February 15, 2009

VENTURA COUNTY AGRICULTURAL IRRIGATED LANDS GROUP (VCAILG)

2008 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)

LARRY WALKER ASSOCIATES

Table of Contents

List of Tables

List of Figures

List of Appendices

Acronyms

BMP	Best Management Practice
CC	Calleguas Creek
CCWTMP	Calleguas Creek Watershed TMDL Monitoring Program
CWA	Clean Water Act
DPR	Department of Pesticide Regulation
DQO	Data Quality Objective
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FTO	Fish Tissue (sampling) Offset
IPM	Integrated Pest Management
IR	Instrument Resolution
LARWQCB	Los Angeles Regional Water Quality Control Board (Regional Board)
MDL	Method Detection Limit
MRP	Monitoring and Reporting Program
NA	Not Applicable
ND	Not Detected
NM	Not Measured
NOA	Notice of Applicability
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NS	Not Sampled; insufficient flow present
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
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
USDA	United Stated Department of Agriculture
VCAILG	Ventura County Agricultural Irrigated Lands Group
VR	Ventura River
WQMP	Water Quality Management Plan

Introduction

On November 3, 2005 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. R4-2005-0080). 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 form to comply with this Conditional Waiver. 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 August 3, 2006. 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 December 18, 2006, signifying the Regional Board's approval of the VCAILG and its Monitoring Program.

The first Annual Monitoring Report was submitted by the VCAILG to the Regional Board on February 15, 2008. On August 15, 2008 the VCAILG submitted its first Water Quality Management Plan (WQMP). The WQMP was developed in response to water quality benchmark exceedances that occurred during the 2007 monitoring year and details a plan to reduce water quality impacts from agricultural discharges.

This document serves as the second Annual Monitoring Report; it provides a detailed summary of activities of the VCAILG during 2008, including administration of the VCAILG, an overview of farming in Ventura County, coursework offered to Group

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 four monitoring events conducted. Also included is a discussion of monitoring results that exceeded water quality benchmarks, therefore triggering the requirement to update the existing WQMP.

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 a 20-member Steering Committee and a 7-member Executive Committee (also members of the Steering Committee). Steering Committee membership consists of agricultural organization representatives, and 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 Conservation District *	N/A	N/A
Jerry Conrow, Jerry L. Conrow & Co., CPA *	Citrus	Ventura River
Jim Coultas, Coultas Ranch Company	Avocado, Citrus	Ventura River
Robert Crudup, Valley Crest Tree Company	Nursery Stock	Santa Clara River
John Dullam, Dullam Nursery	Strawberries	Calleguas Creek
Mike Friel, Laguna Grove Service	Citrus	Calleguas Creek
Jurgen Gramckow, Southland Sod Farms	Sod, Hay, Oats	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
Dan Naumann, AA Nauman, Inc.	Vegetables	Calleguas Creek
Cris Pérez, 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
Bill Reiman, Catalinos Berry Farms	Strawberries	Calleguas Creek
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. The VCAILG currently represents 1,411 Ventura County agricultural landowners and 85,536 irrigated acres. According to the Ventura County Assessor's records, there are an estimated 232 landowners who are not enrolled in the VCAILG. Therefore, VCAILG enrollment currently represents 86 percent of agricultural landowners in Ventura County.

Table 2. VCAILG Membership Statistics as of January 23, 2009

Watershed	Landowner Count	Parcel Count	Irrigated Acres
Calleguas Creek	640	1,290	45,395
Oxnard Coastal	54	109	4,371
Santa Clara River	581	1,257	29,704
Ventura River	201	365	6,034
Total	*1,476* [1]	*3,021*	*85,050*

[1] There are 1,411 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 330,000 acres of agricultural land in the county, there are approximately 125,000 acres of irrigated land.[1] The Calleguas Creek Watershed contains the highest number of irrigated acres (roughly 60,000), followed by the Santa Clara River Watershed (approximately 50,000) and Ventura River watershed (approximately 15,000).[2]

[1] The estimate of 330,000 acres of irrigated agricultural land in the county: U.S. Department of Agriculture-National Agricultural Statistics Service, *2002 Census of Agriculture*. Washington, D.C.: June 2004.

[2] Estimates of irrigated acreage in each watershed are based on data obtained from the Ventura County Assessor's Office. For irrigated acreage estimates, the same acreage is counted only once for land on which multiple crops are grown throughout the year.

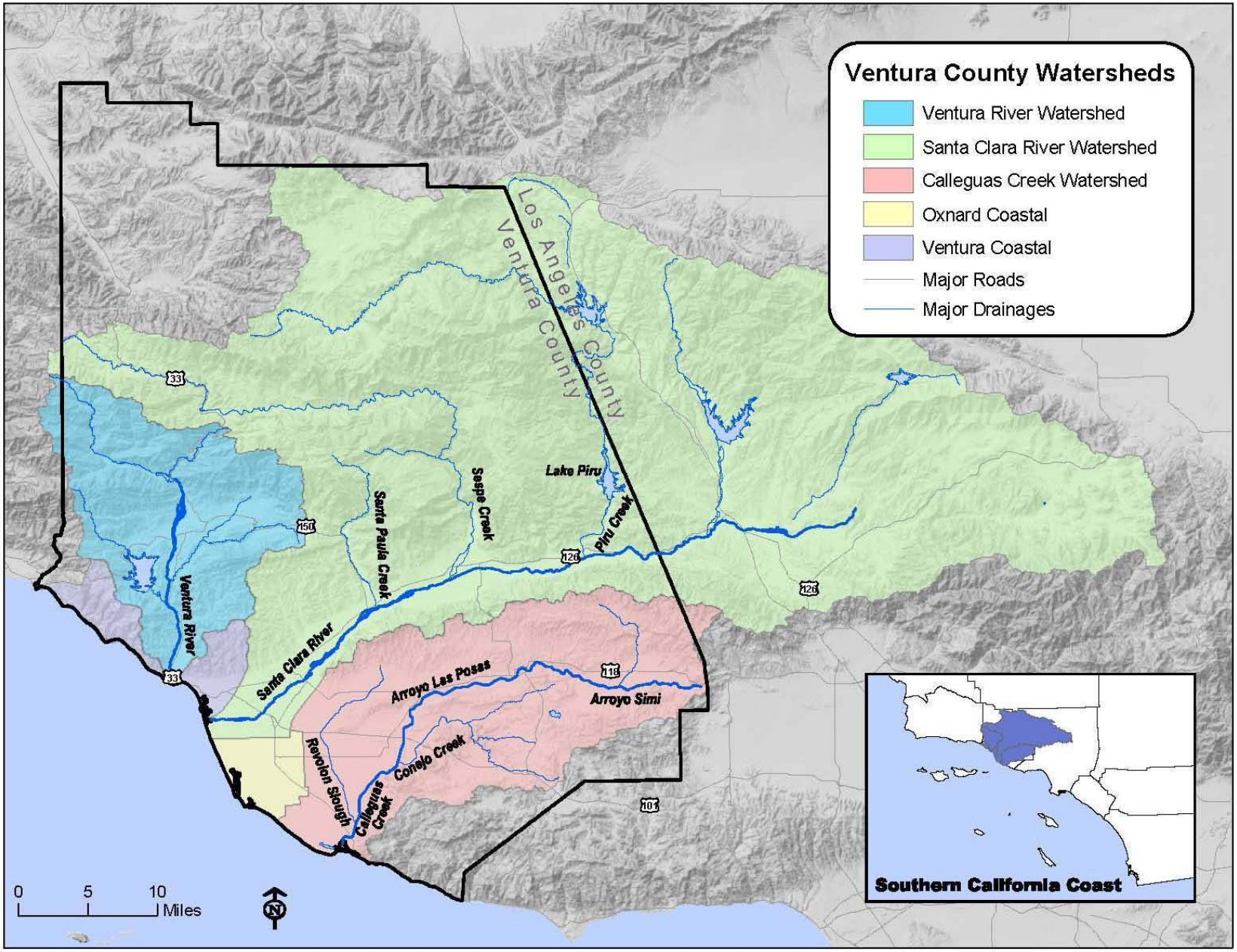


Figure 1. Ventura County Watersheds

Agriculture is a major industry in Ventura County, generating just under $1.55 billion in gross sales for 2007. This gross value is up 2.8% from 2006.[3] With this small increase, Ventura County dropped from 8th to 9th in statewide ranking. Ventura County was ranked as one of the top five counties in California for twelve agricultural commodities in 2007. Table 3 lists the County's ten leading crops in gross value for 2007. Table 4 lists the commodities for which Ventura County ranked in the top five of California's 58 counties for 2007.

Table 3. Ventura County's Leading Agricultural Commodities – 2007

Commodity	Gross Value ($)
1. Strawberries	366,428,000
2. Nursery Stock	292,989,000
3. Lemons	235,124,000
4. Celery	169,512,000
5. Tomatoes	86,486,000
6. Raspberries	69,268,000
7. Avocados	52,911,000
8. Cut Flowers	48,646,000
9. Peppers	39,676,000
10. Valencia Oranges	19,393,000

Source: Ventura County Agricultural Commissioner. *Ventura County Crop Report 2007.*

Table 4. Ventura County's Statewide Commodity Rank by Gross Value – 2007

Commodity	Ventura County Rank Among 58 CA Counties	% of CA Total
Lemons	1	54.0
Celery	1	46.9
Raspberries	2	42.0
Strawberries	2	22.6
Avocados	2	19.7
Cabbage	2	13.5
Nursery Stock	2	9.2
Mushrooms	3	18.0
Bell Peppers	3	17.5
Spinach	4	4.5
Oranges	5	1.9
Tangerines	5	1.8

Source: USDA, NASS, CA Field Office. *Summary of County Agricultural Commissioners' Reports, Gross Values by Commodity Groups–California 2006-2007.*

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

[3] "Summary of County Agricultural Commissioners' Reports, 2006-2007," USDA, NASS, CA Field Office.

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, PCBs and Siltation, Toxicity, and Metals, and Salts. In addition, a TMDL for Bacteria is under development.

Approximately 58,235 acres or 26.7% percent of land in the 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.

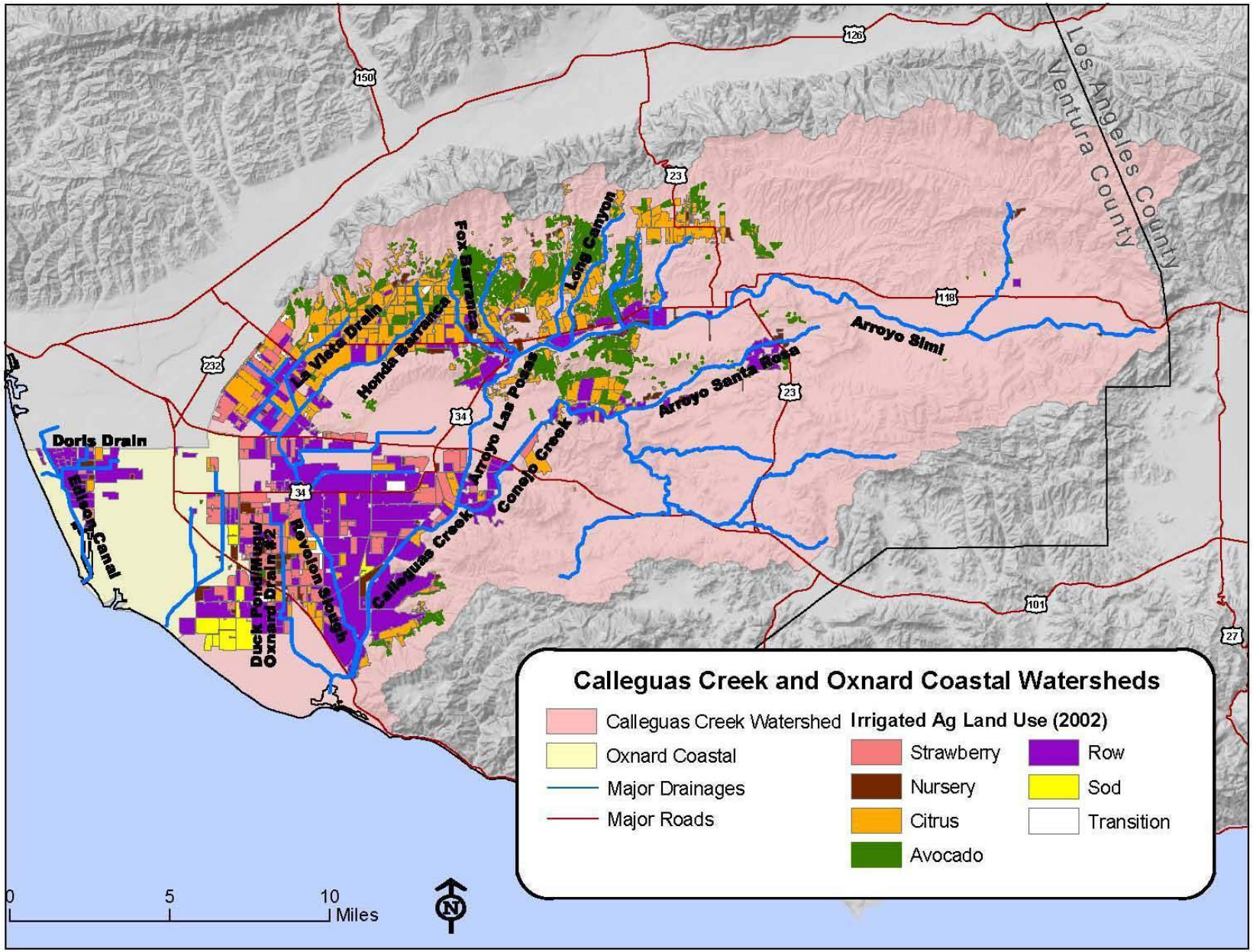


Figure 2. Calleguas Creek Watershed Agricultural Land Use

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) and Chloride (Reach 3).

Just south of the mouth of the Santa Clara River lies a small coastal watershed that drains to McGrath Lake. A TMDL is currently being developed to address pesticides and PCBs impairments in the lake. This TMDL will target properties within the Oxnard Coastal watershed that drain to the OXD_CENTR monitoring site.

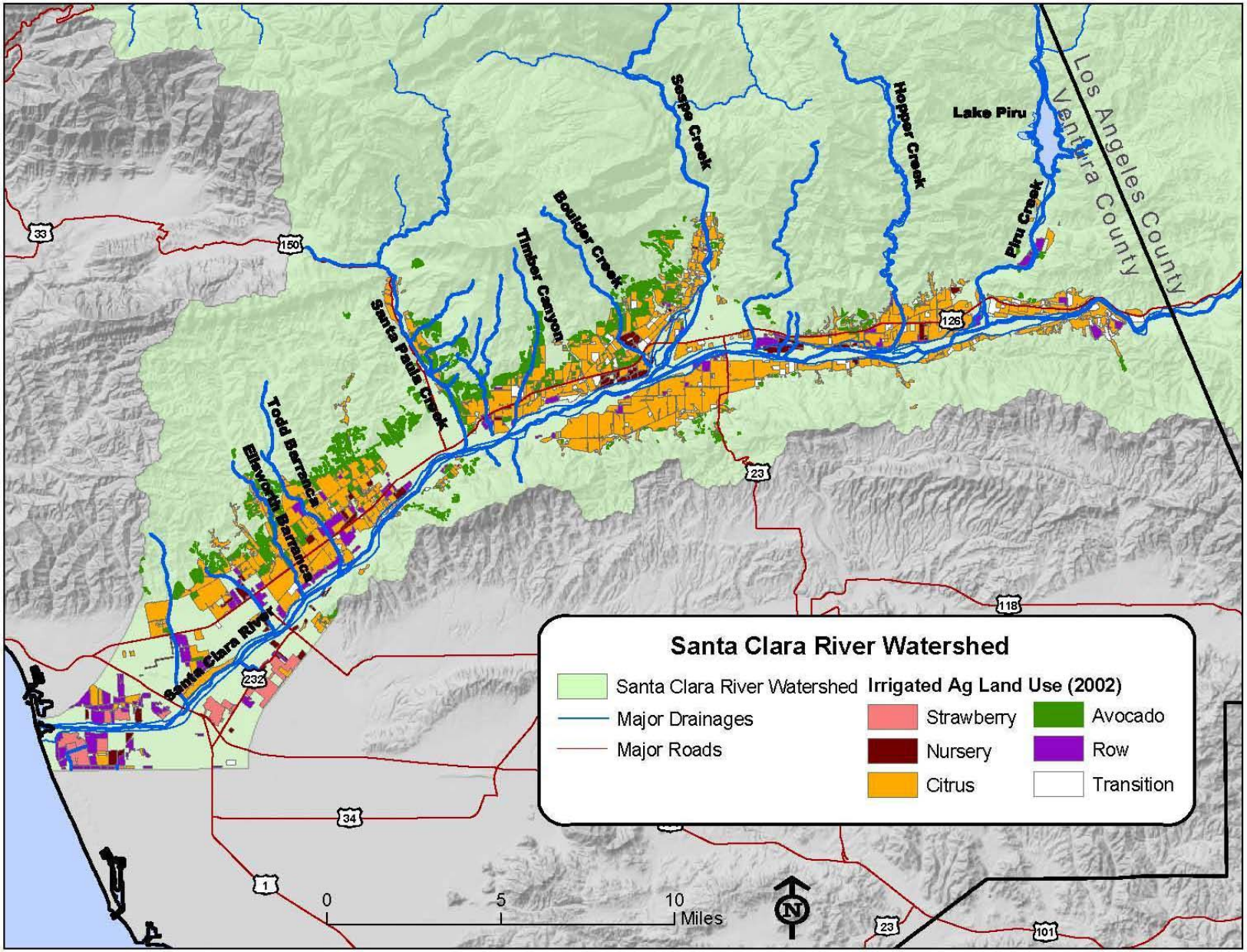


Figure 3. Santa Clara River Watershed Agricultural Land Use

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 5 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, low dissolved oxygen, bacteria, and trash. The Ventura River Estuary Trash TMDL became effective in 2008. Development of the Ventura River Algae TMDL is underway.

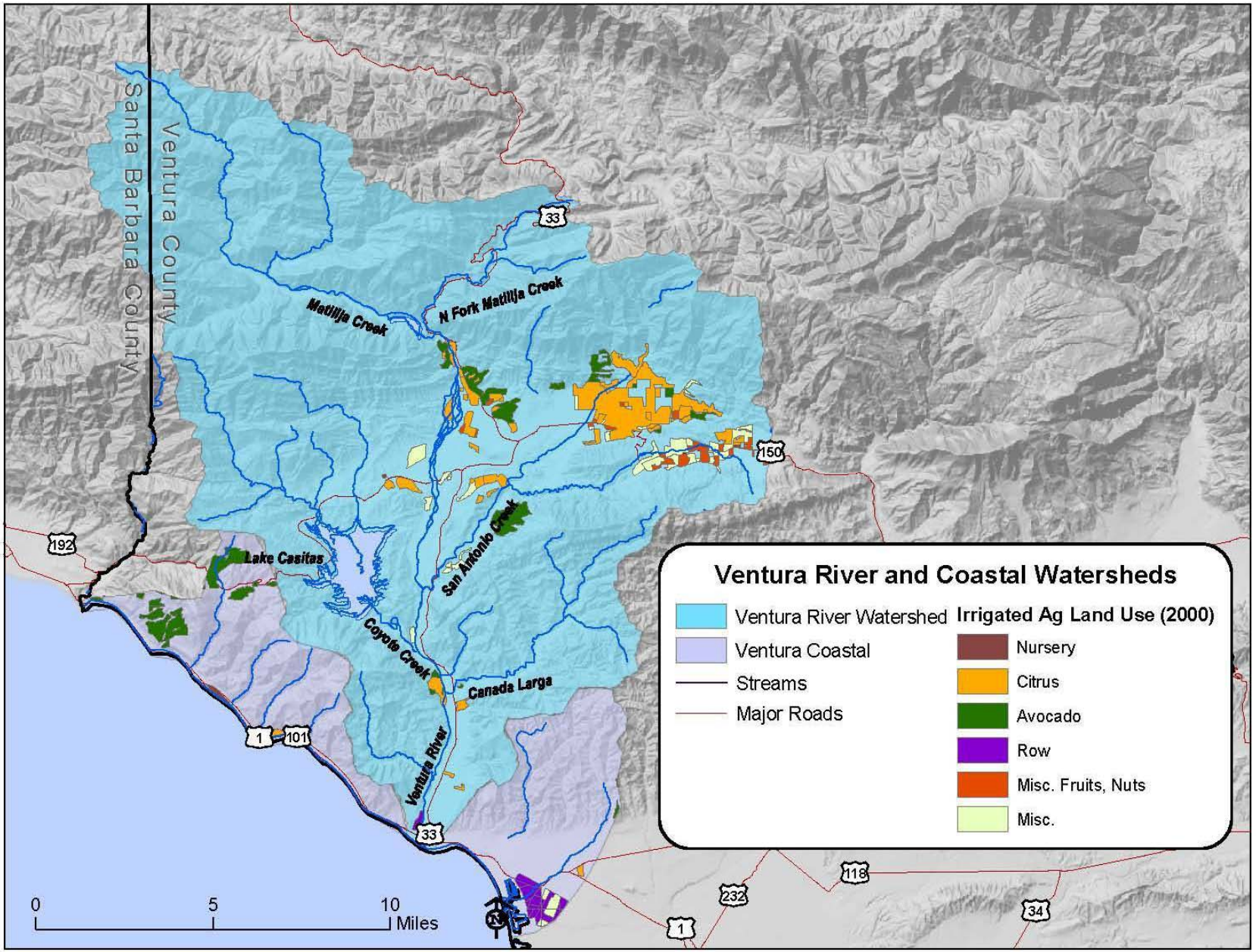


Figure 4. Ventura River Watershed Agricultural Land Use

VCAILG PARTICIPATION IN TMDLS AND OTHER WATER QUALITY CONCERNS

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

During 2008 the VCAILG was approached regarding two discharge complaints and requests for information regarding enrollment and Conditional Waiver compliance of some parcels. The VCAILG has responded to questions and/or complaints in the following manner. First it is confirmed whether the parcels in question are enrolled in the VCAILG and the landowners are members in good standing. If the property is not enrolled in the VCAILG, then the complaint is forwarded to Regional Board staff. Complaints or concerns regarding VCAILG members are dealt with on a case by case basis. In two instances the City of Camarillo decided to work directly with the landowner to address issues of dirt in the city right-of-way and some discharge into their storm drain system. The VCAILG provided relevant BMP information and the City reported that the landowner had been responsive and was taking steps to fix the problems brought to their attention. The other complaint came from the Santa Barbara Channelkeeper regarding some turbidity increases in the river in an area with adjacent farmland. VCAILG representatives met with the landowners and growers in the area, provided BMP information, and performed a site-visit of the area. Though no discharge was found during the site-visit, the landowners and John Krist, CEO of Ventura County Farm Bureau have asked that they be contacted next time such discharge is observed so they can locate the source and if necessary implement strategies to eliminate turbid discharge from the farms.

Water Quality Monitoring

MONITORING OBJECTIVES

The objectives of the VCAILG Monitoring Program are as follows:

- Assess the impact on waters of the State from wastes discharged from irrigated lands;
- Determine concentration and loading (where practicable) of pollutants present in surface waterbodies influenced primarily by the irrigated agriculture land use;
- Evaluate compliance with applicable water quality benchmarks to determine whether modifying management practices is necessary to improve surface water quality;
- Attempt to identify pollutant sources, if necessary;
- Provide feedback to growers in areas where benchmarks are exceeded to facilitate implementation and monitoring of management practices employed for controlling pollutant loads, if necessary;
- Report results and other required information as specified in the Monitoring and Reporting Program (CI-8836);
- Monitor trends in ambient water quality over time (long term objective);
- 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 Calleguas Creek Watershed TMDL Monitoring Program).

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.

Additional site selection criteria included the following:

- Sub-watershed representation;
- Acreage of agricultural irrigated lands represented;
- Drainage into waterbodies included on the federal Clean Water Act 303(d) list of impaired waterbodies
- Safe access during dry and wet weather

Monitoring site selection in the Calleguas Creek Watershed was coordinated with monitoring sites identified in the Calleguas Creek Watershed TMDL Monitoring Program (CCWTMP). Data collected at these coordinated sites are designed to augment TMDL

implementation monitoring in that watershed by establishing loadings from agricultural inputs. No changes to the monitoring locations were made during the 2008 monitoring year.

The format for the monitoring site ID/code is XXXA_YYYYY_ZZZZZ, 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 discharge (D) or a tributary (T) to the receiving water;
- YYYYY is a 3-, 4- or 5-character abbreviation for the site location;
- ZZZZZ is an optional 3-, 4- or 5-character abbreviation that provides additional site location information (*e.g.*, "BKGD" indicates a background site).

Examples:

05D_SANT_VCWPD signifies that the monitoring site is located in on the Santa Clara Drain, which is an agricultural discharge that flows into Calleguas Creek Watershed Reach 5 (Beardsley Channel). The site is located at the Ventura County Watershed Protection District stream gage.

SO4T_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 contains a detailed list of monitoring sites selected for the VCAILG Monitoring Program. Monitoring site IDs in bold type indicate CCW TMDL monitoring sites that will be monitored through that program once that program is underway.

Maps of monitoring sites located in the Calleguas Creek / Oxnard Coastal, Santa Clara River and Ventura River watersheds are presented in Figure 5, 6, and 7, respectively.

Table 6 provides estimates of irrigated acreage by crop type represented by each monitoring site selected.

Maps of crops grown in the vicinity of each monitoring site in the Calleguas Creek / Oxnard Coastal, Santa Clara River and Ventura River watersheds are presented in Figure 8, 9, and 10, respectively.

Table 5. VCAILG Monitoring Program Monitoring Site Locations

Watershed / Subwatershed	Station ID [1]	Reach	Water-body Type [2]	Station Location	GPS Coordinates [3]	
					Latitude	Longitude
Calleguas Creek / Mugu Lagoon	**01T_ODD2_DCH**	1	T	Duck Pond/Oxnard Drain #2/Mugu Drain S. of Hueneme Rd.	34.139514	-119.118330
	01T_ODD3_ARN	1	T	Rio de Santa Clara/Oxnard Drain #3 at Arnold Rd.	34.123564	-119.156514
Calleguas Creek / Calleguas Creek	02D_BROOM	2	D	Discharge to Calleguas Creek at Broome Ranch Rd.	34.143353	-119.071306
	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_VCWPD**	5	D	Santa Clara Drain at VCWPD Gage #781	34.242667	-119.113736
	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_FC_BR**	6	T	Fox Canyon at Bradley Rd.	34.264653	-119.011128
	06T_LONG	6	T	Long Canyon at Hwy. 118	34.270083	-118.958664
Calleguas Creek / Conejo Creek	**9BD_GERRY**	9B	D	Drain Crossing Santa Rosa Rd. at Gerry Rd.	34.235847	-118.944675
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_HOPP	4	T	Hopper Creek at Hwy. 126	34.401616	-118.826799
	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] Station IDs indicated in bold type signify Calleguas Creek Watershed TMDL Monitoring Program sites that will be monitored through that program once that program is underway.
[2] T = Tributary to receiving water; D = agricultural Drain; B = Background site.
[3] All GPS coordinates presented in decimal degrees latitude and longitude in North American Datum 1983 (NAD83).

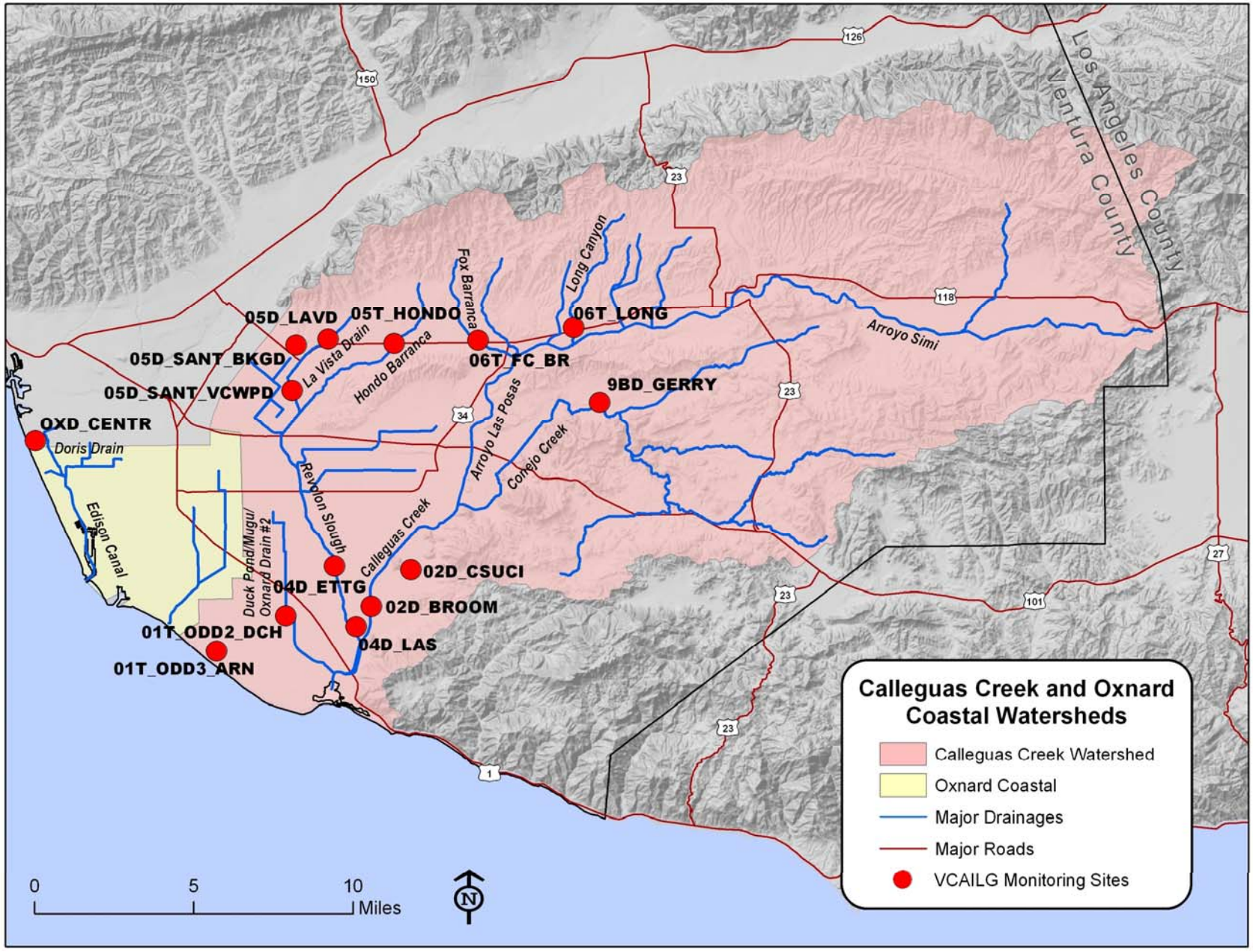


Figure 5. VCAILG Monitoring Sites Located in the Calleguas Creek / Oxnard Coastal Watersheds

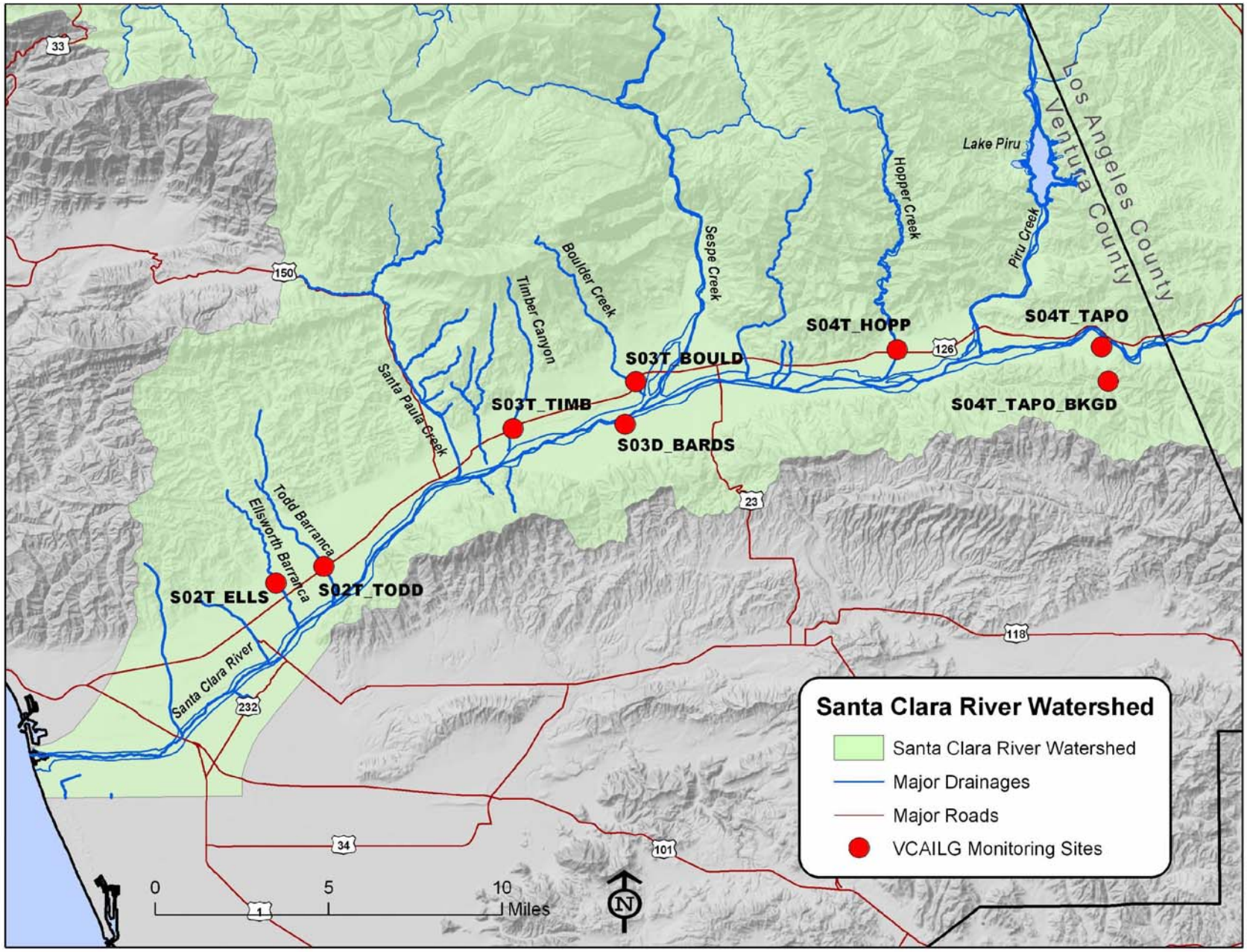


Figure 6. VCAILG Monitoring Sites Located in the Santa Clara River Watershed

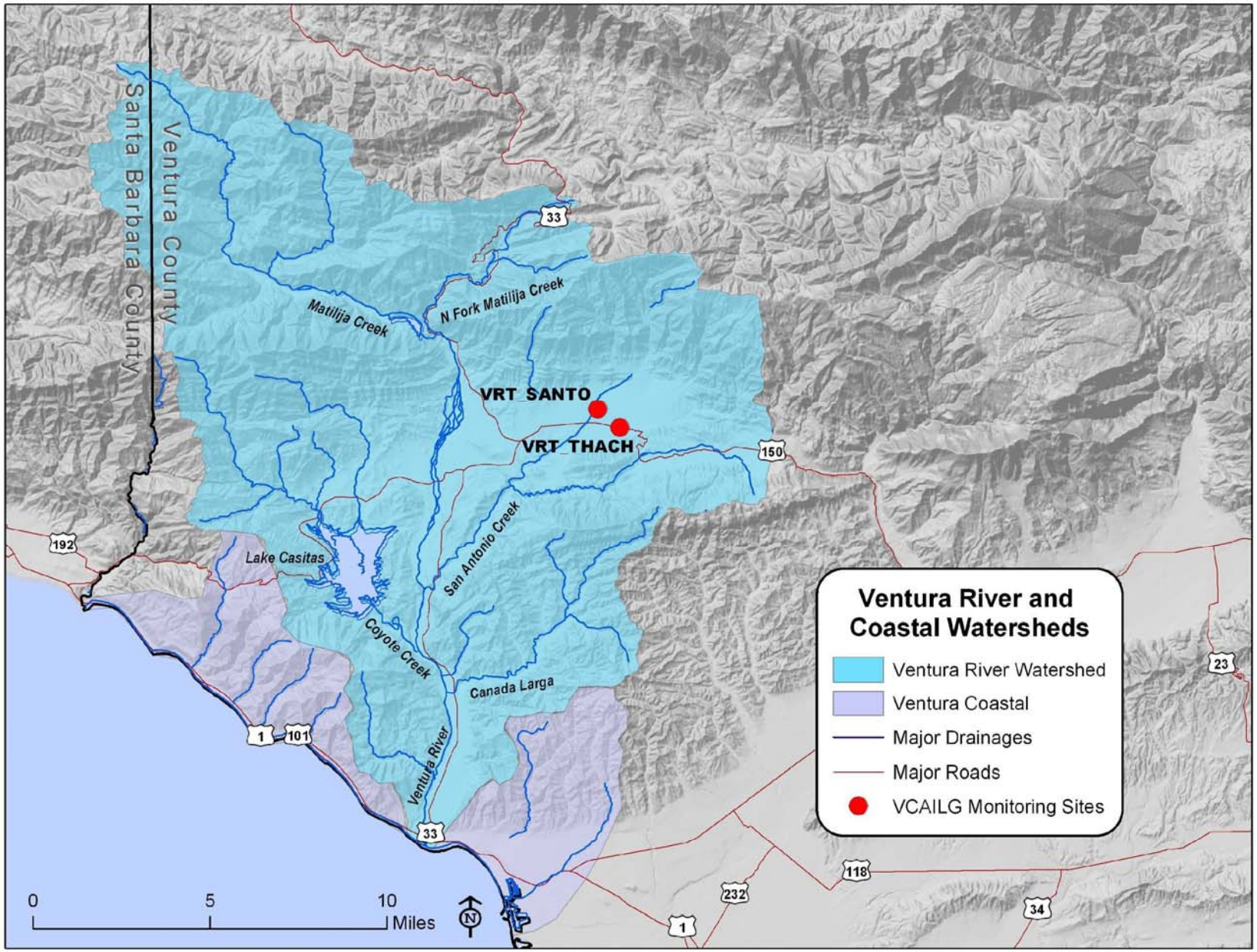


Figure 7. VCAILG Monitoring Sites Located in the Ventura River Watershed

Table 6. Estimated Irrigated Acreage Represented at Each VCAILG Monitoring Site

Station ID [1]	Irrigated Agricultural Acreage [2]									Total Acres Drained [3]
	Row Crops	Cut Flowers	Citrus	Avocados	Other Tree Crops	Strawberries	Other Berries	Sod	Nursery	
01T_ODD2_DCH	2,874	3	17			665		368		1,564
01T_ODD3_ARN	818					39		578		800
02D_BROOM	3,639		378	344		283	177		21	8,236
04D_ETTG	6,271		116			952	77			3,779
04D_LAS	2,212	42				209	41	178		1,339
05D_LAVD	12		219	139		199	77			877
05D_SANT_VCWPD	725		502	146		447				1,154
05T_HONDO	16	4	740	475	1	78	48		9	3,267
06T_FC_BR	129	19	1,029	117	2	15	72		65	3,121
06T_LONG	12		501	692		24	28		48	2,935
9BD_GERRY			58	100			91			447
OXD_CENTR	435	67	35			943			11	1,243
S02T_ELLS	74		277	524	1		21			9,015
S02T_TODD	51	33	227	160	1					5,748
S03D_BARDS	30		725	74					17	2,214
S03T_BOULD			165	680					167	3,764
S03T_TIMB	9		102	363	3					2,183
S04T_HOPP			7						14	15,141
S04T_TAPO	28		34						50	3,686
VRT_SANTO			279	251	13					7,220
VRT_THACH	6		620	130	8				2	6,003

[1] Background Sites 02D_CSUCI (primarily runoff from the university), 05D_SANT_BKGD (runoff from a golf course and residential area), and S04T_TAPO_BKGD (runoff from non-irrigated agriculture) are not included in this table.

[2] Data Source Ventura Agricultural Commissioner's Office

[3] Total Acres Drained refers to the entire drainage area for each monitoring site. In cases where the total area drained is significantly smaller than the sum of the crop areas, the drainage has significant areas of open space. For some monitoring sites the drainage area is smaller than the sum of the crop acreage, this is due to double or triple counted acres that are farmed using multi-cropping practices.

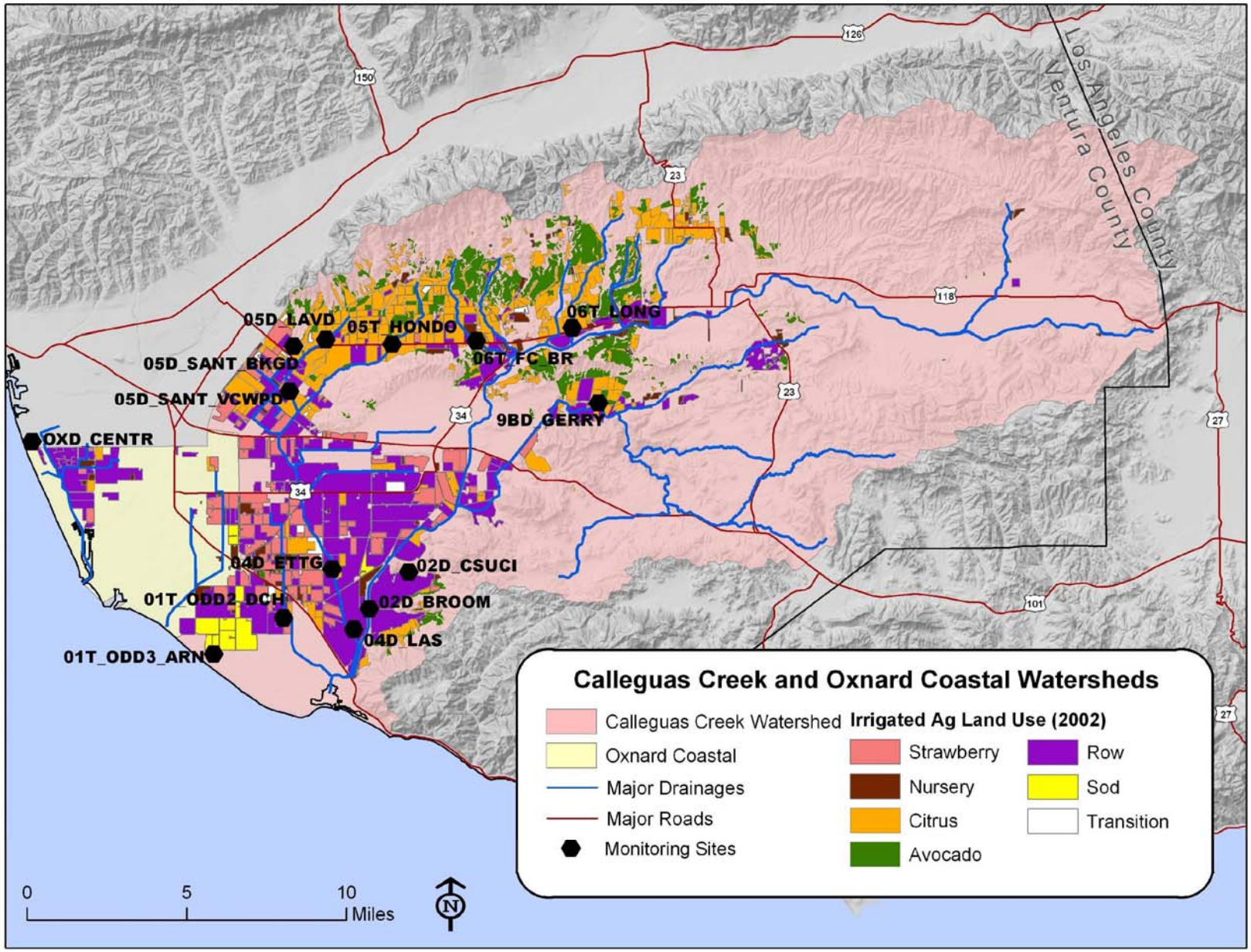


Figure 8. Calleguas Creek Watershed Monitoring Sites and Agricultural Land Use

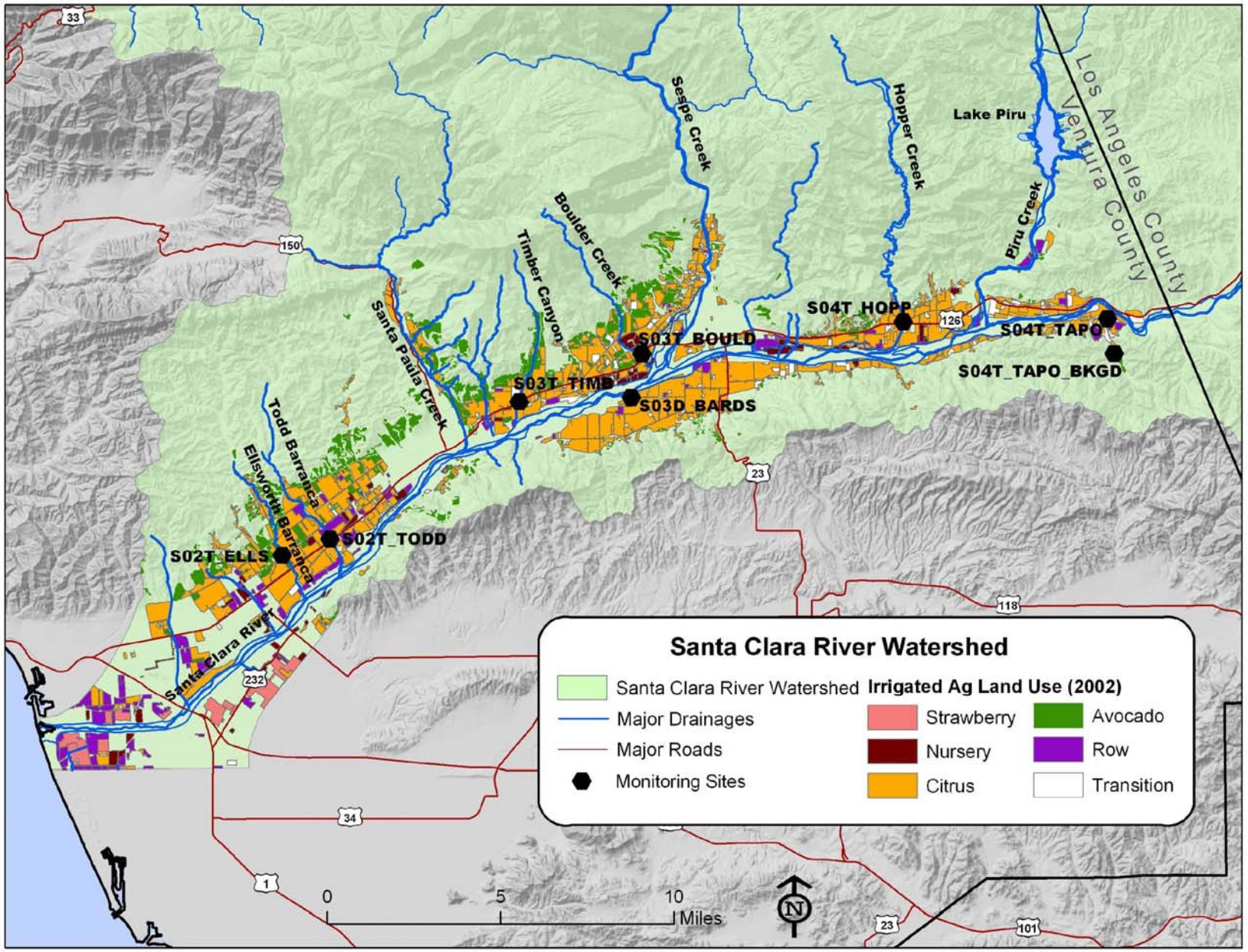


Figure 9. Santa Clara River Watershed Monitoring Sites and Agricultural Land Use

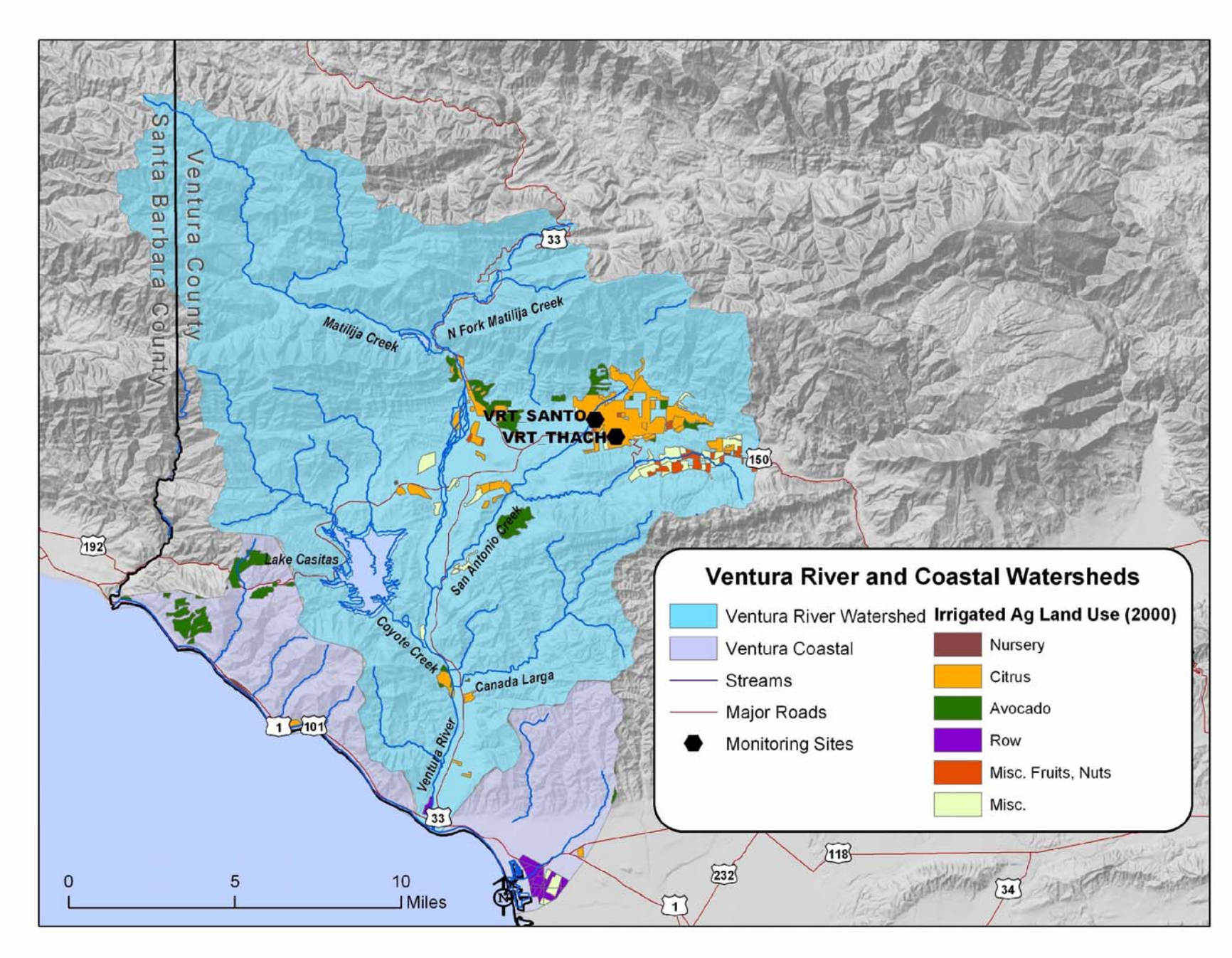


Figure 10. Ventura River Watershed Monitoring Sites and Agricultural Land Use

PARAMETERS MONITORED AND MONITORING FREQUENCY

The Conditional Waiver specifies the constituents to be monitored during each monitoring event as well as the monitoring frequency. These requirements are summarized in Table 7 for Phase I of the Monitoring Program, which covers the first two monitoring years (2007 and 2008). Monitoring years are defined as calendar years (January through December).

The Conditional Waiver requires that two wet events be conducted each Phase I year between October 15 through May 15. The decision to mobilize sampling crews for a wet event is based on receiving at least 0.5 inches of rainfall that produces runoff from agricultural lands. The timing of sample collection for wet events is targeted toward the first 24 hours of discharge to the extent practicable. Two dry events are also required during each Phase I year between May 16 and October 14 during irrigation and following pesticide application.

Table 7. Constituents and Monitoring Frequency for the VCAILG Monitoring Program

Constituent	Phase I Frequency[1]
General Water Quality Constituents (WQ)	Quarterly (2 dry events; 2 wet events)
Flow pH Temperature Dissolved Oxygen Turbidity Conductivity Total Dissolved Solids (TDS) Total Suspended Solids (TSS) Chloride Sulfate	
Nutrients	
Total Ammonia-N Nitrate-N Phosphate	
Pesticides	
Organochlorine Pesticides[3] Organophosphorus Pesticides[4] Pyrethroids[5]	
Aquatic Toxicity (Chronic)	Semiannually (1 dry event; 1 wet event) [2]

[1] The Phase I monitoring period covers the first two monitoring years of the Conditional Waiver (2007 and 2008).
[2] For chronic toxicity testing, the "dry" season is defined as May 16 through October 14; the "wet" season is defined as October 15 through May 15. This same seasonal monitoring schedule will be followed for all constituents monitored.
[3] Organochlorine Pesticides include aldrin, alpha-BHC, beta-BHC, gamma-BHC (Lindane), delta-BHC, chlordane-alpha, chlordane-gamma, 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, toxaphene.
[4] Organophosphorus Pesticides include bolstar, chlorpyrifos, demeton, diazinon, dichlorovos, dimethoate, disulfoton, ethoprop, fenchlorophos, fensulfothion, fenthion, malathion, merphos, methyl parathion, mevinphos, phorate, tetrachlorvinphos, tokuthion, trichloronate.
[5] Pyrethroids include allethrin, bifenthrin, cyfluthrin, l-cyhalothrin, cypermethrin, danitol (fenpropathrin), deltamethrin, esfenvalerate, fenvalerate, fluvalinate, permethrin, prallethrin, resmethrin.

Both storm samples for 2008 were collected in January. These were the first two major storms of the year. It was decided to collect both of these storms instead of waiting for another later in the year due to the lack of sufficient rainfall in 2007, which only allowed for sampling of one rain event. Runoff was produced at 17 sites during collection of the first storm on January 5, 2008. The second storm event was collected on January 24th and 20 monitoring sites were sampled. During both storms samples were collected at the two Ventura River sites, neither of which had any runoff during 2007 sampling events.

Two dry events were also conducted in 2008, one on May 20th, and the other on September 16th. The first monitoring event was scheduled for May because it is early in the dry season and dry weather samples had not been previously collected during that month. May is also in the middle of the 3 peak months of reported pesticide usage, according to the Department of Pesticide Regulation (DPR) Pesticide Use Summaries Database. The September event was scheduled under the assumption that dry antecedent conditions would require more frequent irrigation events, thereby increasing the likelihood of irrigation runoff. Table 7 provides a summary of monitoring sites and constituents that were sampled during each of the four monitoring events in 2008. Field probe measurements were also performed at the sites where samples were collected.

To assist with development of the Santa Clara River Estuary Pesticides TMDL, Regional Board staff proposed that the VCAILG Monitoring Program conduct one fish tissue monitoring event in the Santa Clara River Estuary in spring 2008 in exchange for other monitoring toxicity monitoring. The California Department of Fish and Game collected fish for tissue analysis on April 8, 2008. The results of this sampling have been provided to the Regional Board. To offset the cost of this fish tissue sampling, three toxicity sites were not sampled during the September 16, 2008 VCAILG event. The sites that were part of the fish tissue cost offset include: 01T_ODD3_ARN, S02T_TODD, and S03T_BOULD. The fish tissue cost offset is noted in the monitoring and data tables where appropriate.

Table 8. VCAILG Sites Monitored and Constituents Sampled in 2008

Watershed / Subwatershed	Station ID	Reach	Wet Events		Dry Events	
			Jan. 5	Jan. 24	May 20	Sept. 16
Calleguas Creek / Mugu Lagoon	01T_ODD2_DCH	1	TOX,WQ,N,P	WQ,N,P	WQ,N,P	TOX,WQ,N,P
	01T_ODD3_ARN	1	TOX,WQ,N,P	WQ,N,P	WQ,N,P	FTO
Calleguas Creek / Calleguas Creek	02D_BROOM	2	WQ,N,P	WQ,N,P	WQ,N,P	WQ,N,P
	02D_CSUCI	2	NS	NS	NS	NS
Calleguas Creek / Revolon Slough	04D_ETTG	4	WQ,N,P	WQ,N,P	WQ,N,P	WQ,N,P
	04D_LAS	4	WQ,N,P	WQ,N,P	WQ,N,P	WQ,N,P
Calleguas Creek / Beardsley Channel	05D_SANT_VCWPD	5	WQ,N,P	WQ,N,P	WQ,N,P	WQ,N,P
	05D_SANT_BKGD	5	NS	WQ,N,P	NS	NS
	05D_LAVD	5	NS	WQ,N,P	NS	NS
	05T_HONDO	5	TOX,WQ,N,P	WQ,N,P	NS	NS
Calleguas Creek / Arroyo Las Posas	06T_FC_BR	6	TOX,WQ,N,P	WQ,N,P	NS	NS
	06T_LONG	6	NS	NS	NS	NS
Calleguas Creek / Conejo Creek	9BD_GERRY	9B	NS	NS	NS	NS
Oxnard Coastal	OXD_CENTR	--	WQ,N,P	WQ,N,P	WQ,N,P	WQ,N,P
Santa Clara River	S02T_ELLS	2	TOX,WQ,N,P	WQ,N,P	NS	WQ,N,P [1]
	S02T_TODD	2	TOX,WQ,N,P	WQ,N,P	WQ,N,P	FTO
	S03T_TIMB	3	TOX,WQ,N,P	WQ,N,P	NS	NS
	S03T_ BOULD	3	TOX,WQ,N,P	WQ,N,P	WQ,N,P	FTO
	S03D_BARDS	3	NS	WQ,N,P	NS	NS
	S04T_HOPP	4	TOX,WQ,N,P	WQ,N,P	WQ,N,P	NS
	S04T_TAPO	4	TOX,WQ,N,P	WQ,N,P	WQ,N,P	TOX,WQ,N,P
	S04T_TAPO_BKGD	4	NS	NS	WQ,N,P	NS
Ventura River	VRT_THACH	--	TOX,WQ,N,P	WQ,N,P	NS	NS
	VRT_SANTO	--	TOX,WQ,N,P	WQ,N,P	NS	NS

TOX = Chronic Toxicity WQ = General Water Quality Constituents N = Nutrients P = Pesticides

NS = Not Sampled; insufficient flow present or inaccessible. FTO = Fish Tissue Sampling Offset (site not visited)

[1] The ice chest and sampling container containing the toxicity sample were damaged in transit to the lab. A comparison of field EC and EC upon arrival to lab determined the sample had been diluted by packing ice. Therefore, toxicity samples were collected but not analyzed for this event.

SAMPLING METHODS

The VCAILG QAPP contains requirements for sampling procedures that are designed to ensure that high-quality data are generated through the VCAILG Monitoring Program. 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.

With the exception of samples for toxicity, samples collected during both dry events were collected by direct immersion of sample containers at mid-stream and mid-depth, then immediately placed on ice in an ice chest. A secondary container was used to fill 5 or

2.5-gallon jerricans for toxicity tests. Secondary containers are always used at 01T_ODD3_ARN, where a grab pole with a secured secondary container must be used to reach out into the channel. Flow measurements were made according to the standard operating procedure included in Appendix C-1 of the QAPP. Water velocity and depth were measured at specified increments across the width of the channel, and then the sum of the incremental flow measurements was calculated to obtain total flow.

Samples collected during the two wet events in January were collected either by the direct immersion technique or by using a secondary container attached to a grab pole; filled sample containers were immediately put on ice in an ice chest. During the wet events, 4 replicate measurements of water velocity were performed by measuring the time it took for a floating object (e.g., stick, orange, leaf) to travel a defined distance downstream. Channel width was measured at some monitoring sites and estimated at sites with higher flow. Channel depth was estimated at several locations across the width of the channel if it was safe to do so, and then averaged. In a couple of cases it was too dangerous to obtain depth measurements, in those cases a reference photo was taken and based on the photo and known width of the channel during storm flow, the depth during the storm was estimated. The sites where depth was estimated based on a reference photo include 01T_ODD2_DCH, 04D_LAS, and OXD_CENTR during event 4 and 04D_ETTG and 01T_ODD2_DCH for event 5. Total flow was estimated by multiplying the estimated velocity, depth and width of flow. *Flow estimates made during the two wet events, therefore, should be regarded as gross estimates and used with discretion.*

During all four 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. In situ measurements were not taken at VRT_SANTO and VRT_THACH during the January 24th wet event since a third Hydrolab MS5 Data Sonde was not available for that sampling team. To compensate, the parameters of conductivity, pH, and turbidity were measured by Fruit Growers Laboratory. However, since the samples had to be kept on ice following collection, temperature and dissolved oxygen could not be measured. Data and information collected at each monitoring site were recorded on a field log sheet. PDFs of 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, wildlife, etc.;
- Estimates of algae coverage and bank vegetation, and the dominant channel substrate (*i.e.*, concrete, cobble, sand, etc.)

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

Samples were transported back to FGL Environmental Laboratory in Santa Paula, where chain-of-custody documentation was completed and toxicity samples were prepared for overnight delivery to Pacific EcoRisk (toxicity testing laboratory). A courier picked up CRG's samples from FGL and delivered them to CRG.

PDFs of 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 9 provides a summary of analytical methods used by contract laboratories for analyzing samples collected for the VCAILG Monitoring Program in 2008.

During event 7 there was a method change by the contracting laboratory in how they analyze the organochlorine pesticide toxaphene. Previously, toxaphene along with all other OC and OP pesticide were analyzed using electron impact (EI) GC/MS. However, the laboratory found that by using negative ion chemical ionization (NCI) GC/MS they are able to improve their sensitivity and reduce the background noise that is present when comparing sample results to the toxaphene standard. Manufactured toxaphene contains over 670 chemicals and was produced by over 180 different manufactures. Each of the these formulations initially varies and due to degradation that occurs between the time toxaphene was applied and it is picked up in water quality samples, it is impossible to have a laboratory standard that matches toxaphene in the environment. The contract laboratory has ordered an additional toxaphene standard that is produced in Germany and has more of the individual compounds that make up toxaphene. Event 7 samples will then be rerun using the alternative standard. A decision on which method best represents the samples will be made once results can be compared between the EI-GC/MS method, NCI GC/MS using the old standard, and NCI GC/MS using the German standard. At this time, concentrations of toxaphene are considered by the analyzing laboratory to be upper value estimations of actual concentrations and are flagged as estimated.

Table 9. Analytical Methods

Constituent	Analytical Method
Aquatic Toxicity [1]	
Chronic (7 day) *Ceriodaphnia dubia* [2]	EPA-821-R-02-013, EPA/500/R-99/064
Chronic (7 day) *Pimephales promelas* [3]	
Chronic (96-hour) *Selenastrum capricornutum* [4]	
General Water Quality Constituents (WQ)	
Flow, pH, Temperature, Dissolved Oxygen, Conductivity, Turbidity	Field Measurement
Total Dissolved Solids (TDS)	SM 2540C,E
Total Suspended Solids (TSS)	SM 2540D
Chloride	300.0
Sulfate	300.0
Total Ammonia-N [5]	SM 4500NH_3 H, SM4500NH_3 F
Nitrate-N	300.0
Phosphate (Total Orthophosphate as P)	SM 4500-PE
Organic Constituents [6]	
Organochlorine Pesticides [7]	EPA 625m/8270Cm
Organophosphorus Pesticides	EPA 625m/8270Cm
Pyrethroid Pesticides	EPA 625m/8270Cm / NCI GC/MS

[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] All samples that required larval fish testing were low conductivity, so *Pimephales promelas* was used for all tests in 2008.

[4] If sample conductivity exceeded 3000 uS/cm, *Thalassiosira pseudonana* was used for toxicity testing.

[5] Ammonia was analyzed by FGL for events 4-6, due to detections of ammonia in their blank water since event 7 and for the rest of the program CRG will be analyzing samples for ammonia. FGL used the first method listed above and CRG the second. Both meet the detection and reporting limits required in the QAPP.

[6] See Table 7 for the list of constituents in each pesticide group.

[7] Beginning with event 7 the contract laboratory has begun analyzing the OC pesticide toxaphene using NCI GC/MS as it does for pyrethroids. This change in methods has led to detection of toxaphene at some sites, when previously toxaphene had not been found in any VCAILG monitoring.

WATER QUALITY BENCHMARKS

The Conditional Waiver requires that if monitoring data exceed applicable benchmarks, Water Quality Management Plans (WQMPs) designed to reduce pollutant loading to surface waters must be developed to address those exceedances. This section presents the water quality benchmarks used to evaluate monitoring data collected at VCAILG monitoring sites in 2008. Benchmarks used for this purpose include numeric and narrative water quality objectives contained in Appendix 1 and Appendix 2 in the Conditional Waiver, which includes narrative and numeric Basin Plan objectives and water quality standards from the California Toxics Rule (CTR). For the purposes of this report, TMDL load allocations were not used as benchmarks to determine whether WQMPs are necessary to reduce water quality impacts from irrigated agriculture. Rather, because effective TMDLs already contain the requirement to develop WQMPs regardless of whether monitoring data exceed benchmarks identified in the Conditional Waiver, VCAILG monitoring data were compared against TMDL load allocations solely for the purpose of evaluating compliance with applicable load allocations.

Limitations associated with comparing VCAILG monitoring data with TMDL load allocations include the following:

- Load allocations for organochlorine (OC) pesticides in the Calleguas Creek Watershed are established in sediment. The VCAILG monitoring program does not include a sediment monitoring element, so a comparison of VCAILG monitoring data to these TMDL load allocations cannot be made.
- Load allocations for the organophosphorus (OP) pesticides and salts in the Calleguas Creek Watershed apply at the base of each subwatershed. However, there are no VCAILG monitoring sites co-located with these TMDL compliance monitoring locations, so the TMDL load allocations technically do not apply to data collected at VCAILG monitoring sites. Although monitoring data are not compared with these TMDL load allocations, it should be noted that VCAILG data will be evaluated to determine whether agricultural discharges are contributing to any load allocation exceedances detected in the Calleguas Creek Watershed TMDL Monitoring Program annual report which includes sample collection at the base of each subwatershed.

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.

Conditional Waiver benchmarks applicable to VCAILG monitoring sites and TMDL load allocations in effect are presented in Table 10 through Table 17.

Table 10. Conditional Waiver 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.	$6.5 \leq pH \leq 8.5$ Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
Temperature	CC, OXD, SCR, VR	For waters designated WARM, water temperature shall not be altered by more than 5°F above the natural temperature. At no time shall WARM-designated waters be raised above 80°F as a result of waste discharges.	WARM: $\leq$ 80°F Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
	SCR, VR	For waters designated COLD, water temperature shall not be altered by more than 5°F above the natural temperature.	COLD: No numeric benchmark. Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
Dissolved Oxygen	OXD	No single dissolved oxygen determination shall be less than 5 mg/L, except when natural conditions cause lesser concentrations.	$\geq$ 5 mg/L
	CC, SCR, VR	The dissolved oxygen content of all surface waters designated as WARM shall not be depressed below 5 mg/L as a result of waste discharges.	WARM: $\geq$ 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: $\geq$ 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: ▪ Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20%; ▪ Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%.	No numeric benchmarks. Changes to ambient receiving water conditions are not assessed; "ambient" or "natural" conditions have not been established
Biostimulatory Substances	CC, OXD, SCR, VR	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.	No numeric benchmarks. Waterbody-specific benchmarks for nutrients are listed in Tables 11 and 12.
Total Suspended Solids (TSS)	CC, OXD, SCR, VR	Wastes shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.	No numeric benchmarks.
Pesticides	CC, OXD, SCR, VR	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.	No numeric benchmarks. Applicable benchmarks for specific pesticides are listed in Tables 13,15, and 17.
Toxicity	CC, OXD, SCR, VR	All waters shall be free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal or aquatic life. There shall be no chronic toxicity in ambient waters outside mixing zones.	$\leq$ 1.0 TUc [3] Benchmarks for specific potentially toxic constituents are listed in Tables 12 through 16.

[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. R4-2005-0077, Los Angeles Regional Water Quality Control Board, adopted November 3, 2005.

Table 11. Conditional Waiver 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 [1] (mg/L)	Ammonia [2] (mg/L)	Phosphate (mg/L)
CC All Waterbodies	-----	-----	-----	-----	-----	pH, temperature dependent	-----
CC above Potrero Rd.	-----	150	250	850	-----	pH, temperature dependent	-----
OXD	-----	-----	-----	-----	-----	pH, temperature dependent	-----
SCR Reach 1	Tidally-influenced mouth of Santa Clara River upstream to 101 Bridge	-----	-----	-----	-----	pH, temperature dependent	-----
SCR Reach 2	Upstream of Hwy 101 Bridge to Freeman Diversion	150	600	1200	10 [3]	pH, temperature dependent	-----
SCR Reach 3	Upstream of Freeman Diversion to A Street Bridge in Fillmore	100 [4]	650	1300	5	pH, temperature dependent	-----
SCR Reach 4	Upstream of A Street Bridge in Fillmore to Blue Cut Gaging Station	100	600	1300	5	pH, temperature dependent	-----
VR Reach 4	Between Camino Cielo Rd. and Casitas Vista Rd.	60	300	800	5	pH, temperature dependent	-----

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

[1] The Nitrogen benchmark listed for VR is as Nitrate-N plus Nitrite-N.

[2] 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.

[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 collected at monitoring sites in this reach.

[4] The 100 mg/L benchmark for chloride is the revised water quality objective adopted by the Regional Board in Resolution 2003-015.

Table 12. Total Maximum Daily Load (TMDL) Load Allocations for Salts and Nutrients

Watershed / Reach	Reach Description	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Nitrogen (mg/L)	Ammonia (mg/L)	Phosphate (mg/L)
CC All Waterbodies	-----	-----	-----	-----	9 [1]	-----	-----
Receiving Water at the Base of Each Subwatershed	See CCW Salts TMDL Technical Report for Compliance Monitoring Sites	230 [2]	1962 [2]	3995 [2]	-----	-----	-----
OXD	-----	-----	-----	-----	-----	-----	-----
SCR Reach 1	Tidally-influenced mouth of Santa Clara River upstream to 101 Bridge	-----	-----	-----	10 [3]	-----	-----
SCR Reach 2	Upstream of Hwy 101 Bridge to Freeman Diversion	-----	-----	-----	10 [3]	-----	-----
SCR Reach 3	Upstream of Freeman Diversion to A Street Bridge in Fillmore	----- [4]	-----	-----	10 [3]	-----	-----
SCR Reach 4	Upstream of A Street Bridge in Fillmore to Blue Cut Gaging Station	-----	-----	-----	10 [3]	-----	-----
VR Reach 4	Between Camino Cielo Rd. and Casitas Vista Rd.	-----	-----	-----	-----	-----	-----

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

[1] Nitrogen Compounds and Related Effects TMDL: "Amendment to the *Water Quality Control Plan for the Los Angeles Region* to Include a TMDL for Nitrogen Compounds and Related Effects in Calleguas Creek (LARWQCB Resolution 2002-017). The TMDL became effective July 16, 2003. The load allocation must be fully achieved by July 16, 2010. The load allocation listed is as Nitrate-N + Nitrite-N.

[2] Calleguas Creek Watershed Salts TMDL: "Total Maximum Daily Load for Boron, Chloride, Sulfate and TDS (Salts) in the Calleguas Creek Watershed" (LARWQCB Resolution 2007-016). This TMDL became effective December 2, 2008, Final load allocations must be fully achieved by 15 years after the effective date of the TMDL, and can be found in the Basin Plan Amendment. These interim dry weather TMDL load allocations apply in the receiving water at the base of each sub-watershed. However, there are no VCAILG monitoring sites located at the base of each sub-watershed, so technically these TMDL load allocations cannot be directly compared to the VCAILG monitoring data. If data collected at the base of each subwatershed under the CCW TMDL Monitoring Program exceed TMDL load allocations for salts, VCAILG monitoring data collected at VCAILG monitoring sites within each subwatershed will be evaluated to determine whether agricultural discharges may be contributing to the exceedance.

[3] Nitrogen Compounds TMDL: "Amendment to the *Water Quality Control Plan for the Los Angeles Region* to Include a TMDL for Nitrogen Compounds in the Santa Clara River" (LARWQCB Resolution 2003-011). The TMDL became effective March 23, 2004. The Basin Plan Amendment does not specify the date to achieve full compliance. The load allocation listed is as Ammonia-N + Nitrate-N + Nitrite-N.

[4] Santa Clara River Chloride TMDL: "Total Maximum Daily Load for Chloride in the Santa Clara River, Reach 3" (USEPA, June 18, 2003). The USEPA Chloride TMDL is in effect for SCR Reach 3, but it does not specify a load allocation for agriculture.

Table 13. Conditional Waiver Benchmarks for Organochlorine Pesticides

	CC Watershed		OXD, SCR Watersheds		VR Watershed	
Constituent	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	0.00057	CTR HHWO
2,4'-DDD	-----	-----	-----	-----	-----	-----
2,4'-DDE	-----	-----	-----	-----	-----	-----
2,4'-DDT	-----	-----	-----	-----	-----	-----
4,4'-DDD	0.00084	CTR HHO	0.00084	CTR HHO	0.00083	CTR HHWO
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	0.0002	CTR AFWC	0.0002	CTR AFWC	0.0002	CTR AFWC

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

[1] CTR = California Toxics Rule (USEPA, May 18, 2000).
HHO = Human Health for Consumption of Organisms Only (30-day average)
HHWO = Human Health for Consumption of Water and Organisms (MUN-designation) (30-day average)
AFWC = Aquatic Life, Freshwater Chronic (4-day average)

Table 14. Total Maximum Daily Load (TMDL) Load Allocations for Organochlorine Pesticides

	CC Watershed	OXD, SCR Watersheds	VR Watershed
Constituent	Load Allocation (ug/L) [1]	Load Allocation (ug/L) [2]	Load Allocation (ug/L) [2]
Chlordane-alpha	-----	-----	-----
Chlordane-gamma	-----	-----	-----
Chlordane, sum	-----	-----	-----
4,4'-DDD	-----	-----	-----
4,4'-DDE	-----	-----	-----
4,4'-DDT	-----	-----	-----
Dieldrin	-----	-----	-----
PCBs	-----	-----	-----
Toxaphene	-----	-----	-----

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

[1] The Organochlorine (OC) Pesticides TMDL for the Calleguas Creek Watershed contains load allocations based on concentrations in sediment. However, the Conditional Waiver does not require sediment quality monitoring. Sediment quality data collected through the CCW TMDL Monitoring Program will be evaluated against sediment TMDL load allocations once that monitoring program is underway.

[2] There is currently no TMDL in effect in this watershed for Organochlorine (OC) Pesticides.

Table 15. Conditional Waiver Benchmarks for Organophosphorus Pesticides

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

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

Table 16. Total Maximum Daily Load (TMDL) Load Allocations for Organophosphorus Pesticides

Constituent	CC Watershed			OXD, SCR, VR Watersheds
	Interim LA [2] (ug/L)	Final LA (ug/L)	Load Allocation Source [1]	Load Allocation
Chlorpyrifos	2.57 / 0.810	0.013	TMDL	-----
Diazinon	0.278 / 0.138	0.10	TMDL	-----

Watersheds: CC = Calleguas Creek OXD = Oxnard Coastal SCR = Santa Clara River VR = Ventura River
[1] "Total Maximum Daily Load for Toxicity, Chlorpyrifos, and Diazinon in the Calleguas Creek, its Tributaries and Mugu Lagoon" (LARWQCB Resolution 2005-009). The TMDL became effective on March 24, 2006. These TMDL load allocations apply to the receiving water at the base of each subwatershed. However, there are no VCAILG monitoring sites located at the base of each sub-watershed, so technically these TMDL load allocations cannot be directly compared to the VCAILG monitoring data. If data collected at the base of each subwatershed under the CCW TMDL Monitoring Program exceed TMDL load allocations for chlorpyrifos and diazinon, VCAILG monitoring data collected at VCAILG monitoring sites within each subwatershed will be evaluated to determine whether agricultural discharges may be contributing to the exceedance.
[2] Interim load allocations listed are the acute (1-hour) / chronic (4-day) values that are currently in effect. Final load allocations must be achieved by March 24, 2016.

Table 17. Conditional Waiver Benchmarks and Total Maximum Daily Load (TMDL) Load Allocations for Pyrethroid Pesticides

Constituent	CC, OXD, SCR, VR Watersheds Benchmark / Load Allocation (ug/L) [1]
Allethrin	-----
Bifenthrin	-----
Cyfluthrin	-----
l-Cyhalothrin	-----
Cypermethrin	-----
Deltamethrin	-----
Esfenvalerate	-----
Fenpropathrin (Danitol)	-----
Fenvalerate	-----
Fluvalinate	-----
Permethrin	-----
Prallethrin	-----
Resmethrin	-----

Watersheds: CC = Calleguas Creek OXD = Oxnard Coastal SCR = Santa Clara River VR = Ventura River
[1] There are currently no Conditional Waiver benchmarks or TMDL load allocations 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 4 monitoring events conducted in 2008. 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, benchmark and/or TMDL load allocation exceedances (if any), and unusual occurrences (if any) from each event. The predominant crop type(s) potentially contributing to the flow at each monitoring site is also noted in this section; this information is also listed in Table 6. Data tables for each site present all detected values from each monitoring event. Water quality data that were reported as less than the laboratory's reporting limit are not included in this section, but instead are included with all of the water quality monitoring data for 2008 as Appendix F on the Annual Report Data CD. PDFs of all hard copy laboratory reports are also included on the Data CD. Results summarized in this section are compared with Conditional Waiver benchmarks and applicable TMDL load allocations listed in Tables 10 through 17 where applicable, and all exceedances are indicated in ***bold italic type*** in data tables.

Data reported by the laboratory in units of ng/L were converted to ug/L for comparison with benchmarks expressed in units of ug/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/mol). The converted result is reported as "Phosphate" 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 to date are discussed separately in a subsequent section.

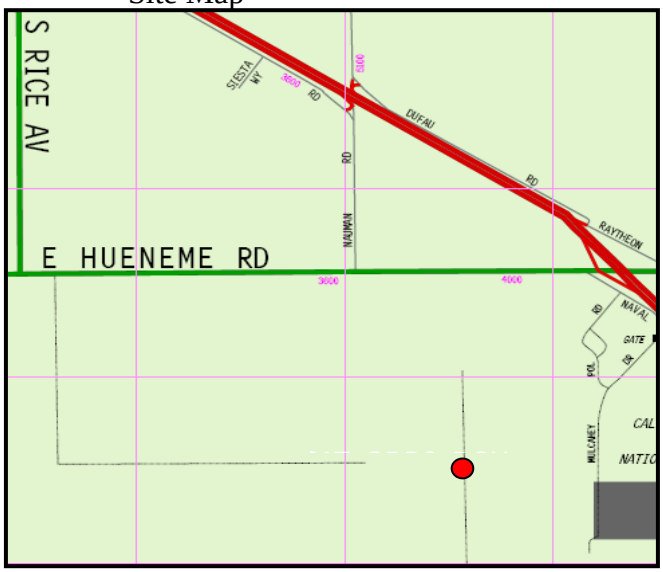
Calleguas Creek Watershed

The Calleguas Creek Watershed contains 13 VCAILG monitoring sites, the highest number of VCAILG sites in one watershed. It also contains the highest number of monitoring sites located on primarily agricultural drainages. Monitoring sites are discussed below in order of the Calleguas Creek reach into which they drain.

01T_ODD2_DCH

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

Site Map



View toward the NE (looking downstream)

This agricultural drain contained sufficient flow for sampling during all 4 monitoring events in 2008. Table 18 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 19 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Results for DDT compounds exceeded applicable benchmarks during events 5 through 7 in 2008. Nitrate results exceeded the benchmarks in all four monitoring events. Concentrations of pesticides from all 3 pesticide groups were detected, with the greatest number of detected values occurring during the second wet event (Event 5). There were additional exceedances in event 5 for chlordane and chlorpyrifos. Row crops are the predominant crop type that drains to this monitoring site.

Table 18. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 01T_ODD2_DCH

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	15.95 EST	28.93 EST	4.18	5.32
pH	NA	6.5 ≤ pH ≤ 8.5	7.45	7.27	8.11	7.84
Temperature	ºC	---	14.38	12.62	23.24	21.81
Dissolved oxygen	mg/L	≥ 5	8.48	9.15	20.57	28.31
Turbidity	NTU	---	188.2	557.2	0.0	0.1
Conductivity	umhos/cm	---	2711	2557	4003	3626
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	---	2260	2090	3590	3140
Total Suspended Solids (TSS)	mg/L	---	194	457	4.89	3
Chloride	mg/L	---	100	100	165	150
Sulfate	mg/L	---	1110	1030	1650	1510
Total Ammonia-N	mg/L	4.00 / 6.88 / 0.48 / 0.96 [1]	0.2 [3]	0.353 [4]	0.045 [5]	0.1
Nitrate-N	mg/L	10 [2]	***45.05***	***40.44***	***60.37***	***59.6***
Phosphate	mg/L	---	2.33	4.05	0.58	0.80
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	ND	0.0272	ND	ND
Chlordane-gamma	µg/L	---	ND	0.0241	ND	ND
cis-Nanochlor	µg/L	---	ND	0.0075	ND	ND
trans-Nanochlor	µg/L	---	ND	0.0211	ND	ND
Total Chlordane	µg/L	0.00059	ND	***0.0799***	ND	ND
DCPA(Dacthal)	µg/L	---	ND	0.018	ND	ND
2,4'-DDD	µg/L	---	ND	0.0618	ND	ND
2,4'-DDE	µg/L	---	ND	0.0135	ND	ND
2,4'-DDT	µg/L	---	ND	0.0888	ND	ND
4,4'-DDD	µg/L	0.00084	ND	***0.2558***	ND	ND
4,4'-DDE	µg/L	0.00059	ND	***0.7365***	***0.0052***	***0.006***
4,4'-DDT	µg/L	0.00059	ND	***0.4435***	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	---	ND	0.0207	ND	ND
Danitol	µg/L	---	0.0543	0.0405	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	***1.2828***	***0.9837***	0.0112	0.014
Malathion	µg/L	---	0.0252	ND	ND	ND

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.

EST: Flow result is a gross estimate and should be used with discretion. ND = Not Detected

[1] The 4 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 + Nitrite-N was used for comparison with VCAILG data collected at monitoring sites in this reach.

[3] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.

[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

[5] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 19. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 01T_ODD2_DCH

Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	***45.05***	***40.44***	***60.37***	***59.6***

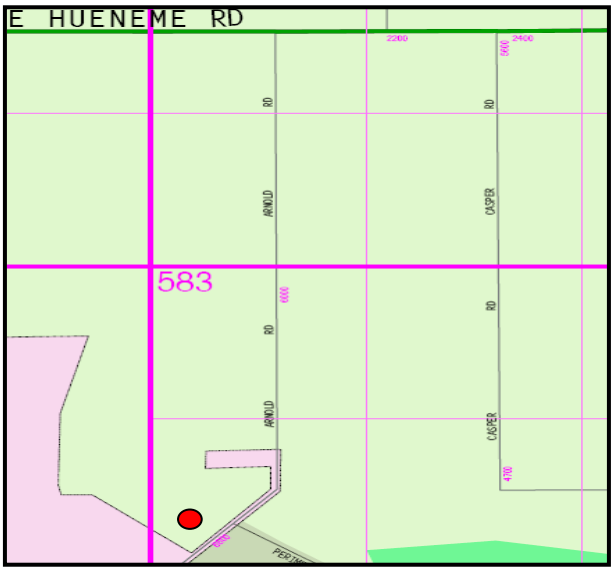
Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Table 10 through Table 17 for a list of allocations and benchmarks applicable to this site.

[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

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 during the first 3 monitoring events. This site was used to offset the cost of fish sampling and tissue analysis; therefore it was not visited during event 7. Table 20 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 21 provides a comparison of detected constituent concentrations with applicable TMDL load allocations. Flow is not measured at this site because it is unsafe to do so.

DDT compounds were the most commonly detected pesticides at this site, and there were exceedances of DDT benchmarks during each event in 2008. In addition to DDT compounds, the chlordane benchmark was exceeded during events 5 and 6. Nitrate results from all three sampled events exceeded the benchmarks. One pyrethroid pesticide was detected in event 5. Organophophorus pesticides were detected during the three sampled events, but did not exceed benchmarks. Row crops and sod are the primary crop types in the vicinity of this site.

Table 20. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 01T_ODD3_ARN

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	NM	NM	NM	
pH	NA	6.5 ≤ pH ≤ 8.5	7.46	7.7	7.9	
Temperature	ºC	---	14.85	8.71	23.0	
Dissolved oxygen	mg/L	≥ 5	9.13	9.45	12.67	
Turbidity	NTU	---	62.1	120.5	41.0	
Conductivity	umhos/cm	---	1797	1493	5932	
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	---	1210	937	4680	
Total Suspended Solids (TSS)	mg/L	---	39	124	44.5	
Chloride	mg/L	---	134	210	949	
Sulfate	mg/L	---	529	352	1480	
Total Ammonia-N	mg/L	3.76 / 3.42 / 0.78 / -- [1]	1.7	0.36 [3]	0.546 [4]	
Nitrate-N	mg/L	10 [2]	*28.47*	*10.69*	*46.78*	
Phosphate	mg/L	---	1.07	2.54	0.58	
Organochlorine Pesticides						Fish Tissue Offset
Chlordane-alpha	µg/L	---	ND	0.0085	0.003	
Chlordane-gamma	µg/L	---	ND	0.0078	0.0013	
cis-Nanochlor	µg/L	---	ND	0.0035	ND	
trans-Nonachlor	µg/L	---	ND	0.0052	0.0018	
Total Chlordane	µg/L	0.00059	ND	*0.025*	*0.0061*	
DCPA (Dacthal)	µg/L	---	0.0171	0.0142	ND	
2,4'-DDD	µg/L	---	0.0088	0.015	0.0064	
2,4'-DDE	µg/L	---	ND	ND	ND	
2,4'-DDT	µg/L	---	0.0087	0.0195	ND	
4,4'-DDD	µg/L	0.00084	*0.0198*	*0.0646*	*0.0255*	
4,4'-DDE	µg/L	0.00059	*0.0992*	*0.1772*	*0.0439*	
4,4'-DDT	µg/L	0.00059	*0.0377*	*0.0917*	*ND*	
Pyrethroid Pesticides						
L-Cyhalothrin	µg/L	---	ND	0.0063	ND	
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	ND	ND	0.0075	
Diazinon	µg/L	0.10	0.01	0.0392	ND	

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 10 through 17 for a list of benchmarks applicable to this site.
NM = Not Measured; too dangerous to measure flow. ND = Not Detected
[1] The 3 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 + Nitrite-N was used for comparison with VCAILG data collected at monitoring sites in this reach.
[3] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.
[4] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 21. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 01T_ODD3_ARN

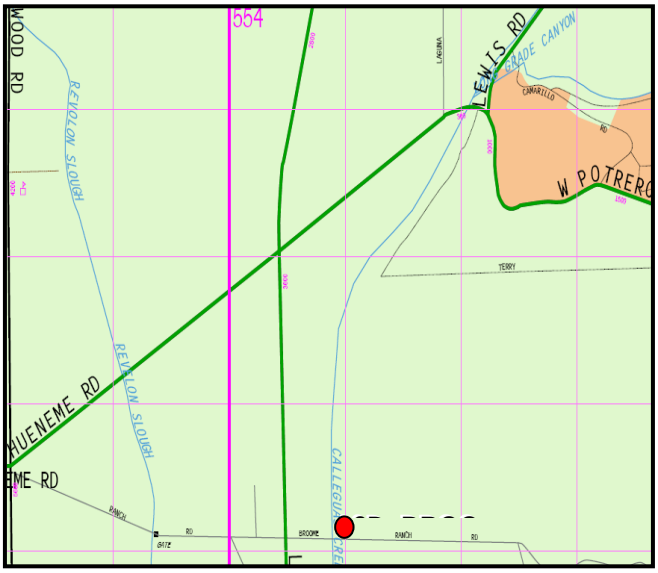
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	***28.47***	***10.69***	***46.78***	FTO

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Tables 10 through 17 for a list of allocations and benchmarks applicable to this site.
FTO = Fish Tissue Offset
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

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)

Water at 02D_BROOM originates in an agricultural drain to the east of Calleguas Creek and is pumped at an approximate rate of 200 gpm into Calleguas Creek. Water was flowing through the discharge pipe when the monitoring crew visited the site during all four sampling events. Table 22 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 23 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Concentrations of DDT compounds and nitrate exceeded benchmarks during all four events. The chlordane benchmark was exceeded during events 5 and 7. The toxaphene benchmark was exceeded during event 7. The dissolved oxygen benchmark was violated in event 8. Organophosphorus pesticides were detected during the two storm events, but did not exceed water quality benchmarks. No pyrethroids were detected at this site. Row crops are the predominant crop type in the vicinity of the monitoring site.

Table 22. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 02D_BROOM

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/202008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	0.45	0.45	0.45	0.45
pH	NA	6.5 ≤ pH ≤ 8.5	7.57	7.46	8.2	7.16
Temperature	ºC	≤ 26.67˚C [1]	14.45	12.77	22.64	21.68
Dissolved oxygen	mg/L	≥ 5	7.66	8.49	11.28	*1.95*
Turbidity	NTU	---	34.5	18.5	19.4	62.9
Conductivity	umhos/cm	---	3033	2910	2878	3303
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	---	2340	2330	2130	2410
Total Suspended Solids (TSS)	mg/L	---	36	18.6	12.3	106
Chloride	mg/L	---	230	25.4	228	250
Sulfate	mg/L	---	1000	90.8	829	1000
Total Ammonia-N	mg/L	4.11 / 5.05 / 1.06 / 3.47 [2]	0.3	0.197 [4]	0.165 [5]	0.12
Nitrate-N	mg/L	10 [3]	*43.95*	*49.22*	*36.82*	*48.23*
Phosphate	mg/L	---	1.78	1.07	11.28	2.33
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	ND	0.0063	ND	ND
Chlordane-gamma	µg/L	---	ND	0.0039	ND	ND
cis-Nonachlor	µg/L	---	ND	0.0015	ND	ND
trans-Nonachlor	µg/L	---	ND	0.0031	ND	ND
Oxychlordane	µg/L	---	ND	ND	ND	0.0285
Total Chlordane	µg/L	0.00059	ND	*0.0148*	ND	*0.0285*
DCPA (Dacthal)	µg/L	---	0.14	0.1669	0.0187	ND
2,4'-DDD	µg/L	---	0.006	ND	ND	0.0057
2,4'-DDE	µg/L	---	ND	ND	ND	ND
2,4'-DDT	µg/L	---	0.005	0.0107	ND	ND
4,4'-DDD	µg/L	0.00084	*0.0155*	*0.0113*	*0.0051*	*0.0134*
4,4'-DDE	µg/L	0.00059	*0.0511*	*0.0866*	*0.0168*	*0.0547*
4,4'-DDT	µg/L	0.00059	*0.0140*	*0.034*	ND	*0.0144*
Dieldrin	µg/L	0.00014	ND	*0.0108*	ND	ND
Toxaphene	µg/L	0.0002	ND	ND	ND	*0.19371* EST
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	ND	0.0067	ND	ND
Demeton	µg/L	---	0.0193	ND	ND	ND
Diazinon	µg/L	0.10	0.0341	0.0079	ND	ND
Dimethoate	µg/L	---	8.8696	3.6921	ND	ND
Disulfoton	µg/L	---	0.0506	ND	ND	ND
Malathion	µg/L	---	0.0197	ND	ND	ND

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected EST = Reported toxaphene concentration is considered an upper limit estimation due to the low percentage of sample peaks that correspond with the standard solution.
[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.
[4] Ammonia was detected in the lab and field blanks between the RL and MDL.
[5] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 23. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 02D_BROOM

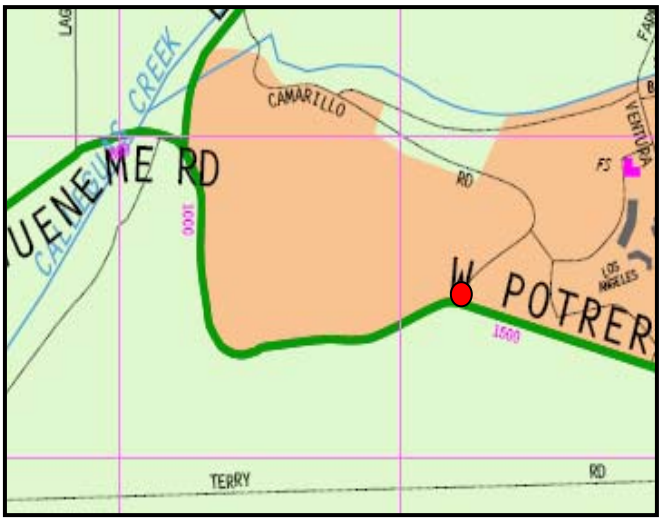
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/202008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	***43.95***	***49.22***	***36.82***	***48.23***

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Table 10 through Table 17 for a list of allocations and benchmarks applicable to this site.
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

02D_CSUCI

This site was selected as a background site for 02D_BROOM and was selected 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



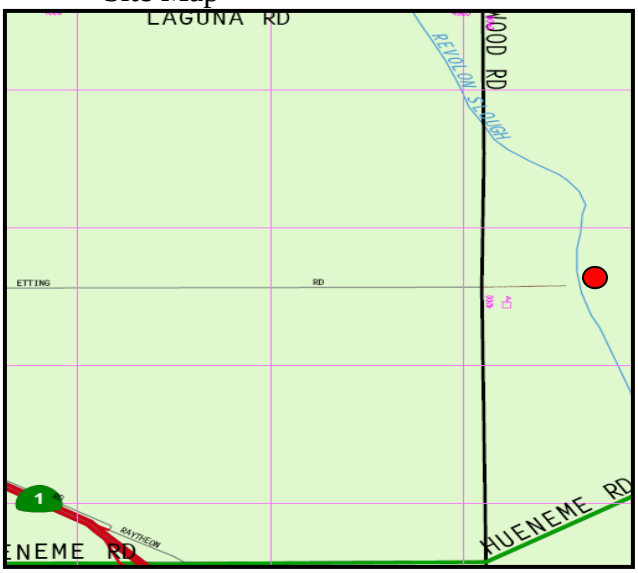
View toward SE of culvert draining runoff from CSUCI campus.

This site has not yet been sampled. It was dry all four times that samples were collected at the 02D_BROOM monitoring site, signifying that runoff from CSUCI has not influenced constituent concentrations at 02D_BROOM during 2008 monitoring.

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 during all 4 sampling events. Table 24 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 25 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Concentrations of DDT compounds exceeded benchmarks during all 4 events, and chlorpyrifos exceeded the benchmark during events 4, 5, and 7. Additionally, chlordane was detected and exceeded the water quality objective during the two storm events. The toxaphene benchmark was exceeded during event 7. Nitrate results from all 4 events exceeded the benchmarks and the ammonia objective was exceeded during event 7. All three classes of pesticides were detected at this site. Row crops are the predominant crop type in the vicinity of the monitoring site.

Table 24. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_ETTG

Constituent	Units	Benchmark	Results			
			Event 4	Event 5	Event 6	Event 7
			1/5/2008	1/24/2008	5/20/2008	9/16/2008
Field Measurements						
Flow	CFS	---	9.27	132.49 EST	4.03	2.88
pH	NA	6.5 ≤ pH ≤ 8.5	7.66	7.49	7.91	8.01
Temperature	°C	≤ 26.67˚C [1]	14.4	13.41	23.39	19.54
Dissolved oxygen	mg/L	≥ 5	8.31	9.17	10.26	8.74
Turbidity	NTU	---	226	>3000	2.7	34.1
Conductivity	umhos/cm	---	3573	3540	4185	3903
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	---	3040	2780	3750	3780
Total Suspended Solids (TSS)	mg/L	---	460	854	8.32	37
Chloride	mg/L	---	210	334	219	230
Sulfate	mg/L	---	1400	1380	1670	1590
Total Ammonia-N	mg/L	3.77 / 4.73 / 1.56 / 1.74 [2]	0.7	0.495 [4]	0.185 [5]	*1.91*
Nitrate-N	mg/L	10 [3]	*75.65*	*56.85*	*74.66*	*114.92*
Phosphate	mg/L	---	2.33	7.48	19.43	5.67
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	ND	0.0123	ND	ND
Chlordane-gamma	µg/L	---	0.0032	0.0117	ND	ND
cis-Nonachlor	µg/L	---	ND	0.0036	ND	ND
trans-Nonachlor	µg/L	---	0.0039	0.0077	ND	ND
Total Chlordane	µg/L	0.00059	*0.0071*	*0.0353*	ND	ND
DCPA (Dacthal)	µg/L	---	0.112	0.0885	ND	ND
2,4'-DDD	µg/L	---	0.039	0.0527	ND	0.005
2,4'-DDE	µg/L	---	0.0153	0.0134	ND	ND
2,4'-DDT	µg/L	---	0.0328	0.1009	ND	ND
4,4'-DDD	µg/L	0.00084	*0.0839*	*0.1679*	*0.007*	*0.0078*
4,4'-DDE	µg/L	0.00059	*0.599*	*0.9049*	*0.023*	*0.0342*
4,4'-DDT	µg/L	0.00059	*0.1388*	*0.5552*	*0.0078*	*0.0092*
Dicofol	µg/L	---	ND	0.1527	ND	ND
Toxaphene	µg/L	0.0002	ND	ND	ND	*0.190* EST
Pyrethroid Pesticides						
Bifenthrin	µg/L	---	ND	0.0237	ND	ND
Danitol	µg/L	---	ND	0.0053	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	*0.5481*	*0.8757*	0.0109	*0.0561*
Dimethoate	µg/L	---	ND	0.8436	ND	ND
Disulfoton	µg/L	---	0.0181	0.013	0.0037	ND
Malathion	µg/L	---	0.0755	0.0516	ND	ND

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.

EST = Flow result is a gross estimate and should be used with discretion. ND = Not Detected

EST = Reported toxaphene concentration is considered an upper limit estimation due to the low percentage of sample peaks that correspond with the standard solution.

[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 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 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 + Nitrite-N was used for comparison with VCAILG data collected at monitoring sites in this reach.

[4] Ammonia was detected in the lab field blanks between the RL and MDL, however it did not cause a benchmark exceedance.

[5] Ammonia was detected in the lab blank and one of the two field blanks between the RL and MDL, however these detections did not cause a benchmark exceedance. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 25. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 04D_ETTG

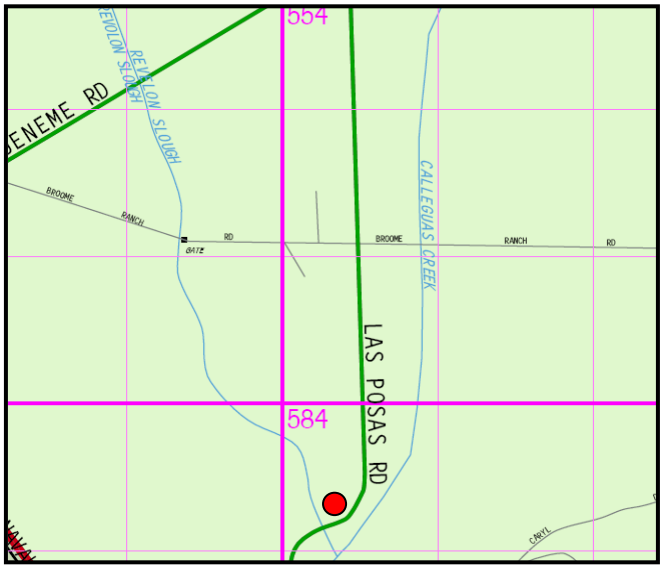
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	***75.65***	***56.85***	***74.66***	***114.92***

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocations applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

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



04D_LAS: View toward S looking downstream on ag drain before the culvert draining into Revolon Slough. Samples are collected downstream of rocky area.

Flow was present during all 4 sampling events. Table 26 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 27 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Concentrations of DDT compounds exceeded benchmarks during all 4 events, and chlordane exceeded the benchmark during events 4, 5, and 7. The toxaphene benchmark was exceeded during event 7. For organophophorus pesticides, the chlorpyrifos benchmark was exceeded during events 4, 5, and 7 whilst diazinon was exceeded during event 6. Nitrate results from all 4 events exceeded the benchmarks. The temperature benchmark was also exceeded during the May 20th dry event by 3.3ºC. Row crops and sod are the primary crop types in the vicinity of this site.

Table 26. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 04D_LAS

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	7.67 EST	NM	7.23	5.46
pH	NA	6.5 ≤ pH ≤ 8.5	7.74	7.57	8.23	7.86
Temperature	ºC	≤ 26.67˚C [1]	13.55	11.41	*29.95*	22.75
Dissolved oxygen	mg/L	≥ 5	7.09	10.3	20.4	11.83
Turbidity	NTU	---	283.5	402	9.1	45.9
Conductivity	umhos/cm	---	2121	2746	3875	3331
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	---	1500	2140	3000	2080
Total Suspended Solids (TSS)	mg/L	---	320	366	21.9	59
Chloride	mg/L	---	177	18	346	290
Sulfate	mg/L	---	620	135	1230	830
Total Ammonia-N	mg/L	3.64 / 5.00 / 0.63 / 1.73 [2]	0.8	0.092 [3]	0.047 [4]	1.2
Nitrate-N	mg/L	10	*27.49*	*45.23*	*26.36*	*22.09*
Phosphate	mg/L	---	9.38	5.15	9.32	3.49
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	0.0049	0.0156	ND	0.0031
Chlordane-gamma	µg/L	---	0.0059	0.0119	ND	0.0031
cis-Nonachlor	µg/L	---	ND	0.0047	ND	ND
trans-Nonachlor	µg/L	---	0.0061	0.0116	ND	0.0026
Total Chlordane	µg/L	0.00059	*0.0169*	*0.0438*	ND	*0.0088*
DCPA (Dacthal)	µg/L	---	0.3651	0.6467	0.1499	0.0901
2,4'-DDD	µg/L	---	0.0307	0.0356	ND	0.0069
2,4'-DDE	µg/L	---	0.0124	0.0111	ND	ND
2,4'-DDT	µg/L	---	0.0163	0.0356	ND	ND
4,4'-DDD	µg/L	0.00084	*0.0449*	*0.0928*	*0.0083*	*0.02*
4,4'-DDE	µg/L	0.00059	*0.4073*	*0.5177*	*0.0217*	*0.0583*
4,4'-DDT	µg/L	0.00059	*0.0701*	*0.1695*	*0.0073*	*0.0109*
Endosulfan-I	µg/L	---	ND	ND	ND	0.0559
Toxaphene	µg/L	0.0002	ND	ND	ND	*0.31612* EST
Cypermethrin	µg/L	---	0.0075	0.0328	ND	ND
Danitol	µg/L	---	ND	0.0036	ND	ND
Esfenvalerate	µg/L	---	ND	0.0026	ND	ND
Permethrin	µg/L	---	0.2304	0.3711	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	*0.0654*	*0.0586*	ND	*0.1307*
Diazinon	µg/L	0.10	0.0339	0.0267	*0.1933*	ND
Malathion	µg/L	---	0.2593	0.0145	ND	0.0231

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
EST: Flow result is a gross estimate and should be used with discretion. NM = Not Measured; too dangerous to measure flow.
ND = Not Detected EST = Reported toxaphene concentration is considered an upper limit estimation due to the low percentage of sample peaks that correspond with the standard solution.
[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 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 collection.
[3] Ammonia was detected in the lab and field blanks between the RL and MDL, however it did not cause a benchmark exceedance.
[4] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 27. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 04D_LAS

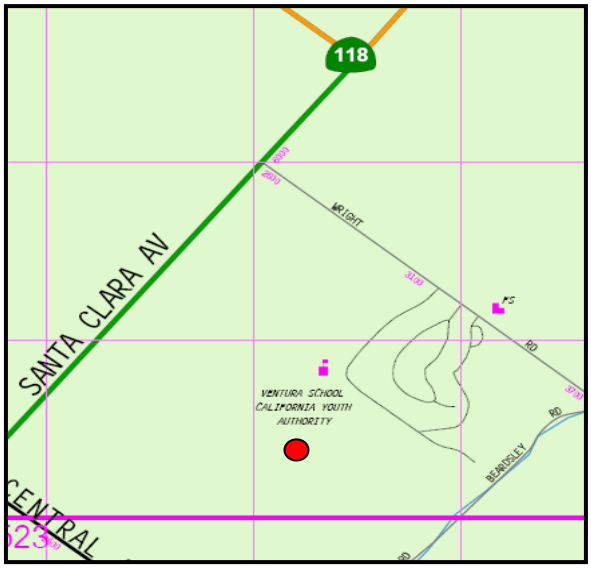
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	*27.49*	*45.23*	*26.36*	*22.09*

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

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 (toward NW) facing the VCWPD stream gage.

Flow was present during all 4 sampling events. Table 28 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks.

Table 29 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

General water quality parameters were exceeded during all four monitoring events for TDS, chloride, sulfate, and nitrate. The chlordane benchmark was exceeded during the two wet events and DDT compounds were detected during all sampling events. Two pyrethroids were detected at this site and the organophosphate pesticide, chlorpyrifos was detected and exceeded the benchmark during events 4, 5, and 7. Row crops, berries, citrus and avocado are the predominant crop types that may influence water quality at this site. It is also one of two first priority monitoring drainages in the Calleguas Creek Watershed as identified in the VCAILG 2007 WQMP.

Flows to 05D_SANT_VCWPD are also influenced by a golf course and residential area upstream. Accordingly, background site 05D_SANT_BKGD was selected to characterize non-agricultural inputs. As shown in Table 30, the background site only had flows during the January 24th storm event. Though the flow was significantly less at the background site than 05D_SANT_VCWPD, the organochlorine pesticides that were detected there correspond with the site exceedances. Chlordane and DDT were present at both sites. Chloride levels were comparable between the two sites, 100 mg/L at the background site and 155 mg/L at the monitoring site. In regards to other general water quality parameters, the background levels were significantly lower than 05D_SANT_VCWPD.

Table 28. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 05D_SANT_VCWPD

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	17.35	9.88	4.44	1.11
pH	NA	6.5 ≤ pH ≤ 8.5	7.63	7.76	8.37	8.2
Temperature	ºC	≤ 26.67˚C [1]	13.14	9.45	24.05	17.13
Dissolved oxygen	mg/L	≥ 5	9.97	11.95	21.43	12.84
Turbidity	NTU	---	251.4	920	0.2	14.3
Conductivity	umhos/cm	---	3497	2174	3189	2991
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850	***2960***	***2260***	***2650***	***2310***
Total Suspended Solids (TSS)	mg/L	---	240	410	4.28	30
Chloride	mg/L	150	***220***	***155***	***220***	***210***
Sulfate	mg/L	250	***1430***	***1150***	***1110***	***1040***
Total Ammonia-N	mg/L	4.22 / 4.63 / 0.73 / 1.52 [2]	0.2 [4]	0.363 [5]	0.316 [6]	ND
Nitrate-N	mg/L	10 [3]	***40.88***	***55***	***40.08***	***39.62***
Phosphate	mg/L	---	3.55	3.16	0.37	0.21
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	0.0081	0.0088	ND	ND
Chlordane-gamma	µg/L	---	ND	0.0079	ND	ND
cis-Nonachlor	µg/L	---	ND	0.0024	ND	ND
trans-Nonachlor	µg/L	---	ND	0.0053	ND	ND
Total Chlordane	µg/L	0.00059	***0.0081***	***0.0244***	ND	ND
2,4'-DDD	µg/L	---	ND	0.0098	ND	ND
2,4'-DDT	µg/L	---	ND	0.0179	ND	ND
4,4'-DDD	µg/L	0.00084	ND	***0.0427***	ND	ND
4,4'-DDE	µg/L	0.00059	***0.0509***	***0.1827***	***0.0175***	***0.0456***
4,4'-DDT	µg/L	0.00059	ND	***0.1078***	ND	***0.0164***
Endosulfan Sulfate	µg/L	---	0.0197	ND	ND	ND
Toxaphene	µg/L	0.0002	ND	ND	ND	***0.2237*** EST
Pyrethroid Pesticides						
Cypermethrin	µg/L	---	0.0348	ND	0.0341	ND
Danitol	µg/L	---	0.0558	0.0617	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	***0.2254***	***0.2442***	ND	***0.2695***

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
EST: Flow result is a gross estimate and should be used with discretion. ND = Not Detected
EST = Reported toxaphene concentration is considered an upper limit estimation due to the low percentage of sample peaks that correspond with the standard solution.
[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 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 + Nitrite-N was used for comparison with VCAILG data collected at monitoring sites in this reach.
[4] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[5] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.
[6] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 29. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 05D_SANT_VCWPD

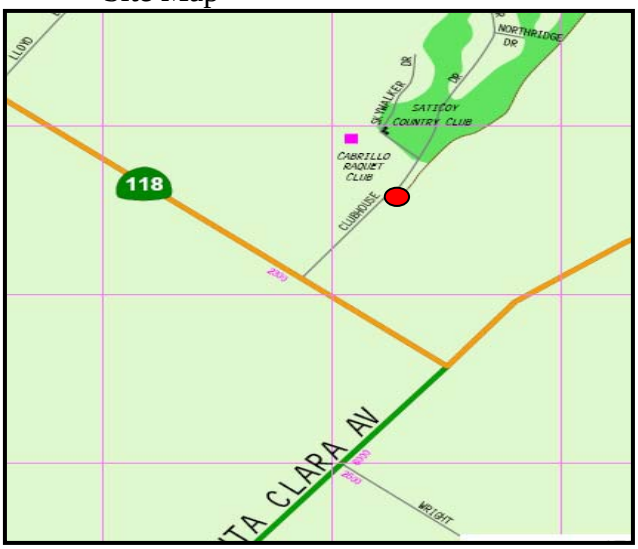
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	***40.88***	***55***	***40.08***	***39.62***

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

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 toward NE of sampling location on channel upstream of Clubhouse Dr.

Though 05D_SANT_VCWPD was sampled during all 4 monitoring events, this background site was dry for all except the second storm. 05D_SANT_BKGD results from event 5 are compared in the 05D_SANT_VCWPD discussion.

Table 30. 2008 VCAILG Monitoring Data: 05D_SANT_BKGD

Constituent	Units	Results			
		Event 4	Event 5	Event 6	Event 7
		1/5/2008	1/24/2008	5/20/2008	9/16/2008
Field Measurements					
Flow	CFS	Not Sampled	0.06	Not Sampled	Not Sampled
pH	NA		8.22		
Temperature	ºC		10.35		
Dissolved oxygen	mg/L		11.79		
Turbidity	NTU		153.5		
Conductivity	umhos/cm		700.5		
General Water Quality					
Total Dissolved Solids (TDS)	mg/L		410		
Total Suspended Solids (TSS)	mg/L		67.2		
Chloride	mg/L		100		
Sulfate	mg/L		109		
Total Ammonia-N	mg/L		0.18 [1]		
Nitrate-N	mg/L		0.75		
Phosphate	mg/L		4.41		
Organochlorine Pesticides					
Chlordane-alpha	µg/L		0.0029		
Chlordane-gamma	µg/L		0.002		
cis-Nonachlor	µg/L		0.0021		
trans-Nonachlor	µg/L		0.0021		
Total Chlordane	µg/L		0.007		
DCPA (Dacthal)	µg/L		0.0169		
4,4'-DDT	µg/L		0.0173		

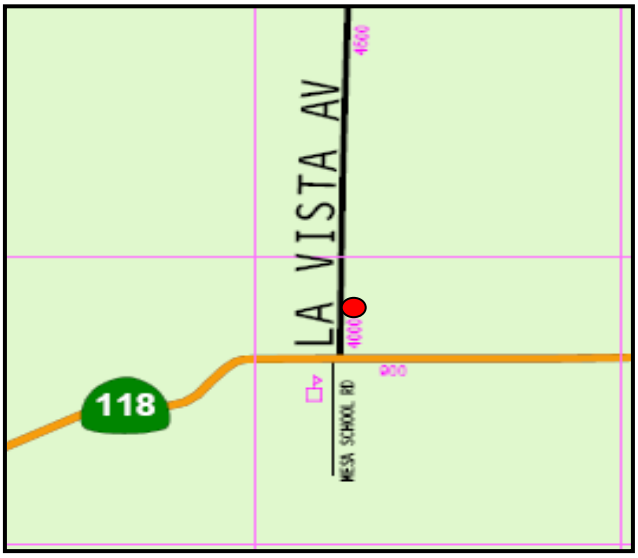
Note: This is the background site for 05D_SANT_VCWPD; therefore results are not compared to water quality benchmarks.

[1] Ammonia was detected in the lab blank and field blank below the RL but above the MDL.

05D_LAVD

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

Site Map



View upstream (NE) from sampling location. Samples are collected at the culvert entrance.

Sufficient flow was present during the second storm event. Table 31 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 32 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Concentrations of DDT compounds, chlordane, and chlorpyrifos exceeded benchmarks during event 5. None of the general water quality parameters were exceeded. Though this site was only sampled once during 2008, based on the exceedances that occurred during 2007, it is a first tier priority drainage under the 2007 WQMP.

Table 31. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 05D_LAVD

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	Not Sampled	0.30	Not Sampled	Not Sampled
pH	NA	6.5 ≤ pH ≤ 8.5		8.0		
Temperature	ºC	≤ 26.67˚C [1]		6.76		
Dissolved oxygen	mg/L	≥ 5		13.03		
Turbidity	NTU	---		1298		
Conductivity	umhos/cm	---		619.5		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850		396		
Total Suspended Solids (TSS)	mg/L	---		750		
Chloride	mg/L	150		28.7		
Sulfate	mg/L	250		169		
Total Ammonia-N	mg/L	-- / 3.95 / -- / -- [2]		0.09 [4]		
Nitrate-N	mg/L	10 [3]		5.1		
Phosphate	mg/L	---		1.38		
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---		0.0032		
Chlordane-gamma	µg/L	---		0.002		
trans-Nonachlor	µg/L	---		0.0017		
Total Chlordane	µg/L	0.00059		***0.0069***		
2,4'-DDT	µg/L	---		0.0054		
4,4'-DDD	µg/L	0.00084		***0.0136***		
4,4'-DDE	µg/L	0.00059		***0.1011***		
4,4'-DDT	µg/L	0.00059		***0.0429***		
Pyrethroid Pesticides						
Danitol	µg/L	---		0.0028		
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025		***0.3984***		
Diazinon	µg/L	0.10		0.0075		

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 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 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 + Nitrite-N was used for comparison with VCAILG data collected at monitoring sites in this reach.

[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

Table 32. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 05D_LAVD

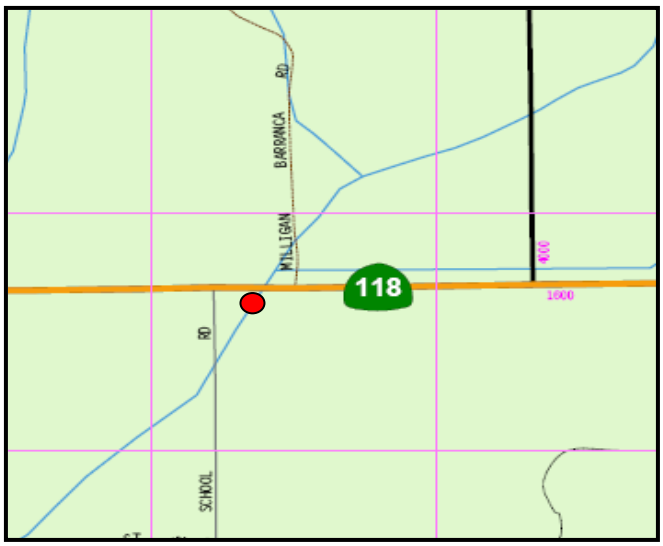
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	NS	5.1	NS	NS

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
NS = Not Sampled
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

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.

Water was not present at this monitoring site during the two dry events, indicating a lack of irrigation runoff from agricultural lands in the area during dry weather. Stormwater runoff was collected at this site during events 4 and 5. Table 33 contains a summary of constituents detected in the two storm event samples and provides a comparison of those concentrations with applicable water quality benchmarks. Table 34 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

During the first storm there were exceedances of sulfate and two DDT compounds. Exceedances of objectives for chlordane, DDT, and chlorpyrifos occurred during the second storm. Hondo Barranca drains land planted primarily in citrus, avocado and row crops.

Table 33. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 05T_HONDO

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	0.58	6.15	Not sampled	Not sampled
pH	NA	6.5 ≤ pH ≤ 8.5	7.61	8.04		
Temperature	ºC	≤ 26.67˚C [1]	12.36	5.03		
Dissolved oxygen	mg/L	≥ 5	9.92	13.33		
Turbidity	NTU	---	11157	1509		
Conductivity	umhos/cm	---	874.8	117.5		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850	640	68.8		
Total Suspended Solids (TSS)	mg/L	---	670	1050		
Chloride	mg/L	150	32	8.61		
Sulfate	mg/L	250	***335***	86.9		
Total Ammonia-N	mg/L	4.52 / 3.73 / -- / --[2]	0.2 [4]	0.25 [5]		
Nitrate-N	mg/L	10 [3]	6.5	1.23		
Phosphate	mg/L	---	2.21	5.49		
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	ND	0.0094		
Chlordane-gamma	µg/L	---	ND	0.0077		
cis-Nonachlor	µg/L	---	ND	0.0027		
trans-Nonachlor	µg/L	---	ND	0.0059		
Total Chlordane	µg/L	0.00059	ND	***0.0257***		
DCPA (Dacthal)	µg/L	---	0.019	0.0511		
2,4'-DDD	µg/L	---	ND	0.0458		
2,4'-DDE	µg/L	---	ND	0.0147		
2,4'-DDT	µg/L	---	ND	0.0952		
4,4'-DDD	µg/L	0.00084	ND	***0.2694***		
4,4'-DDE	µg/L	0.00059	***0.0299***	***1.0013***		
4,4'-DDT	µg/L	0.00059	***0.0116***	***0.494***		
Dicofol	µg/L	---	ND	0.1282		
Pyrethroid Pesticides						
Bifenthrin	µg/L	---	ND	0.0537		
Danitol	µg/L	---	ND	0.0333		
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	0.0198	***0.2482***		
Diazinon	µg/L	0.10	ND	0.0455		
Malathion	µg/L	---	ND	0.0237		

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 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 + Nitrite-N was used for comparison with VCAILG data collected at monitoring sites in this reach.

[4] Ammonia was detected in the lab blank below between the RL and MDL, however it did not cause benchmark exceedance.

[5] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

Table 34. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 05T_HONDO

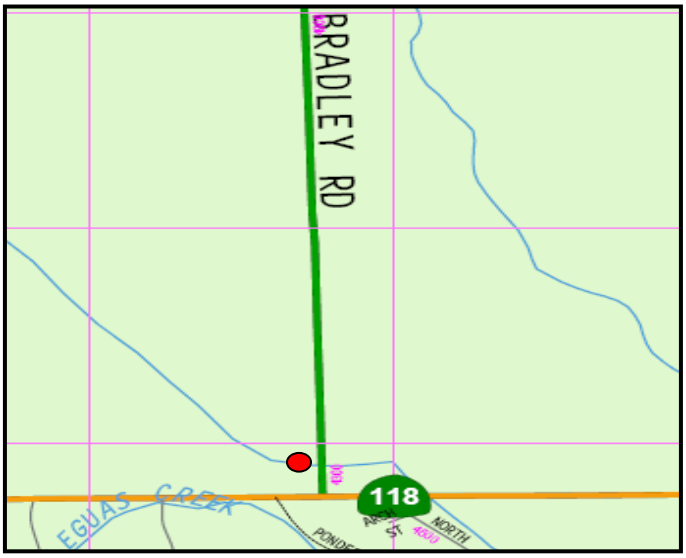
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	6.5	1.23	NS	NS

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
NS = Not Sampled; no flow.
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

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.

Water was not present at this monitoring site during Events 6 and 7, indicating a lack of irrigation runoff from crops draining to this site during dry weather. This is a trend that is consistent with 2007 samplings. Stormwater runoff was collected at this site during Events 4 and 5. Table 35 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 36 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Exceedances during the first storm were in the general water quality category: TDS, sulfate, and nitrate. Concentrations of chlordane and DDT compounds exceeded benchmarks during the second storm event. This site drains mostly citrus orchards and smaller acreages planted in avocados, nurseries and row crops.

Table 35. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: 06T_FC_BR

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	0.24	1.65	Not sampled	Not sampled
pH	NA	6.5 ≤ pH ≤ 8.5	6.95	8.02		
Temperature	ºC	≤ 26.67˚C [1]	12.17	5.11		
Dissolved oxygen	mg/L	≥ 5	9.73	13.2		
Turbidity	NTU	---	1046	3000		
Conductivity	umhos/cm	---	1870	365.8		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	850	***1600***	226		
Total Suspended Solids (TSS)	mg/L	---	660	3880		
Chloride	mg/L	150	23	23.4		
Sulfate	mg/L	250	***958***	104		
Total Ammonia-N	mg/L	7.00 / 3.84 / -- / --[2]	0.4 [3]	0.532 [4]		
Nitrate-N	mg/L	10	***17.19***	4.39		
Phosphate	mg/L	---	5.52	14.74		
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	ND	0.007		
Chlordane-gamma	µg/L	---	ND	0.0059		
cis-Nonachlor	µg/L	---	ND	0.0183		
trans-Nonachlor	µg/L	---	ND	0.0055		
Total Chlordane	µg/L	0.00059	ND	***0.0367***		
DCPA (Dacthal)	µg/L	---	ND	0.014		
2,4'-DDD	µg/L	---	ND	0.0126		
2,4'-DDT	µg/L	---	ND	0.0603		
4,4'-DDE	µg/L	0.00059	ND	***0.3005***		
4,4'-DDT	µg/L	0.00059	ND	***0.1066***		

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected
[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 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] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

Table 36. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: 06T_FC_BR

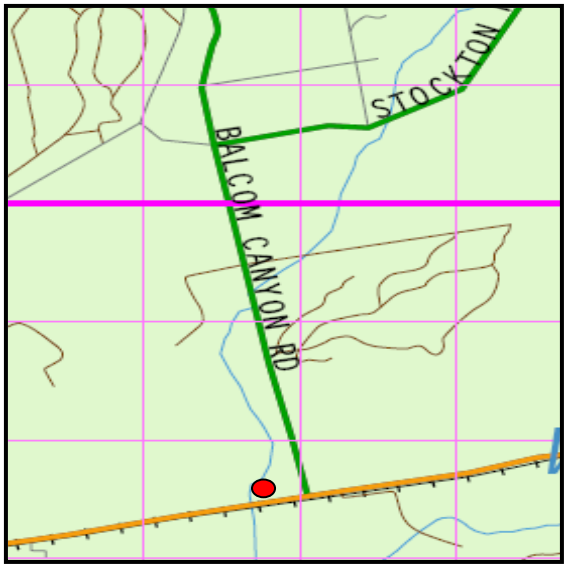
Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Nitrate-N	mg/L	9 [1]	***17.19***	4.39	NS	NS

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocation applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
NS = Not Sampled; no flow.
[1] The CCW Nitrogen Compounds TMDL load allocation is listed as Nitrate-N + Nitrite-N. Only nitrate is measured as required by the Conditional Waiver; therefore Nitrate-N concentrations are compared with the TMDL load allocation. Compliance with this load allocation is not required until July 16, 2010.

06T_LONG

This monitoring site is located on Long Canyon just upstream of the Hwy 118 Bridge. Long Canyon is a tributary to Calleguas Creek Reach 6 (Arroyo Las Posas).

Site Map



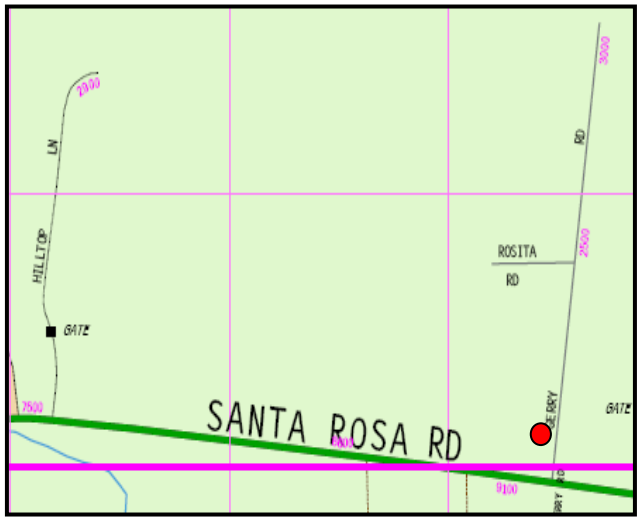
View upstream (N) from Hwy 118 bridge. Samples are to be collected upstream from view in photo.

This site was dry during all 4 monitoring events and so has not yet been sampled. Absence of flow at this site signifies an absence of runoff from the citrus and avocado orchards, as well as smaller acreages of nursery stock and row crops that drain to this location.

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 toward the N at sampling site (foot bridge).

There was no flow at this site during each of the monitoring events in 2008, signifying the absence of runoff from citrus and avocado orchards and berries.

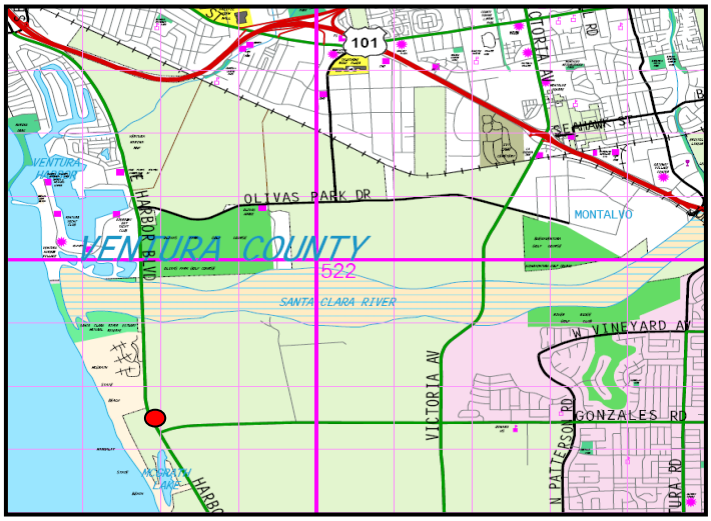
Oxnard Coastal Watershed

The Oxnard Coastal Watershed contains only one VCAILG monitoring site. The monitoring 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 Blvd 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 Blvd.

Site Map



View looking downstream.

Sufficient flow was present during all 4 monitoring events. Table 37 contains a summary of constituents detected in one or more monitoring events and provides a comparison of those concentrations with applicable water quality benchmarks.

Benchmarks were exceeded during all four monitoring events for nitrate and DDT compounds. A chlordane exceedance occurred during the second storm and the chlorpyrifos benchmark was exceeded at both storm events. Strawberries and row crops are the predominant crop types that drain into this site. This site is also a first tier priority drainage for the 2007 WQMP implementation.

Table 37. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: OXD_CENTR

			Results			
			Event 4	Event 5	Event 6	Event 7
Constituent	Units	Benchmark	1/5/2008	1/24/2008	5/20/2008	9/16/2008
Field Measurements						
Flow	CFS	---	5.63 EST	35.66	1.08	0.75
pH	NA	6.5 ≤ pH ≤ 8.5	7.09	7.17	7.58	7.68
Temperature	°C	---	14.3	10.92	19.34	18.67
Dissolved oxygen	mg/L	≥ 5	7.03	9.63	12.27	6.63
Turbidity	NTU	---	44.2	1570	0.0	1.6
Conductivity	umhos/cm	---	3022	1690	3545	3505
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	---	2510	1320	2780	2710
Total Suspended Solids (TSS)	mg/L	---	33	1270	2.78	5
Chloride	mg/L	---	170	77.2	316	300
Sulfate	mg/L	---	1260	686	1220	1220
Total Ammonia-N	mg/L	5.77 / 6.91 / 2.97 / 2.8 [1]	0.2 [3]	0.205 [4]	0.086 [5]	0.24
Nitrate-N	mg/L	10 [2]	*19.7*	*19.35*	*14.68*	*14.88*
Phosphate	mg/L	---	0.95	10.54	0.21	0.15
Organochlorine Pesticides						
BHC-beta	µg/L	---	ND	0.0498	ND	ND
Chlordane-alpha	µg/L	---	ND	0.0657	ND	ND
Chlordane-gamma	µg/L	---	ND	0.0623	ND	ND
cis-Nonachlor	µg/L	---	ND	0.0152	ND	ND
trans-Nonachlor	µg/L	---	ND	0.037	ND	ND
Total Chlordane	µg/L	0.00059	ND	*0.1802*	ND	ND
DCPA (Dacthal)	µg/L	---	ND	0.0267	ND	ND
2,4'-DDD	µg/L	---	0.017	0.3734	ND	ND
2,4'-DDE	µg/L	---	ND	0.0426	ND	ND
2,4'-DDT	µg/L	---	0.0075	0.2783	ND	ND
4,4'-DDD	µg/L	0.00084	*0.0128*	*1.0772*	ND	*0.0053*
4,4'-DDE	µg/L	0.00059	*0.1029*	*2.1452*	*0.0079*	*0.0093*
4,4'-DDT	µg/L	0.00059	*0.0439*	*1.0539*	ND	ND
Dicofol	µg/L	---	ND	0.5786	ND	ND
Heptachlor Epoxide	µg/L	---	ND	0.0064	ND	ND
Pyrethroid Pesticides						
Bifenthrin	µg/L	---	0.0481	0.1029	ND	ND
Danitol	µg/L	---	0.1433	0.0485	ND	ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	*0.6766*	*4.9679*	0.0062	ND

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Tables 10 through 17 for a list of benchmarks applicable to this site.
EST: Flow result is a gross estimate and should be used with discretion. ND = Not Detected
[1] The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based 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 + Nitrite-N was used for comparison with VCAILG data collected at the monitoring sites in this reach.
[3] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.
[5] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

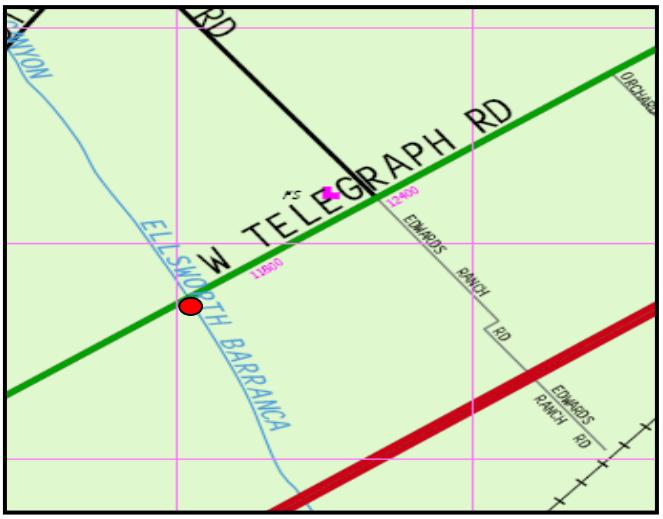
Santa Clara River Watershed

The Santa Clara River Watershed contains 7 VCAILG monitoring sites, all but one of which is located on a tributary of the Santa Clara River. S03D_BARDS is the only monitoring site located on a drainage 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 from W bank looking NE (upstream) at the bridge pier.

Flow was present at this site during events 4, 5, and 7. Table 38 contains a summary of constituents detected in Event 3 samples and provides a comparison of those concentrations with applicable water quality benchmarks. Table 39 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

During the two storm events, TDS and sulfate benchmarks were exceeded, chloride levels were also too high during the first storm. The pH level during the event 7 dry weather event was slightly elevated above the basic benchmark. There was also an exceedance in chlorpyrifos during the dry event. Citrus and avocados are the primary crop types associated with this site.

Table 38. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_ELLS

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	28.64	65.99	Not Sampled	0.25
pH	NA	6.5 ≤ pH ≤ 8.5	8.24	8.19		*8.56*
Temperature	°C	≤ 26.67°C [1]	11.43	6.21		25.4
Dissolved oxygen	mg/L	≥ 6	10.59	12.56		8
Turbidity	NTU	---	1646	247.3		3.9
Conductivity	umhos/cm	---	2097	2106		1328
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1200	*1510*	*1530*		970
Total Suspended Solids (TSS)	mg/L	---	1620	221		2
Chloride	mg/L	150	*157*	121		47
Sulfate	mg/L	600	*740*	*776*		450
Total Ammonia-N	mg/L	2.05 / 3.11 / -- / 0.49 [2]	0.2 [3]	0.167 [4]		ND
Nitrate-N	mg/L	10	6.37	4.93		0.21
Phosphate	mg/L	---	1.65	0.61		ND
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	ND	ND		*0.225*

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected
[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 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] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

Table 39. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: S02T_ELLS

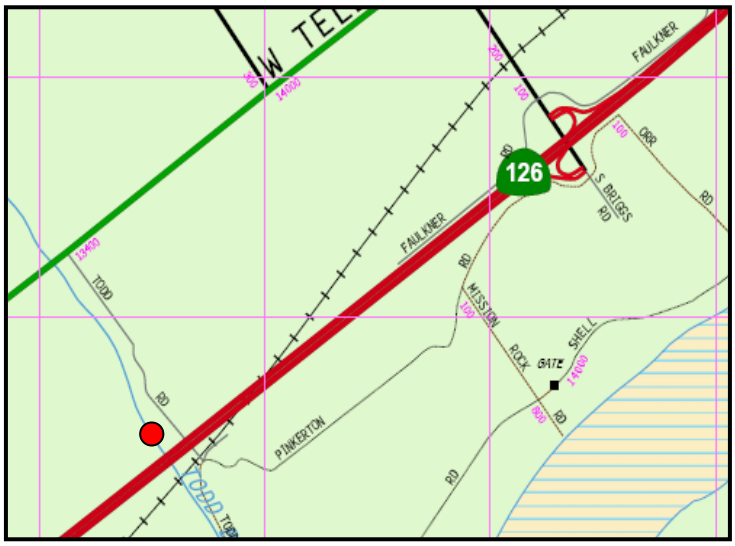
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Ammonia-N + Nitrate-N	mg/L	10 [1]	6.57	5.097	NS	0.21

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocations applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
NS = Not Sampled; no flow.
[1] The SCR Nitrogen Compounds TMDL load allocation is expressed as Ammonia-N + Nitrate-N + Nitrite-N. Monitoring for Nitrite-N is not required under the Conditional Waiver; therefore, the sum of Ammonia-N + Nitrate-N is compared with the TMDL allocation.

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 (toward the NW).

Sufficient flow was present during the first 3 monitoring events. The Todd Barranca site was not visited during event 7 as part of the fish tissue sampling cost offset. Table 40 contains a summary of constituents detected in one or more samples and provides a comparison of those concentrations with applicable water quality benchmarks. Table 41 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Concentrations of total dissolved solids and sulfate detected in samples from all events exceeded benchmarks. A DDT exceedance occurred during the event 5 storm and nitrate was slightly above the benchmark during event 6. Citrus, avocados and row crops are the primary crop types associated with this site. This site is also a first tier priority drainage area for targeted outreach and BMP implementation under the 2007 WQMP.

Table 40. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: S02T_TODD

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	15.14	24.44	0.37	
pH	NA	6.5 ≤ pH ≤ 8.5	7.64	7.44	7.78	
Temperature	°C	≤ 26.67°C [1]	12.47	8.56	17.15	
Dissolved oxygen	mg/L	≥ 6	9.26	10.89	9.31	
Turbidity	NTU	---	489	174.6	0	
Conductivity	umhos/cm	---	2294	2260	2700	
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1200	*1770*	*1710*	*2120*	
Total Suspended Solids (TSS)	mg/L	---	360	130	2.2	
Chloride	mg/L	150	105	98.9	98.7	
Sulfate	mg/L	600	*880*	*875*	*1050*	
Total Ammonia-N	mg/L	4.36 / 6.74 / 2.75 / --[2]	0.3 [3]	0.155 [4]	0.046 [5]	
Nitrate-N	mg/L	10	8.94	7.89	*10.25*	
Phosphate	mg/L	---	3.06	0.98	0.25	
Organochlorine Pesticides						
2,4'-DDE	µg/L	---	ND	0.0094	ND	
4,4'-DDT	µg/L	0.00059	ND	*0.0186*	ND	
Pyrethroid Pesticides						
Cypermethrin	µg/L	---	ND	0.0186	ND	
Organophosphorus Pesticides						
Diazinon	µg/L	0.10	ND	ND	0.0085	

Fish Tissue Offset

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected
[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 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] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.
[5] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 41. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: S02T_TODD

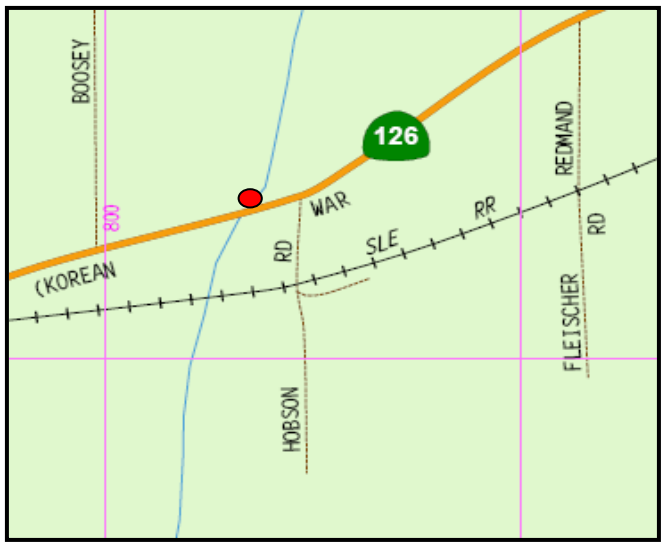
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Ammonia-N + Nitrate-N	mg/L	10	9.24	8.045	*10.296*	FTO

Note: Concentrations in ***bold italics*** indicate an exceedance of a TMDL load allocations applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
FTO = Fist Tissue Offset; site not visited.
[1] The SCR Nitrogen Compounds TMDL load allocation is expressed as Ammonia-N + Nitrate-N + Nitrite-N. Monitoring for Nitrite-N is not required under the Conditional Waiver; therefore, the sum of Ammonia-N + Nitrate-N is compared with the TMDL allocation.

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 S toward Hwy 126 bridge. Samples are collected just upstream from the bridge pier.

There was no flow at this site during both dry events. Stormwater samples were collected during Events 4 and 5. Table 42 contains a summary of constituents detected in storm event samples and provides a comparison of those concentrations with applicable water quality benchmarks. Table 43 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Concentrations of nitrate and chlorpyrifos exceeded benchmarks during event 4. During the second storm, exceedances in sulfate and DDT occurred. Citrus and avocados are the primary crop types associated with this site.

Table 42. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_TIMB

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	1.40	2.77	Not Sampled	Not Sampled
pH	NA	6.5 ≤ pH ≤ 8.5	7.89	7.92		
Temperature	ºC	≤ 26.67˚C [1]	11.61	6.11		
Dissolved oxygen	mg/L	≥ 5	10.54	12.61		
Turbidity	NTU	---	1834	842		
Conductivity	umhos/cm	---	1030	1630		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300	700	1150		
Total Suspended Solids (TSS)	mg/L	---	1560	587		
Chloride	mg/L	100	52.6	30		
Sulfate	mg/L	650	391	*677*		
Total Ammonia-N	mg/L	3.42 / 4.68 / -- / --[2]	0.2 [3]	0.178 [4]		
Nitrate-N	mg/L	5	*6.65*	4.18		
Phosphate	mg/L	---	0.83	2.11		
Organochlorine Pesticides						
DCPA (Dacthal)	µg/L	---	0.0223	ND		
4,4'-DDT	µg/L	0.00059	ND	*0.0081*		
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025	*0.1123*	0.0237		
Diazinon	µg/L	0.10	ND	0.0083		
Dimethoate	µg/L	---	ND	0.0166		

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected
[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 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] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

Table 43. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: S03T_TIMB

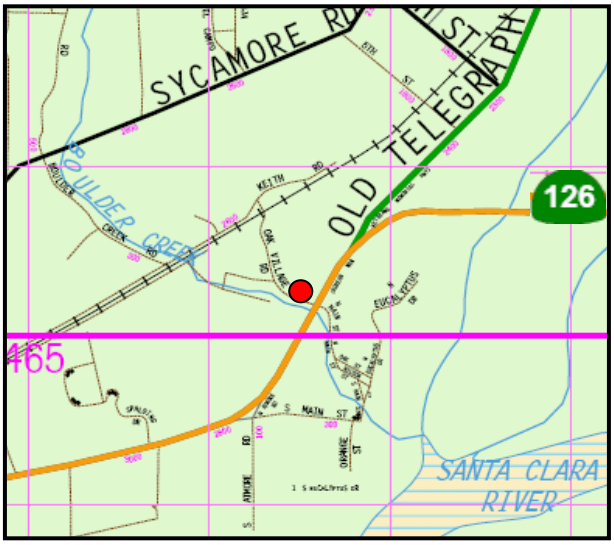
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Ammonia-N + Nitrate-N	mg/L	10	6.85	4.358	NS	NS

Note: Concentrations in ***bold italics*** indicate an exceedance of TMDL load allocations applicable to this site for the specified constituent. See Table 10 through 17 or a list of allocations and benchmarks applicable to this site.
NS = Not Sampled; no flow.
[1] The SCR Nitrogen Compounds TMDL load allocation is expressed as Ammonia-N + Nitrate-N + Nitrite-N. Monitoring for Nitrite-N is not required under the Conditional Waiver; therefore, the sum of Ammonia-N + Nitrate-N is compared with the TMDL allocation.

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 from sampling location downstream toward the Hwy 126 Bridge.

Sufficient flow was present during the first three monitoring events. This site was not visited during event 7 as part of the fish tissue sampling cost offset. Table 44 contains a summary of constituents detected in one or more events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 45 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

No exceedances occurred at this site during the first storm event. During the event 5 storm event, there was only an exceedance for chlordane. However, during event 6 there were exceedances in TDS, chloride, sulfate, ammonia, and nitrate. Citrus and avocados are the primary crop types associated with this site; a nursery is located adjacent to the monitoring site.

Table 44. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: S03T_BOULD

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	16.03	33.88	0.18	
pH	NA	6.5 ≤ pH ≤ 8.5	7.77	7.94	8.1	
Temperature	ºC	≤ 26.67˚C [1]	11.82	7.34	20.21	
Dissolved oxygen	mg/L	≥ 5	10.62	12.24	8.83	
Turbidity	NTU	---	497	464	18.9	
Conductivity	umhos/cm	---	551	816.1	2416	
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300	533	330	***1940***	
Total Suspended Solids (TSS)	mg/L	---	381	390	26.2	
Chloride	mg/L	100	14.2	8	***105***	
Sulfate	mg/L	650	273	169	***905***	
Total Ammonia-N	mg/L	3.93 / 4.21 / 1.45 / --[2]	0.33 [3]	0.1 [4]	***6.42*** [5]	
Nitrate-N	mg/L	5	4.31	2.78	***54.42***	
Phosphate	mg/L	---	2.08	1.16	19.43	
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	ND	0.0029	ND	
Chlordane-gamma	µg/L	---	ND	0.0022	ND	
trans-Nonachlor	µg/L	---	ND	0.0015	ND	
Total Chlordane	µg/L	0.00059	ND	***0.0066***	ND	
Pyrethroid Pesticides						
Bifenthrin	µg/L	---	ND	ND	0.1103	
Danitol	µg/L	---	ND	0.0213	0.0226	
Fluvalinate	µg/L	---	ND	ND	0.0082	
Permethrin	µg/L	---	ND	ND	0.1308	
Organophosphorus Pesticides						
Dichlorvos	µg/L	---	ND	ND	0.0279	
Malathion	µg/L	---	ND	0.0086	0.0093	

Fish Tissue Offset

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected
[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 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] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.
[5] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 45. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: S03T_BOULD

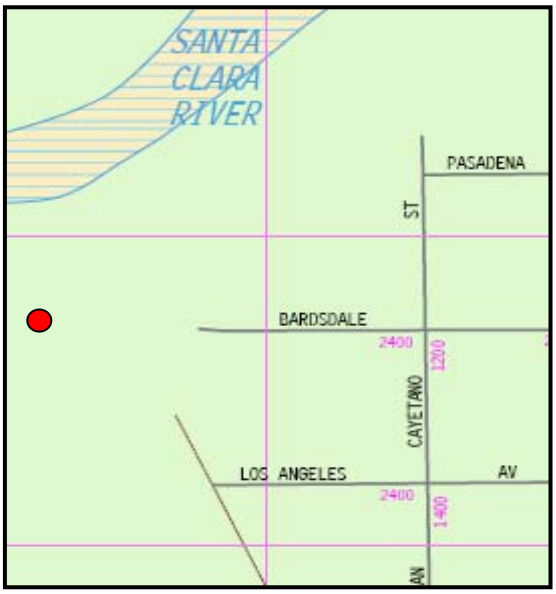
Constituent	Units	Load Allocation	Results Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Ammonia-N + Nitrate-N	mg/L	10 [1]	4.64	2.88	***60.84***	FTO

Note: Concentrations in ***bold italics*** indicate an exceedance of TMDL load allocations applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
FTO = Fish Tissue Offset; site not visited.
[1] The SCR Nitrogen Compounds TMDL load allocation is expressed as Ammonia-N + Nitrate-N + Nitrite-N. Monitoring for Nitrite-N is not required under the Conditional Waiver; therefore, the sum of Ammonia-N + Nitrate-N is compared with the TMDL allocation.

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 downstream (toward the E) from the sampling site toward the Santa Clara River.

Insufficient flow was present during Events 4, 6, and 7. Stormwater samples were collected during Event 5. Table 46 contains a summary of constituents detected in Event 5 samples and provides a comparison of those concentrations with applicable water quality benchmarks. Table 47 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

The concentrations of chlordane and DDT compounds in the Event 5 sample exceeded the applicable water quality benchmarks. There were also exceedances of two organophosphorus pesticides, diazinon and chlopyrifos. Citrus is the primary crop type associated with this site.

Table 46. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: S03D_BARDS

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	Not Sampled	1.64	Not Sampled	Not Sampled
pH	NA	6.5 ≤ pH ≤ 8.5		7.93		
Temperature	°C	≤ 26.67°C [1]		7.94		
Dissolved oxygen	mg/L	≥ 5		12.36		
Turbidity	NTU	---		698		
Conductivity	umhos/cm	---		573.7		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300		328		
Total Suspended Solids (TSS)	mg/L	---		357		
Chloride	mg/L	100		3.02		
Sulfate	mg/L	650		14.6		
Total Ammonia-N	mg/L	-- / 4.1 / -- / --[2]		0.469 [3]		
Nitrate-N	mg/L	5		4.33		
Phosphate	mg/L	---		3.16		
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---		0.0054		
Chlordane-gamma	µg/L	---		0.0046		
cis-Nonachlor	µg/L	---		0.0029		
trans-Nonachlor	µg/L	---		0.0057		
Total Chlordane	µg/L	0.00059		***0.0186***		
2,4'-DDT	µg/L	---		0.0095		
4,4'-DDD	µg/L	0.00084		***0.0141***		
4,4'-DDE	µg/L	0.00059		***0.1001***		
4,4'-DDT	µg/L	0.00059		***0.0553***		
DCPA (Dacthal)	µg/L	---		4.8474		
Pyrethroid Pesticides						
Cyfluthrin	µg/L	---		0.0267		
Cypermethrin	µg/L	---		0.0192		
Permethrin	µg/L	---		0.7955		
Organophosphorus Pesticides						
Chlorpyrifos	µg/L	0.025		***2.6776***		
Diazinon	µg/L	0.10		***0.1231***		
Dimethoate	µg/L	---		0.2372		

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 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 the April 2002 Basin Plan Amendment chronic equation (ELS present) and are dependent upon the pH and temperature of the water at the time of sample collection.

[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

Table 47. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: S03D_BARDS

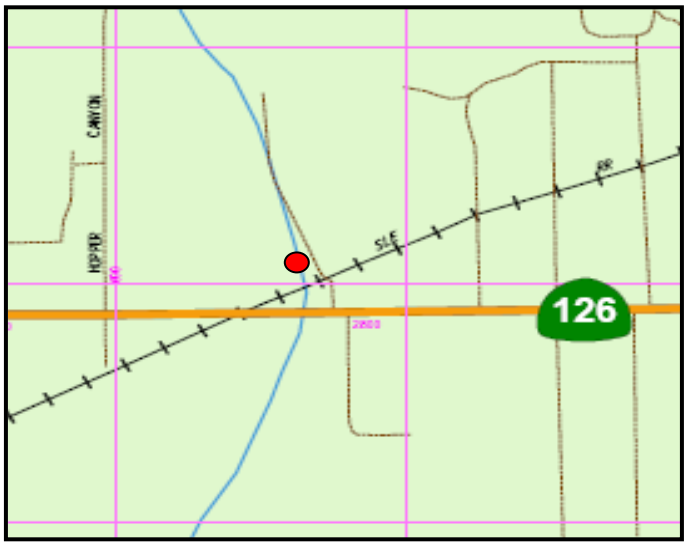
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Ammonia-N + Nitrate-N	mg/L	10 [1]	NS	4.80	NS	NS

Note: Concentrations in ***bold italics*** indicate an exceedance of TMDL load allocations applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
NS = Not Sampled; no flow.
[1] The SCR Nitrogen Compounds TMDL load allocation is expressed as Ammonia-N + Nitrate-N + Nitrite-N. Monitoring for Nitrite-N is not required under the Conditional Waiver; therefore, the sum of Ammonia-N + Nitrate-N is compared with the TMDL allocation.

S04T_HOPP

This monitoring site is located on Hopper Creek just upstream of Hwy 126 and the railroad bridge. Hopper Creek is a tributary to Santa Clara River Reach 4.

Site Map



View upstream (toward the N) from sampling location upstream of the railroad bridge.

Insufficient flow was present during event 7. Stormwater samples were collected during events 4 and 5 and water was also present during the event 6 dry weather sampling. Table 48 contains a summary of constituents detected in samples and provides a comparison of those concentrations with applicable water quality benchmarks. Table 49 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

There were no benchmark exceedances during the two wet events. Only TDS and sulfate exceeded benchmarks during the dry weather sampling. Additionally, no pesticides were detected in any of the samples. Primary crop types associated with this site are citrus and nursery stock.

Table 48. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: S04T_HOPP

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	110.18	151.63	0.31	Not Sampled
pH	NA	6.5 ≤ pH ≤ 8.5	8.18	8.07	8.16	
Temperature	°C	≤ 26.67°C [1]	11.01	8.06	18.36	
Dissolved oxygen	mg/L	≥ 5	10.57	11.87	9.57	
Turbidity	NTU	---	592	117.8	0.0	
Conductivity	umhos/cm	---	1133	848.9	2007	
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300	870	553	***1560***	
Total Suspended Solids (TSS)	mg/L	---	590	82.3	2.11	
Chloride	mg/L	100	11	8.24	30.6	
Sulfate	mg/L	600	509	296	***805***	
Total Ammonia-N	mg/L	2.32 / 3.33 / 1.49 / --[2]	0.2 [3]	0.239 [4]	0.156 [5]	
Nitrate-N	mg/L	5	0.9	0.22	ND	
Phosphate	mg/L	---	2.02	0.55	0.40	

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected
[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 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] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.
[5] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 49. 2008 VCAILG Monitoring Data v. TMDL Load Allocations: S04T_HOPP

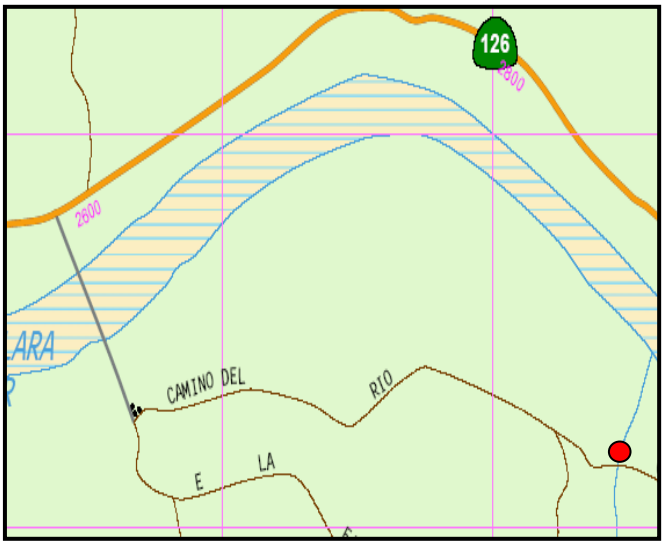
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Ammonia-N + Nitrate-N	mg/L	10	1.10	0.46	0.16	NS

Note: Concentrations in ***bold italics*** indicate an exceedance of TMDL load allocation applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
NS = Not Sampled; no flow.
[1] The SCR Nitrogen Compounds TMDL load allocation is expressed as Ammonia-N + Nitrate-N + Nitrite-N. Monitoring for Nitrite-N is not required under the Conditional Waiver; therefore, the sum of Ammonia-N + Nitrate-N is compared with the TMDL allocation.

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 S) toward the sample site at the culvert outfall.

Sufficient flow was present during all 4 monitoring events. Table 50 contains a summary of constituents detected in one or more events and provides a comparison of those concentrations with applicable water quality benchmarks. Table 51 provides a comparison of detected constituent concentrations with applicable TMDL load allocations.

Concentrations of TDS, chloride, and sulfate exceeded applicable benchmarks in all 4 events. The nitrate objective was exceeded during the two dry weather events and DDT compounds were present in the two storm samples. In addition, there was a chlordane exceedance during event 5. Unfortunately, the background site for Tapo Creek is inaccessible during wet weather. However, samples were detected at the background site during the first dry weather event. Though no pesticides were detected at the background site, TDS, chloride, and sulfate levels are quite similar between the two sites. The percent difference in concentrations between the Tapo Creek site and the background site are 2% for TDS and 8% for sulfate. The percent difference for chloride is much higher at 34%, however the concentration at the background site is greater. Therefore, it is likely that the salts exceedances at this site are a function of natural conditions and not agricultural practices. Row crops and citrus are the primary crop types associated with this site. This site is a first tier priority drainage under the 2007 WQMP.

Table 50. 2007 VCAILG Monitoring Data v. Waiver Benchmarks: S04T_TAPO

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	2.03	1.71	0.15	0.014
pH	NA	6.5 ≤ pH ≤ 8.5	8.34	8.14	8.26	7.8
Temperature	ºC	≤ 26.67˚C [1]	11.14	9.37	15.67	17.47
Dissolved oxygen	mg/L	≥ 5	10.3	11.2	8.77	8.64
Turbidity	NTU	---	1303	768	0.0	6.7
Conductivity	umhos/cm	---	4601	3926	4564	4219
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	1300	***4080***	***3030***	***4200***	***3660***
Total Suspended Solids (TSS)	mg/L	---	1440	644	3.37	16
Chloride	mg/L	100	***190***	***137***	***203***	***200***
Sulfate	mg/L	600	***2160***	***1530***	***1870***	***1810***
Total Ammonia-N	mg/L	1.77 / 2.75 / 1.51 / 2.63 [2]	0.5 [3]	0.507 [4]	0.042 [5]	ND
Nitrate-N	mg/L	5	4.4	3.9	***8.03***	***13.56***
Phosphate	mg/L	---	1.53	1.65	0.28	0.09
Organochlorine Pesticides						
Chlordane-alpha	µg/L	---	ND	0.0131	ND	ND
Chlordane-gamma	µg/L	---	ND	0.0084	ND	ND
cis-Nonachlor	µg/L	---	ND	0.005	ND	ND
trans-Nonachlor	µg/L	---	ND	0.0088	ND	ND
Total Chlordane	µg/L	0.00059	ND	***0.0353***	ND	ND
2,4'-DDD	µg/L	---	ND	0.0075	ND	ND
2,4'-DDT	µg/L	---	ND	0.0331	ND	ND
4,4'-DDD	µg/L	0.00084	ND	***0.079***	ND	ND
4,4'-DDE	µg/L	0.00059	***0.0777***	***0.2578***	ND	ND
Pyrethroid Pesticides						
Cyfluthrin	µg/L	---	ND	0.0065	ND	ND
Organophosphorus Pesticides						
Diazinon	µg/L	0.10	ND	0.0564	ND	ND
Dimethoate	µg/L	---	ND	0.8969	ND	ND

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected
[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 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] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[4] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.
[5] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL, however these detections did not cause an exceedance of the water quality benchmark. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

Table 51. 2007 VCAILG Monitoring Data v. TMDL Load Allocations: S04T_TAPO

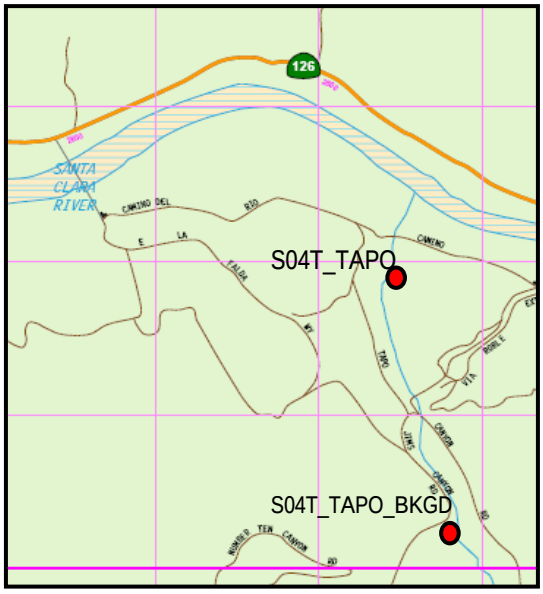
Constituent	Units	Load Allocation	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
General Water Quality						
Ammonia-N + Nitrate-N	mg/L	10 [1]	4.9	4.407	8.072	***13.56***

Note: Concentrations in ***bold italics*** indicate an exceedance of TMDL load allocations applicable to this site for the specified constituent. See Table 10 through 17 for a list of allocations and benchmarks applicable to this site.
[1] The SCR Nitrogen Compounds TMDL load allocation is expressed as Ammonia-N + Nitrate-N + Nitrite-N. Monitoring for Nitrite-N is not required under the Conditional Waiver; therefore, the sum of Ammonia-N + Nitrate-N is compared with the TMDL allocations.

S04T_TAPO_BKGD

The 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 investigate the formation of a white floc and film on laboratory glassware and test vessels during Event 1 toxicity testing. 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

Samples were collected at this site only during Event 6 (dry weather event). Wet weather sampling was not conducted at this site due to inaccessibility during wet weather. Table 52 contains a summary of constituents detected in Event 6 samples. Concentrations detected are not compared with benchmarks because this site is located upstream of irrigated agriculture and benchmarks therefore do not apply.

Elevated concentrations of TDS, chloride and sulfate were detected in Event 6 samples. A comparison of these levels with the Tapo Creek site can be found in the discussion of S04T_TAPO results. As expected, pesticides were not detected, and nutrient levels were low.

.

Table 52. 2007 VCAILG Monitoring Data: S04T_TAPO_BKGD

Constituent	Units	Results			
		Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements					
Flow	CFS	Not Sampled	Not Sampled	0.11	Not Sampled
pH	NA			7.84	
Temperature	ºC			15.13	
Dissolved oxygen	mg/L			6.69	
Turbidity	NTU			0.0	
Conductivity	umhos/cm			5029	
General Water Quality					
Total Dissolved Solids (TDS)	mg/L			4100	
Total Suspended Solids (TSS)	mg/L			3.91	
Chloride	mg/L			287	
Sulfate	mg/L			1720	
Total Ammonia-N	mg/L			0.122 [1]	
Nitrate-N	mg/L			ND	
Phosphate	mg/L			0.61	

Note: This is the background site for S04T_TAPO; therefore results are not compared to water quality benchmarks.
ND = Not Detected
[1] Ammonia was detected in the lab blank and one of the two field blanks below the RL but above the MDL. The second field blank was bottled Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

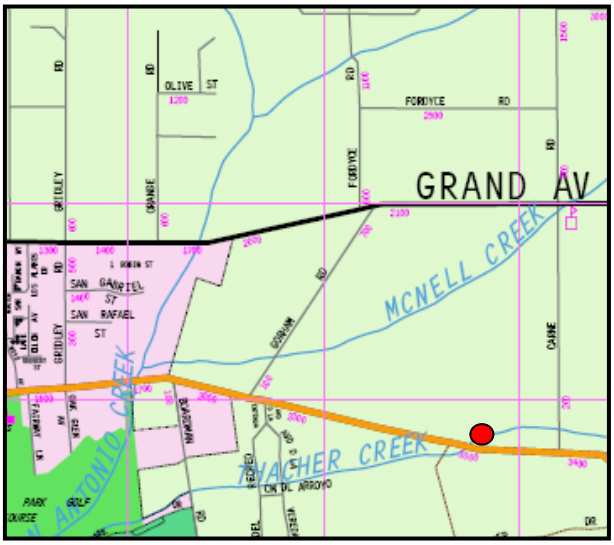
Ventura River Watershed

There are 2 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 to San Antonio Creek, which is tributary to the Ventura River.

Site Map



View upstream (toward NE), upstream of the Ojai Ave. Bridge.

This site was dry during events 6 and 7, signifying a lack of runoff from irrigated agricultural lands that drain to this site. The two January storms were sufficient to produce runoff at this site. Table 53 contains a summary of constituents detected in one or more events and provides a comparison of those concentrations with applicable water quality benchmarks.

There were no benchmark exceedances during the first storm event and during event 5, there was one detection and exceedance of 4,4'-DDT. Avocado and citrus are the predominant crop types associated with this site.

Table 53. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: VRT_THACH

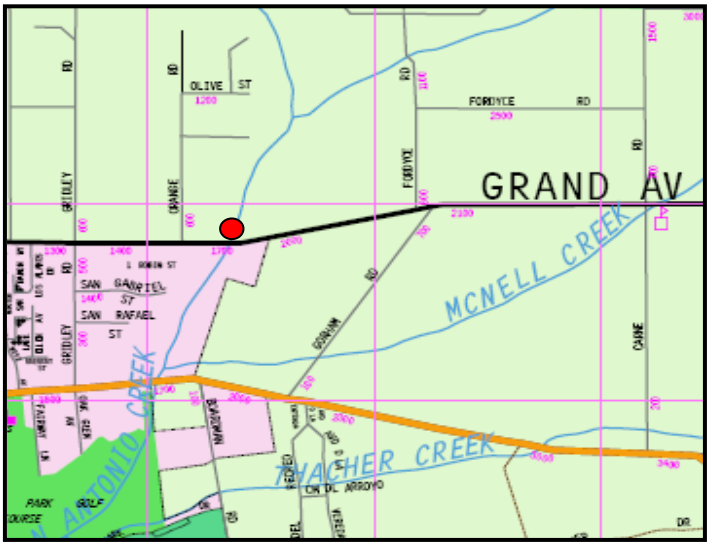
Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	31.30	46.32	Not Sampled	Not Sampled
pH	NA	6.5 ≤ pH ≤ 8.5	7.75	8.0		
Temperature	ºC	≤ 26.7˚C [1]	11.59	NM		
Dissolved oxygen	mg/L	≥ 7	10.44	NM		
Turbidity	NTU	---	235.9	9.82		
Conductivity	umhos/cm	---	658.2	606		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	800	450	377		
Total Suspended Solids (TSS)	mg/L	---	148	11.4		
Chloride	mg/L	60	9	9.67		
Sulfate	mg/L	300	213	147		
Total Ammonia-N	mg/L	4.08 / [2] / -- / --[3]	ND [4]	0.114 [5]		
Nitrate-N	mg/L	5	2.55	2.72		
Phosphate	mg/L	---	0.74	0.28		
Organochlorine Pesticides						
4,4'-DDT	ng/L	0.00059	ND	***0.0069***		

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected NM = Not Measured
[1] The temperature limit for waterbodies designated as WARM is 80ºF (26.7ºC).
[2] Temperature was not measured at this site during event 5 and therefore the water quality objective for ammonia could not be calculated.
[3] The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based the April 2002 Basin Plan Amendment chronic equation (ELS present) and are dependent upon the pH and temperature of the water at the time of sample collection.
[4] Ammonia was detected in the lab blank below the Reporting Limit (RL) but above the Method Detection Limit (MDL), however it did not cause an exceedance in the water quality benchmark.
[5] Ammonia was detected in the lab blank and field blank below the RL but above the MDL, however it did not cause an exceedance of the water quality benchmark.

VTR_SANTO

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

Site Map



View downstream toward the Grand Ave. Bridge

This site was dry during events 6 and 7, signifying a lack of runoff from irrigated agricultural lands that drain to this site. The two January storms were sufficient to produce runoff at this site. Table 54 contains a summary of constituents detected in one or more events and provides a comparison of those concentrations with applicable water quality benchmarks.

To date there have not been any water quality benchmark exceedances at this site. Avocado and citrus are the predominant crop types associated with this site.

Table 54. 2008 VCAILG Monitoring Data v. Waiver Benchmarks: VRT_SANTO

Constituent	Units	Benchmark	Results			
			Event 4 1/5/2008	Event 5 1/24/2008	Event 6 5/20/2008	Event 7 9/16/2008
Field Measurements						
Flow	CFS	---	199.32	83.81	Not Sampled	Not Sampled
pH	NA	6.5 ≤ pH ≤ 8.5	7.81	8.2		
Temperature	ºC	≤ 26.67˚C [1]	11.98	NM		
Dissolved oxygen	mg/L	≥ 7	10.34	NM		
Turbidity	NTU	---	151.4	2.84		
Conductivity	umhos/cm	---	638.1	796		
General Water Quality						
Total Dissolved Solids (TDS)	mg/L	800	420	539		
Total Suspended Solids (TSS)	mg/L	---	111	3.32		
Chloride	mg/L	60	12	12.6		
Sulfate	mg/L	300	194	215		
Total Ammonia-N	mg/L	3.7 / [2] / -- / -- [3]	ND [4]	0.085 [5]		
Nitrate-N	mg/L	5	2.27	1.42		
Phosphate	mg/L	---	0.28	0.03		

Note: Concentrations in ***bold italics*** indicate an exceedance of a water quality benchmark applicable to this site for the specified constituent. See Table 10 through 17 for a list of benchmarks applicable to this site.
ND = Not Detected NM = Not Measured
[1] The temperature limit for waterbodies designated as WARM is 80ºF (26.7ºC).
[2] Temperature was not measured at this site during event 5 and theregore the water quality objective for ammonia could not be calculated.
[3] The benchmarks for Ammonia-N are listed in order of monitoring event and were calculated based on the April 2002 Basin Plan Amendment chronic equation (ELS present) and are dependent upon the pH and temperature of the water at the time of sample collection.
[4] Ammonia was detected in the lab blank and one of two field blanks below the RL but above the MDL, however these detections did not cause an exceedance in the water quality benchmark.
[5] Ammonia was detected in the lab blank and one of two field blanks below the RL but above the MDL, however these detections did not cause an exceedance in the water quality benchmark. The second field blank was Arrowhead water instead of lab water, this field blank came back as ND for ammonia.

CHRONIC TOXICITY TEST RESULTS

Three types of toxicity testing were performed on samples collected at VCAILG monitoring sites in 2008: 3-species screening to determine the most sensitive species to use for the duration of the Monitoring Program, single-species tests once the most sensitive species was determined, and Toxicity Identification Evaluation (TIE) test procedures to identify the toxicant(s) causing reduced growth in the invertebrate species. This section discusses the types of tests in detail and includes a summary of toxicity data.

Toxicity reports submitted by the toxicity laboratory for Event 4 and Event 7 tests contain test results and raw data as well as a more detailed discussion of 3-species screen and TIE test procedures. Two types of reports were submitted by the laboratory, an electronic data deliverable (EDD) that is SWAMP compatible and PDF of the hard copy narrative report. Both reports are included as Appendix G on the Annual Report Data CD.

3-Species Screen to Determine the Most Sensitive Species

The Conditional Waiver requires that 3-species chronic toxicity testing be performed on samples collected at each site during the first monitoring event. The 3-species screen is designed to provide an indication of 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 VCAILG Monitoring Program. Three-species screenings were completed for 6 of the 14 toxicity sites during the 2007 monitoring year. Of the sites that did not have the 3-species screen in 2007, seven of them had sufficient flow for testing during event 4.

In summary, in 2008, the 3-species screen was completed for the following 7 toxicity sites (six other toxicity sites had 3-species screen tests completed during 2007 and one of the 14 toxicity sites has been dry during every sampling event):

- 05T_HONDO
- 06T_FC_BR
- S02T_ELLS
- S03T_TIMB
- S04T_HOPP
- VRT_THACH
- VRT_SANTO

Toxicity Results for the 3-Species Screen

Three-species screen tests were only done at freshwater sites (*i.e.*, conductivity <3000 uS/cm) in 2008. At these sites, *Ceriodaphnia* experienced the greatest reductions relative to controls for 05T_HONDO, S02T_ELLS, and S03T_TIMB. At 06T_FC_BR, *Selenastrum* had the greatest reductions relative to the control sample. At the remaining three-species screen test sites (S04T_HOPP, VRT_THACH, and VRT_SANTO), no toxicity was observed. High conductivity sites already had completed their three-species screenings during the 2007 monitoring year. Summary tables of data from 3-species toxicity tests are shown in Table 55.

Table 55. Chronic Toxicity Results for 3-Species Screen at Freshwater Sites for 2008

Site	Event	*Selenastrum*		*Ceriodaphnia*			*P. promelas*			TIE Triggered?
		Cell Growth Toxicity	% Growth Reduct.	Survival Toxicity	Reprod. Toxicity	Reprod. % Reduct.	Survival Toxicity	Biomass Toxicity	Biomass % Reduct.	
05T_HONDO	4: Jan 2008	N	----	N	Y	**16.6**	N	N	----	N
06T_FC_BR	4: Jan 2008	Y	**39.5**	N	Y	**25.6**	N	N	----	N
S02T_ELLS	4: Jan 2008	N	----	N	Y	**32.4**	N	N	----	N
S02T_ELLS dup	4: Jan 2008	N	----	N	Y	**29.7**	N	N	----	N
S03T_TIMB	4: Jan 2008	Y	**14.7**	N	Y	**18.2**	N	N	----	N
S04T_HOPP	4: Jan 2008	N	----	N	N	----	N	N	----	N
VRT_THACH	4: Jan 2008	N	----	N	N	----	N	N	----	N
VRT_SANTO	4: Jan 2008	N	----	N	N	----	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.

Based on the completed 3-species screen tests, the VCAILG submitted a letter to the Regional Board on July 30, 2008, suggesting single-species for future toxicity testing. The Regional Board responded on September 11, 2008 approving single-species for ten sites, requiring two-species testing at two sites, and three-species testing at the one remaining site without any water quality data. Sites that require testing of more than one species will be re-evaluated following 2009 results. VCAILG monitoring sites and their corresponding most sensitive species for future toxicity testing are listed in the table below.

Table 56. Most Sensitive Species Selected for Toxicity Testing

Site ID	Species
01T_ODD2_DCH	Hyalella or Ceriodaphnia (depending on EC)
01T_ODD3_ARN	Thalassiosira
05D_LAVD	*Ceriodaphnia*
S02T_TODD	*Selenastrum*
S03T_BOULD	*Ceriodaphnia*
05T_HONDO	*Ceriodaphnia*
06T_FC_BR	*Selenastrum*
S02T_ELLS	*Ceriodaphnia*
S03T_TIMB	*Ceriodaphnia*
S04T_HOPP	*Selenastrum, Ceriodaphnia*
VTR_SANTO	*Selenastrum, Ceriodaphnia*
VTR_THACH	*Selenastrum, Ceriodaphnia*
06T_LONG	*Selenastrum, Ceriodaphnia, Pimephales*
S04T_TAPO	Thalassiosira

Single-Species 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).

Single-species tests were completed at five sites during the Event 4 sampling. Testing was completed on the appropriate invertebrate at all single-species test sites during this event as per verbal approval from Regional Board Staff. During Event 7 sampling, single-species recommendations from the September 11, 2008 Regional Board letter were followed. Results from the single-species tests at freshwater sites in 2008 can be found in Table 57. High-conductivity single-species test results are in Table 58.

Table 57. Chronic Toxicity Results for Single-Species Testing at Freshwater Sites for 2008

Site	Event	*Ceriodaphnia* [1]			TIE Triggered?
		Survival Toxicity	Reproduction Toxicity	Reproduction % Reduction	
S02T_TODD	4: Jan 2008	N	Y	**100.0**	N [3]
S03T_BOULD	4: Jan 2008	N	Y	**48.8**	N
S02T_ELLS [2]	7: Sept 2008	NR	NR	NR	NR

[1] *Ceriodaphnia dubia* (invertebrate – water flea) is evaluated for the survival and reproduction endpoints.
[2] NR = No Results; collected sample was broken in transit to testing laboratory. Both the ice chest and internal container were damaged.
[3] A TIE was not triggered for this sample since we are evaluating chronic toxicity and survival was not significantly different from the control.

Table 58. Chronic Toxicity Results for Single-Species Testing at High-Conductivity Sites for 2008

Site	Event	*Thalassiosira* [1]		*Hyalella* [2]		TIE Triggered?
		Cell Growth Toxicity	Growth % Reduction	Survival Toxicity	Survival % Reduction	
01T_ODD2_DCH	4: Jan 2008	----	----	Cerio: Y [3]	**100.0**	Ceriodaphnia [3]
01T_ODD3_ARN	4: Jan 2008	----	----	N	----	N
S04T_TAPO	4: Jan 2008	----	----	N	----	N
01T_ODD2_DCH	7: Sept 2008	----	----	N	----	N
01T_ODD2_DCH dup [4]	7: Sept 2008	NR	NR	NR	NR	NR
S04T_TAPO	7: Sept 2008	N	----	----	----	N

[1] *Thalassiosira pseudonana* (algae) is evaluated for the growth endpoint.
[2] *Hyalella azteca* (invertebrate – crustacean) is evaluated for the survival endpoint.
[3] 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.
[4] NR = No Results; collected sample was broken in transit to testing laboratory. However, because this was the QA site, the second sample collected was analyzed for toxicity.

Considering both three-species and single-species toxicity tests, exceedances of the 1.0 TUc toxicity benchmark occurred at 01T_ODD2_DCH, 05T_HONDO, 06T_FC_BR, S02T_ELLS, S03T_TIMB, S02T_TODD, and S03T_BOULD during the 2008 monitoring year.

Toxicity Identification Evaluation (TIE) Testing

As discussed in the VCAILG QAPP, significant toxicity is used to trigger further investigation to 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 TIE procedures, significant toxicity is defined as at least 50% mortality (*P. promelas* and *C. dubia* for freshwater sites, *Menidia* and *Hyalella* for high-conductivity sites) or a 50% reduction in growth (*Selenastrum* for freshwater sites and *Thalassiosira* for high-conductivity sites). The 50% threshold is consistent with the approach recommended in guidance published by U.S. EPA for conducting TIEs (USEPA 1996b), which recommends a minimum threshold of 50% mortality because the probability of completing a successful TIE decreases rapidly for samples with less than this degree of toxicity. A targeted Phase I TIE will be conducted

to determine the general class of constituents (*e.g.*, non-polar organics, metals) causing toxicity. The targeted TIE will focus on classes of constituents anticipated to be observed in drainages dominated by agricultural discharges and those previously observed to cause toxicity. These classes of constituents have been determined to be primarily non-polar organics and metals. TIE methods will generally adhere to EPA procedures documented in conducting TIEs (USEPA 1991, 1992, 1993a-b). For samples exhibiting toxic effects consistent with carbofuran, diazinon, or chlorpyrifos, TIE procedures will follow those documented in Bailey *et al*. (1996).

The Conditional Waiver Monitoring and Reporting Program (MRP, CI-8836) requires that any exceedance of the 1.0 TUc trigger be followed up with two consecutive months of toxicity testing, and that a TIE must be initiated if the toxicity exceedances persist. Although the follow-up approach is consistent with NPDES monitoring protocols, it will not provide information that will lead to the identification of specific toxicants which can allow for toxicity reductions in agricultural discharges through implementation of best management practices. Although the follow-up testing approach may provide a temporal assessment of low-level toxicity, there will be no concurrent chemical analysis of the sample to identify a potential toxicant and therefore no indication that the same toxicant is causing toxicity from one sampling event to the next. The toxicity monitoring approach developed for the VCAILG Monitoring Program is designed to identify toxicants and thereby provide a mechanism for achieving toxicity reductions in agricultural discharges. This approach was used successfully in the Calleguas Creek Watershed for toxicity monitoring in support of toxicity TMDL development, and it has been recommended by US EPA toxicologists because of its success in identifying toxicants. It is therefore the approach selected for the VCAILG Monitoring Program.

There were significant reductions (>50%) in invertebrate survival in samples collected at the following site during the event 4 monitoring event:

- 01T_ODD2_DCH (*Ceriodaphnia dubia* – freshwater invertebrate)

Follow-up Phase I TIEs targeted for pesticides and metals were performed on the event 4 sample. Toxicity observed in the original sample was persistent, which is a prerequisite for continuing with the TIE process. Conclusions based on TIE test results are as follows:

- C8 treatment, which eliminates pesticides (non-polar organics), removed the toxicity of the sample;
- Chelex treatment, which extracts metals, also removed the sample toxicity;
- Therefore, the TIE indicates that the presence of both non-polar organics and metals caused the toxicity in this sample when present together.

EVALUATION OF DATA QUALITY

The VCAILG QAPP specifies monitoring program requirements and procedures designed to ensure that the quality of data generated through the VCAILG Monitoring Program 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 VCAILG Monitoring Program in 2008. The evaluation 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 VCAILG Monitoring Program 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

Tables 59 through 61 list Project Method Detection Limits (MDLs) and Reporting Limits (RLs) for field measurements and laboratory data specified in the QAPP. Detection limits that were not achieved in 2008 are explained in footnotes and in the discussion immediately following these tables.

Table 59. 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 ^{o}C	NA
Dissolved oxygen	Membrane	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 umhos/cm

NA = Not Applicable

Table 60. Analytical Methods and Project Detection Limits for Laboratory Analyses: General Water Quality Constituents, Organochlorine Pesticides, and Pyrethroids

Parameter	Units	Project MDL	MDL Reported by Lab	Project RL	RL Reported By Lab
General Water Quality Constituents					
Total Dissolved Solids (TDS)	mg/L	4	7.7 [1]	20	20
Total Suspended Solids (TSS)	mg/L	2	0.28	5	1
Chloride	mg/L	0.2	0.2	1	1
Sulfate	mg/L	0.03	0.26 [1]	1	1
Total Ammonia-N	mg/L	0.04	0.04 / 0.03 [2]	0.2	0.2 / 0.03 [2]
Nitrate-N	mg/L	0.008	0.01[1]	0.1	0.05
Phosphate	mg/L	0.01	0.01	0.05	0.01
Organochlorine Pesticides [3]					
Aldrin	ng/L	1	1	5	5
alpha-BHC	ng/L	1	1	5	5
beta-BHC	ng/L	1	1	5	5
gamma-BHC (Lindane)	ng/L	1	1	5	5
Delta-BHC	ng/L	1	1	5	5
Chlordane-alpha	ng/L	1	1	5	5
Chlordane-gamma	ng/L	1	1	5	5
2,4'-DDD	ng/L	1	1	5	5
2,4'-DDE	ng/L	1	1	5	5
2,4'-DDT	ng/L	1	1	5	5
4,4'-DDD	ng/L	1	1	5	5
4,4'-DDE	ng/L	1	1	5	5
4,4'-DDT	ng/L	1	1	5	5
Dieldrin	ng/L	1	1	5	5
Endosulfan I	ng/L	1	1	5	5
Endosulfan II	ng/L	1	1	5	5
Endosulfan Sulfate	ng/L	1	1	5	5
Endrin	ng/L	1	1	5	5
Endrin Aldehyde	ng/L	1	1	5	5
Endrin Ketone	ng/L	1	1	5	5
Toxaphene	ng/L	10	10	50	50
Pyrethroid Pesticides [4]					
Allethrin	ng/L	--	0.5	--	2
Bifenthrin	ng/L	5	0.5	5	2
Cyfluthrin	ng/L	4	0.5	5	2
l-Cyhalothrin	ng/L	4	0.5	5	2
Cypermethrin	ng/L	3	0.5	5	2
Deltamethrin [5]	ng/L	3	0.5	10	2
Esfenvalerate [6]	ng/L	4	0.5	5	2
Fenpropathrin	ng/L	3	0.5	5	2
Fenvalerate	ng/L	4	0.5	5	2
Fluvalinate	ng/L	3	0.5	5	2
Permethrin	ng/L	3	5	5	25
Prallethrin	ng/L	--	0.5	--	2
Resmethrin	ng/L	6	5	10	25

MDL = Method Detection Limit RL = Reporting Limit

[1] Project MDLs were not met in 2008. However, project RLs were met, and concentrations in environmental samples greatly exceeded RLs for these constituents.

[2] The analyzing laboratory for ammonia was changed during event 7 and for future all future events. The first MDL and RL apply to events 4-6, the second values are for event 7.

[3] The laboratory reports nine additional organochlorine pesticides that were not included in the QAPP: cis-Nonachlor, DCPA (dacthal), dicofol, heptachlor, heptachlor epoxide, methoxychlor, mirex, oxychlordane, and perthane.

[4] The laboratory originally retained to analyze samples for pyrethroids was not prepared to achieve Project MDLs or RLs by the time monitoring commenced. A different laborabory with different MDLs and RLs was retained for pyrethroids analysis. The laboratory reports two additional pyrethroids that were not included in the QAPP.

[5] The QAPP originally listed Deltamethrin/Tralomethrin because they coelute. The analyzing laboratory has chosen to report only Deltamethrin because of uncertainties with respect to MDLs and RLs for Tralomethrin.

[6] The QAPP originally listed Esfenvalerate/Fenvalerate because they coelute. The analyzing laboratory is able to separate the two compounds and therefore reports them separately.

Table 61. Analytical Methods and Project Detection Limits for Laboratory Analyses: Organophosphorus Pesticides

Parameter [1]	Units	Project MDL	MDL Reported by Lab	Project RL	RL Reported By Lab
Bolstar	ng/L	2	2	4	4
Chlorpyrifos	ng/L	1	1	2	2
Demeton	ng/L	1	1	2	2
Diazinon	ng/L	2	2	4	4
Dichlorovos	ng/L	3	3	6	6
Dimethoate	ng/L	3	3	6	6
Disulfoton	ng/L	1	1	2	2
Ethoprop	ng/L	1	1	2	2
Fenchlorophos	ng/L	2	2	4	4
Fensulfothion	ng/L	1	1	2	2
Fenthion	ng/L	2	2	4	4
Malathion	ng/L	3	3	6	6
Merphos	ng/L	1	1	2	2
Methyl Parathion	ng/L	1	1	2	2
Mevinphos	ng/L	8	8	16	16
Phorate	ng/L	6	6	12	12
Tetrachlorvinphos	ng/L	2	2	4	4
Tokuthion	ng/L	3	3	6	6
Trichloronate	ng/L	1	1	2	2

MDL = Method Detection Limit RL = Reporting Limit

[1] In event 7 the laboratory began reporting 6 additional organophosphorus pesticides that were not included in the QAPP. None of them were detected in the VCAILG samples.

All project detection limits were met in 2008 for field measurements.

MDLs for TDS, sulfate, and nitrate were not met during 2008. However, the RLs for these constituents were met, and levels of these analytes in environmental samples greatly exceeded MDLs. Therefore, higher MDLs for these constituents are not considered quality control failures.

MDLs and RLs for pyrethroids that are listed in the QAPP were provided by a laboratory that had not yet completed method development to achieve those limits by the time monitoring commenced. Another qualified laboratory was selected to perform the analysis but is unable to meet Project RLs and MDLs for two pyrethroides: permethrin and resmethrin. Because there are no established / approved methods or water quality objectives for pyrethroids, MDLs and RLs achieved during 2008 are acceptable and not considered to be a quality control failure.

All project detection limits were met in 2008 for organophosphorus and organochlorine pesticides.

Data Quality Objectives for Precision and Accuracy

Table 62 lists data quality objectives for precision and accuracy for field measurements and laboratory analyses**.**

Table 62. Data Quality Objectives for Precision and Accuracy

Parameter	Accuracy	Precision	Recovery
Field Measurements			
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
Laboratory Analyses			
Aquatic Chronic Toxicity	[1]	[2]	NA
Total Suspended Solids (TSS)	80-120%	25%	80-120%
Total Dissolved Solids (TDS)	80-120%	25%	80-120%
Chloride	80-120%	25%	80-120%
Sulfate	80-120%	25%	80-120%
Ammonia-Nitrogen	80-120%	25%	80-120%
Nitrate-Nitrogen	80-120%	25%	80-120%
Orthophosphate	80-120%	25%	80-120%
Organochlorine Pesticides	80-120%	25% [3]	50-150% [3]
Organophosphorus Pesticides	80-120%	25% [3]	50-150% [3]
Pyrethroid Pesticides	80-120%	25% [3]	50-150% [3]

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.

Hydrolab MS5 Data Sondes (field meters) were calibrated the morning of each monitoring day, 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 monitoring day, mid-range standards were rerun 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. All calibration checks performed on field meters met data quality objectives for accuracy, signifying the validity of all field measurements.

Flow results for events 4 and 5 were obtained by either measuring or estimating stream width and the average depth, and multiplying those estimates by the reciprocal of the time required for a floating object to travel over a measured distance. Higher flows that occurred during these storm events prevented crews from entering streams to measure flow therefore; these are gross estimates and should be used with discretion. Events 6 and 7 were during dry weather and the velocity meter was used when appropriate.

Table 63 lists quality control failures reported by the analytical laboratories for samples collected during all 4 monitoring events in 2008 and includes the laboratory's explanation (qualifier) for each failure.

Table 63. Quality Control Failures - 2008

Event	Lab	Constituent	QC Type	Failure	Lab Qualifier
4	CRG	Bolstar	MS	MS % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
4	FGL	Chloride	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	435 Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.
5	CRG	Diazinon	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
5	CRG	Methyl parathion	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
5	CRG	Phorate	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
5	FGL	TSS	LD	RPD did not meet acceptance criteria	440 Sample nonhomogeneity may be affecting this analyte. Data was accepted based on the LCS or CCV.
6	CRG	2,4'-DDD	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.

Table 63. Quality Control Failures - 2008 continued

Event	Lab	Constituent	QC Type	Failure	Lab Qualifier
6	CRG	4,4'-DDD	MS	MS % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
6	CRG	Chlordane-gamma	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
6	CRG	Endrin aldehyde	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
6	CRG	Heptachlor	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
6	CRG	Methoxychlor	MS/MSD	MS % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
6	CRG	Perthane	MS/MSD	MS and MSD % recovery did not meet acceptance criteria	M4 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
7	CRG	4,4'-DDE	LD	RPD did not meet acceptance criteria	Q3 - RPD values are < 10 times the MDL

LD = Lab Duplicate MDL = Method Detection Limit MS = Matrix Spike MS/MSD = Matrix Spike/Matrix Spike Duplicate RPD = Relative Percent Difference

In all cases, quality control failures listed in Table 63 did not result in the rejection of data. All data files on the 2008 Data CD include the appropriate quality control qualifiers where appropriate. Specific failures are discussed in more detail below.

Ammonia-N

Issues with ammonia detections in field blanks during 2007 monitoring were reported in the previous Annual Monitoring Report. It was requested that if these issues continued that a different analytical method be used for subsequent ammonia analyses. During event 4, ammonia was detected in the lab blank above the MDL, but below the RL. During event 5, ammonia was detected in both the lab blank and field blank, again at a low concentration that was below the RL. During event 6, two field blanks were submitted for analysis, one containing the lab provided blanks water and the second, standard bottled Arrowhead water. The Arrowhead water field blank results for ammonia were ND, whereas the lab water field blank resulted in ammonia detection between the MDL and RL. For event 7 and all future VCAILG monitoring events, the laboratory performing pesticides, nitrate, and phosphate analyses will also test for ammonia. There were not issues with ammonia during event 7. Irrespective of reagent water contamination, concentrations of ammonia in environmental samples were well below benchmarks in all but one instance during events 4 through 6. The event 6 exceedance was significantly above the benchmark. Also, since the issue seems to be with the lab blank water and not the lab methods, the analysis results were accepted.

Completeness

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

Establishing a data quality objective for percent completeness for the VCAILG Monitoring Program is complicated by the fact that dry sites contribute valuable information necessary to identify areas where discharges from irrigated agriculture are not occurring. For this reason, not all of the data planned for collection can be considered absolutely critical, so it is difficult to set a meaningful objective for percent 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 64 lists the percent completeness of data collected during 2008 in comparison with the established DQO.

Table 64. Data Completeness – 2008

Monitoring Element	% Completeness Objective	% Completeness Achieved
Chronic Toxicity	***90***	***96%***
Field Measurements		
Flow	90	100%
pH	90	100%
Temperature	90	98%
Dissolved oxygen	90	98%
Turbidity	90	100%
Conductivity	90	100%
General Water Quality		
Total Dissolved Solids (TDS)	90	100%
Total Suspended Solids (TSS)	90	100%
Chloride	90	100%
Sulfate	90	100%
Total Ammonia-N	90	100%
Nitrate-N	90	100%
Phosphate	90	100%
Organochlorine Pesticides	***90***	**100%**
Pyrethroid Pesticides	***90***	**100%**
Organophosphorus Pesticides	***90***	**100%**

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. Percent completeness dropped to 96% for chronic toxicity because during event 7, the sample from S02T_ELLS was broken in transit. Additionally, the duplicate sample from 01T_ODD2_DCH was also damaged, however since the remaining sample from this site was successfully testing, this loss is not considered in the percent completeness evaluation. During event 5, one of the field crews forgot their MS5 Hydrolab for taking field measurements. Samples were collected at the two Ventura River sites without measuring these parameters, however all but temperature and dissolved oxygen were measured by the lab after sample collection; this is the reason for slightly decreased completeness for these two parameters. Overall, the completeness objectives in the QAPP were all achieved during the 2008 sampling year.

Additional Program Requirements

Training

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 occurred on January 5, 2007 at FGL Environmental Laboratory in anticipation of a wet event. 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. A field exercise followed the "classroom" session. Crews met at the S02T_TODD site and practiced techniques of wet and dry weather sampling and learned how to use the Hydrolab MS5 Data Sondes (field probes).

LWA conducted the second training event on December 14, 2007, again at FGL. The purpose of the refresher training was to prepare for the first wet event. The December training event was a classroom session only, where site-specific details were discussed in addition to the standard sampling training material. The most recent training occurred on December 19, 2008 at FGL. Training consisted of a PowerPoint presentation as a refresher of proper sample collection, field log completion, and site specific issues. There was also a demonstration of proper use of the flow pole and meter followed by a question and answer session. New toxicity sampling requirements were also discussed. Now that the most sensitive species has been determined for most sites, sampling crews must be aware of which species will be tested and the required sample volume and EC considerations. Training documentation is kept on file with other VCAILG Monitoring Program documents and is available for review upon request.

SWAMP-Compatible Data Format

The QAPP requires that data collected through the VCAILG Monitoring Program conform to SWAMP reporting protocols so that data can be included in the SWAMP database. Toxicity data has been formatted to be SWAMP compatible based on communications between Pacific EcoRisk and State Board Staff. However, it is understood that this format is not finalized nor has it been standardized statewide. Other monitoring data have not been formatted to conform to SWAMP specifications because of a lack of clear direction regarding data formatting specifics. Once LWA database administrators receive appropriate guidance on data format, the VCAILG Monitoring Database will be modified accordingly and submitted for inclusion in the SWAMP database.

In summary, data collected in 2008 through the VCAILG Monitoring Program are of acceptable quality and fulfilled Monitoring Program objectives.

Summary of Benchmark Exceedances

Monitoring data from samples collected at 17 of the 21 VCAILG monitoring sites exceeded benchmarks and triggered the requirement to update the VCAILG WQMP to address the additional exceedances. Background sites are not included in the total number of monitoring sites because they are located upstream of irrigated agricultural operations. Exceedances of water quality benchmarks occurred in all watersheds.

Because TMDLs require the development of WQMPs regardless of whether monitoring data exceed TMDL load allocations, TMDL load allocation exceedances are discussed separately in the next section.

Table 65 contains a summary of benchmark exceedances that occurred at each site during 2008. Table 65 also identifies sites that were sampled but where no exceedances occurred, as well as sites that were not sampled.

Table 66 contains the same exceedance summary organized by constituent and by watershed. Organochlorine (legacy) pesticides, primarily DDT compounds, caused the highest number of exceedances overall, followed by nitrogen, organophosphorus pesticides, salts, and chronic toxicity. During the wet events there were fewer sites with flow that had exceedances than during the two dry events. However, during the dry events there are less total sites that are sampled.

PESTICIDES

Exceedances of benchmarks for organochlorine (OC) pesticides occurred at 16 VCAILG sites, 10 of which are located in the Calleguas Creek Watershed. Exceedances of benchmarks for DDT compounds occurred during all 3 events at the sites located in the Oxnard Coastal Watershed and at 4 sites in the Calleguas Creek Watershed. There were 10 sites with OP pesticides exceedances during 2008, 7 of those sites are in the Calleguas Creek Watershed. Chlorpyrifos was the most frequently detected OP pesticide.

SALTS

Exceedances of salts benchmarks (TDS, chloride, sulfate, or any combinations thereof) occurred at 8 sites, five of which are located in the Santa Clara River Watershed.

CHRONIC TOXICITY

Toxicity was detected at 7 sites during event 4. Toxicity was not detected in any of the event 7 samples. Only one site triggered a TIE during 2008 monitoring.

NITROGEN

Exceedances of nitrate-N and ammonia-N occurred at 12 VCAILG sites, 8 of which are in the Calleguas Creek Watershed. The nitrate-N benchmark applicable to the Oxnard Coastal monitoring site was exceeded during all four monitoring events. In the Santa Clara River Watershed, nitrogen objectives were exceeded at 4 monitoring sites. It should be noted here that there are nitrogen compounds TMDLs in both the Calleguas Creek and Santa Clara River Watersheds for which the VCAILG monitoring results can be compared to load allocations; exceedances of the applicable load allocations are discussed in the next section.

DISSOLVED OXYGEN

An exceedance of the dissolved oxygen benchmark occurred during Event 7 at one site in the Calleguas Creek Watershed.

TEMPERATURE

An exceedance of the temperature benchmark occurred during Event 6 at one site in the Calleguas Creek Watershed.

PH

An exceedance in pH occurred during Event 7 at one site in the Santa Clara River Watershed. The pH at the site was slightly too basic to meet the water quality objective.

Table 65. Water Quality Benchmark Exceedances in 2008 – by Site & Event

	Event 4 – *Wet* January 5, 2008	Event 5 – *Wet* January 24, 2008	Event 6 – *Dry* May 20, 2008	Event 7 – *Dry* Sept. 16, 2008
01T_ODD2_DCH	Nitrate-N, Chlorpyrifos, Chronic Toxicity	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	Nitrate-N, 4,4'-DDE	Nitrate-N, 4,4'-DDE
01T_ODD3_ARN	Nitrate-N, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE	*FTO*
02D_BROOM	Nitrate-N, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Dieldrin	Nitrate-N, 4,4'-DDD, 4,4'-DDE	Dissolved Oxygen, Nitrate-N, Chlordane, , 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Toxaphene
04D_ETTG	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	Nitrate-N, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT	Ammonia-N, Nitrate-N, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Toxaphene, Chlorpyrifos
04D_LAS	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	Temperature, Nitrate-N, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Diazinon	Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Toxaphene, Chlorpyrifos
05D_SANT_VCWPD	TDS, Chloride, Sulfate, Nitrate-N, Chlordane, 4,4'-DDE, Chlorpyrifos	TDS, Chloride, Sulfate, Nitrate-N, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	TDS, Chloride, Sulfate, Nitrate-N, 4,4'-DDE	TDS, Chloride, Sulfate, Nitrate-N, 4,4'-DDE, 4,4'-DDT, Toxaphene, Chlorpyrifos
05D_LAVD	*NS*	Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	*NS*	*NS*
05T_HONDO	Sulfate, 4,4'-DDE, 4,4'-DDT, Chronic Toxicity	Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	*NS*	*NS*
06T_FC_BR	TDS, Sulfate, Nitrate-N, Chronic Toxicity	Chlordane, 4,4'-DDE, 4,4'-DDT	*NS*	*NS*
06T_LONG	*NS*	*NS*	*NS*	*NS*
9BD_GERRY	*NS*	*NS*	*NS*	*NS*
OXD_CENTR	Nitrate-N, 4,4-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	Nitrate-N, Chlordane, 4,4-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos	Nitrate-N, 4,4'-DDE	Nitrate-N, 4,4'-DDD, 4,4'-DDE
S02T_ELLS	TDS, Chloride, Sulfate, Chronic Toxicity	TDS, Sulfate	*NS*	pH, Chlorpyrifos
S02T_TODD	TDS, Sulfate, Chronic Toxicity	TDS, Sulfate, 4,4'-DDT	TDS, Sulfate, Nitrate-N	*FTO*
S03T_TIMB	Nitrate-N, Chlorpyrifos, Chronic Toxicity	Sulfate, 4,4'-DDT	*NS*	*NS*
S03T_ BOULD	Chronic Toxicity	Chlordane	TDS, Chloride, Sulfate, Ammonia-N, Nitrate-N	*FTO*
S03D_BARDS	*NS*	Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorpyrifos, Diazinon	*NS*	*NS*
S04T_HOPP	*None*	*None*	*None*	*NS*
S04T_TAPO	TDS, Chloride, Sulfate, 4,4'-DDE	TDS, Chloride, Sulfate, Chlordane, 4,4'-DDD, 4,4'-DDE	TDS, Chloride, Sulfate, Nitrate-N	TDS, Chloride, Sulfate, Nitrate-N
VRT_THACH	*None*	4,4'-DDT	*NS*	*NS*
VRT_SANTO	*None*	*None*	*NS*	*NS*
Total Number of Sites Sampled	17	19	11	8
Total Number of Sites with Exceedances	14	17	10	8

NS = Not Sampled; insufficient or no flow. FTO = Fish Tissue Offset; site not visited.

Table 66. Water Quality Benchmark Exceedances in 2008 – by Pollutant & Watershed

	VCAILG Monitoring Sites with Benchmark Exceedances		
Pollutant	**CC / OXN**	**SCR**	**VR**
Salts	05D_SANT_VCWPD 05T_HONDO 06T_FC_BR	S02T_ELLS S02T_TODD S03T_TIMB S03T_BOULD S04T_TAPO	None
Nitrogen	01T_ODD2-DCH 01T_ODD3_ARN 02D_BROOM 04D_ETTG 04D_LAS 05D_SANT_VCWPD 06T_FC_BR OXD_CENTR	S02T_TODD S03T_TIMB S03T_BOULD S04T_TAPO	None
Chronic Toxicity	01T_ODD2_DCH 05T_HONDO 06T_FC_BR	S02T_ELLS S02T_TODD S03T_TIMB S03T_BOULD	None
OC Pesticides	01T_ODD2-DCH 01T_ODD3_ARN 02D_BROOM 04D_ETTG 04D_LAS 05D_SANT_VCWPD 05D_LAVD 05T_HONDO 06T_FC_BR OXD_CENTR	S02T_TODD S03T_TIMB S03T_BOULD S03D_BARDS S04T_TAPO	VRT_THACH
OP Pesticides	01T_ODD2-DCH 04D_ETTG 04D_LAS 05D_SANT_VCWPD 05D_LAVD 05T_HONDO OXD_CENTR	S02T_ELLS S03T_TIMB S03D_BARDS	None
Dissolved Oxygen	02D_BROOM	None	None
pH	None	S02T_ELLS	None
Temperature	04D_LAS	None	None

CC = Calleguas Creek OXN = Oxnard Coastal SCR = Santa Clara River VR = Ventura River

Benchmark exceedances that occurred in 2007 triggered the requirement to develop Water Quality Management Plans (WQMPs) for those constituents causing exceedances in each watershed. On August 15, 2008 a draft WQMP was submitted to the Regional Board for approval by the Executive Officer. The WQMP was then revised according to the comment letter provided by the Regional Board and the update report was submitted December 15, 2008. The WQMP is targeted toward reducing pollutant loads to surface waters and includes the following elements:

- An evaluation of sources and existing management practices;
- a plan for identifying and implementing additional management practices with time-specific milestones;
- methods for determining the impact of management practices;
- schedule for revision of management practices (if appropriate.

Table 67 is a comparison of water quality benchmark exceedances in each of eight constituent classes: salts, nitrogen, chronic toxicity, organochlorine pesticides, organophosphorus pesticides, dissolved oxygen, pH, and temperature, between the two monitoring years. The following sites had exceedances in the same classes of constituents in 2007 and 2008:

- 04D_ETTG
- OXD_CENTR
- S02T_TODD
- S03T_BOULD
- S03D_BARDS

Four sites had less exceedances in 2008 than previously, considering the constituents by class, not necessarily overall number; they are:

- 01T_ODD3_ARN
- 05D_SAND_VCWPD
- 05D_LAVD
- S04T_TAPO

05D_LAVD showed significant improvement between the two monitoring years. In 2007 there were exceedances in five classes of constituents and in 2008, only two. Part of the WQMP implementation will be comparing the BMPs implemented at this site to provide insight to making improvements within other monitoring drainages.

There are four sites that continue to not have any water quality benchmark exceedances, they are as follows:

- 06T_LONG
- 9BD_GERRY
- S04T_HOPP
- VRT_SANTO

The remaining sites showed an increase in benchmark exceedances by constituent class. By comparing the BMPs that have been implemented in these monitoring drainages with those that are meeting benchmarks or showing improvement, will provide valuable information on the practices that are most effective. This information will be shared with growers through the WQMP implementation process.

The 2007 WQMP will be updated based on the exceedances that occurred during 2008 monitoring events. The 2008 WQMP will then be submitted on August 15, 2009. Priority areas will be re-assessed based on the additional 2008 monitoring data and progress towards completing WQMP milestones will be discussed.

Table 67. Water Quality Benchmark Exceedance Comparison between 2007 and 2008 Monitoring Years

Site [1]	Sampling Year	Salts	Nitrogen	Chronic Toxicity	OC Pesticides	OP Pesticides	Dissolved Oxygen	pH	Temperature
01T_ODD2_DCH	2007		x		x	x			
	2008		x	x	x	x			
01T_ODD3_ARN	2007		x	x	x				
	2008		x		x				
02D_BROOM	2007		x		x				
	2008		x		x		x		
04D_ETTG	2007		x		x	x			
	2008		x		x	x			
04D_LAS	2007		x		x	x			
	2008		x		x	x			x
05D_SANT_VCWPD	2007	x	x		x	x			x
	2008	x	x		x	x			
05D_LAVD	2007	x	x	x	x	x			
	2008				x	x			
05T_HONDO	2007				x	x			
	2008	x		x	x	x			
06T_FC_BR	2007				x	x			
	2008	x	x	x	x	x			
OXD_CENTR	2007		x		x	x			
	2008		x		x	x			
S02T_ELLS	2007	x				x			
	2008	x		x		x		x	
S02T_TODD	2007	x	x	x		x			
	2008	x	x	x	x				
S03T_TIMB	2007	x							
	2008		x	x	x	x			
S03T_BOULD	2007	x	x	x			x		
	2008	x	x	x	x				
S03D_BARDS	2007				x	x			
	2008				x	x			
S04T_TAPO	2007	x	x	x	x				
	2008	x	x		x				
VRT_THACH	2007								
	2008				x				

x = Water quality benchmark exceedance during the corresponding year for the constituent noted in the above column.
[1] 06T_LONG and 9BD_GERRY are not included in the above table since they were not sampled during either monitoring year due to a lack of flow. S04T_HOPP and VRT_SANTO are not included in this table because they did not have any exceedances in water quality benchmarks during 2007 or 2008.

Summary of TMDL Load Allocation Exceedances

As stated previously, VCAILG monitoring data were also compared with applicable TMDL load allocations to evaluate compliance, but not to determine whether Water Quality Management Plans are required; TMDL implementation plans already include the requirement to develop Water Quality Management Plans to address water quality impairments caused by irrigated agriculture. VCAILG data collected in 2008 are compared with TMDL load allocations in this section to evaluate compliance with established load allocations.

Three Calleguas Creek Watershed (CCW) TMDLs were not included in the comparison with VCAILG data:

- the CCW Organochlorine Pesticides TMDL (load allocations are established in sediment);
- the CCW Chlorpyrifos and Diazinon TMDL (compliance monitoring is required at receiving water sites located at the base of each subwatershed, which are not co-located with VCAILG monitoring sites);
- and the CCW Salts TMDL (compliance monitoring is required at receiving water sites located at the base of each subwatershed).

There are two TMDLs that apply to VCAILG monitoring sites:

- the CCW Nitrogen Compounds TMDL, which establishes load allocations as nitrate-N + nitrite-N;
- and the SCR Nitrogen Compounds TMDL, which establishes load allocations as ammonia-N + nitrate-N + nitrite-N.

Because the Conditional Waiver does not require that samples be analyzed for nitrite-N, the comparison with load allocations is based on nitrate-N only for the CCW Nitrogen Compounds TMDL, and ammonia-N + nitrate-N for the SCR Nitrogen Compounds TMDL.

Table 68 lists exceedances of both TMDL load allocations by site for each event, and Table 69 lists exceedances of the TMDL load allocations by constituent and by watershed.

Table 68. TMDL Load Allocation Exceedances in 2008 – by Site & Event

Site ID	Constituents that Exceeded Applicable TMDL Load Allocations			
	Event 4 – *Wet* January 5, 2008	**Event 5 – *Wet* January 24, 2008**	**Event 6 – *Dry* May 20, 2008**	**Event 7 – *Dry* Sept. 16, 2008**
01T_ODD2_DCH	Nitrate-N	Nitrate-N	Nitrate-N	Nitrate-N
01T_ODD3_ARN	Nitrate-N	Nitrate-N	Nitrate-N	FTO
02D_BROOM	Nitrate-N	Nitrate-N	Nitrate-N	Nitrate-N
04D_ETTG	Nitrate-N	Nitrate-N	Nitrate-N	Nitrate-N
04D_LAS	Nitrate-N	Nitrate-N	Nitrate-N	Nitrate-N
05D_SANT_VCWPD	Nitrate-N	Nitrate-N	Nitrate-N	Nitrate-N
05D_LAVD	*NS*	None	*NS*	*NS*
05T_HONDO	None	None	*NS*	*NS*
06T_FC_BR	Nitrate-N	None	*NS*	*NS*
06T_LONG	*NS*	*NS*	*NS*	*NS*
9BD_GERRY	*NS*	*NS*	*NS*	*NS*
OXD_CENTR	No TMDLs	No TMDLs	No TMDLs	No TMDLs
S02T_ELLS	None	None	*NS*	None
S02T_TODD	None	None	Ammonia-N + Nitrate-N	FTO
S03T_TIMB	None	None	*NS*	*NS*
S03T_ BOULD	None	None	Ammonia-N + Nitrate-N	FTO
S03D_BARDS	*NS*	None	*NS*	*NS*
S04T_HOPP	None	None	None	*NS*
S04T_TAPO	None	None	None	Ammonia-N + Nitrate-N
VRT_THACH	No TMDLs	No TMDLs	No TMDLs	No TMDLs
VRT_SANTO	No TMDLs	No TMDLs	No TMDLs	No TMDLs
Total Number of Sites Sampled with TMDLs	**14**	**16**	**10**	**7**
Total Number of Sites with Exceedances	**7**	**6**	**8**	**6**

NS = Not Sampled; insufficient or no flow. FTO = Fish Tissue Offset; site not visited.

Table 69. TMDL Load Allocation Exceedances in 2008 – by Pollutant & Watershed

Pollutant	VCAILG Monitoring Sites with TMDL Load Allocation Exceedances		
	CC / OXN	SCR	VR
Nitrate-N (9 mg/L LA)	01T_ODD2_DCH 01T_ODD3_ARN 02D_BROOM 04D_ETTG 04D_LAS 05D_SANT_VCWPD 06T_FC_BR	---------	No TMDLs
Ammonia-N + Nitrate-N (10 mg/L LA)	---------	S02T_TODD S03T_ BOULD S04T_TAPO	No TMDLs

CC = Calleguas Creek OXN = Oxnard Coastal SCR = Santa Clara River VR = Ventura River

Education Requirement

The Conditional Waiver requires Group participants to earn 8 hours of education credit. VCAILG members were given additional opportunities to fulfill the education requirement in 2008. The VCAILG sponsored meetings in each of the 3 major watersheds and collaborated with the University of California Cooperative Extension (UCCE) on field demonstrations at the Hansen Trust specifically for Spanish speakers. UCCE also sponsored various crop-specific and general education meetings as part of their outreach and Proposition 13 and 50 grant programs. The Regional Board granted reciprocity for courses offered in Region 3, allowing hours fulfilled in that region to be credited toward Region 4 as well. This benefited VCAILG members who have agricultural operations in both regions and new growers that needed additional class hours to make up 8 hours. Table 70 lists the courses offered during 2008 that were attended by VCAILG members for education credit. Appendix H lists the number of education hours earned by each VCAILG member to date.

Table 70. Courses Offered in 2007 for Education Credit

Date	Education Hours	Course Title	Course Coordinator and/or Sponsor [1]
3/26/08	4	Annual Vegetable Production Meeting-IPM	UCCE
4/10/08	4	Overview of Concepts and Practices	VCAILG / UCCE
4/23/08	4	VCAILG Monitoring Results, TMDLs and BMPs (morning and afternoon sessions)	VCAILG
4/30/08	4	Alternative Fumigants-New Regulations and Research	UCCE
5/7/08	4	Farm Management Practices that Improve Quality	UCCE / VCAILG
6/10/08	4	Grower Tour: Remaining Competitive in Today's Market	UCCE
7/28/08	2	TMDL Review	VCAILG
7/29/08	2	TMDL Review (morning and afternoon sessions)	VCAILG
8/7/08	4	Irrigation Scheduling, Salinity, and Drainage (short course)	Region 3
8/14/08	7.5	Chemigation (short course)	Region 3
8/27/08	3	Avocado Production Workshop	Region 3
9/9/08	5	Importance of Soil Microbes in Agriculture	Region 3
9/9/08	6	Irrigation and Nutrient Management-Workshop for Growers	Region 3
10/15/08	6	ABCs of Plant Pathology (Spanish)	UCCE
11/13/08	6.5	Sustainable Ag Expo (Day 1)	Region 3
11/13/08	1.5	Water and Ag in Ventura County: The Conditional Waiver and You	California Strawberry Commission / VCAILG
11/14/08	3	Sustainable Ag Expo (Day 2)	Region 3

[1] Courses denoted with "Region 3" are part of the education reciprocity agreement between Regions 3 and 4.

Conclusions and Recommendations

MONITORING PROGRAM REVISIONS

The only monitoring program change in 2008 was the approval by the Regional Board on a change in submittal date for the Annual Monitoring Reports and WQMPs. The revised date for Annual Monitoring Report submittal is February 15th of each year. WQMP submittal is August 15th of each year.

RECOMMENDED MONITORING PROGRAM CHANGES

There are no monitoring program changes recommended at this time. Monitoring program adjustments will be re-assessed once more progress has been made in WQMP implementation.

PESTICIDE USE DATA SUBMITTAL

Due to difficulties in obtaining and utilizing Agricultural Commissioner's pesticide use data for chlorpyrifos and diazinon; an analysis of pesticide application areas as compared to 2007 pesticides benchmark exceedances is not included with the submittal of this report and appendices. We are currently in communications with the Agricultural Commissioner's office to determine how their location codes correspond with parcel APNs, which are the identifying locations in the VCAILG database. Pending no further issues in utilizing pesticide use data, a memo with the requested pesticides analysis will be submitted in March 2009.

References

Bailey H, C diGiorgio, K Kroll, J Miller, D Hinton, and G Starrett. 1996. Development of procedures for identifying pesticide toxicity in ambient waters: Carbofuran, diazinon, and chlorpyrifos. *Environmental Toxicology and Chemistry* 15:837-845.

Pucket, M. 2002. Quality Assurance Management Plan for the State of California's Surface Water Ambient Monitoring Program (SWAMP). California Department of Fish and Game, Monterey, CA. Prepared for the State Water Resources Control Board, Sacramento, CA. 145 pages plus Appendices.

State Water Resources Control Board (SWRCB). 2004a. Surface Water Ambient Monitoring Program, SWAMP-Compatible Quality Assurance Project Plans. March 2004.

State Water Resources Control Board (SWRCB). 2004b. Surface Water Ambient Monitoring Program, Checklist. April 2004.

United States Environmental protection Agency (USEPA). 1991. Methods for Aquatic Toxicity Identification Evaluations: Phase 1 Toxicity Characterization Procedures (Second Edition). EPA-600/6-91/003. USEPA, Environmental Research Laboratory, Duluth, MN.

United States Environmental Protection Agency (USEPA). 1992. Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents Phase 1. EPA-600/6-91/005. USEPA, Office of Research and Development, Washington, D.C.

United States Environmental Protection Agency (USEPA). 1993a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fourth Edition. EPA/600/4-90/027F. USEPA, Office of Research and Development, Washington, D.C.

United States Environmental Protection Agency (USEPA). 1993b. Methods for Aquatic Toxicity Identification Evaluations: Phase II toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity. EPA/600/R-92/080. USEPA, Office of Research and Development, Washington, D.C.

United States Environmental Protection Agency (USEPA). 1996b. Marine Toxicity Identification Evaluation (TIE) Phase I Guidance Document. September, 1996. EPA/600/R-96/054.

United States Environmental Protection Agency (USEPA). 2002. Short-Term methods for Estimating the Chronic toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. EPA-821-R-02-013.