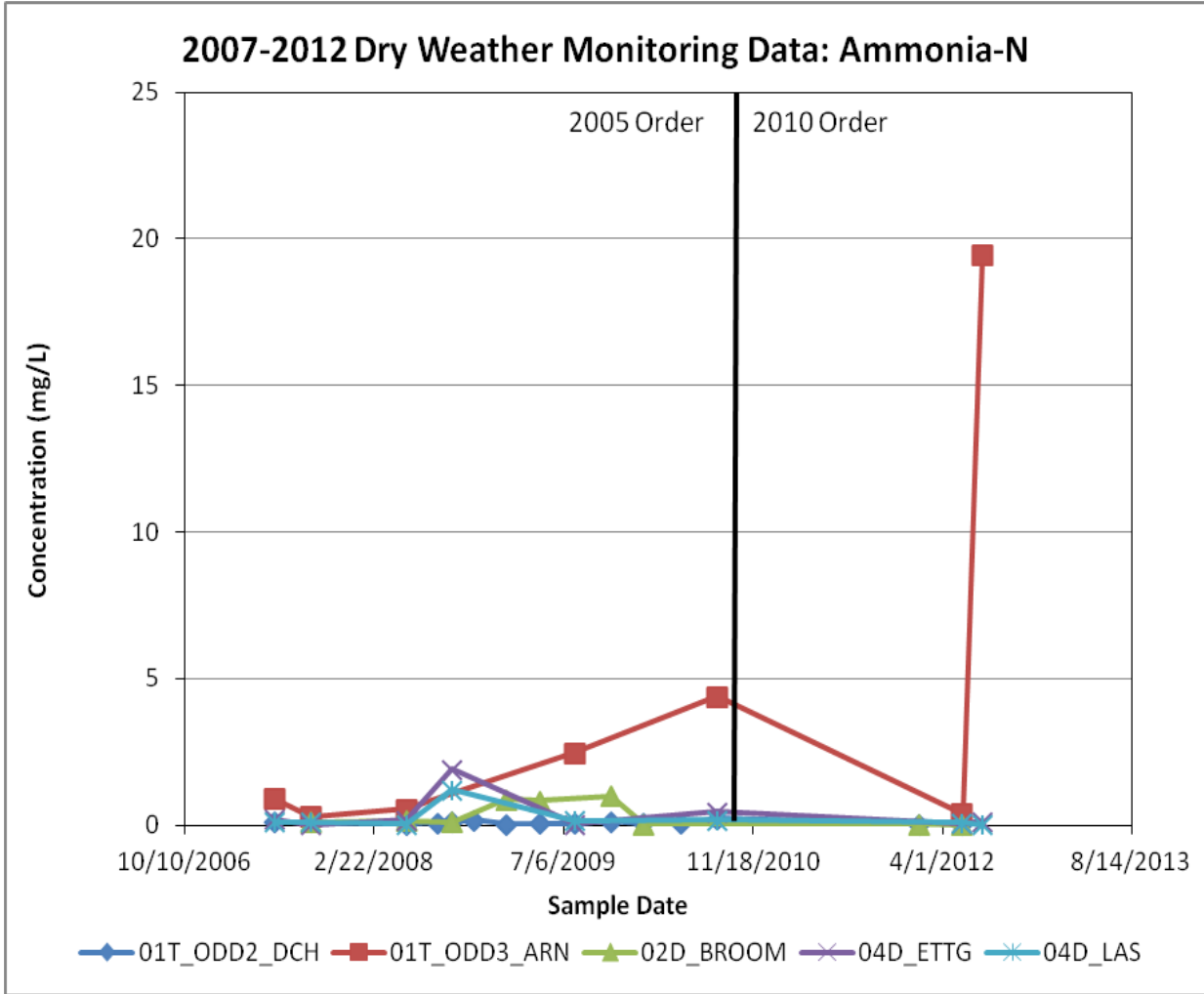


Figure 32. Dry weather ammonia-N concentrations collected at second priority sites from 2007-2012

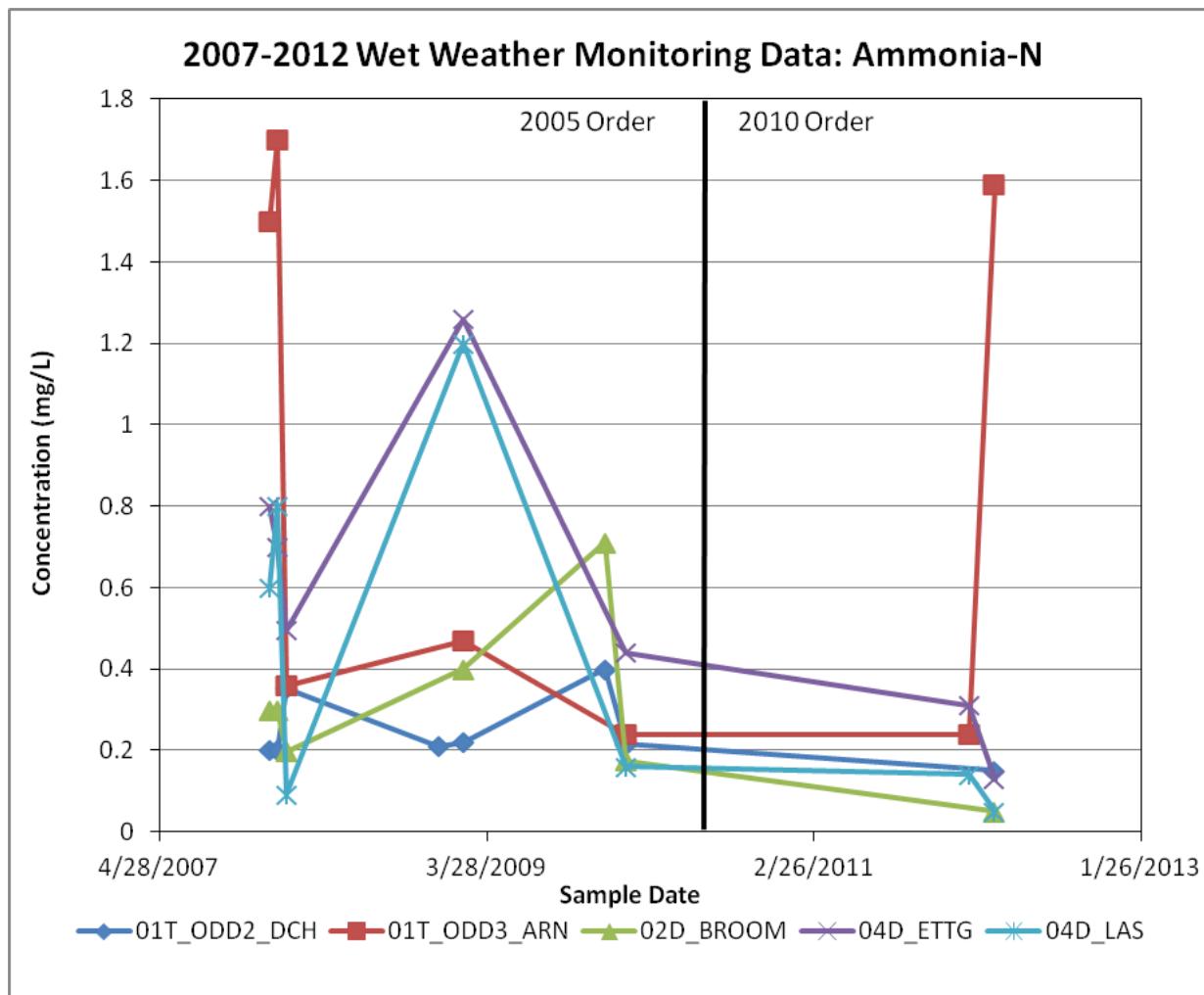


Figure 33. Wet weather ammonia-N concentrations collected at second priority sites from 2007-2012

THIRD AND NON-PRIORITY SITES

Water quality data for constituents with benchmarks listed in the 2010 Order collected at VCAILG sites between 2007 and 2012 were analyzed to identify trends. VCAILG sites include:

05T_HONDO	O6T_FC_BR	06T_LONG2	9BD_GERRY	S02T_ELLS
S03D_BARDS	S03T_BOULD	S03T_TIMB	VRT_SANTO	VRT_THACH

Water quality data were analyzed for the following constituents:

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

For dry weather, only one VCAILG site has data that span the entire monitoring time frame (06T_FC_BR). Therefore, dry weather data trends are not discussed. For wet weather,

06T_LONG2, S03T_TIMB, S03T_BOULD, VRT_SANTO, and VRT_THACH do not have data that span the entire monitoring time frame. Wet weather trends are based on the monitoring sites that have data spanning the entire time frame. Data trends are discussed below by constituent.

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

Based on the data collected for DDT, DDD, and DDE from 2007-2012, it appears that DDT has been breaking down into its metabolites with DDE the most prevalent metabolite. However, there is no discernible trend in DDT concentrations as they have increased and decreased variably throughout the monitoring period. Additionally, for DDD and DDE, there do not appear to be any trends in the data as concentrations have increased and decreased variably throughout the monitoring time frame.

Chlordane

There is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame

Dieldrin

Dieldrin has not been detected in any of the samples over the entire monitoring period.

Toxaphene

There appears to be a slight decreasing trend in the concentrations of toxaphene (Figure 34).

Chlorpyrifos

There appears to be a slight decreasing trend in the concentrations of chlorpyrifos (Figure 35).

Diazinon

There is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame.

Nitrate-N

There is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame.

Ammonia-N

There is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame.

TDS

There is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame.

Sulfate

There is no discernible trend as concentrations have increased and decreased variably throughout the monitoring time frame.

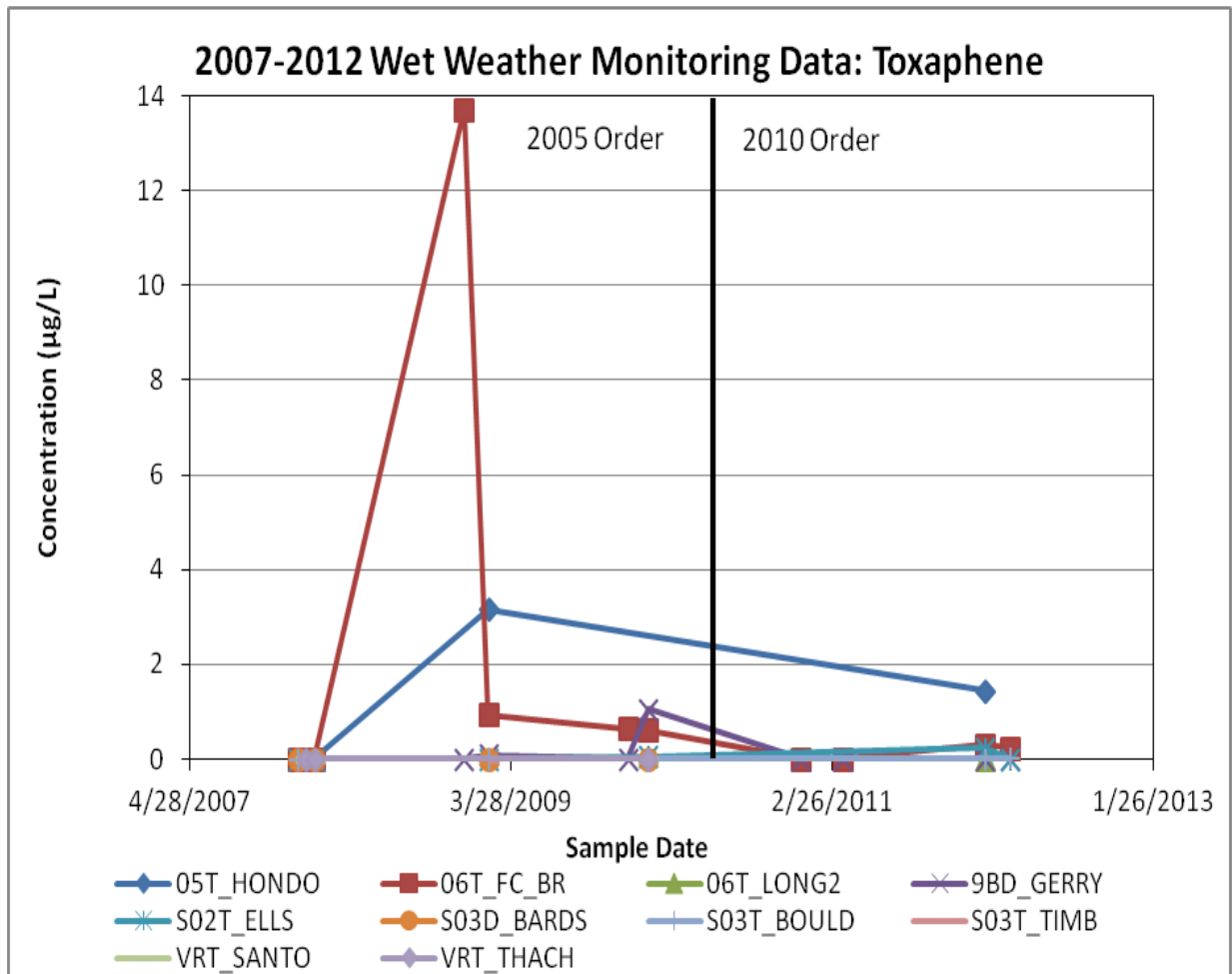


Figure 34. Wet weather toxaphene concentrations collected at VCAILG sites from 2007 to 2012

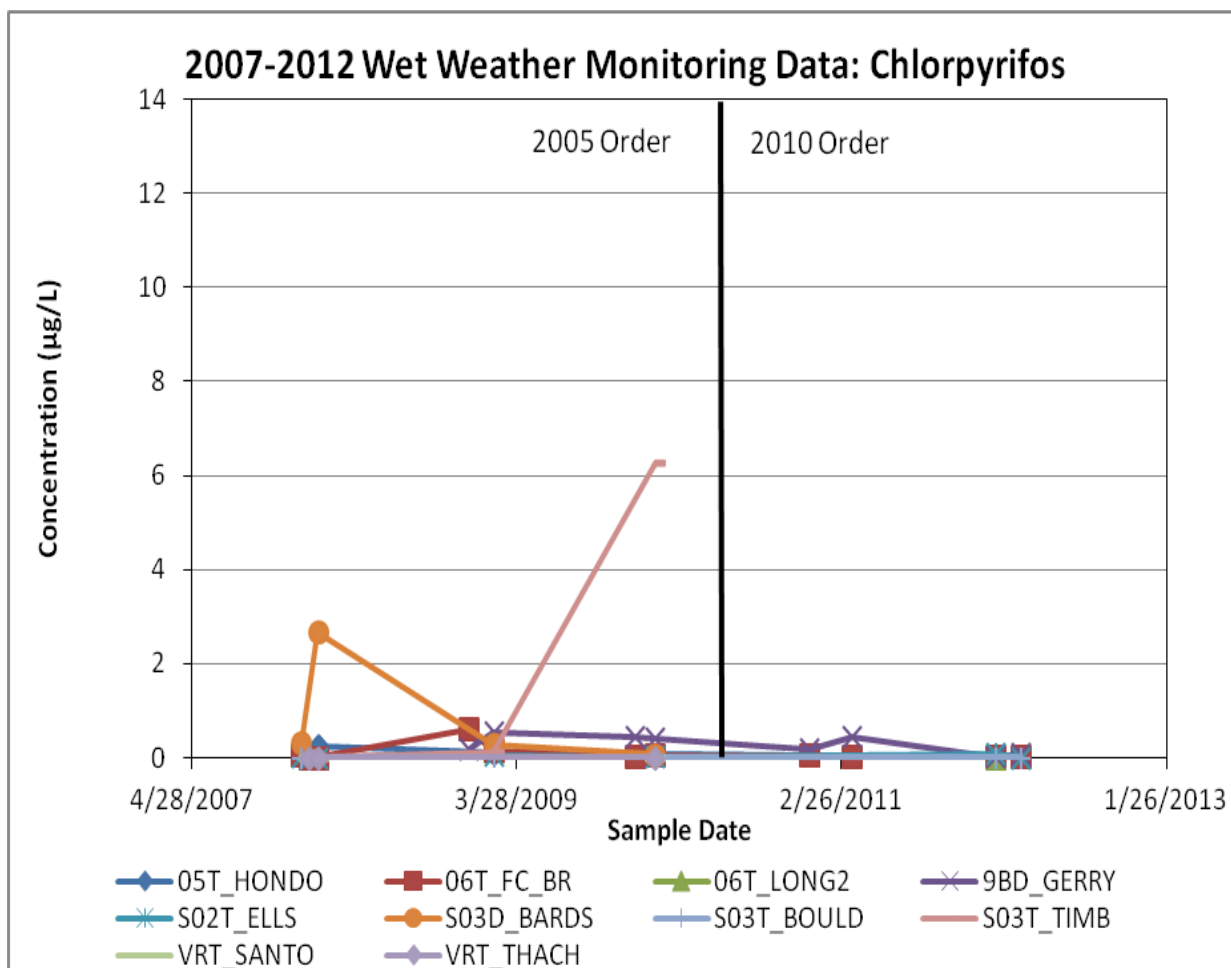


Figure 35. Wet weather chlorpyrifos concentrations collected at VCAILG sites from 2007 to 2012

CHRONIC TOXICITY

The following summarizes chronic toxicity results for all VCAILG events covering the 2005 Conditional Waiver and the first year of monitoring for the 2010 Conditional Waiver. During the three-species screen tests, the fish species was never observed to be the most sensitive at any of the monitoring sites. None of the samples tested exhibited fish survival toxicity. Therefore, in later testing, either the algae or invertebrate were used to evaluate toxicity.

At the freshwater sites, reproduction toxicity in *Ceriodaphnia* was the most commonly observed toxic response. Conversely survival toxicity for this organism occurred only once. *Selenastrum* growth toxicity was observed in 42% of the samples. In instances of significant toxicity, further investigation through TIE testing takes place. TIE procedures are initiated when there is at least 50% mortality (vertebrate and invertebrate species) or a 50% reduction in growth (algal species). There were only four instances of freshwater organisms triggering TIE testing between June 2007 and July 2012. Two of the instances occurred in 2007, one in 2008, and one in 2009; all except the 2008 TIE were during dry weather.

Overall, chronic toxicity for high-conductivity sites is low. There were only three instances of toxicity exceeding the organism-specific thresholds between June 2007 and July 2012; one of

which triggered a TIE. The 2007 TIE occurred during dry weather in 2007 and was an exceedance of the *Thalassiosira* (algae) growth endpoint. There were no exceedances of the *Menidia beryllina* (vertebrate) threshold.

Table 84. Chronic Toxicity Results for Freshwater Sites

Site	Event	Type	<i>Selenastrum</i> ¹		<i>Ceriodaphnia</i> ²			<i>Pimephales promelas</i> ³			TIE Triggered?
			Growth Toxicity	Growth % Red.	Survival Toxicity	Reprod. Toxicity	Reprod. % Red.	Survival Toxicity	Biomass Toxicity	Biomass % Red.	
S03T_BOULD	1: Jun 2007	Dry	Y	54.4	N	Y	84.0	N	Y	26.4	<i>Selenastrum</i>
S02T_TODD	1: Jun 2007	Dry	Y	93.7	N	Y	23.2	N	N	----	<i>Selenastrum</i>
05D_LAVD	1: Jun 2007	Dry	N	----	N	Y	25.9	N	N	----	N
05T_HONDO	4: Jan 2008	Wet	N	----	N	Y	16.6	N	N	----	N
06T_FC_BR	4: Jan 2008	Wet	Y	39.5	N	Y	25.6	N	N	----	N
S02T_ELLS	4: Jan 2008	Wet	N	----	N	Y	32.4	N	N	----	N
S03T_TIMB	4: Jan 2008	Wet	Y	14.7	N	Y	18.2	N	N	----	N
VRT_THACH	4: Jan 2008	Wet	N	----	N	N	----	N	N	----	N
VRT_SANTO	4: Jan 2008	Wet	N	----	N	N	----	N	N	----	N
S02T_TODD	4: Jan 2008	Wet			N	Y	100.0				N ⁵
S03T_BOULD	4: Jan 2008	Wet			N	Y	48.8				N
S02T_ELLS ⁴	7: Sep 2008	Dry			NR	NR	NR				NR
S02T_TODD	9: Aug 2009	Dry	Y	12.89							N
S04T_TAPO	9: Aug 2009	Dry	Y	92.67							<i>Selenastrum</i>
S02T_TODD	11: Aug 2010	Dry	Y	26.6							N
06T_FC_BR	11: Aug 2010	Dry	N	----							N
S02T_ELLS	11: Aug 2010	Dry			N	Y	19.0				N
S02T_TODD	12: Jan 2012	Wet	N	----	N	Y	42.4	N	N	----	N
S02T_ELLS	12: Jan 2012	Wet	N	----	N	Y	52.0	N	N	----	N
S03T_BOULD	12: Jan 2012	Wet	N	----	N	Y	18.4	N	N	----	N
05D_LAVD	12: Jan 2012	Wet	Y	20.9	N	Y	44.3	N	Y	2.2	N
05T_HONDO	12: Jan 2012	Wet	N	----	N	Y	55.4	N	N	----	N
06T_LONG	12: Jan 2012	Wet	N	----	N	Y	33.2	N	N	----	N

Site	Event	Type	<i>Selenastrum</i> ^[1]		<i>Ceriodaphnia</i> ^[2]			<i>Pimephales promelas</i> ^[3]			TIE Triggered?
			Growth Toxicity	Growth % Red.	Survival Toxicity	Reprod. Toxicity	Reprod. % Red.	Survival Toxicity	Biomass Toxicity	Biomass % Red.	
S02T_TODD	15: Jul 2012	Dry			N	N	----				N
S04T_TAPO	15: Jul 2012	Dry			N	Y	11.0				N
05D_LAVD	15: Jul 2012	Dry			N	N	----				N

1. *Selenastrum capricornutum* (algae) is evaluated for the growth endpoint.
2. *Ceriodaphnia dubia* (invertebrate – water flea) is evaluated for the survival and reproduction endpoints.
3. *Pimephales promelas* (vertebrate – fathead minnow) is evaluated for survival and biomass endpoints.
4. NR = No Results; collected sample was broken in transit to testing laboratory. Both the ice chest and internal container were damaged.
5. A TIE was not triggered for this sample since survival toxicity is the trigger and survival was not significantly different from the control.

Table 85. Chronic Toxicity Results for High-Conductivity Sites

Site	Event	Type	<i>Thalassiosira</i> ¹		<i>Hyalella</i> ^{2,3}		<i>Menidia</i> ⁴		TIE Triggered?
			Growth Toxicity	Growth % Reduction	Survival Toxicity	Survival % Reduction	Survival Toxicity	Biomass Toxicity	
01T_ODD2_DCH	1: Jun 2007	Dry	N	----	N	----			N
01T_ODD3_ARN	1: Jun 2007	Dry	Y	39.1	N	----			N
S04T_TAPO	1: Jun 2007	Dry	Y	63.8	N	----			<i>Thalassiosira</i>
01T_ODD2_DCH	2: Sep 2007	Dry	N	----	NR	NR	N	N	N
01T_ODD3_ARN	2: Sep 2007	Dry	N	----	NR	NR	N	N	N
S04T_TAPO	2: Sep 2007	Dry	N	----	NR	NR	N	N	N
01T_ODD2_DCH	4: Jan 2008	Wet			<i>Cerio: Y</i> ⁵	100.0			<i>Ceriodaphnia</i>
01T_ODD3_ARN	4: Jan 2008	Wet			N	----			N
S04T_TAPO	4: Jan 2008	Wet			N	----			N
01T_ODD2_DCH	7: Sep 2008	Dry			N	----			N
S04T_TAPO	7: Sep 2008	Dry	N	----					N
01T_ODD3_ARN	9: Aug 2009	Dry	N	----					N
01T_ODD2_DCH	9: Aug 2009	Dry			N	----			N
S03T_BOULD	9: Aug 2009	Dry			Y	8.16			N
S04T_TAPO	11: Aug 2010	Dry	N	----					N
01T_ODD3_ARN	11: Aug 2010	Dry	N	----					N
01T_ODD2_DCH	11: Aug 2010	Dry			N	----			N
S04T_TAPO	12: Jan 2012	Wet	N	----	N	----	N	N	N
01T_ODD3_ARN	12: Jan 2012	Wet	N	----	N	----	N	N	N
01T_ODD3_ARN	15: Jul 2012	Dry			N	----			N

1. *Thalassiosira pseudonana* (algae) is evaluated for the growth endpoint.

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

3. NR = No Results; invalid test due to control failure. Quality of culture obtained from supplier suspected, as mortality occurred in all test treatments. Potential salt sensitivity also suspected, demonstrated by excessive mortality in the salt control.

4. *Menidia beryllina* (vertebrates – fish) is evaluated for the survival and biomass endpoints.

5. This site typically has high-conductivity, however during the Event 4 storm event, the EC <3000 uS/cm, therefore it was appropriate to perform the test using the freshwater invertebrate (*Ceriodaphnia*).

Education Requirement

Since the adoption of this Conditional Waiver, VCAILG members have completed 9,540 hours of water quality education. To date, 738 VCAILG members have fulfilled the eight hour requirement; 407 of those members have completed more than eight hours. There are nine members with forty education hours, greatly surpassing the minimum requirements. The large number of members going above and beyond the education requirement is an indicator of the perceived value and benefit of the information being presented regarding specific water quality problems and the management practices and tools available to the farmers for addressing them.

During this Conditional Waiver period alone, over thirty education opportunities have been offered to VCAILG members, adding up to 100 hours. Education classes have been organized by VCAILG, Ventura County Resource Conservation District (RCD), University of California Cooperative Extension – Ventura, as well as commodity groups such as the California Avocado and Strawberry Commissions. Table 86 lists the courses that have been offered to date during this Conditional Waiver. Appendix H lists the number of education hours earned by each VCAILG member.

The effort to provide classes and encourage VCAILG members to obtain education credits is for compliance with the Conditional Waiver provision that within two years of issuance of the NOA, all dischargers shall complete eight hours of education. The VCAILG NOA was issued September 15, 2011; therefore, VCAILG members have until the same date in 2013 to complete their education training. Course agendas are approved by the Executive Officer for a specified number of credit hours to ensure that the education classes meet the training requirements related to water quality impairments, regulatory requirements, and management practices that control waste discharges.

Table 86. Courses Offered for Education Credit

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

Conclusions

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

This report presents monitoring data for evaluating agricultural discharges as compared to standard water quality benchmarks as well as compliance with effective TMDL LAs that were incorporated in the Conditional Waiver as benchmarks. Instances where exceedances occurred of either type of benchmark triggers the need to develop a WQMP; which will be submitted to the Regional Board March 15, 2013. Details regarding benchmark exceedances were provided in this AMR and will also be included in the WQMP.

The following summary highlights compliance with standard water quality benchmarks.

- Nitrate-N continues to be an issue at some monitoring locations (4 out of 15 VCAILGMP sites), however those that have previously been in compliance, remain under the applicable benchmark for the site. Two first tier priority areas have shown significant improvements in Nitrate-N concentrations during dry weather, due to the implementation of BMPs including both source control and runoff managements. The Ammonia-N objective was only exceeded once when considering all sites and monitoring events.
- This is the first AMR that included results for copper. All freshwater sites are meeting the copper benchmark.
- Six OC pesticides that have applicable water quality benchmarks have never been detected during VCAILG monitoring to date (Events 1-15). An additional three OC pesticides with benchmarks have only been detected once or twice throughout the entire monitoring program. Though DDT and its breakdown products are often detected during wet weather, dry weather exceedances have greatly decreased and it is the breakdown products that are most common. This demonstrates the degradation of DDT in the environment and the minimization of transport during the irrigation season, of which farmers have some control.
- Regarding OP pesticides, diazinon only had a single benchmark exceedance during this monitoring year. Some chlorpyrifos exceedances did occur during wet weather, but there was only a single dry weather exceedance.
- None of the sites exhibited significant toxicity; therefore, no TIEs were required during this monitoring year.
- There was one dry weather event where a single site exceeded the pH benchmark. Temperature was always under the upper limit, where applicable. The dissolved oxygen benchmark was only exceeded once at a single site during the first dry event.
- Seven sites with applicable salts benchmarks were in compliance during all four monitoring events in 2012.

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

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