APPENDIX I

SJCDWQC WATER QUALITY COALITION

HIGH PRIORITY SITE SUBWATERSHED ANALYSIS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This document contains individual site subwatershed analyses for sites in the Coalition region where focused outreach has occurred with targeted growers since 2008. Appendix II contains tables of all exceedances for each site. Each individual site subwatershed section includes:

- An overview (monitoring, outreach, current and completed management plans, and MPM)
- A description of the site subwatershed with land use map
- The subwatershed monitoring history
- Monitoring results for the reporting year
- Source identification and outreach information
- An evaluation of management practice effectiveness
- The next steps for MPM and outreach

Beginning with the submittal of Appendix I in the 2014 MPUR, the information included in the Monitoring Results sections for each site subwatershed only contains data for the current reporting year. Therefore, the 2013 MPUR Appendix I is the last report including the complete history of monitoring for all site subwatersheds where focused outreach occurred up to that point in time. If there is no new data to report for the previous WY, a reference to the past report containing the latest data is included.

When an exceedance of the WQTL occurs for constituent that can be traced to a source, the Coalition evaluates PUR data and past monitoring results. If an exceedance of the WQTL did not occur, an evaluation of the data was not included in this report.

SJCDWQC MPU Schedule Changes

The Coalition's monitoring schedule is provided in the annual MPU every August 1. The Coalition monitored at Core and Represented sites during the 2015 WY, in addition to MPM. Below is a list of approvals affecting the 2015 and 2016 WY MPUs and MPM monitoring schedules:

- Approval of the 2015 SQMP (November 24, 2015)
  - Approved updates include DO and SC WQTLs and management plans
- Approval of management plan completion letter (December 18, 2015)
  - 20 management plans in 10 site subwatersheds.
- Approval of SWAMP Protocol for Sediment Toxicity (March 7, 2016)
  - Updates to total number of sediment toxicities and management plans
- Updates MPM for toxicity to *S. capricornutum* at French Camp Slough @ Airport Way and Terminous Tract Drain @ Hwy 12 (submitted June 8, 2016)

SJCDWQC Management Plan Updates

The approved 2015 SQMP Strategy involves identification of when and where monitoring will occur in order to 1) identify sources, 2) evaluate the effectiveness of implemented management practices, 3)

assess performance goals and measures, and 4) adhere to management plan compliance time schedules.

The Management Plan Strategy allows the Coalition to address management plans within the 10 year (or as soon as practicable) compliance timeframes outlined in the WDR (Table 1). The Coalition addresses constituents that are not easily sourced separately (Table 2). Below is a list of submittal dates or when the Coalition intends to address each of these constituents (discussed in detail in sections below):

- DO/pH
  - Submitted February 22, 2016
- Arsenic and copper
  - Submitted March 23, 2016
- Ammonia and nitrate
  - Submitted April 22, 2016
- Lead, DDE, DDT, dieldrin, HCH
  - Due May 22, 2016
- *E. coli*
  - Pending Regional Board direction
- SC/TDS (Salts)
  - Pending CV-SALTS

After three years of monitoring at a site with no exceedances of the WQTL for a specific management plan constituent, the Coalition send a request to the Regional Board for management plan completion. Table 3 includes all site subwatersheds where management plans have been approved for completion.

Table 1. Compliance timetable for management plans of constituents sourced to irrigated agriculture.
Table organized by 10 year compliance deadline per constituent and then alphabetically by site.

Compliance Deadline	Site	Constituent	Focused Outreach Years
2016	Union Island Drain @ Bonetti Rd	*H. azteca* toxicity	2010-2012
	French Camp Slough @ Airport Way	Chlorpyrifos	2011-2013
	Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	2008-2010
2017	Duck Creek @ Hwy 4	Chlorpyrifos	2008-2010
	Mormon Slough @ Jack Tone Rd	Chlorpyrifos	2012-2014
	Roberts Island @ Whiskey Slough Pump	Chlorpyrifos	2013-2015
	Sand Creek @ Hwy 4 Bypass	*H. azteca* toxicity	2012-2014
	Terminous Tract Drain @ Hwy 12	*H. azteca* toxicity	2011-2013
	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	2008-2010
2018	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	2008-2010
2019	Duck Creek @ Hwy 4	*C. dubia* toxicity	2008-2010
	Lone Tree Creek @ Jack Tone Rd	*P. promelas* toxicity	2008-2010
	Roberts Island @ Whiskey Slough Pump	Diuron	2013-2015
	Roberts Island @ Whiskey Slough Pump	*S. capricornutum* toxicity	2013-2015
	Terminous Tract Drain @ Hwy 12	Chlorpyrifos	2011-2013
	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	*H. azteca* toxicity	2008-2010
2021	Roberts Island @ Whiskey Slough Pump	*C. dubia* toxicity	2013-2015
2023	Duck Creek @ Hwy 4	*H. azteca* toxicity	2008-2010
2025	Mokelumne River @ Bruella Rd	*S. capricornutum* toxicity	2011-2013

Compliance Deadline	Site	Constituent	Focused Outreach Years
2025	French Camp Slough @ Airport Way	Diuron	2011-2013
2026	East Orwood Tract Drain	*S. capricornutum* toxicity	
	South McDonald Island Pump*	*S. capricornutum* toxicity	
	Terminous Tract Drain @ Hwy 12	Diuron	2011-2013
	Union Island Drain @ Bonetti Rd	Chlorpyrifos	2010-2012
	Union Island Drain @ Bonetti Rd	*S. capricornutum* toxicity	2010-2012
	Upper Roberts Island Drain	*C. dubia* toxicity	
	Upper Roberts Island Drain*	*H. azteca* toxicity	

*Sites not included in this Appendix because focused outreach and MPM has not been initiated.

Table 2. Management plan constituents requiring a study or work plan to analyze the constituent's source.

Constituent	Bacon Island Pump @ Old River*	Bear Creek @ North Alpine Rd	Drain @ Woodbridge Rd	Duck Creek @ Hwy 4	Empire Tract @ 8 Mile Rd[1]*	French Camp Slough @ Airport Way	Kellogg Creek along Hoffman Ln	Littlejohns Creek @ Jack Tone Rd	Lone Tree Creek @ Jack Tone Rd	Mokelumne River @ Bruella Rd	Mormon Slough @ Jack Tone Rd	Roberts Island @ Whiskey Slough Pump	Sand Creek @ Hwy 4 Bypass	South Webb Tract Drain *	Terminous Tract Drain @ Hwy 12	Union Island Drain @ Bonetti Rd[1]	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Walthall Slough @ Woodward Ave
DO	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X
pH							X		X	X	X	X						
SC	X		X	X	X		X					X	X	X	X	X		X
Ammonia									X									
Nitrate															X			X
E. coli	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Arsenic	X		X		X									X	X	X		
Lead																	X	
DDE							X					X	X			X		
DDT							X						X					

[1]Union Island Drain @ Bonetti Rd is the monitoring site substitute for Grant Line Canal @ Clifton Court Rd and the Grant Line Canal near Calpack; constituent management plans from those sites were carried over to the Union Island Drain @ Bonetti Rd site.
*Sites not included in this Appendix because focused outreach and MPM has not been initiated.

Table 3. Completed constituent management plans.

Table organized by 10 year compliance deadline per constituent and then alphabetically by site. Red text indicates management plans approved for completion; however, the constituent was reinstated in a management plan due to recent exceedances. The compliance deadline begins again the year it was reinstated (included in Table 1 and Table 2 above).

Compliance Deadline	Site	Constituent	Completion Year	Focused Outreach
2016	Grant Line Canal @ Clifton Court	Chlorpyrifos	2014	2010-2012
2016	Grant Line Canal near Calpack Rd	Chlorpyrifos	2013	2010-2012
2016	Kellogg Creek along Hoffman Ln	Chlorpyrifos	2013	2012-2014
2016, 2025	Kellogg Creek along Hoffman Ln	DO	2013*	2012-2014
2016	Kellogg Creek along Hoffman Ln	*P. promelas* toxicity	2015	2012-2014
2016	Kellogg Creek along Hoffman Ln	*H. azteca* toxicity	2015	2012-2014
2016	Littlejohns Creek @ Jack Tone Rd	*S. capricornutum* toxicity	2013	2010-2012
2016	Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	2015	2010-2012
2016, 2026	Lone Tree Creek @ Jack Tone Rd	DO	2013*	2008-2010
2016	Mokelumne River @ Bruella Rd	DO	2012	2011-2013
2016	Mokelumne River @ Bruella Rd	*C. dubia* toxicity	2013	2011-2013
2016, 2025	Mokelumne River @ Bruella Rd	*S. capricornutum* toxicity	2013*	2011-2013
2016	Terminous Tract Drain @ Hwy 12	*P. promelas* toxicity	2012	2011-2013
2017	French Camp Slough @ Airport Way	Copper	2013	2011-2013
2017	Grant Line Canal @ Clifton Court	pH	2013	2010-2012
2017	Grant Line Canal @ Clifton Court	Copper	2012	2010-2012
2017	Grant Line Canal @ Clifton Court	Lead	2012	2010-2012
2017	Kellogg Creek along Hoffman Ln	*C. dubia* toxicity	2013	2012-2014
2017	Lone Tree Creek @ Jack Tone Rd	*S. capricornutum* toxicity	2012	2008-2010
2017	Lone Tree Creek @ Jack Tone Rd	*H. azteca* toxicity	2012	2008-2010
2017	Roberts Island @ Whiskey Slough Pump	Chlorpyrifos	2015	2013-2015
2017	Roberts Island @ Whiskey Slough Pump	*H. azteca* toxicity	2015	2013-2015
2017	Sand Creek @ Hwy 4 Bypass	Chlorpyrifos	2013	2012-2014
2017	Sand Creek @ Hwy 4 Bypass	Diazinon	2013	2012-2014
2017	Sand Creek @ Hwy 4 Bypass	*C. dubia* toxicity	2013	2012-2014
2017	Sand Creek @ Hwy 4 Bypass	Dieldrin	2015	2012-2014
2017	Terminous Tract Drain @ Hwy 12	*S. capricornutum* toxicity	2012	2011-2013
2018	Duck Creek @ Hwy 4	pH	2012	2008-2010
2018	Duck Creek @ Hwy 4	Diazinon	2012	2008-2010
2018	French Camp Slough @ Airport Way	*H. azteca* toxicity	2015	2011-2013
2018	French Camp Slough @ Airport Way	Lead	2013	2011-2013
2018	French Camp Slough @ Airport Way	Diazinon	2013	2011-2013
2018	French Camp Slough @ Airport Way	*C. dubia* toxicity	2013	2011-2013
2018	Kellogg Creek along Hoffman Ln	Copper	2013	2012-2014
2018	Littlejohns Creek @ Jack Tone Rd	Diazinon	2013	2010-2012
2018	Littlejohns Creek @ Jack Tone Rd	Copper	2015	2010-2012
2018	Lone Tree Creek @ Jack Tone Rd	Copper	2012	2008-2010
2018	Lone Tree Creek @ Jack Tone Rd	Diuron	2012	2008-2010
2018	Mokelumne River @ Bruella Rd	Copper	2012	2011-2013
2018	Mormon Slough @ Jack Tone Rd	*C. dubia* toxicity	2015	2012-2014
2018	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	*S. capricornutum* toxicity	2012	2008-2010
2018	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	SC	2015	2008-2010
2019	Duck Creek @ Hwy 4	*S. capricornutum* toxicity	2012	2008-2010
2019	French Camp Slough @ Airport Way	pH	2015	2011-2013
2019	French Camp Slough @ Airport Way	Dieldrin	2012	2011-2013
2019, 2025	French Camp Slough @ Airport Way	Diuron	2013*	2011-2013
2019	French Camp Slough @ Airport Way	*S. capricornutum* toxicity	2013	2011-2013

Compliance Deadline	Site	Constituent	Completion Year	Focused Outreach
2019	Kellogg Creek along Hoffman Ln	*S. capricornutum* toxicity	2014	2012-2014
2019	Lone Tree Creek @ Jack Tone Rd	Diazinon	2012	2008-2010
2019	Mormon Slough @ Jack Tone Rd	*S. capricornutum* toxicity	2014	2012-2014
2019	Roberts Island @ Whiskey Slough Pump	Diuron	2015	2013-2015
2019	Sand Creek @ Hwy 4 Bypass	Disulfoton	2014	2012-2014
2019	Sand Creek @ Hwy 4 Bypass	*S. capricornutum* toxicity	2014	2012-2014
2019	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	2012	2008-2010
2019	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	*C. dubia* toxicity	2012	2008-2010
2019	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	2015	2008-2010
2020	Walthall Slough @ Woodward Ave	HCH-delta	2015	2013-2015
2021	Drain @ Woodbridge Rd	Chlorpyrifos	2015	2014-2016
2021	Walthall Slough @ Woodward Ave	*H. azteca* toxicity	2015	2013-2015
2022	Bear Creek @ North Alpine Rd	Chlorpyrifos	2015	2013-2015
2022	Bear Creek @ North Alpine Rd	pH	2015	2013-2015
2022	Bear Creek @ North Alpine Rd	Malathion	2015	2013-2015
2022	Walthall Slough @ Woodward Ave	Chlorpyrifos	2015	2013-2015
2023	Lone Tree Creek @ Jack Tone Rd	SC	2012	2008-2010

* Management plans were reinstated due to recent exceedances.

Preliminary Analysis Conclusions

The Coalition submitted preliminary analyses in an attempt to source exceedances for constituents that are applied for agriculture or have no available application documentation.

DO and pH

Monitoring data for concentrations of DO from sampling locations within the Delta consistently indicated concentrations of DO that were lower relative to the rest of the Central Valley. Further analysis indicated that samples collected from the island drains had high concentrations of TOC, SC, and NH3; all of the mentioned parameters potentially increase the probability of exceedances of the WQTL for DO. Additionally, the main source of water from the island drains is groundwater seepage due to a shallow water table. Generally, groundwater holds little DO since it lacks atmospheric contact. Another factor to consider is the flow of water in the island drains; the sampling locations are typically at the pump station, where there is little to no flow unless the pump is running. The aforementioned factors leading to exceedances of the WQTL of DO are all unrelated to agricultural processes. Conversely, implementing management practices for pesticides and toxicity aims to reduce the amount of water reaching surface waterways, which exacerbates the DO issue by decreasing stream flow.

Arsenic and Copper

Irrigated agriculture is not responsible for the exceedances of the arsenic WQO for the sampling sites in the Delta. Exceedances are the result of arsenic in shallow groundwater that seeps into the Delta island drain channels. Subsurface soils, pH, and redox conditions drive the mobilization of arsenic from the rocks and soils that underlie the Delta. There are no management practices that can be used to manage arsenic in the groundwater or the seepage of the groundwater into the drain channels.

Irrigation tailwater runoff or stormwater runoff may contribute to concentrations of copper in the waterbody. Whether or not the concentration is an exceedance of the WQTL copper is determined by the hardness of the water. Past Coalition monitoring data indicate that concentrations of copper in the water, when exceedances occurred, were not significantly high; however, the hardness of the water was universally low for all samples where exceedances of the WQTL for copper occurred. Naturally hard water results in no exceedances, while soft water potentially leads to exceedances. The variability of hardness in water is determined by natural upstream sources and/or groundwater influences. Efforts by individual growers to implement management practices to control hardness in water are likely ineffective. Therefore, it is unlikely that exceedances of the WQTLs for copper are caused by agricultural processes.

Ammonia and Nitrate

Both ammonium and nitrate concentrations were slightly elevated in the Delta Island drains relative to the rest of the Coalition region. Fertilizers are usually applied during the spring prior to irrigation. Due to the extreme solubility nature, nitrates in fertilizer could move to surface waters immediately after applications. However, it is unlikely that applications in the spring would result in exceedances of the WQO for nitrate throughout the irrigation season. Because Delta Island drains are mostly fed by drainage from the shallow water table that runs laterally through peat soils, slightly elevated concentrations of ammonium are most likely due to bacterial decomposition of the organic material in the soils. However, if elevated ammonium concentrations are indeed caused by natural oxidation of the organic soil, exceedances are likely to continue occurring occasionally in the region independent of management practices implemented by the Coalition farmers.

I. BEAR CREEK @ NORTH ALPINE RD

Overview

Monitoring began at Bear Creek @ North Alpine Rd in October 2008. The Coalition completed the third year of its management plan strategy in the site subwatershed in 2015. As part of outreach activities, water quality concerns were discussed and current management practices were documented. Growers in the site subwatershed were informed of water quality impairments and encouraged to prevent offsite movement of agricultural constituents through recommendation of new management practices.

The active management plan constituents for Bear Creek @ North Alpine Rd are DO and *E. coli* (Table I-1). During the 2015 WY the Coalition conducted MPM for chlorpyrifos and malathion with no exceedances of the WQTLs. The last exceedances of the WQTLs for chlorpyrifos and malathion to occur were in October and September 2011, respectively. Non-conserved constituents, DO and pH, were monitored during all MPM events in the 2015 WY and 11 exceedances of the WQTL for DO occurred. On December 18, 2015 the Coalition received approval for completion to the management plans for chlorpyrifos, malathion, and pH.

The Coalition submitted results from a study on water quality parameters associated with the concentrations of DO in the Coalition region to the Regional Board on February 22, 2016. A summary of the results from this study is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.*

Bear Creek @ North Alpine Rd is a Represented site in Zone 1; Represented site monitoring is scheduled to occur for water column toxicity to *S. capricornutum* (2015 MPU). No MPM is scheduled in the 2016 WY although those management plan constituents which are field parameters (DO) will be measured during all monitoring events.

Table I-1. Bear Creek @ North Alpine Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Constituents Requiring Source ID/Work Plans			
Dissolved Oxygen	2009	2013-2015	NA
E. coli	2012	2013-2015	NA
Completed Management Plans			
Chlorpyrifos	2012	2013-2015	2015
Malathion	2012	2013-2015	2015
pH	2012	2013-2015	2015

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

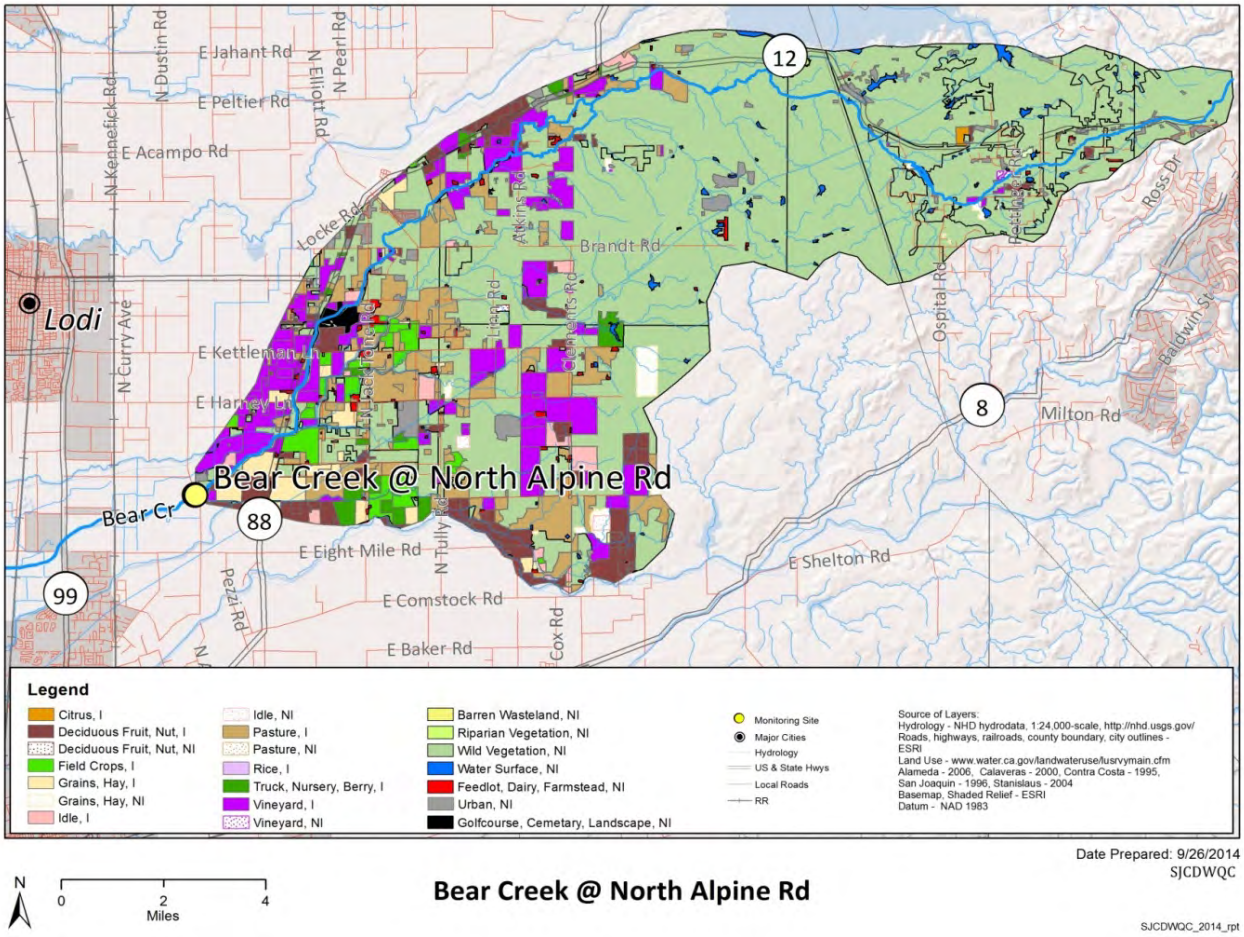
The site is located on the northern edge of the Coalition region with its western boundary starting in the northeastern region of San Joaquin County and extending eastward into parts of Calaveras County in its upstream region (Table I-2). The site consists of 19,642 irrigated acres that are primarily pasture, vineyards, deciduous orchards, field crops, grains, and hay (Figure I-1). This site subwatershed receives drainage from recent urban developments, industrial sites, a golf course, field crops, grains, and pastureland.

Bear Creek (San Joaquin and Calaveras Counties; partly in Delta Waterways, eastern portion) is listed as a 303 (d) List of Impaired Waterebodies for diazinon (updated in 2010).

Table I-2. Bear Creek @ North Alpine Rd site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Bear Creek @ North Alpine Rd	531BCANAR	38.07386	-121.21215

Figure I-1. Bear Creek @ North Alpine Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring was initiated at Bear Creek @ North Alpine Rd in October 2008 and continued through the 2015 WY, with the exception of 2010 when no monitoring occurred. The last time the full suite of constituents was collected at the site was in 2011 and MPM began in 2012. During the 2015 WY, Bear Creek @ North Alpine Rd was classified as a Represented site in Zone 1. Table I-3 contains the number of events monitored per year and by constituents from 2008 through September 2015.

Management Plan Monitoring was initiated in 2012 and continued through the 2015 WY for chlorpyrifos and malathion during months of past exceedances (Table I-4). During the 2015 WY, in addition to MPM for chlorpyrifos and malathion, the Coalition monitored for water column toxicity to *S. capricornutum* due to past exceedances at the Core site. The last detections of chlorpyrifos or malathion occurred in 2011.

Table I-3. Bear Creek @ North Alpine Rd sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	3	3	0	14	3	4	3	12
	Dry Sites	0	0	0	0	0	0	0	0
	Events Sampled	3	3	0	14	3	4	3	12
Field and Physical Parameters	Dissolved Oxygen	3	3	0	14	3	4	3	12
	Dissolved Solids	3	3	0	12	0	0	0	12
	E. coli	3	3	0	12	0	0	0	0
	Grain size (sediment)	0	0	0	2	0	0	0	0
	Hardness as CaCO3	3	3	0	12	0	0	0	0
	pH	2	3	0	14	3	4	3	12
	Specific Conductivity	3	3	0	14	3	4	3	12
	Suspended Solids	3	3	0	12	0	0	0	0
	Total Organic Carbon	3	3	0	12	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	2	0	0	0	0
	Turbidity	3	3	0	12	0	0	0	0
Nutrients	Ammonia as N	3	3	0	12	0	0	0	0
	Nitrate + Nitrite as N	3	3	0	12	0	0	0	0
	Nitrate as N	0	0	0	0	0	0	0	0
	Nitrite as N	0	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	3	3	0	12	0	0	0	0
	Orthophosphate as P	3	3	0	12	0	0	0	0
	Phosphate as P	3	3	0	12	0	0	0	0
Metals (Dissolved)	Cadmium	3	3	0	12	0	0	0	0
	Copper	3	3	0	12	0	0	0	0
	Lead	3	3	0	12	0	0	0	0
	Nickel	3	3	0	12	0	0	0	0
	Zinc	3	3	0	12	0	0	0	0
Metals (Total)	Arsenic	3	3	0	12	0	0	0	0
	Boron	3	3	0	12	0	0	0	0
	Cadmium	3	3	0	12	0	0	0	0
	Copper	3	3	0	12	0	0	0	0
	Lead	3	3	0	12	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Molybdenum	3	3	0	12	0	0	0	0
	Nickel	3	3	0	12	0	0	0	0
	Selenium	3	3	0	12	0	0	0	0
	Zinc	3	3	0	12	0	0	0	0
Carbamates	Aldicarb	3	3	0	12	0	0	0	0
	Carbaryl	3	3	0	12	0	0	0	0
	Carbofuran	3	3	0	12	0	0	0	0
	Diuron	3	3	0	12	0	0	0	0
	Linuron	3	3	0	12	0	0	0	0
	Methiocarb	3	3	0	12	0	0	0	0
	Methomyl	3	3	0	12	0	0	0	0
	Oxamyl	3	3	0	12	0	0	0	0
Group A Pesticides	Aldrin	3	3	0	0	0	0	0	0
	Chlordane	3	3	0	0	0	0	0	0
	Endosulfan I	3	3	0	0	0	0	0	0
	Endosulfan II	3	3	0	0	0	0	0	0
	HCH, alpha	3	3	0	0	0	0	0	0
	HCH, beta	3	3	0	0	0	0	0	0
	HCH, delta	3	3	0	0	0	0	0	0
	HCH, gamma	3	3	0	0	0	0	0	0
	Heptachlor	3	3	0	0	0	0	0	0
	Heptachlor epoxide	3	3	0	0	0	0	0	0
	Toxaphene	3	3	0	0	0	0	0	0
Herbicides	Atrazine	3	3	0	12	0	0	0	0
	Cyanazine	3	3	0	12	0	0	0	0
	Glyphosate	3	3	0	12	0	0	0	0
	Paraquat	3	3	0	12	0	0	0	0
	Simazine	3	3	0	12	0	0	0	0
	Trifluralin	3	3	0	12	0	0	0	0
Organochlorines	DDD(p,p')	3	3	0	12	0	0	0	0
	DDE(p,p')	3	3	0	12	0	0	0	0
	DDT(p,p')	3	3	0	12	0	0	0	0
	Dicofol	3	3	0	12	0	0	0	0
	Dieldrin	3	3	0	12	0	0	0	0
	Endrin	3	3	0	12	0	0	0	0
	Methoxychlor	3	3	0	12	0	0	0	0
Organophosphates	Azinphos methyl	3	3	0	12	0	0	0	0
	Chlorpyrifos	3	3	0	12	2	3	2	5
	Demeton-s	3	3	0	12	0	0	0	0
	Diazinon	3	3	0	12	0	0	0	0
	Dichlorvos	3	3	0	12	0	0	0	0
	Dimethoate	3	3	0	12	0	0	0	0
	Disulfoton	3	3	0	12	0	0	0	0
	Malathion	3	3	0	12	2	3	3	3
	Methamidophos	3	3	0	12	0	0	0	0
	Methidathion	3	3	0	12	0	0	0	0
	Molinate	0	0	0	0	0	0	0	0
	Parathion, Methyl	3	3	0	12	0	0	0	0
	Phorate	3	3	0	12	0	0	0	0
	Phosmet	3	3	0	12	0	0	0	0
	Thiobencarb	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Pyrethroids	Bifenthrin	0	0	0	0	0	0	0	0
	Cyfluthrin, total	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	0	0	0	0	0	0	0	0
	Cypermethrin, total	0	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	0	0	0	0	0	0	0	0
Sediment Pesticides	Permethrin, total	0	0	0	0	0	0	0	0
	Bifenthrin	0	0	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	3	3	0	12	0	0	0	0
	Pimephales promelas	3	3	0	12	0	0	0	0
	Selenastrum capricornutum	3	3	0	12	0	0	0	10
	Hyalella azteca	0	0	0	2	0	0	0	0

Table I-4. Bear Creek @ North Alpine Rd Management Plan Monitoring schedule (2012 – 2015 WY).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Malathion
Bear Creek @ North Alpine Rd	5/16/2012	MPM		X
Bear Creek @ North Alpine Rd	9/18/2012	MPM	X	X
Bear Creek @ North Alpine Rd	10/16/2012	MPM	X	
Bear Creek @ North Alpine Rd	1/15/2013	MPM	X	X
Bear Creek @ North Alpine Rd	5/21/2013	MPM		X
Bear Creek @ North Alpine Rd	9/17/2013	MPM	X	X
Bear Creek @ North Alpine Rd	10/15/2013	MPM	X	
Bear Creek @ North Alpine Rd	1/28/2014	MPM	X	X
Bear Creek @ North Alpine Rd	5/20/2014	MPM		X
Bear Creek @ North Alpine Rd	9/16/2014	MPM	X	X
Bear Creek @ North Alpine Rd	10/21/2014	MPM	X	
Bear Creek @ North Alpine Rd	1/20/2015	MPM	X	X
Bear Creek @ North Alpine Rd	5/19/2015	MPM		X
Bear Creek @ North Alpine Rd	7/21/2015	MPM	X	
Bear Creek @ North Alpine Rd	8/18/2015	MPM	X	
Bear Creek @ North Alpine Rd	9/15/2015	MPM	X	X

Monitoring Results

No exceedances of the WQTLs for chlorpyrifos (October, January, and July through September) and malathion (January, May, and September) occurred in samples collected during the 2015 WY (Table I-4). The Coalition measured the field parameters, DO and pH, during all MPM events; exceedances of the WQTL for DO occurred during 11 sampling events.

Table I-5 is a tally of exceedances of WQTLs from 2008 through September 2015 for management plan constituents in the Bear Creek @ North Alpine Rd site subwatershed. Table I-6 contains all detections and exceedances of WQTL results for all sampling events since management plans were implemented

for constituents that can be sourced. A record of all exceedances in the site subwatershed since monitoring began is provided in Appendix II, Table II-1.

Table I-5. Bear Creek @ North Alpine Rd management plan constituent exceedance tally).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-1.

Monitoring Year	Management Plan Constituents		Completed Management Plans		
	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	Chlorpyrifos, > 0.015 µg/L	Malathion, > 0 µg/L	pH, <6.5 and >8.5 units
2008	3	1	0	0	0
2009	1	0	0	0	0
2011	4	1	3	3	2
2012	3	NA	0	0	0
2013	3	NA	0	0	0
2014 WY*	2	NA	0	0	0
2015 WY	11	NA	0	0	0
Overall Tally	**27**	**2**	**3**	**3**	**2**

NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table I-6. Bear Creek @ North Alpine Rd site subwatershed monitoring results for MPM constituents since management plan initiation.
Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold.

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012 MPM (@ North Alpine Rd)	Date	1/17/12	NA	NA	NA	5/16/12	NA	NA	NA	9/18/12	10/16/12	NA	NA
	Chlorpyrifos (µg/L)	<0.003	NA	NA	NA	<0.003	NA	NA	NA	<0.003	<0.003	NA	NA
	Malathion (µg/L)	0	NA	NA	NA	0	NA	NA	NA	0	0	NA	NA
2013 MPM (@ North Alpine Rd)	Date	1/15/13	NA	NA	NA	5/21/13	NA	NA	NA	9/17/13	10/15/13	NA	NA
	Chlorpyrifos (µg/L)	<0.003	NA	NA	NA	NA	NA	NA	NA	<0.003	<0.003	NA	NA
	Malathion (µg/L)	<0.05	NA	NA	NA	<0.05	NA	NA	NA	<0.03	NA	NA	NA
2014 & 2015 WY MPM (@ North Alpine Rd)	Date	1/28/14	NA	NA	NA	5/20/14	NA	NA	NA	9/16/14	10/21/14	NA	NA
	Chlorpyrifos (µg/L)	<0.003	NA	NA	NA	NA	NA	NA	NA	<0.003	<0.003	NA	NA
	Malathion (µg/L)	<0.03	NA	NA	NA	<0.03	NA	NA	NA	<0.03	NA	NA	NA
2015 WY MPM (@ North Alpine Rd)	Date	1/20/15	NA	NA	NA	5/19/15	NA	7/21/15	8/18/15	9/15/15	Oct	Nov	Dec
	Chlorpyrifos (µg/L)	<0.003	NA	NA	NA	NA	NA	<0.003	<0.003	<0.003			
	Malathion (µg/L)	<0.03	NA	NA	NA	<0.03	NA	NA	NA	<0.03			

MPM – Management Plan Monitoring.
NA – Not Applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring

Source Identification and Outreach

Sourcing analyses for past exceedances of Bear Creek @ North Alpine Rd management plan constituents are evaluated in past years' site subwatershed appendices.

Eleven exceedances of the lower WQTL of 7 mg/L for DO occurred at Bear Creek @ North Alpine Rd during the 2015 WY. Exceedances of the lower WQTL for DO occurred in October through May during the 2015 WY. Exceedances of non-conserved constituents such as DO are difficult to source. There was no observed flow in the creek during seven months of the 2015 WY. These low flow conditions likely contributed to low DO.

Outreach

Beginning in 2013, the Coalition began focused outreach in the site subwatershed, which consisted of corresponding with targeted growers, documenting current management practices, tracking the implementation of additional management practices, and following up with the growers in 2014 and 2015. The Coalition contacted seven members farming 655 irrigated acres in the site subwatershed (2015 Annual Report). Surveys filled out in 2013 indicate, all targeted members in the Bear Creek @ North Alpine Rd site subwatershed had one or more management practices in place that were specific to runoff management or pesticide application management. Follow-up surveys indicate growers implemented management practices to further improve water quality in the site subwatershed. The most common management practices included reducing runoff water volumes and reducing use of pesticide types found in exceedances. Installation of sprinkler or micro irrigation and the use of center grass rows/grass waterways/grass filter strips were also favored management practices. The Coalition believes the implementation of certain management practices and increased grower awareness will continue to improve water quality in the site subwatershed.

Evaluation

In an effort to address water quality concerns, management practices were recommended to growers farming land with potential to drain directly to the creek. Applications of chlorpyrifos and malathion were reduced, and irrigation runoff management practices were implemented. As indicated by the completion of the management plans for chlorpyrifos, malathion, and pH, water quality is improving. The only remaining management plan constituents are DO and *E. coli*. The Coalition is confident water quality will continue to improve with continued general outreach and increased awareness of beneficial management practices.

Next Steps

Represented site monitoring is scheduled to occur for water column toxicity to *S. capricornutum* at Bear Creek @ North Alpine Rd during months of past exceedances. Field parameters, including DO and pH, will be measured during every monitoring event. The Coalition will analyze these results to evaluate the overall water quality in the site subwatershed.

II. DRAIN @ WOODBRIDGE RD

Overview

Monitoring at Drain @ Woodbridge Rd was initiated in October 2008. The Coalition began focused outreach and MPM in 2014 and will continue through 2016. As part of outreach activities, water quality concerns were discussed and management practices were recorded for targeted growers in the site subwatershed. Growers were informed of water quality impairments and encouraged to prevent offsite movement of agricultural constituents.

The current management plan constituents for Drain @ Woodbridge Rd are arsenic, DO, *E. coli,* and SC (Table II-1). The management plan for chlorpyrifos was approved for completion on December 18, 2015 by the Regional Board after three or more years of monitoring with no exceedances of the WQTL. On February 22 and March 23, 2016 the Coalition provided the Regional Board with results from studies conducted on DO and arsenic. A summary of the results from these studies is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* Exceedances of the WQTL for SC are currently being addressed as part of the Central Valley-wide CV-SALTS program.

Drain @ Woodbridge Rd is a Represented site in Zone 3; Represented site monitoring is scheduled for diuron, water column toxicity to *C. dubia* and *S. capricornutum,* and sediment toxicity to *H. azteca* in the 2016 WY (2015 MPU). No MPM is scheduled in the 2016 WY although those management plan constituents which are field parameters (DO and SC) will be measured during all monitoring events.

Table II-1. Drain @ Woodbridge Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Constituents Requiring Source ID/Work Plans			
Arsenic	2009	2014-2016	NA
Dissolved Oxygen	2009	2014-2016	NA
E. coli	2011	2014-2016	NA
Specific Conductivity	2009	2014-2016	NA
Completed Management Plans			
Chlorpyrifos	2011	2014-2016	2015

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

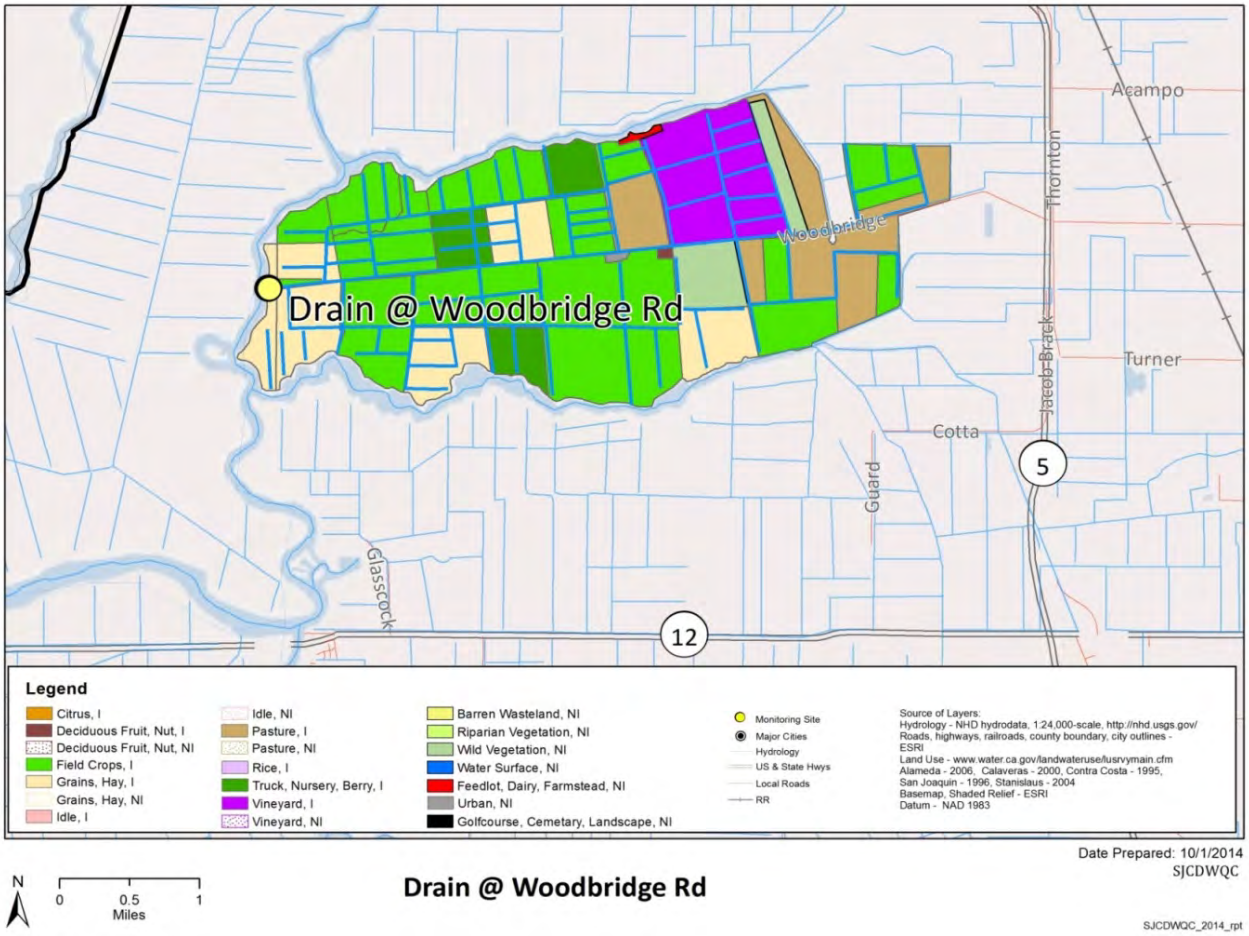
This site is located on the northern side of the Coalition region. Water from the drain is pumped to the Mokelumne River close to the sample location. The site subwatershed drains an area of land to the east between Hog Slough and Sycamore Slough (Table II-2). Land use in the site subwatershed includes 4,540 irrigated acres, of which the primary irrigated agriculture is a combination of field crops, truck/nursery/berry crops, vineyards, pasture, grains/hay, and dairy (Figure II-1).

The drain that empties into the Mokelumne River is not considered an impaired waterbody on California's 303(d) List of Impaired Waterbodies (last updated in 2010). However, the represented TMDL subareas in the Delta Waterways (central and eastern portions) where the site drains are listed for chlorpyrifos, DDT, diazinon, group A pesticides, invasive species, mercury, and unknown water column toxicity.

Table II-2. Drain @ Woodbridge Rd site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Drain @ Woodbridge Rd	544DAWRXX	38.15256	-121.50095

Figure II-1. Drain @ Woodbridge Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began in the Drain @ Woodbridge Rd site subwatershed in October 2008 and continued through 2010 then resumed again from 2013 through September 2015. The site was last monitored for the full suite of constituents in 2010. Table II-3 contains the number of events monitored per year and the constituents from 2008 through September 2015.

One exceedance of the WQTL for chlorpyrifos occurred in 2010. The Coalition initiated MPM for chlorpyrifos in 2013 and continued through the 2015 WY (Table II-4).

Table II-3. Drain @ Woodbridge Rd sampling events and analyses per year.
Listed by group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	3	3	12	0	0	1	1	3
	Dry Sites	0	0	0	0	0	0	0	0
	Events Sampled	2[1]	3	12	0	0	1	1	3
Field and Physical Parameters	Dissolved Oxygen	2	3	12	0	0	1	1	3
	Dissolved Solids	2	3	12	0	0	0	0	0
	E. coli	2	3	12	0	0	0	0	0
	Grain size (sediment)	0	0	2	0	0	0	0	2
	Hardness as CaCO3	2	3	12	0	0	0	0	0
	pH	2	3	12	0	0	1	1	3
	Specific Conductivity	2	3	12	0	0	1	1	3
	Suspended Solids	2	3	12	0	0	0	0	0
	Total Organic Carbon	2	3	12	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	2	0	0	0	0	2
	Turbidity	2	3	12	0	0	0	0	0
Nutrients	Ammonia as N	2	3	12	0	0	0	0	0
	Nitrate + Nitrite as N	2	3	12	0	0	0	0	0
	Nitrate as N	0	0	0	0	0	0	0	0
	Nitrite as N	0	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	2	3	12	0	0	0	0	0
	Orthophosphate as P	2	3	12	0	0	0	0	0
	Phosphate as P	2	3	12	0	0	0	0	0
Metals (Dissolved)	Cadmium	2	3	12	0	0	0	0	0
	Copper	2	3	12	0	0	0	0	0
	Lead	2	3	12	0	0	0	0	0
	Nickel	2	3	12	0	0	0	0	0
	Zinc	2	3	12	0	0	0	0	0
Metals (Total)	Arsenic	2	3	12	0	0	0	0	0
	Boron	2	3	12	0	0	0	0	0
	Cadmium	2	3	12	0	0	0	0	0
	Copper	2	3	12	0	0	0	0	0
	Lead	2	3	12	0	0	0	0	0
	Molybdenum	2	3	12	0	0	0	0	0
	Nickel	2	3	12	0	0	0	0	0
	Selenium	2	3	12	0	0	0	0	0
	Zinc	2	3	12	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Carbamates	Aldicarb	2	3	12	0	0	0	0	0
	Carbaryl	2	3	12	0	0	0	0	0
	Carbofuran	2	3	12	0	0	0	0	0
	Diuron	2	3	12	0	0	0	0	0
	Linuron	2	3	12	0	0	0	0	0
	Methiocarb	2	3	12	0	0	0	0	0
	Methomyl	2	3	12	0	0	0	0	0
	Oxamyl	2	3	12	0	0	0	0	0
Group A Pesticides	Aldrin	2	3	0	0	0	0	0	0
	Chlordane	2	3	0	0	0	0	0	0
	Endosulfan I	2	3	0	0	0	0	0	0
	Endosulfan II	2	3	0	0	0	0	0	0
	HCH, alpha	2	3	0	0	0	0	0	0
	HCH, beta	2	3	0	0	0	0	0	0
	HCH, delta	2	3	0	0	0	0	0	0
	HCH, gamma	2	3	0	0	0	0	0	0
	Heptachlor	2	3	0	0	0	0	0	0
	Heptachlor epoxide	2	3	0	0	0	0	0	0
	Toxaphene	2	3	0	0	0	0	0	0
Herbicides	Atrazine	2	3	12	0	0	0	0	0
	Cyanazine	2	3	12	0	0	0	0	0
	Glyphosate	2	3	12	0	0	0	0	0
	Paraquat	2	3	12	0	0	0	0	0
	Simazine	2	3	12	0	0	0	0	0
	Trifluralin	2	3	12	0	0	0	0	0
Organochlorines	DDD(p,p')	2	3	12	0	0	0	0	0
	DDE(p,p')	2	3	12	0	0	0	0	0
	DDT(p,p')	2	3	12	0	0	0	0	0
	Dicofol	2	3	12	0	0	0	0	0
	Dieldrin	2	3	12	0	0	0	0	0
	Endrin	2	3	12	0	0	0	0	0
	Methoxychlor	2	3	12	0	0	0	0	0
Organophosphates	Azinphos methyl	2	3	12	0	0	0	0	0
	Chlorpyrifos	2	3	12	0	0	1	1	1
	Demeton-s	2	3	12	0	0	0	0	0
	Diazinon	2	3	12	0	0	0	0	0
	Dichlorvos	2	3	12	0	0	0	0	0
	Dimethoate	2	3	12	0	0	0	0	0
	Disulfoton	2	3	12	0	0	0	0	0
	Malathion	2	3	12	0	0	0	0	0
	Methamidophos	2	3	12	0	0	0	0	0
	Methidathion	2	3	12	0	0	0	0	0
	Parathion, Methyl	2	3	12	0	0	0	0	0
	Phorate	2	3	12	0	0	0	0	0
	Phosmet	2	3	12	0	0	0	0	0
	Thiobencarb	0	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	0	0	0	0	0	0	0	0
	Cyfluthrin, total	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	0	0	0	0	0	0	0	0
	Cypermethrin, total	0	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	0	0	0	0	0	0	0	0
	Permethrin, total	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sediment Pesticides	Bifenthrin	0	0	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	2	3	12	0	0	0	0	0
	Pimephales promelas	2	3	12	0	0	0	0	0
	Selenastrum capricornutum	2	3	12	0	0	0	0	0
	Hyalella azteca	0	0	2	0	0	0	0	2

[1]Sampling at Drain @ Woodbridge was scheduled three times in 2008; however, December samples were not collected due to no access.

Table II-4. Drain @ Woodbridge Rd site subwatershed Management Plan Monitoring schedule (2014-2015 WY).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos
Drain @ Woodbridge Rd	4/15/2014	MPM	X
Drain @ Woodbridge Rd	4/21/2015	MPM	X

Monitoring Results

During the 2015 WY, the Coalition conducted MPM for chlorpyrifos (April 21, 2015) (Table II-4); no exceedances of the WQTL occurred. Monitoring for sediment toxicity to *H. azteca* occurred in March and September 2015 as part of the Represented site monitoring strategy in Zone 3; no exceedances of the WQTL for sediment toxicity occurred. Dissolved Oxygen and SC were monitored during all sampling events in the 2015 WY. Exceedances of the WQTL occurred for DO (3) and SC (2) (Table II-5).

Table II-5 is a tally of exceedances of the WQTLs from 2008 through September 2015 for management plan constituents in the Drain @ Woodbridge Rd site subwatershed. Table II-6 contains all detections and exceedances of WQTLs for all sampling events since the constituent became part of the site subwatershed management plan. The waterbody is too deep to measure discharge, and therefore, no instantaneous loads were calculated for chlorpyrifos. A record of all exceedances in the Drain @ Woodbridge Rd site subwatershed since monitoring began is provided in Appendix II, Table II-2.

Table II-5. Drain @ Woodbridge Rd management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-2.

Monitoring Years	Management Plan Constituents				Completed Management Plans
	Dissolved Oxygen, >7 mg/L	Specific Conductivity[1], >700 µS/cm or >1000 µS/cm	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	Chlorpyrifos, > 0.015 µg/L
2008	2	1	1	2	0
2009	2	3	0	3	0
2010	12	8	1	9	1
2013	1	0	NA	NA	0
2014 WY*	1	1	NA	NA	0
2015 WY	3	2	NA	NA	0
Overall Tally	**21**	**15**	**2**	**14**	**1**

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table II-6. Drain @ Woodbridge Rd site subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold.

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008 NM (@ Woodbridge Rd)	Date:	NA	NA	NA	NA	NA	NA	NA	NA	NA	10/14/08	11/4/08	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.003	<0.003	NA
2009 NM (@ Woodbridge Rd)	Date:	1/13/09	2/10/09	3/10/09	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010 NM (@ Woodbridge Rd)	Date:	1/13/10	2/9/10	3/16/10	4/13/10	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	10/12/10	11/9/10	12/7/10
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	**0.029**	<0.003	<0.003	<0.003	<0.003	0.007	<0.003	<0.003	<0.003
2013 MPM (@ Woodbridge Rd)	Date:	NA	NA	NA	4/2/13	NA	NA	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA
2014 MPM (@ Woodbridge Rd)	Date:	NA	NA	NA	4/15/14	NA	NA	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA
2015 MPM (@ Woodbridge Rd)	Date:	NA	NA	NA	4/21/15	NA	NA	NA	NA	NA	Oct	Nov	Dec
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	NA	NA	NA	NA			

MPM – Management Plan Monitoring

NA – Not Applicable. No monitoring occurred on this date for this constituent.

NM – Normal Monitoring

Source Identification and Outreach

Sourcing analyses for past exceedances of Drain @ Woodbridge management plan constituents are evaluated in past years' site subwatershed appendices.

Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. Drain @ Woodbridge Rd is an agricultural drain within the Delta islands and pumping is required to remove water from the drain. In most cases there is no flow in the drains unless the pumps are activated. Furthermore, algal production and decay along with stagnant, warm water at these sites can contribute to low DO detections. Therefore, exceedances of the WQTL for DO and SC are common in this site subwatershed due to a lack of flow.

Outreach

All constituents are discussed with growers during focused outreach. The Coalition conducted focused outreach with four targeted growers in the Drain @ Woodbridge Rd site subwatershed on February 5, 2014. Management practices were documented for 33 % of the acreage identified as having direct drainage. Three of the four growers transferred their parcels to the Dairy Program and one grower indicated they planned to implement new management practices and therefore, received a follow-up survey in 2015. A final analysis of the management practices is included in the main body of this report.

Evaluation

Since monitoring began in the Drain @ Woodbridge Rd site subwatershed in 2008, water quality has improved and as a result, no exceedances of the WQTL for chlorpyrifos have occurred since 2010. Approval for the completion of the management plan was received on December 18, 2015. The Coalition is confident water quality will continue to improve as members are informed through general outreach.

Next Steps

Drain @ Woodbridge Rd is a Represented site in Zone 3 and Represented site monitoring for diuron, water column toxicity to *C. dubia* and *S. capricornutum*, and sediment toxicity to *H. azteca* will occur based on past exceedances in the Zone 3 Core site, Terminous Tract Drain @ Hwy 12. No MPM is scheduled for the 2016 WY. Focused outreach will continue through 2016.

III. DUCK CREEK @ HWY 4

Overview

Monitoring at Duck Creek @ Hwy 4 began in 2004. The Coalition completed the focused outreach portion of its management plan strategy in 2012 (including additional outreach) and monitoring results from 2009 through September 2015 indicate water quality improved within the site subwatershed. The Coalition received approval to complete the management plans for diazinon, pH, and water column toxicity to *S. capricornutum* on March 22, 2012 (Table III-1). The remaining constituents in the Duck Creek @ Hwy 4 site subwatershed's active management plan include DO, *E. coli,* chlorpyrifos, SC, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca* (Table III-1).

On February 22, 2016 the Coalition provided the Regional Board with results from studies it conducted on the water quality parameters in the Coalition region associated with DO. A summary of the results from this study is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* Exceedances of the WQTL for SC and TDS are currently being addressed as part of the CV-SALTS program.

The Coalition initially planned to conduct focused outreach from 2008 through 2010. Due to continued exceedances of the WQTL for chlorpyrifos and associated toxicity to *C. dubia,* the Coalition conducted additional focused outreach to growers in 2010 and 2012. The Coalition plans to conduct additional focused outreach at Duck Creek @ Hwy 4 in 2017 due to ongoing water quality impairments.

In the 2015 WY, the Coalition conducted MPM for chlorpyrifos, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca*; there were no toxic samples, but there were two exceedances of the WQTL for chlorpyrifos. Exceedances of the WQTL for field parameters DO and SC occurred in the 2015 WY.

Duck Creek @ Hwy 4 is a Represented site; no Represented site monitoring is scheduled for the 2016 WY (2015 MPU). Management Plan Monitoring will continue for chlorpyrifos, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca.* Field parameters, including DO and SC, will be measured during all monitoring events.

Table III-1. Duck Creek @ Hwy 4 management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Chlorpyrifos	2007	2008-2010	NA
C. dubia water column toxicity	2009	2008-2010	NA
H. azteca sediment toxicity	2013	2008-2010	NA
Constituents Requiring Source ID/Work Plans			
Dissolved Oxygen	2007	2008-2010	NA
E. coli	2007	2008-2010	NA
Specific Conductivity	2016	2008-2010	NA
Completed Management Plans			
Diazinon	2008	2008-2010	2012
pH	2008	2008-2010	2012

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
S. capricornutum water column toxicity	2009	2008-2010	2012

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Duck Creek @ Hwy 4 site subwatershed is located just to the east of the city of Stockton and drains a section of southern San Joaquin County between Stockton and the Lone Tree Creek site subwatershed. The site subwatershed includes an upstream location, Duck Creek @ Drais Rd (Table III-2). The Duck Creek @ Hwy 4 site subwatershed consists of 12,958 irrigated acres which include grains, hay, and field crops (Figure III-1). There are also large areas of deciduous nuts, truck/farm/nursery, berries, irrigated pasture, and vineyards.

Duck Creek (San Joaquin County) is listed on California's 303(d) List of Impaired Waterbodies for chlorpyrifos, *E. coli,* and mercury (last updated in 2010).

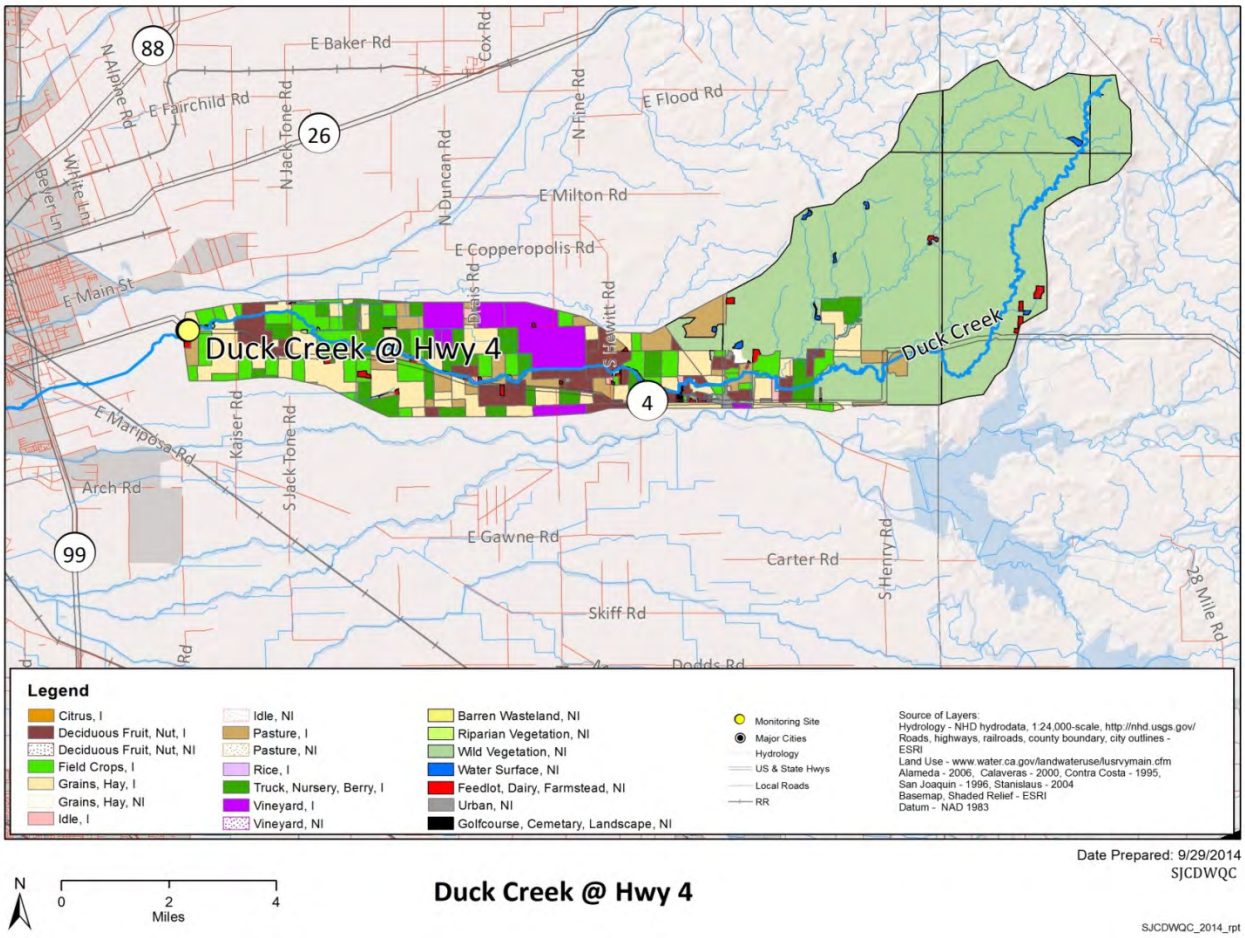
Table III-2. Duck Creek site subwatershed sampling locations coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Duck Creek @ Hwy 4*	531XDCAHF	37.94949	-121.18208
Duck Creek @ Drais Rd [US]	531XDCADR	37.93480	-121.08412

[US] Upstream sites

*Original SJCDWQC sampling site

Figure III-1. Duck Creek @ Hwy 4 site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Duck Creek @ Hwy 4 in 2004. No monitoring occurred in 2005; sampling resumed in 2006 and continued through September 2015. Table III-3 contains the number of events monitored per year and the constituents from 2008 through September 2015. The last time the full suite of constituents was collected at the site was in 2012. During the 2015 WY, Duck Creek @ Hwy 4 was classified as a Represented site; monitoring was conducted in accordance to the strategy for Represented sites outlined in the 2014 MPU.

In 2007, MPM was initiated to address exceedances of chlorpyrifos, DO, and *E. coli* (Table III-4). In an effort to source exceedances of the WQTL for chlorpyrifos, additional sampling occurred in 2007 and in 2008 at the upstream location, Duck Creek @ Drais Rd. In 2009 and 2013, MPM was initiated for water column toxicity to *C. dubia* and sediment toxicity to *H. azteca* toxicity, respectively. The last exceedance of the WQTL for diazinon was in 2009.

Table III-3. Duck Creek @ Hwy 4 sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	15	9	11	8	13	7	7	7
	Dry Sites	0	0	0	0	0	0	1	2
	Events Sampled	15	9	11	8	13	7	6	5

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Field and Physical Parameters	Dissolved Oxygen	15	9	11	8	13	7	6	5
	Dissolved Solids	10	3	0	0	12	0	0	0
	E. coli	10	3	0	0	12	0	0	0
	Grain size (sediment)	0	0	1	0	2	2	2	2
	Hardness as CaCO3	9	3	0	0	12	0	0	0
	pH	15	9	11	8	13	7	6	5
	Specific Conductivity	15	9	11	8	13	7	6	5
	Suspended Solids	0	3	3	0	12	0	0	0
	Total Organic Carbon	10	3	0	0	14	0	0	0
	Total Organic Carbon (sediment)	0	0	0	1	2	2	2	2
	Turbidity	10	3	0	0	12	0	0	0
Nutrients	Ammonia as N	9	3	0	0	12	0	0	0
	Nitrate + Nitrite as N	0	3	3	0	12	0	0	0
	Nitrate as N	6	0	0	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	9	3	0	0	12	0	0	0
	Orthophosphate as P	9	3	0	0	12	0	0	0
	Phosphate as P	9	3	0	0	12	0	0	0
Metals (Dissolved)	Cadmium	3	3	0	0	12	0	0	0
	Copper	3	3	0	0	12	0	0	0
	Lead	3	3	0	0	12	0	0	0
	Nickel	3	3	0	0	12	0	0	0
	Zinc	3	3	0	0	12	0	0	0
Metals (Total)	Arsenic	9	3	0	0	12	0	0	0
	Boron	9	3	0	0	12	0	0	0
	Cadmium	9	3	0	0	12	0	0	0
	Copper	9	3	0	0	12	0	0	0
	Lead	9	3	0	0	12	0	0	0
	Molybdenum	3	3	0	0	12	0	0	0
	Nickel	9	3	0	0	12	0	0	0
	Selenium	9	3	0	0	12	0	0	0
	Zinc	9	3	0	0	12	0	0	0
Carbamates	Aldicarb	10	3	0	0	12	0	0	0
	Carbaryl	10	3	0	0	12	0	0	0
	Carbofuran	10	3	0	0	12	0	0	0
	Diuron	10	3	0	0	12	0	0	0
	Linuron	10	3	0	0	12	0	0	0
	Methiocarb	10	3	0	0	12	0	0	0
	Methomyl	10	3	0	0	12	0	0	0
	Oxamyl	10	3	0	0	12	0	0	0
Group A Pesticides	Aldrin	3	3	0	0	0	0	0	0
	Chlordane	3	3	0	0	0	0	0	0
	Endosulfan I	3	3	0	0	0	0	0	0
	Endosulfan II	3	3	0	0	0	0	0	0
	HCH, alpha	0	3	3	0	0	0	0	0
	HCH, beta	0	3	3	0	0	0	0	0
	HCH, delta	0	3	3	0	0	0	0	0
	HCH, gamma	0	3	3	0	0	0	0	0
	Heptachlor	0	3	3	0	0	0	0	0
	Heptachlor epoxide	0	3	3	0	0	0	0	0
	Toxaphene	0	3	3	0	0	0	0	0
Herbicides	Atrazine	10	3	0	0	12	0	0	0
	Cyanazine	10	3	0	0	12	0	0	0
	Glyphosate	10	3	0	0	12	0	0	0
	Paraquat	10	3	0	0	12	0	0	0
	Simazine	10	3	0	0	12	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Trifluralin	0	3	3	0	12	0	0	0
Organochlorines	DDD(p,p')	10	3	0	0	12	0	0	0
	DDE(p,p')	10	3	0	0	12	0	0	0
	DDT(p,p')	10	3	0	0	12	0	0	0
	Dicofol	10	3	0	0	12	0	0	0
	Dieldrin	10	3	0	0	12	0	0	0
	Endrin	10	3	0	0	12	0	0	0
	Methoxychlor	10	3	0	0	12	0	0	0
Organophosphates	Azinphos methyl	10	3	0	0	12	0	0	0
	Chlorpyrifos	10	9	9	8	12	6	5	4
	Demeton-s	3	3	0	0	12	0	0	0
	Diazinon	10	3	8	2	12	0	0	0
	Dichlorvos	3	3	0	0	12	0	0	0
	Dimethoate	10	3	0	0	12	0	0	0
	Disulfoton	10	3	0	0	12	0	0	0
	Malathion	10	3	0	0	12	0	0	0
	Methamidophos	10	3	0	0	12	0	0	0
	Methidathion	10	3	0	0	12	0	0	0
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	10	3	0	0	12	0	0	0
	Phorate	10	3	0	0	12	0	0	0
	Phosmet	10	3	0	0	12	0	0	0
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	2	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	2	0	0	0
	Cypermethrin, total	7	0	0	0	2	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	2	0	0	0
	Permethrin, total	7	0	0	0	2	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	0	2	0	0	0
	Chlorpyrifos	0	0	1	0	2	0	0	0
	Cyfluthrin	0	0	1	0	0	0	0	0
	Cyhalothrin, lambda	0	0	1	0	0	0	0	0
	Cypermethrin	0	0	1	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	1	0	2	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	1	0	0	0	0	0
	Fenpropathrin	0	0	1	0	2	0	0	0
	Permethrin	0	0	1	0	2	0	0	0
Toxicity	*Ceriodaphnia dubia*	12	6	3	3	12	3	2	3
	Pimephales promelas	10	3	0	0	12	0	0	0
	Selenastrum capricornutum	12	5	3	3	12	0	0	0
	Hyalella azteca	1	0	2	0	2	2	2	2

Table III-4. Duck Creek Management Plan Monitoring schedule (2007-2015 WY).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Diazinon	*C. dubia*	*S. capricornutum*	*H. azteca*
Duck Creek @ Hwy 4	9/25/2007	Add.	X				
Duck Creek @ Drais Rd	5/5/2008	US	X				
Duck Creek @ Drais Rd	7/15/2008	US	X				
Duck Creek @ Drais Rd	9/16/2008	US	X				
Duck Creek @ Hwy 4	4/14/2009	MPM	X		X	X	
Duck Creek @ Hwy 4	5/12/2009	MPM	X			X	
Duck Creek @ Hwy 4	6/9/2009	MPM	X				
Duck Creek @ Hwy 4	7/14/2009	MPM	X		X		
Duck Creek @ Hwy 4	8/11/2009	MPM	X				
Duck Creek @ Hwy 4	9/15/2009	MPM	X		X		

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Diazinon	*C. dubia*	*S. capricornutum*	*H. azteca*
Duck Creek @ Hwy 4	2/9/2010	MPM		X		X	
Duck Creek @ Hwy 4	4/13/2010	MPM	X		X	X	
Duck Creek @ Hwy 4	5/11/2010	MPM	X			X	
Duck Creek @ Hwy 4	6/8/2010	MPM	X[1]	X[2]			
Duck Creek @ Hwy 4	7/13/2010	MPM	X[1]	X[2]	X		
Duck Creek @ Hwy 4	8/10/2010	MPM	X[1]	X[2]			
Duck Creek @ Hwy 4	9/7/2010	MPM	X[1]	X[2]	X		X[2]
Duck Creek @ Hwy 4	10/12/2010	MPM	X[2]	X[2]			
Duck Creek @ Hwy 4	11/9/2010	MPM	X[2]	X[2]			
Duck Creek @ Hwy 4	12/7/2010	MPM	X[2]	X[2]			
Duck Creek @ Hwy 4	1/11/2011	MPM	X[2]	X[2]			
Duck Creek @ Hwy 4	2/8/2011	MPM	X[2]	X[1]		X	
Duck Creek @ Hwy 4	4/12/2011	MPM	X		X	X	
Duck Creek @ Hwy 4	5/24/2011	MPM	X			X	
Duck Creek @ Hwy 4	6/28/2011	MPM	X				
Duck Creek @ Hwy 4	7/26/2011	MPM	X		X		
Duck Creek @ Hwy 4	8/23/2011	MPM	X				
Duck Creek @ Hwy 4	9/20/2011	MPM	X		X		
Duck Creek @ Hwy 4	2/14/2012	MPM		X		X	
Duck Creek @ Hwy 4	4/12/2012	MPM	X		X		
Duck Creek @ Hwy 4	5/16/2012	MPM	X				
Duck Creek @ Hwy 4	6/19/2012	MPM	X				
Duck Creek @ Hwy 4	7/17/2012	MPM	X		X		
Duck Creek @ Hwy 4	8/21/2012	MPM	X				
Duck Creek @ Hwy 4	9/18/2012	MPM	X		X		
Duck Creek @ Hwy 4	3/19/2013	MPM					X
Duck Creek @ Hwy 4	4/02/2013	MPM	X		X		
Duck Creek @ Hwy 4	5/21/2013	MPM	X				
Duck Creek @ Hwy 4	6/18/2013	MPM	X				
Duck Creek @ Hwy 4	7/16/2013	MPM	X		X		
Duck Creek @ Hwy 4	8/20/2013	MPM	X				
Duck Creek @ Hwy 4	9/17/2013	MPM	X		X		X
Duck Creek @ Hwy 4	3/5/2014	MPM					X
Duck Creek @ Hwy 4	4/15/2014	MPM	X		X		
Duck Creek @ Hwy 4	5/20/2014	MPM	X				
Duck Creek @ Hwy 4	6/17/2014	MPM	X				
Duck Creek @ Hwy 4	7/15/2014	MPM	X		X		
Duck Creek @ Hwy 4	8/19/2014	MPM	X				
Duck Creek @ Hwy 4	9/16/2014	MPM	X		X		X
Duck Creek @ Hwy 4	3/17/2015	MPM					X
Duck Creek @ Hwy 4	4/21/2015	MPM	X		X		
Duck Creek @ Hwy 4	5/19/2015	MPM	X				
Duck Creek @ Hwy 4	6/16/2015	MPM	X				
Duck Creek @ Hwy 4	7/21/2015	MPM	X		X		
Duck Creek @ Hwy 4	8/18/2015	MPM	X				
Duck Creek @ Hwy 4	9/15/2015	MPM	X		X		X

[1] MPM and Department of Pesticide Regulation (DPR) grant monitoring.

[2] DPR grant monitoring

Add. – Additional sampling

US – Upstream sampling

X – Constituent sampled for Management Plan Monitoring (MPM).

During the 2015 WY, MPM occurred for chlorpyrifos (April through September), water column toxicity to *C. dubia* (April, July, and September), and sediment toxicity to *H. azteca* (March and September). There were two exceedances of the WQTL for chlorpyrifos (Table III-5); both exceedances occurred during MPM on April 21, 2015 (0.016 µg/L) and August 18, 2015 (0.022 µg/L). There was no toxicity to *C. dubia* or to *H. azteca*. During MPM in the 2015 WY, DO and SC were also measured; four exceedances of the WQTL occurred for DO and one exceedance of the WQTL occurred for SC. Although *E. coli* is in the site's management plan, it was last monitored in 2012.

Table III-5 is a tally of exceedances of WQTLs from 2006 through September 2015 for management plan constituents in the Duck Creek @ Hwy 4 site subwatershed. Table III-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances since monitoring began is provided in Appendix II, Table II-3. Table III-7 includes load information for chlorpyrifos from 2006 through the 2015 WY.

Table III-5. Duck Creek @ Hwy 4 management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-3.

	Management Plan Constituents						Completed Management Plans		
Monitoring Year	Oxygen, Dissolved, <5 mg/L	Specific Conductivity[1], >700 µS/cm or > 1000 µS/cm	*E. coli*, >235 MPN/100 mL	Chlorpyrifos, >0.015 µg/L	*C. dubia*, (%Control)	*H. azteca*, (%Control)	pH, <6.5 and >8.5 units	Diazinon, >0.1 µg/L	*S. capricornutum*, (% control)
2006	1	0	2	2	1	0	1	0	0
2007	0	0	3	3	0	0	1	1	1
2008	1	0	1	5	4	0	1	0	2
2009	2	0	0	3	1	NA	0	0	0
2010	2	0	NA	4	0	1	0	0	0
2011	0	0	NA	1	1	NA	0	0	0
2012	7	0	1	0	0	2	0	0	0
2013	4	0	NA	0	0	0	0	NA	NA
2014 WY*	4	0	0	0	0	0	0	NA	NA
2015 WY	4	1	NA	2	0	0	0	NA	NA
Overall Tally	**25**	**1**	**7**	**20**	**7**	**3**	**3**	**1**	**3**

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table III-6. Duck Creek @ Hwy 4 subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

MONTH:		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		OCT	NOV	DEC
2007 NM (@ Hwy 4)	Date	NA	NA	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/7/07	9/4/07		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	<0.003	**0.024**	<0.003	**0.025**		NA	NA	NA
2007 MPM Add. (@ Hwy 4)	Date	NA	NA	NA	NA	NA	NA	NA	NA	9/25/07		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	**0.029**		NA	NA	NA
2008 NM (@Hwy 4)	Date	1/23/08	NA	NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08		10/14/08	11/4/08	12/9/08
	Chlorpyrifos (µg/L)	0.0081	NA	NA	**0.057**	<0.003	**0.110**	**0.066**	**0.017**	**0.027**		<0.003	<0.003	<0.003
	Diazinon (µg/L)	0.018	NA	NA	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004
2008 MPM US (@ Drais Rd)	Date	NA	NA	NA	NA	5/13/08	NA	7/15/08	NA	9/16/08		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	**0.420**	NA	<0.003	NA	<0.003		NA	NA	NA
2009 NM (@Hwy 4)[1]	Date	1/13/09	2/10/09	3/10/09	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Chlorpyrifos (µg/L)	0.005	0.0037	<0.003	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Diazinon (µg/L)	0.012	<0.004	<0.004	NA	NA	NA	NA	NA	NA		NA	NA	NA
	C. dubia toxicity (% Control)	100	100	100	NA	NA	NA	NA	NA	NA		NA	NA	NA
	S. capricornutum toxicity (% Control)	136	188	147	NA	NA	NA	NA	NA	NA		NA	NA	NA
2009 MPM (@ Hwy 4)	Date	NA	NA	NA	4/14/09	5/12/09	6/9/09	7/14/09	8/11/09	9/15/09		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	0.011	**0.070**	**0.150**	**0.031**	<0.003		NA	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	100	NA	NA	**0**	NA	100		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	516	498	NA	NA	NA	NA		NA	NA	NA
2010 MPM (@ Hwy 4)	Date	NA	2/9/10	NA	4/13/10	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	9/14/10	10/12/10	11/9/10	12/7/10
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	**0.055**	<0.003	**0.02**	**0.3**	**0.023**	NA	<0.003*	<0.003*	<0.003*
	Diazinon (µg/L)	NA	<0.004	NA	NA	NA	<0.004*	<0.004*	<0.004*	<0.004*	NA	<0.004*	<0.004*	<0.004*
	C. dubia toxicity (% Control)	NA	NA	NA	100	NA	NA	100	NA	100	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	660	NA	992	1136	NA	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	NA	NA	**17***	NA	NA	NA
2011 MPM (@ Hwy 4)	Date	1/11/11	2/8/11	NA	4/12/11	5/24/11	6/28/11	7/26/11	8/23/11	9/20/11		NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003*	0.004*	NA	<0.003	<0.003	<0.003	<0.003	<0.003	**0.12**		NA	NA	NA
	Diazinon (µg/L)	<0.004*	<0.004	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	95	NA	NA	100	NA	**35**		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	994	NA	1204	826	NA	NA	NA	NA		NA	NA	NA

Month:		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012 NM & MPM (@ Hwy 4)	Date	1/17/12	2/14/12	3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12	9/18/12	10/16/12	11/6/12	12/3/12
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	Diazinon (µg/L)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
	C. dubia toxicity (% Control)	100	100	105	100	100	100	100	100	95	100	100	100
	S. capricornutum toxicity (% Control)	813	830	88	355	526	293	192	278	466	303	294	1797
2013 MPM (@ Hwy 4)	Date	NA	NA	3/19/13	4/2/13	5/21/13	6/18/13	7/16/13	8/20/13	9/17/13	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	NA	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	100	NA	NA	100	NA	100	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	91	NA	NA	NA	NA	NA	96	NA	NA	NA
2014 & 2015 WY MPM (@ Hwy 4)	Date	NA	NA	3/05/14	4/15/14	5/20/14	6/17/14	7/15/14	8/19/14	9/16/14	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	Dry	<0.003	<0.003	<0.003	<0.003	<0.003	NA	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	Dry	NA	NA	100	NA	100	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	100	NA	NA	NA	NA	NA	96	NA	NA	NA
2015 WY MPM (@Hwy 4)	Date	NA	NA	3/17/15	4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15	Oct	Nov	Dec
	Chlorpyrifos (µg/L)	NA	NA	NA	**0.016**	Dry	Dry	<0.003	**0.022**	<0.003			
	C. dubia toxicity (% Control)	NA	NA	NA	95	NA	NA	100	NA	100			
	H. azteca toxicity (% Control)	NA	NA	100	NA	NA	NA	NA	NA	92			

[1] Assessment Monitoring at Duck Creek @ Hwy 4 began under the October 2008 MRPP and was scheduled to continue through 2009; however, in March 2009 (Effective April 1, 2009) the Coalition received approval to revise the monitoring schedule, and Assessment Monitoring was rescheduled for 2012.

Add. – Additional Monitoring, conducted in 2007 only.

MPM – Management Plan Monitoring.

NA – Not applicable. No monitoring occurred for the constituent

NM – Normal Monitoring

US – Upstream Monitoring, conducted in 2008 only.

*Additional Department of Pesticide Regulation (DPR) grant monitoring

Table III-7. Duck Creek @ Hwy 4 site subwatershed instantaneous load calculations for chlorpyrifos.
If discharge was unable to be measured or the analyte was ND, the result is not included in the table.

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Duck Creek @ Hwy 4	Chlorpyrifos	5/16/2006	12.68	0.29	µg/L	10	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	9/19/2006	6.02	0.15	µg/L	26	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	7/10/2007	14.43	0.024	µg/L	10	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	9/04/2007	0	0.025	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	9/04/2007	2.16	0.029	µg/L	2	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	1/23/2008	2.11	0.0081	µg/L	1	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	4/15/2008	13.07	0.057	µg/L	21	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	6/10/2008	15.51	0.11	µg/L	48	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	7/15/2008	13.67	0.066	µg/L	26	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	8/12/2008	4.97	0.017	µg/L	2	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	9/16/2008	20.8	0.027	µg/L	16	µg/sec
Duck Creek @ Hwy 4*	Chlorpyrifos	1/13/2009	0	0.0048	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	1/13/2009	0	0.005	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	2/10/2009	0	0.0037	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	5/12/2009	5.57	0.011	µg/L	2	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	6/09/2009	11.54	0.07	µg/L	23	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	7/14/2009	23.44	0.15	µg/L	100	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	5/11/2010	18.49	0.055	µg/L	29	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	7/13/2010	20.73	0.02	µg/L	12	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	9/07/2010	14.56	0.023	µg/L	10	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	2/08/2011	0	0.004	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	4/21/2015	1.2	0.016	µg/L	1	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	8/18/2015	0	0.022	µg/L	0	µg/sec

[1] Load = Discharge (cfs) X 28.317L/ft3 X Concentration (µg/L). To convert a concentration measured in mg/L to µg/L multiply by 1000. The load values calculated represent instantaneous loads only, and should not be used to extrapolate loading over any period of time.
*Field Duplicate

Source Identification and Outreach

Sourcing analyses for past exceedances of Duck Creek @ Hwy 4 management plan constituents are evaluated in past years' site subwatershed appendices. During the 2015 WY, there were exceedances of the WQTLs for DO (4), SC (1), and chlorpyrifos (2).

Monitoring during the 2015 WY resulted in four exceedances of the WQTL for DO. Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. The exceedances that occurred in July, August, and September 2015 are likely due to increased water temperature. However, the exceedances occurring in the winter and early spring months are likely the result of the low water levels resulting in slow to stagnant water. As previously discussed, study results on the water quality parameters associated with DO concentrations in surface water have been submitted to the Regional Board and exceedances of the WQTL for SC are currently being addressed as part of the CV-SALTS program. Additional investigation of the sources of DO variability is pending further discussion with the Regional Board.

Chlorpyrifos concentrations in samples collected during MPM on April 21, 2015 (0.016 µg/L) exceeded the WQTL. The exceedance corresponds with the beginning of the irrigation season (typically April

through September), when the insecticide is most heavily used to control pests in row crops and orchards. Based on PUR data associated with the exceedance in April, there were eight applications of chlorpyrifos from April 2, 2015 through April 21, 2015. The applications totaled 352 lbs of AI of chlorpyrifos over 375 acres of walnut orchards.

Concentrations of chlorpyrifos in samples collected during MPM on August 18, 2015 (0.022 µg/L) resulted exceeded the WQTL. Based on PUR data associated with the exceedance in August, there was just one application of chlorpyrifos on August 4, 2015. The application totaled 68 lbs of AI of chlorpyrifos applied over 36 acres of walnut orchards.

Outreach

Beginning in 2008, the Coalition conducted focused outreach, which consisted of corresponding with targeted growers, documenting current management practices, tracking the implementation of additional management practices, and following up with the growers in 2009, 2010, and 2012. The Coalition contacted 35 targeted growers farming 4,978 acres within the Duck Creek @ Hwy 4 site subwatershed and documented management practices. Additional contacts were made with 12 growers in 2010 and three growers in 2012. These growers were targeted for supplementary focused outreach based on their recent use of chlorpyrifos associated with the exceedance in September 2011. Following focused outreach, all three growers indicated discontinued use of chlorpyrifos, implementation of management practices to control runoff, and management of pesticide applications. Additional management practices include the use of center grass rows, grass waterways or grass filter strips, and installation of micro sprinkler or drip irrigation. There were 19 growers who returned follow-up surveys and documented newly implemented management practices in 2009 or 2010. Due to ongoing water quality issues in this site subwatershed, the Coalition will initiate additional focused outreach in 2017.

Evaluation

Overall, water quality has improved since focused outreach to targeted growers began in the Duck Creek @ Hwy 4 site subwatershed. Due to water quality improvements, the Coalition received approval to complete the management plans for diazinon, pH, and toxicity to *S. capricornutum* March 22, 2012. The remaining active management plans constituents include chlorpyrifos, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca.* The Coalition is confident water quality will continue to improve with continued focused and general outreach and increased grower awareness of water quality issues.

Next Steps

The Coalition will conduct additional focused outreach in 2017 due to ongoing water quality impairments. Management Plan Monitoring is scheduled during months of past exceedances for chlorpyrifos, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca.* Field parameters, such as DO and SC, will be measured during all scheduled monitoring events.

IV. FRENCH CAMP SLOUGH @ AIRPORT WAY

Overview

Monitoring at the French Camp Slough @ Airport Way site subwatershed began in 2005, and management plans were first established in 2007. The Coalition completed focused outreach in the site subwatershed in 2013 and monitoring results through September 2015 indicate improved water quality. The Coalition has received approval to complete management plans for copper, diazinon, dieldrin, diuron, lead, pH, sediment toxicity to *H. azteca*, and water column toxicity *to C. dubia* and *S. capricornutum*. However, constituent concentrations in samples collected on February 11, 2014 resulted in an exceedance of the WQTLs for diuron and water column toxicity to *S. capricornutum*. As a result, the Coalition reinstated the management plan for diuron. The constituents with active management plans for the site subwatershed include: chlorpyrifos, DO, *E. coli*, and water column toxicity to *S. capricornutum* (Table IV-1). The Coalition submitted results from a study on water quality parameters associated with the concentrations of DO in the Coalition region to the Regional Board on February 22, 2016. A summary of the results from this study is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.*

During the 2015 WY, MPM occurred for chlorpyrifos, diuron, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca*. One exceedance of the WQTL for chlorpyrifos and diuron occurred in January and February 2015, respectively. No toxicity occurred during the 2015 WY. (Appendix III, Table III-2A).

French Camp Slough @ Airport Way is a Core site in Zone 2; monthly Core site monitoring is scheduled to occur in the 2016 WY (2015 MPU). The Coalition will conduct monitoring at French Camp Slough @ Airport Way based on the monitoring strategy at a Core site and the Delta RMP. Additionally, MPM will occur for chlorpyrifos, diuron, and water column toxicity to *S. capricornutum*. Dissolved Oxygen will be monitored during all sampling events.

Table IV-1. French Camp Slough @ Airport Way management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Chlorpyrifos	2006	2011-2013	NA
Diuron[1]	2009, 2015	2011-2013	NA
Constituents Requiring Source ID/Work Plans			
Dissolved Oxygen	2006	2011-2013	NA
E. coli	2006	2011-2013	NA
Completed Management Plans			
C. dubia water column toxicity	2008	2011-2013	2013
S. capricornutum water column toxicity	2009	2011-2013	NA

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Copper	2007	2011-2013	2013
Diazinon	2008	2011-2013	2013
Dieldrin	2009	2011-2013	2012
H. azteca sediment toxicity	2008	2011-2013	2015
Lead	2008	2011-2013	2013
pH	2009	2011-2013	2015

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

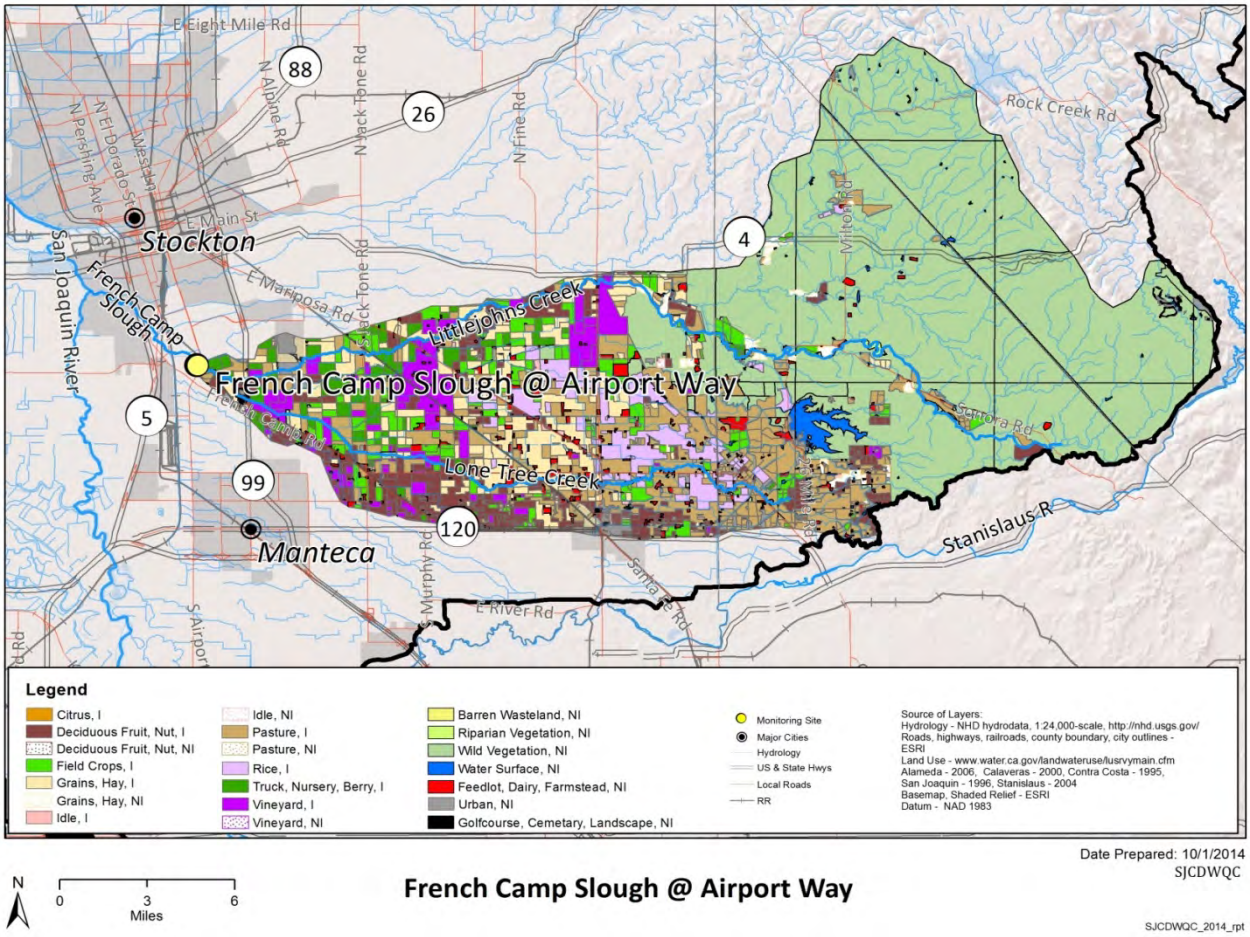
The French Camp Slough @ Airport Way site subwatershed contains 83,229 irrigated acres consisting of all major types of agriculture present in the Coalition region including field crops, orchards, grains, hay, rice, tomatoes, vineyards, and irrigated pasture (Figure IV-1). The site subwatershed drains agricultural land to the east of Manteca and Stockton and eventually flows through urban areas prior to discharging into the San Joaquin River; French Camp Slough is created by the confluence of Littlejohns Creek and Lone Tree Creek and includes both of these subwatersheds as well as Unnamed Drain to Lone Tree Creek (a tributary to Lone Tree Creek) in its overall watershed area (Figure IV-1). Table VII-2 lists the coordinates of the location where monitoring occurs on French Camp Slough.

French Camp Slough (confluence of Littlejohns and Lone Tree Creeks to San Joaquin River, San Joaquin County; partly in Delta Waterways, eastern portion) is listed on California's 303(d) List of Impaired Waterbodies for chlorpyrifos, diazinon, DO, *E. coli,* sediment toxicity, and unknown toxicity (last updated in 2010).

Table IV-2. French Camp Slough @ Airport Way site subwatershed coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
French Camp Slough @ Airport Way	531SJC504	37.88172	-121.24933

Figure IV-1. French Camp Slough @ Airport Way site subwatershed land use map.



Subwatershed Monitoring History

Monitoring at French Camp Slough @ Airport Way has been conducted from 2005 through the 2015 WY. The last time the full suite of constituents was collected at the site was in 2014. Table IV-3 contains the number of events monitored per year and the constituents from 2008 through the 2015 WY.

The Coalition conducted MPM in 2007 and then from 2010 through September 2015 during months of past exceedances (Table IV-4). As a result of the exceedance of the WQTL for diuron and a toxicity to *S. capricornutum,* in February of 2014, the management plan for diuron was reinstated.

Table IV-3. French Camp Slough @ Airport Way sampling events and analyses per year.
Listed by Group. Only the environmental samples are counted.

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	14	13	12	14	12	12	10	12
	Dry Sites	0	0	0	0	0	0	0	0
	Events Sampled	14	13	12	14	12	12	10	12
Physical Para	BOD	0	0	0	0	0	0	0	0
	Color	7	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Dissolved Oxygen	14	13	12	14	12	12	10	12
	Dissolved Solids	10	12	12	12	12	12	9	0
	E. coli	10	12	12	12	12	12	9	12
	Grain size (sediment)	0	0	1	2	2	2	2	2
	Hardness as CaCO3	7	0	4	12	5	1	9	4
	pH	14	13	12	14	12	12	10	12
	Specific Conductivity	14	13	12	14	12	12	10	12
	Suspended Solids	3	12	12	12	12	12	9	12
	Total Organic Carbon	10	12	12	12	12	12	9	12
	Total Organic Carbon (sediment)	0	0	1	2	2	2	2	2
	Turbidity	10	12	12	12	12	12	9	12
Nutrients	Ammonia as N	10	12	12	12	12	12	9	12
	Nitrate + Nitrite as N	3	12	12	12	12	12	9	12
	Nitrate as N	7	0	0	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	10	12	12	12	0	12	9	0
	Orthophosphate as P	10	12	12	12	12	12	9	12
	Phosphate as P	10	12	12	12	12	12	9	0
Metals (Dissolved)	Cadmium	0	0	0	12	0	0	9	0
	Copper	0	0	4	12	5	1	9	4
	Lead	0	0	0	12	2	0	9	0
	Nickel	0	0	0	12	0	0	9	0
	Zinc	0	0	0	12	0	0	9	0
Metals (Total)	Arsenic	7	0	0	12	0	0	9	0
	Boron	7	0	0	12	0	0	9	0
	Cadmium	7	0	0	12	0	0	9	0
	Copper	7	0	4	12	5	1	9	0
	Lead	7	0	0	12	2	0	9	0
	Molybdenum	0	0	0	12	0	0	9	0
	Nickel	7	0	0	12	0	0	9	0
	Selenium	7	0	0	12	0	0	9	0
	Zinc	7	0	0	12	0	0	9	0
Carbamates	Aldicarb	10	12	12	12	0	0	9	12
	Carbaryl	10	12	12	12	0	0	9	12
	Carbofuran	10	12	12	12	0	0	9	12
	Diuron	10	1	0	12	0	2	9	12
	Linuron	10	1	0	12	0	0	9	12
	Methiocarb	10	12	12	12	0	0	9	12
	Methomyl	10	12	12	12	0	0	9	12
	Oxamyl	10	12	12	12	0	0	9	12
Group A Pesticides	Aldrin	0	8	0	0	0	0	0	0
	Chlordane	0	8	0	0	0	0	0	0
	Endosulfan I	0	8	0	0	0	0	0	0
	Endosulfan II	0	8	0	0	0	0	0	0
	HCH, alpha	0	8	0	0	0	0	0	0
	HCH, beta	0	8	0	0	0	0	0	0
	HCH, delta	0	8	0	0	0	0	0	0
	HCH, gamma	0	8	0	0	0	0	0	0
	Heptachlor	0	8	0	0	0	0	0	0
	Heptachlor epoxide	0	8	0	0	0	0	0	0
	Toxaphene	0	8	0	0	0	0	0	0
rbi cid	Atrazine	7	1	0	12	0	0	9	12

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Cyanazine	7	1	0	12	0	0	9	12
	Glyphosate	7	0	0	12	0	0	9	2
	Paraquat	7	0	0	12	0	0	9	2
	Simazine	7	1	0	12	0	0	9	12
	Trifluralin	0	1	0	12	0	0	9	12
Organochlorines	DDD(p,p')	10	12	0	12	0	0	9	0
	DDE(p,p')	10	12	0	12	0	0	9	0
	DDT(p,p')	10	12	0	12	0	0	9	0
	Dicofol	10	12	0	12	0	0	9	0
	Dieldrin	10	12	1	12	0	0	9	0
	Endrin	10	12	0	12	0	0	9	0
	Methoxychlor	10	12	0	12	0	0	9	0
Organophosphates	Azinphos methyl	10	12	0	12	0	0	9	12
	Chlorpyrifos	10	12	5	12	7	7	9	12
	Demeton-s	3	12	0	12	0	0	9	12
	Diazinon	10	12	0	12	2	2	9	12
	Dichlorvos	3	12	0	12	0	0	9	12
	Dimethoate	10	12	0	12	0	0	9	12
	Disulfoton	10	12	0	12	0	0	9	12
	Malathion	10	12	0	12	0	0	9	12
	Methamidophos	10	12	0	12	0	0	9	12
	Methidathion	10	12	0	12	0	0	9	12
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	10	12	0	12	0	0	9	12
	Phorate	10	12	0	12	0	0	9	12
	Phosmet	10	12	0	12	0	0	9	12
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	0	0	0	0	0
	Chlorpyrifos	0	0	1	0	0	0	0	0
	Cyfluthrin	0	0	1	0	0	0	0	0
	Cyhalothrin, lambda	0	0	1	0	0	0	0	0
	Cypermethrin	0	0	1	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	1	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	1	0	0	0	0	0
	Fenpropathrin	0	0	1	0	0	0	0	0
	Permethrin	0	0	1	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	7	0	0	12	2	1	9	12
	Pimephales promelas	7	0	0	12	0	0	9	12
	Selenastrum capricornutum	8	1	1	12	2	1	9	12
	Hyalella azteca	3	0	1	2	2	2	2	2

Table IV-4. French Camp Slough @ Airport Way Management Plan Monitoring schedule (2007-2015 WY).

Site Name	Sample Date	Monitoring Type	Copper	Lead	Chlorpyrifos	Diazinon	Dieldrin	Diuron	*C. dubia*	*S. capricornutum*	*H. azteca*
French Camp Slough @ Airport Way	6/12/2007	MPM	X								
French Camp Slough @ Airport Way	7/10/2007	MPM	X		X						
French Camp Slough @ Airport Way	8/7/2007	MPM	X		X						
French Camp Slough @ Airport Way	4/13/2010	MPM								X	
French Camp Slough @ Airport Way	5/11/2010	MPM	X		X						
French Camp Slough @ Airport Way	6/8/2010	MPM	X								
French Camp Slough @ Airport Way	7/13/2010	MPM	X		X		X				
French Camp Slough @ Airport Way	8/10/2010	MPM	X		X						
French Camp Slough @ Airport Way	9/7/2010	MPM			X						X
French Camp Slough @ Airport Way	10/12/2010	MPM			X						
French Camp Slough @ Airport Way	1/11/2011	MPM	X			X		X			
French Camp Slough @ Airport Way	2/8/2011	MPM			X	X		X	X	X	
French Camp Slough @ Airport Way	3/8/2011	MPM							X		X
French Camp Slough @ Airport Way	4/12/2011	MPM								X	
French Camp Slough @ Airport Way	5/24/2011	MPM	X		X						
French Camp Slough @ Airport Way	6/28/2011	MPM	X								
French Camp Slough @ Airport Way	7/26/2011	MPM	X		X		X				
French Camp Slough @ Airport Way	8/23/2011	MPM	X		X						
French Camp Slough @ Airport Way	9/20/2011	MPM			X						
French Camp Slough @ Airport Way	10/6/2011	MPM			X						
French Camp Slough @ Airport Way	10/14/2011	MPM									X
French Camp Slough @ Airport Way	1/17/2012	MPM				X		X			
French Camp Slough @ Airport Way	2/14/2012	MPM	X		X	X		X	X	X	
French Camp Slough @ Airport Way	3/15/2012	MPM							X		X
French Camp Slough @ Airport Way	4/12/2012	MPM			X					X	
French Camp Slough @ Airport Way	5/16/2012	MPM	X	X	X						
French Camp Slough @ Airport Way	6/19/2012	MPM	X	X							
French Camp Slough @ Airport Way	7/17/2012	MPM	X		X						
French Camp Slough @ Airport Way	8/21/2012	MPM	X		X						
French Camp Slough @ Airport Way	9/18/2012	MPM			X						X
French Camp Slough @ Airport Way	10/16/2012	MPM			X						
French Camp Slough @ Airport Way	1/15/2013	MPM				X		X			
French Camp Slough @ Airport Way	2/21/2013	MPM	X		X	X		X	X	X	
French Camp Slough @ Airport Way	3/19/2013	MPM									X
French Camp Slough @ Airport Way	4/2/2013	MPM			X						
French Camp Slough @ Airport Way	5/21/2013	MPM			X						
French Camp Slough @ Airport Way	7/16/2013	MPM			X						
French Camp Slough @ Airport Way	8/20/2013	MPM			X						
French Camp Slough @ Airport Way	9/17/2013	MPM			X						X
French Camp Slough @ Airport Way	10/8/2013	MPM			X						
French Camp Slough @ Airport Way	2/11/2014	MPM			X						
French Camp Slough @ Airport Way	3/3/2014	MPM									X
French Camp Slough @ Airport Way	4/15/2014	MPM			X						
French Camp Slough @ Airport Way	5/20/2014	MPM			X						
French Camp Slough @ Airport Way	7/15/2014	MPM			X						
French Camp Slough @ Airport Way	8/19/2014	MPM			X						
French Camp Slough @ Airport Way	9/16/2014	MPM			X						X
French Camp Slough @ Airport Way	10/21/2014	MPM			X						

Site Name	Sample Date	Monitoring Type	Copper	Lead	Chlorpyrifos	Diazinon	Dieldrin	Diuron	*C. dubia*	*S. capricornutum*	*H. azteca*
French Camp Slough @ Airport Way	1/20/2015	MPM						X			
French Camp Slough @ Airport Way	2/9/2015	MPM			X			X		X	
French Camp Slough @ Airport Way	3/17/2015	MPM									X
French Camp Slough @ Airport Way	4/21/2015	MPM			X					X	
French Camp Slough @ Airport Way	5/19/2015	MPM			X						
French Camp Slough @ Airport Way	7/21/2015	MPM			X						
French Camp Slough @ Airport Way	8/18/2015	MPM			X						
French Camp Slough @ Airport Way	9/15/2015	MPM			X						X

X – Constituent sampled for Management Plan Monitoring (MPM).

Monitoring Results

In the 2015 WY, the Coalition conducted monthly monitoring at French Camp Slough @ Airport Way. The Coalition also conducted MPM for chlorpyrifos, diuron, water column toxicity to *S. capricornutum,* and sediment toxicity to *H. azteca* during months of past exceedances (Table IV-4). There was one exceedance of the WQTL for chlorpyrifos on January 20, 2015 (0.075 µg/L) and one for diuron on February 9, 2015 (2.9 µg/L). There were no samples toxic to *S. capricornutum* or sediment toxicity to *H. azteca* through September 2015 (Table IV-5). Exceedances of the WQTL for DO (6) and *E. coli* (4) also occurred.

Table IV-5 is a tally of exceedances of WQTLs from 2005 through September 2015 for management plan constituents. Table IV-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table IIV-7 contains the instantaneous loads for diuron (due to WQTL exceedances in 2014 and 2015) since monitoring began in the site subwatershed. A record of all exceedances since monitoring began is provided in Appendix II, Table II-4.

Table IV-5. French Camp Slough @ Airport Way management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-4.

Monitoring Years	Management Plan Constituents					Completed Management Plans						
	Dissolved Oxygen, <7mg/L	*E. coli*, >235 MPN/100 mL	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	*S. capricornutum*, (%Control)	pH, <6.5 or > 8.5 units	Copper (Total), Variable[1] or >1300 µg/L	Lead (Total), Variable[1] or >15 µg/L	Diazinon, >0.1 µg/L	Dieldrin, >0.00014 µg/L	*C. dubia*, (%Control)	*H. azteca*, (%Control)
2005	3	6	2	NA	1	1	NA	NA	0	NA	0	0
2006	3	5	2	0	0	0	4	1	0	0	1	0
2007	1	5	1	1	0	0	8	1	1	1	1	1
2008	4	4	3	1	1	2	0	0	1	1	0	0

Monitoring Years	Management Plan Constituents					Completed Management Plans						
	Dissolved Oxygen, <7mg/L	*E. coli*, >235 MPN/100 mL	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	*S. capricornutum*, (%Control)	pH, <6.5 or > 8.5 units	Copper (Total), Variable[1] or >1300 µg/L	Lead (Total), Variable[1] or >15 µg/L	Diazinon, >0.1 µg/L	Dieldrin, >0.00014 µg/L	*C. dubia*, (%Control)	*H. azteca*, (%Control)
2009	2	1	1	0	NA	0	NA	NA	0	0	NA	NA
2010	2	5	1	NA	0	0	0	NA	NA	0	NA	1
2011	0	5	2	0	0	3	0	0	0	0	0	0
2012	2	5	0	0	0	1	0	0	0	NA	0	0
2013	2	1	1	0	0	0	0	NA	0	NA	0	0
2014 WY*	2	1	0	1	1	0	0	0	0	0	0	0
2015 WY	6	4	1	1	0	0	NA	NA	0	NA	0	0
Overall Tally	**27**	**42**	**14**	**3**	**3**	**7**	**12**	**2**	**2**	**2**	**2**	**2**

[1] Metal WQTL variable based on hardness.

NA – Not Applicable; monitoring did not occur for this constituent during the year.

*2014 includes January through September results only.

Table IV-6. French Camp Slough @ Airport Way site subwatershed monitoring results for MPM constituents since management plan initiation.
Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

	Month:	Jan	Feb		Mar	Apr	May	Jun	Jul	Aug		Sep	Oct		Nov	Dec
2007 NM (@ Airport Way)	Date	NA	2/11/07	2/28/07	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/7/07		9/4/07	NA		NA	NA
	Copper (µg/L)	NA	30	11	NA	5.7	**5.9**	**5.9**	**5.4**	5		4.5	NA		NA	NA
	Chlorpyrifos (µg/L)	NA	**0.049**	<0.003	NA	0.013	<0.003	0.013	0.014	<0.003		<0.003	NA		NA	NA
2007 MPM (@ Airport Way)	Date	NA	NA		NA	NA	NA	6/20/07	7/30/07	8/28/07		NA	NA		NA	NA
	Copper (µg/L)	NA	NA		NA	NA	NA	**6.7**	**6.9**	**5.9**		NA	NA		NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA	NA	NA	NA	0.011	<0.003		NA	NA		NA	NA
2008 NM (@ Airport Way)	Date	1/23/08	NA		3/18/08	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	8/13/08	9/16/08	10/14/08		11/4/08	12/9/08
	Copper (µg/L)	12	NA		NA	4.9	5.6	3.2	4.8	2.8	NA	3.9	NA		NA	NA
	Chlorpyrifos (µg/L)	0.008	NA		NA	0.003	**0.4**	<0.003	<0.003	**0.022**	NA	**0.039**	<0.003		<0.003	<0.003
	Diazinon (µg/L)	**0.12**	NA		NA	<0.004	<0.004	<0.004	<0.004	<0.004	NA	<0.004	<0.004		<0.004	<0.004
	C. dubia toxicity (% Control)	100	NA		NA	100	100	95	100	100	NA	100	NA		NA	NA
	H. azteca toxicity (% Control)	NA	NA		94	NA	NA	NA	NA	NA	98	NA	NA		NA	NA
2009 NM (@ Airport Way)	Date	1/15/09	2/10/09		3/10/09	4/14/09	5/12/09	6/9/09	7/14/09	8/11/09		9/15/09	10/6/09		11/10/09	12/8/09
	Chlorpyrifos (µg/L)	<0.003	<0.003		<0.003	0.0045	<0.003	<0.003	<0.003	<0.003		<0.003	**0.029**		<0.003	<0.003
	Diazinon (µg/L)	<0.004	<0.004		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004		<0.004	<0.004
	Dieldrin (µg/L)	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005
	Diuron (µg/L)	NA	NA		NA	NA	<0.2	NA	NA	NA		NA	NA		NA	NA
2010 MPM (@Airport Way)	Date	NA	NA		NA	4/13/10	5/11/10	6/8/10	7/13/10	8/10/10		9/7/10	10/12/10		NA	NA
	Copper, dissolved (µg/L)	NA	NA		NA	NA	2.7	3.5	3.5	2.9		NA	NA		NA	NA
	Copper, total (µg/L)	NA	NA		NA	NA	4.3	6.2	6	4.6		NA	NA		NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA	NA	<0.003	NA	<0.003	**0.022**		0.009	<0.003		NA	NA
	Dieldrin (µg/L)	NA	NA		NA	NA	NA	NA	<0.005	NA		NA	NA		NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA	1923	NA	NA	NA	NA		NA	NA		NA	NA
	H. azteca toxicity (% Control)	NA	NA		NA	NA	NA	NA	NA	NA		**1**	NA		NA	NA
2011 NM & MPM (@Airport Way)	Date	1/11/11	2/8/11		3/8/11	4/12/11	5/24/11	6/28/11	7/26/11	8/23/11		9/20/11	10/6/11	10/14/11	11/15/11	12/13/11
	Copper, dissolved (µg/L)	3.4*	2.3		4.3	3.5	3.5*	3.5*	1.9*	1.8*		1.8	2.7	NA	2.1	2.1
	Copper, total (µg/L)	6*	2.9		7.7	6.6	6.4*	5.8*	4.2*	3.1*		3.0	4.1	NA	3	3.2
	Chlorpyrifos (µg/L)	<0.003	<0.003*		<0.003	**0.033**	<0.003*	<0.003	<0.003*	<0.003*		<0.003*	**0.097***	NA	<0.003	<0.003
	Diazinon (µg/L)	<0.004*	<0.004*		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	NA	<0.004	<0.004
	Dieldrin (µg/L)	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005*	<0.005		<0.005	<0.005	NA	<0.005	<0.005
	Diuron (µg/L)	<0.2*	<0.2*		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	NA	<0.2	<0.2
	C. dubia toxicity (% Control)	100	100*		100*	100	100	100	100	100		100	100	NA	100	100
	S. capricornutum toxicity (% Control)	624	1021*		668	1554*	1004	442	1425	1509		461	1197	NA	654	460
	H. azteca toxicity (% Control)	NA	NA		100*	NA	NA	NA	NA	NA		NA	NA	86*	NA	NA
2012 MPM (@Airport Way)	Date	1/17/12	2/14/12		3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12		9/18/12	10/16/12		NA	NA
	Copper, dissolved (µg/L)	NA	4.5		NA	NA	1.8	1.6	1.6	1.4		NA	NA		NA	NA

	Month:	Jan	Feb	Mar		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Copper, total (µg/L)	NA	5.7	NA		NA	4.2	3.8	117.6	2.9	NA	NA	NA	NA
	Lead , dissolved (µg/L)	NA	NA	NA		NA	0.1	0.09	NA	NA	NA	NA	NA	NA
	Lead , total (µg/L)	NA	NA	NA		NA	0.9	0.74	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	<0.003	NA		<0.003	<0.003	NA	<0.003	<0.003	<0.003	<0.003	NA	NA
	Diazinon (µg/L)	<0.004	<0.004	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	Diuron (µg/L)	0.52	0.27	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	C. dubia toxicity (% Control)	NA	100	105		NA	NA	NA	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	865	NA		448	NA	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	111		NA	NA	NA	NA	NA	105	NA	NA	NA
2013 MPM (@ Airport Way)	Date	1/15/13	2/21/13	3/19/13		4/2/13	5/21/13	NA	7/16/13	8/20/13	9/17/13	10/8/13	NA	NA
	Copper, dissolved (µg/L)	NA	2.1	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	Copper, total (µg/L)	NA	3.4	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	<0.003	NA		<0.003	<0.003	NA	**0.042**	<0.003	<0.003	<0.003	NA	NA
	Diazinon (µg/L)	<0.004	<0.004	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	Diuron (µg/L)	<0.2	<0.2	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	C. dubia toxicity (% Control)	NA	100	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	1260	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	102		NA	NA	NA	NA	NA	94	NA	NA	NA
2014 & 2015 WY NM, MPM (@ Airport Way)	Date	1/28/14	2/11/14	3/3/14	3/5/14	4/15/14	5/20/14	6/17/14	7/15/14	8/19/14	9/16/14	10/21/14	11/18/14	12/4/14
	Chlorpyrifos (µg/L)	<0.003	<0.003*	<0.003	NA	<0.003*	<0.003*	<0.003*	<0.003*	<0.003*	<0.003*	<0.003*	<0.003	<0.003
	Diuron (µg/L)	<0.2	38	1.1	NA	<0.2	0.21	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	S. capricornutum toxicity (% Control)	2245	0	549	NA	357	893	581	745	843	529	826	741	522
	H. azteca toxicity (% Control)	NA	NA	NA	100*	NA	NA	NA	NA	NA	90*	NA	NA	NA
2015 WY NM & MPM (@ Airport Way)	Date	1/20/15	2/9/15	3/17/15		4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15	Oct	Nov	Dec
	Chlorpyrifos (µg/L)	**0.075**	<0.003*	<0.003		<0.003*	<0.003*	<0.003	<0.003*	<0.003*	<0.003*			
	Diuron (µg/L)	<0.2*	**2.9***	0.5		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			
	S. capricornutum toxicity (% Control)	997	215*	390		505*	320	739	297	250	281			
	H. azteca toxicity (% Control)	NA	NA	NA		100*	NA	NA	NA	NA	94*			

MPM – Management Plan Monitoring.
NA – Not applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring
*NM and MPM occurred during this date for this constituent.

Table IV-7. French Camp Slough @ Airport Way site subwatershed instantaneous load calculations for chlorpyrifos and diuron.

If discharge was unable to be measured or the analyte was ND, the result is not included in the table. Load information for chlorpyrifos, copper, diazinon, and dieldrin can be found in the 2014 MPUR, Appendix I.

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
French Camp Slough @ Airport Way	Chlorpyrifos	5/17/2005	43.56	0.011	µg/L	14	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	7/19/2005	59.40	0.033	µg/L	56	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	8/16/2005	90.40	0.043	µg/L	110	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	3/15/2006	2030	0.005	µg/L	287	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	5/16/2006	54.83	0.015	µg/L	23	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	7/18/2006	77.96	0.027	µg/L	60	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	9/19/2006	60.56	0.013	µg/L	22	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	2/11/2007	70.48	0.049	µg/L	98	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	4/10/2007	32.12	0.013	µg/L	12	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	6/12/2007	47.33	0.013	µg/L	17	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	7/10/2007	27.64	0.014	µg/L	11	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	7/10/2007	27.64	0.014	µg/L	11	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	7/30/2007	66.63	0.011	µg/L	21	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	1/23/2008	8.13	0.008	µg/L	2	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	4/15/2008	57.81	0.004	µg/L	7	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	4/15/2008	57.81	0.003	µg/L	5	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	5/13/2008	52.12	0.400	µg/L	590	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	8/12/2008	18.46	0.022	µg/L	12	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	9/16/2008	76.09	0.039	µg/L	84	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	4/14/2009	56.42	0.005	µg/L	7	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	10/06/2009	68.06	0.029	µg/L	56	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	8/10/2010	25.75	0.022	µg/L	16	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	9/07/2010	87.76	0.009	µg/L	22	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	4/12/2011	24.6	0.032	µg/L	22	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	4/12/2011	24.6	0.033	µg/L	23	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	10/06/2011	118.57	0.092	µg/L	309	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	10/06/2011	118.57	0.097	µg/L	326	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	7/16/2013	35.68	0.042	µg/L	42	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	1/20/2015	0	0.075	µg/L	0	µg/sec
French Camp Slough @ Airport Way	Diuron	5/16/2006	54.83	0.21	µg/L	326	µg/sec
French Camp Slough @ Airport Way	Diuron	2/11/2007	70.48	3.2	µg/L	6387	µg/sec
French Camp Slough @ Airport Way	Diuron	4/10/2007	32.12	0.36	µg/L	327	µg/sec
French Camp Slough @ Airport Way	Diuron	5/22/2007	71.95	0.30	µg/L	611	µg/sec
French Camp Slough @ Airport Way	Diuron	7/10/2007	27.64	0.38	µg/L	297	µg/sec
French Camp Slough @ Airport Way*	Diuron	7/10/2007	27.64	0.40	µg/L	313	µg/sec
French Camp Slough @ Airport Way	Diuron	1/23/2008	8.13	3.3	µg/L	760	µg/sec
French Camp Slough @ Airport Way*	Diuron	4/15/2008	57.81	0.79	µg/L	1293	µg/sec
French Camp Slough @ Airport Way	Diuron	4/15/2008	57.81	0.84	µg/L	1375	µg/sec
French Camp Slough @ Airport Way	Diuron	6/10/2008	19.99	0.23	µg/L	130	µg/sec
French Camp Slough @ Airport Way	Diuron	1/17/2012	6.81	0.52	µg/L	100	µg/sec
French Camp Slough @ Airport Way	Diuron	2/14/2012	0.64	0.27	µg/L	5	µg/sec
French Camp Slough @ Airport Way	Diuron	2/11/2014	0.53	38	µg/L	570	µg/sec
French Camp Slough @ Airport Way	Diuron	3/3/2014	4.07	1.1	µg/L	127	µg/sec
French Camp Slough @ Airport Way	Diuron	5/20/2014	20.56	0.21	µg/L	122	µg/sec
French Camp Slough @ Airport Way	Diuron	2/9/2015	0	2.9	µg/L	0	µg/sec

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
French Camp Slough @ Airport Way	Diuron	3/17/2015	2.54	0.50	µg/L	36	µg/sec

[1] Load = Discharge (cfs) X 28.317L/ft3 X Concentration (µg/L). To convert a concentration measured in mg/L to µg/L multiply by 1000. The load values calculated represent instantaneous loads only, and should not be used to extrapolate loading over any period of time.
*Field Duplicate

Source Identification and Outreach

Sourcing analyses for past exceedances of the WQTLs for French Camp Slough @ Airport Way management plan constituents are provided in past years' site subwatershed appendices.

During the 2015 WY there was one exceedance of the WQTL for diuron. There was also one exceedance of the WQTL for chlorpyrifos in January 2015. An evaluation of potential sources of the exceedances of the WQTL is provided below.

Monitoring during the 2015 WY resulted in six exceedances of the WQTL for DO (Table IV-5). Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. The exceedances that occurred in July, August, and September 2015 are likely due to increased water temperature. However, the exceedances occurring in the winter and early spring months are likely the result of the low water levels resulting in slow to stagnant water. As previously discussed, study results on the water quality parameters associated with DO has been submitted to the Regional Board. Additional investigation of the sources affecting DO concentrations in surface waters is pending further discussion with the Regional Board.

Four exceedances of the WQTL for *E. coli* occurred during monthly monitoring at the French Camp Slough @ Airport Way site. Elevated levels of *E. coli* in the waterways could be due to 1) storm runoff carrying bacteria from dairy facilities in the subwatershed (past instances of direct dairy discharges have been noted in the Coalition region), 2) manure from dairies is sold to adjacent farms and if improperly composted and stored can contribute to elevated levels of bacteria in the waterway, and 3) naturally occurring *E. coli* bacteria in the waterways. Feedlots and dairies account for 3,443 out of a total 199,856 acres in the French Camp Slough @ Airport Way site subwatershed. Three of the four exceedances occurred during a storm event or irrigation season; therefore stormwater runoff or irrigation tailwater runoff could have transported bacteria into the waterbody.

An exceedance of the WQTL for chlorpyrifos (0.075 µg/L) occurred during the January 20, 2015 monitoring event at French Camp Slough @ Airport Way. Chlorpyrifos is an organophosphate pesticide used for agricultural insect pest control on a wide variety of crops. Based on the PUR data associated with the exceedance, chlorpyrifos applications totaling 18.79 lbs Al occurred within four days prior to the January 20, 2015 sampling event. As a result of this exceedance, the Coalition will conduct additional focused outreach in the site subwatershed during the 2016 WY.

An exceedance of the WQTL for diuron (2.9 µg/L) occurred in February 2015. Diuron is a broad-spectrum herbicide used for weed control on agriculture, highway rights of way, railroads, industrial sites, and by homeowners. Applications of diuron in this site subwatershed have gradually decreased over time (Table IIV-7). Based on PUR data associated with the exceedance in February, four

applications of diuron occurred in January 2015, prior to sampling on February 9, 2015. Applications of diuron totaling 151.25 lbs of AI of product were made on 110 acres of alfalfa (Table IIV-8). The soil half-life of diuron, according to the USDA is approximately 90 days; therefore applications that occurred in January prior to sampling could have persisted in the water column or soil and remobilized due to storm runoff.

Table IIV-7. French Camp Slough @ Airport Way site subwatershed diuron applications, lbs AI applied, and acres treated by year.

Pesticide Use Report data complete through July 2015 for San Joaquin County.

Year	Number of diuron Applications	Pounds of AI Applied	Acres Treated
2006	120	5860	5326
2007	78	3103	3896
2008	41	1475	1366
2009	53	2127	1816
2010	50	1588	1685
2011	50	3107	2192
2012	22	934	726
2013	60	3768	1988
2014	25	1113	872
2015	22	1066	838

Table IIV-8. Pounds of diuron applied by crop in the French Camp Slough @ Airport Way site subwatershed (top five crops per year shown).

Pesticide Use Report data complete through July 2015 for San Joaquin County.

Year	Commodity	Pounds of AI Applied
2006	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	2564.2
	GRAPE	949.2
	GRAPE, WINE	460.0
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	681.2
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	1125.3
2007	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	882.4
	APPLE	169.7
	GRAPE, WINE	724.6
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	300.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	1009.2
2008	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	589.9
	APPLE	16.8
	GRAPE	22.1
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	335.3
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	502.3
2009	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	502.3
	GRAPE	39.1
	GRAPE, WINE	68.2
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	802.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	521.8
2010	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	94.7
	GRAPE, WINE	738.5
	SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS, ETC.)	20.5
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	271.4
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	438.4

Year	Commodity	Pounds of AI Applied
2011	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	65.1
	APPLE	64.9
	GRAPE, WINE	2451.1
	OLIVE (ALL OR UNSPEC)	32.8
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	465.2
2012	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	75.2
	APPLE	23.5
	GRAPE, WINE	562.9
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	7.2
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	253.3
2013	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	187.5
	GRAPE	1146.2
	GRAPE, WINE	1973.4
	SOIL FUM/PREPLT	85.2
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	318.3
2014	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	92.0
	GRAPE	384.4
	GRAPE, WINE	417.7
	SOIL FUM/PREPLT	58.8
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	159.7
2015	ALFALFA	352.9
	GRAPE	317.6
	SOIL FUM/PREPLT	87.0
	WALNUT	308.8

Outreach

The Coalition conducted focused outreach in the site in 2011. The Coalition contacted 13 targeted growers farming 3,767 irrigated acres within the French Camp Slough @ Airport Way site subwatershed (2013 MPUR, Page 45) and documented current management practices (2012 MPUR, Page 50-55). The Coalition recommended management practices to reduce negative impacts of agricultural discharges on water quality. All 13 growers participated in follow-up contacts and documented newly implemented management practices in 2012 (2013 MPUR, Pages 56-59). A final analysis of follow up surveys indicated that reducing runoff water volumes using irrigation management and reducing use of the pesticide of concern were the most popular newly implemented practices; each accounting for 33% of the acreage with new management practices.

Additional focused outreach will occur in 2016 in the site subwatershed to address the 2014 WY exceedances of the WQTLs for diuron and water column toxicity to *S. capricornutum.*

Evaluation

Overall, water quality has improved in the French Camp Slough @ Airport Way site subwatershed since monitoring began. The Coalition received approval to complete the management plan for dieldrin on March 22, 2012 and six more management plans: copper, diazinon, diuron, lead, and toxicity to *C. dubia* and *S. capricornutum* on February 27, 2013. On September 2, 2015, the Coalition submitted a request

to the Regional Board to complete the management plans for pH and sediment toxicity to *H. azteca* due to three or more years of no exceedances.

The management plan for diuron was reinstated due to a WQTL exceedance in the 2014 WY. In order to address the recurring water quality issues, the Coalition will conduct additional focused outreach in the site subwatershed in 2016.

Next Steps

Additional focused outreach will begin in the site subwatershed in 2016. Core site monitoring at French Camp Slough @ Airport Way will occur in October 2015 and January through September 2016 based on the monitoring strategy at the Core site and reduced monitoring due to the Delta RMP. In addition, MPM will occur for chlorpyrifos, diuron, and water column toxicity to *S. capricornutum* during months of past exceedances.

V. KELLOGG CREEK ALONG HOFFMAN LANE

Overview

Monitoring began at Kellogg Creek along Hoffman Ln in 2007 to replace monitoring at Kellogg Creek @ Hwy 4; management plans were established at the Hwy 4 site in 2005. In 2014, the Coalition completed focused outreach in the site subwatershed. The Coalition evaluated the effectiveness of implemented management practices and results indicated improved water quality. The Coalition received approval to complete the management plans for chlorpyrifos, copper, DO, and water column toxicity to *C. dubia* and *S. capricornutum* in previous years.

The remaining constituents in the site's active management plan include DDE, DDT, *E. coli,* pH, and SC. The Coalition submitted results from studies on water quality parameters in the Coalition region associated with the concentrations of pH on February 22, 2016 and will submit study results for DDE and DDT on May 22, 2016 to the Regional Board. A summary of the results from the pH study is provided in the Introduction section of this Appendix and, in the case of DDE and DDT, will be provided in the Annual Report for the 2017 WY. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* Exceedances of the WQTL for SC and TDS are currently being addressed as part of the CV-SALTS program.

During the 2015 WY, the Coalition conducted MPM twice for sediment toxicity to *H. azteca*; there were no toxic samples. The field parameters, pH and SC, were measured during all MPM events and one exceedance of the upper WQTL for pH occurred.

Kellogg Creek along Hoffman Ln is a Represented site; no Represented site or MPM are scheduled in the 2016 WY.

Table V-1. Kellogg Creek along Hoffman Ln management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Constituents Requiring Source ID/Work Plans			
DDE	2008	2012-2014	NA
DDT	2008	2012-2014	NA
Dissolved Oxygen[1]	2006, 2016	2012-2014	NA
E. coli	2006	2012-2014	NA
pH	2006	2012-2014	NA
Specific Conductivity	2006	2012-2014	NA
Completed Management Plans			
Chlorpyrifos	2006	2012-2014	2013
Copper	2008	2012-2014	2013
C. dubia water column toxicity	2007	2012-2014	2013
H. azteca sediment toxicity	2006	2012-2014	2015

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
P. promelas water column toxicity	2006	2012-2014	2015
S. capricornutum water column toxicity	2009	2012-2014	2014

[1] The Coalition received approval to complete the management plan on February 27, 2013 but was reinstated into a management plan due to recent exceedances.
NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Kellogg Creek along Hoffman Ln site subwatershed consists of 1,831 irrigated acres which is primarily deciduous orchards, truck crops, and field crops (Figure V-1). This site subwatershed receives drainage from recent urban developments, industrial sites, a golf course, field crops, grains, and pastureland. The site is located north of Livermore, CA and is surrounded by a mixture of agricultural, preserved natural areas, and urban landscapes.

Kellogg Creek along Hoffman Ln drains the Los Vaqueros Reservoir in the Round Valley Regional Preserve and runs downstream through Discovery Bay Golf Club. Kellogg Creek @ Hwy 4, located downstream from the club was sampled in 2005 and 2006 (Table V-2); this site was discontinued due to the large urban inputs.

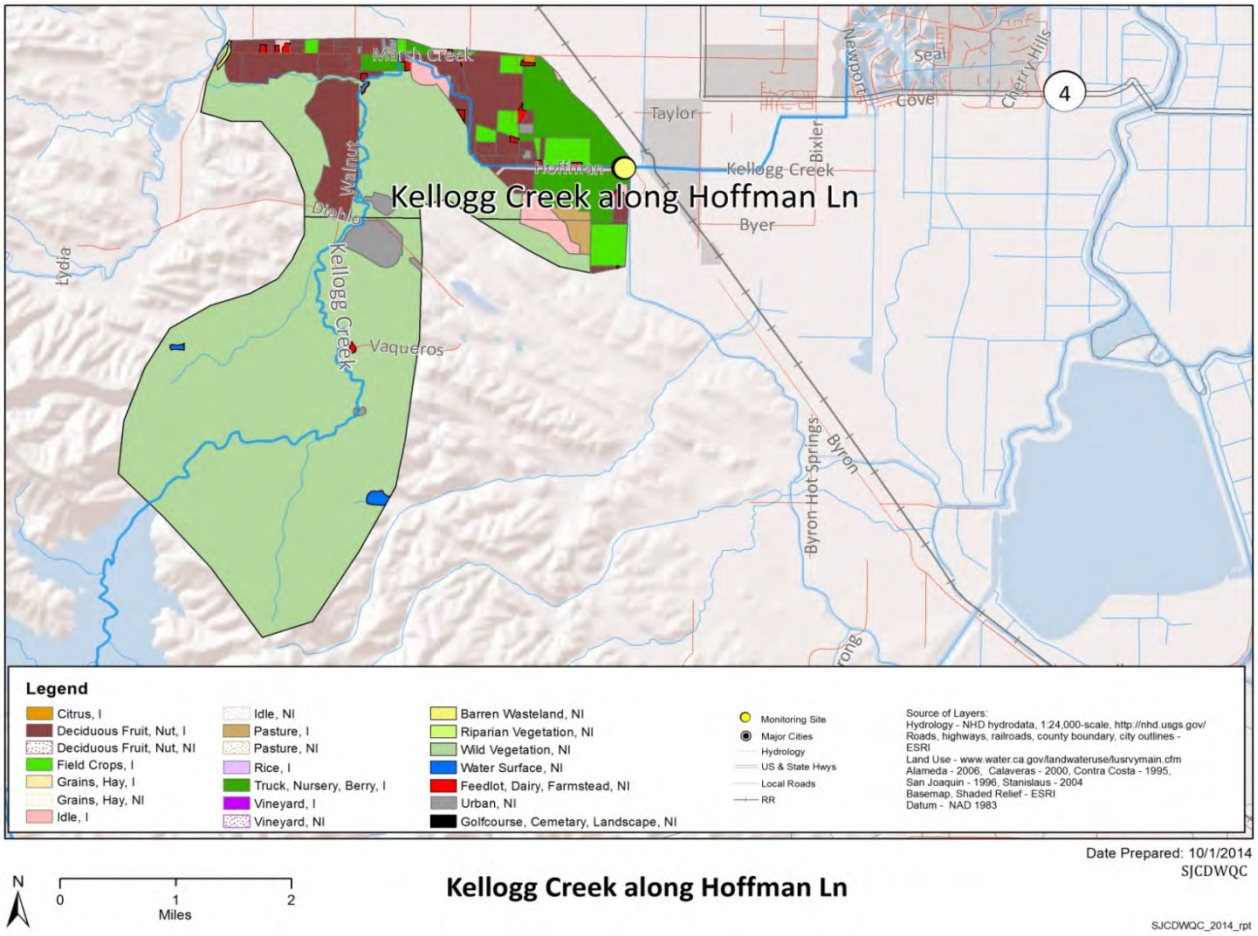
Kellogg Creek (Los Vaqueros Reservoir to Discovery Bay; partly in Delta Waterways, western portion) is on California's 303(d) list as an impaired waterbody for *E. coli,* DO, salinity, sediment toxicity, and unknown toxicity.

Table V-2. Kellogg Creek site subwatershed sampling locations coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Kellogg Creek along Hoffman Ln [US]	544XKCAHL	37.88188	-121.65221
Kellogg Creek @ Hwy 4*	544XKCHWF	37.88924	-121.61901

[US] Upstream sites
*Original SJCDWQC sampling site

Figure V-1. Kellogg Creek along Hoffman Ln site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Kellogg Creek @ Hwy 4 in the storm season of 2005 and continued through the storm season of 2006. Monitoring at Kellogg Creek along Hoffman Ln replaced Kellogg Creek @ Hwy 4 in 2007. No monitoring occurred from 2009 through 2010, but resumed in 2011. Table V-3 contains the number of events monitored at Kellogg Creek along Hoffman Ln per year and the constituents from 2008 through the 2015 WY.

Management Plan Monitoring was initiated in 2005 due to a single exceedance of the WQTL for chlorpyrifos that occurred at Kellogg Creek @ Hwy 4. In an effort to source exceedances of constituents of concern, additional MPM occurred for copper and water column toxicity to *C. dubia* in 2007, and for water column toxicity to *P. promelas* in 2008 (Table V-4). MPM occurred for *S. capricornutum* and *H. azteca* in 2011 through the 2015 WY. The last detections of copper were in 2013.

Table V-3. Kellogg Creek site sampling events and analyses per year.

Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014WY	2015WY
Sampling Events	Events Scheduled	14	0	0	8	7	6	5	2
	Dry Sites	1	0	0	1	0	0	0	0
	Events Sampled	13	0	0	7	7	6	5	2
Field and Physical Parameters	Dissolved Oxygen	14	0	0	7	7	6	5	2
	Dissolved Solids	6	0	0	0	0	0	0	0
	E. coli	6	0	0	0	0	0	0	0
	Grain size (sediment)	0	0	0	2	2	2	2	2
	Hardness as CaCO3	7	0	0	0	2	1	0	0
	pH	14	0	0	7	7	6	5	2
	Specific Conductivity	14	0	0	7	7	6	5	2
	Suspended Solids	0	0	0	0	0	0	0	0
	Total Organic Carbon	6	0	0	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	2	2	2	2	2
	Turbidity	6	0	0	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0	0	0
	Orthophosphate as P	6	0	0	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0
	Copper	0	0	0	1	2	1	0	0
	Lead	0	0	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0	0	0
Metals (Total)	Arsenic	6	0	0	0	0	0	0	0
	Boron	6	0	0	0	0	0	0	0
	Cadmium	6	0	0	0	0	0	0	0
	Copper	7	0	0	1	2	1	0	0
	Lead	6	0	0	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0	0	0
	Nickel	6	0	0	0	0	0	0	0
	Selenium	6	0	0	0	0	0	0	0
	Zinc	6	0	0	0	0	0	0	0
Carbamates	Aldicarb	6	0	0	0	0	0	0	0
	Carbaryl	6	0	0	0	0	0	0	0
	Carbofuran	6	0	0	0	0	0	0	0
	Diuron	6	0	0	0	0	0	0	0
	Linuron	6	0	0	0	0	0	0	0
	Methiocarb	6	0	0	0	0	0	0	0
	Methomyl	6	0	0	0	0	0	0	0
	Oxamyl	6	0	0	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014WY	2015WY
	HCH, delta	0	0	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0	0	0
Herbicides	Atrazine	6	0	0	0	0	0	0	0
	Cyanazine	6	0	0	0	0	0	0	0
	Glyphosate	6	0	0	0	0	0	0	0
	Paraquat	6	0	0	0	0	0	0	0
	Simazine	6	0	0	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0	0	0
Organochlorines	DDD(p,p')	6	0	0	0	0	0	0	0
	DDE(p,p')	6	0	0	0	0	0	0	0
	DDT(p,p')	6	0	0	0	0	0	0	0
	Dicofol	6	0	0	0	0	0	0	0
	Dieldrin	6	0	0	0	0	0	0	0
	Endrin	6	0	0	0	0	0	0	0
	Methoxychlor	6	0	0	0	0	0	0	0
Organophosphates	Azinphos methyl	6	0	0	0	0	0	0	0
	Chlorpyrifos	6	0	0	0	1	1	0	0
	Demeton-s	0	0	0	0	0	0	0	0
	Diazinon	6	0	0	0	0	0	0	0
	Dichlorvos	0	0	0	0	0	0	0	0
	Dimethoate	6	0	0	0	0	0	0	0
	Disulfoton	6	0	0	0	0	0	0	0
	Malathion	6	0	0	0	0	0	0	0
	Methamidophos	6	0	0	0	0	0	0	0
	Methidathion	6	0	0	0	0	0	0	0
	Molinate	6	0	0	0	0	0	0	0
	Parathion, Methyl	6	0	0	0	0	0	0	0
	Phorate	6	0	0	0	0	0	0	0
	Phosmet	6	0	0	0	0	0	0	0
	Thiobencarb	6	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	6	0	0	0	0	0	0	0
	Cyfluthrin, total	6	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	6	0	0	0	0	0	0	0
	Cypermethrin, total	6	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	6	0	0	0	0	0	0	0
	Permethrin, total	6	0	0	0	0	0	0	0
Sediment Pesticide	Bifenthrin	0	0	0	2	0	0	0	0
	Chlorpyrifos	0	0	0	2	0	0	0	0
	Cyfluthrin	0	0	0	2	0	0	0	0
	Cyhalothrin, lambda	0	0	0	2	0	0	0	0
	Cypermethrin	0	0	0	2	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	2	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	2	0	0	0	0
	Fenpropathrin	0	0	0	2	0	0	0	0
	Permethrin	0	0	0	2	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	7	0	0	2	3	1	0	0
	Pimephales promelas	6	0	0	0	0	0	0	0
	Selenastrum capricornutum	8	0	0	3	3	3	3	0
	Hyalella azteca	3	0	0	2	2	2	2	2

Table V-4. Kellogg Creek along Hoffman Ln Management Plan Monitoring schedule (2007-2015 WY).

Site Name	Sample Date	Monitoring Type	Copper	Chlorpyrifos	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Kellogg Creek along Hoffman Ln	6/20/2007	Add.				X		
Kellogg Creek along Hoffman Ln	9/25/2007	Add.				X		
Kellogg Creek along Hoffman Ln	4/30/2008	Add.			X			
Kellogg Creek along Hoffman Ln	7/8/2008	Add.	X					
Kellogg Creek along Hoffman Ln	2/8/2011	MPM	X	X	X			
Kellogg Creek along Hoffman Ln	3/8/2011	MPM			X			X
Kellogg Creek along Hoffman Ln	4/12/2011	MPM			X		X	
Kellogg Creek along Hoffman Ln	5/24/2011	MPM					X	
Kellogg Creek along Hoffman Ln	7/26/2011	MPM	X					
Kellogg Creek along Hoffman Ln	8/23/2011	MPM					X	
Kellogg Creek along Hoffman Ln	10/14/2011	MPM						X
Kellogg Creek along Hoffman Ln	2/14/2012	MPM	X	X	X			
Kellogg Creek along Hoffman Ln	3/15/2012	MPM			X			X
Kellogg Creek along Hoffman Ln	4/12/2012	MPM			X		X	
Kellogg Creek along Hoffman Ln	5/16/2012	MPM					X	
Kellogg Creek along Hoffman Ln	7/17/2012	MPM	X					
Kellogg Creek along Hoffman Ln	8/21/2012	MPM					X	
Kellogg Creek along Hoffman Ln	9/21/2012	MPM						X
Kellogg Creek along Hoffman Ln	2/21/2013	MPM	X	X	X			
Kellogg Creek along Hoffman Ln	3/19/2013	MPM						X
Kellogg Creek along Hoffman Ln	4/2/2013	MPM					X	
Kellogg Creek along Hoffman Ln	5/21/2013	MPM					X	
Kellogg Creek along Hoffman Ln	8/20/2013	MPM					X	
Kellogg Creek along Hoffman Ln	9/17/2013	MPM						X
Kellogg Creek along Hoffman Ln	3/3/2014	MPM						X
Kellogg Creek along Hoffman Ln	4/15/2014	MPM					X	
Kellogg Creek along Hoffman Ln	5/20/2014	MPM					X	
Kellogg Creek along Hoffman Ln	8/19/2014	MPM					X	
Kellogg Creek along Hoffman Ln	9/16/2014	MPM						X
Kellogg Creek along Hoffman Ln	3/17/2015	MPM						X
Kellogg Creek along Hoffman Ln	9/15/2015	MPM						X

Add. – Additional sampling

X – Constituent sampled for Management Plan Monitoring (MPM)

Monitoring Results

During the 2015 WY, MPM for sediment toxicity to *H. azteca* occurred in March and September and there were no toxic samples. The last time sediment toxicity to *H. azteca* occurred was in October 2011; on December 18, 2015, the Coalition received approval to complete the management plan for water column toxicity to *P. promelas* and sediment toxicity to *H. azteca* due to no exceedances in three years of monitoring.

The field parameters, pH and SC, were measured during all MPM events during the 2015 WY; there was one exceedance of the upper WQTL limit for pH (8.89).

Table V-5 is a tally of exceedances of WQTLs from 2005 through the 2015 WY for the management plan constituents. Table V-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances in the Kellogg Creek site subwatershed since monitoring began is provided in Appendix II, Table II-5.

Table V-5. Kellogg Creek management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-5.

Monitoring Year	Management Plan Constituents							Completed Management Plans					
	Dissolved Oxygen, <5 mg/L	pH, <6.5 and >8.5 units	Specific Conductivity[1], >700 µS/cm or > 1000 µS/cm	Total Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L	Copper (Total), Variable[1] or >1300 µg/L	Chlorpyrifos, >0.015 µg/L	*C. dubia*, (%Control)	*H. azteca*, (%Control)	*P. promelas*, (%Control)	*S. capricornutum*, (%Control)
2005	2	2	4	3	4	NA	NA	NA	1	1	3	2	1
2006	2	0	6	4	4	1	1	NA	0	1	0	0	0
2007	1	2	0	1	1	2	1	2	0	1	2	0	0
2008	0	1	0	0	0	0	0	1	0	0	2	0	4
2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2011	0	4	0	NA	NA	NA	NA	0	NA	0	2	NA	0
2012	0	4	0	NA	NA	NA	NA	0	NA	0	0	NA	0
2013	0	3	0	NA	NA	NA	NA	0	0	0	0	NA	0
2014 WY*	0	1	0	NA	NA	NA	NA	NA	NA	NA	0	NA	0
2015 WY	0	1	0	NA	NA	NA	NA	NA	NA	NA	0	NA	NA
Overall Tally	**5**	**18**	**10**	**8**	**9**	**3**	**2**	**3**	**1**	**3**	**9**	**2**	**5**

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table V-6. Kellogg Creek site subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

	MONTH:	FEB		MAR	APR	MAY	JUN	JUL	AUG		SEP	OCT
2007 NM (@ Hoffman Ln)	Date:	2/11/07	2/28/07	NA	4/11/07	5/22/07	6/12/07	7/10/07	8/7/07	8/9/07	9/4/07	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	<0.003	<0.003	<0.003	<0.003	<0.003	NA	<0.003	NA
	C. dubia toxicity (% Control)	100	105	NA	**50**	100	100	95	100	NA	100	NA
	P. promelas toxicity (% Control)	95	100	NA	100	100	103	103	100	NA	103	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	NA	**0**	NA	NA
2007 MPM Add. (@ Hoffman Ln)	Date:	NA		NA	NA	NA	6/20/07	NA	NA		9/25/07	NA
	P. promelas (% Control)	NA		NA	NA	NA	NA	100	NA		100	NA
2008 NM (@ Hoffman Ln)	Date:	NA		3/18/08	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	8/13/08	9/16/08	NA
	Copper (µg/L)	NA		NA	3.1	4.3	4.4	2.5	2.1	NA	2.6	NA
	Chlorpyrifos (µg/L)	NA		NA	<0.003	<0.003	<0.003	<0.003	<0.003	NA	<0.003	NA
	C. dubia toxicity (% Control)	NA		NA	100	100	100	100	100	NA	100	NA
	P. promelas toxicity (% Control)	NA		NA	103	103	98	100	105	NA	100	NA
	H. azteca toxicity (% Control)	NA		29	NA	NA	NA	NA	NA	102	NA	NA
2008 MPM Add. (@ Hoffman Ln)	Date:	NA		NA	4/30/08	NA	NA	7/8/08	NA		NA	NA
	Copper (µg/L)	NA		NA	NA	NA	NA	98	NA		NA	NA
	C. dubia (% Control)	NA		NA	95	NA	NA	NA	NA		NA	NA
2011 MPM (@ Hoffman Ln)	Date:	2/8/11		3/8/11	4/12/11	5/24/11	NA	7/26/11	8/23/11		9/20/11	10/14/11
	Copper, dissolved (µg/L)	Dry Site		NA	NA	NA	NA	1.1	NA		NA	NA
	Copper, total (µg/L)	Dry Site		NA	NA	NA	NA	7.2	NA		NA	NA
	Chlorpyrifos (µg/L)	Dry Site		NA	NA	NA	NA	NA	NA		NA	NA
	C. dubia toxicity (% Control)	Dry Site		100	100	NA	NA	NA	NA		NA	NA
	S. capricornutum toxicity (% Control)	NA		NA	1351	710	NA	NA	690		NA	NA
	H. azteca toxicity (% Control)	NA		**78**	NA	NA	NA	NA	NA		NA	**62**
2012 MPM (@ Hoffman Ln)	Date:	2/14/12		3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12		9/18/12	10/16/12
	Copper, dissolved (µg/L)	1.3		NA	NA	NA	NA	1.4	NA		NA	NA
	Copper, total (µg/L)	1.9		NA	NA	NA	NA	2.5	NA		NA	NA
	Chlorpyrifos (µg/L)	<0.003		NA	NA	NA	NA	NA	NA		NA	NA
	C. dubia toxicity (% Control)	100		105	100	NA	NA	NA	NA		NA	NA
	S. capricornutum toxicity (% Control)	NA		NA	337	484	NA	NA	270		NA	NA
	H. azteca toxicity (% Control)	NA		92	NA	NA	NA	NA	NA		101	NA

	Month:	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
2013 MPM (@ Hoffman Ln)	Date	2/21/13	3/19/13	4/2/13	5/21/13	NA	NA	8/20/13	9/17/13	NA
	Copper, dissolved (µg/L)	2	NA	NA	NA	NA	NA	NA	NA	NA
	Copper, total (µg/L)	3.3	NA	NA	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	NA	NA	NA	NA	NA	NA	NA	NA
	C. dubia toxicity (% Control)	100	NA	NA	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	72	416	NA	NA	139	NA	NA
	H. azteca toxicity (% Control)	NA	97	NA	NA	NA	NA	NA	98	NA
2014 & 2015 WY MPM (@ Hoffman Ln)	Date	NA	3/5/14	4/15/14	5/20/14	NA	NA	8/19/14	9/16/14	NA
	S. capricornutum toxicity (% Control)	NA	NA	250	219	NA	NA	341	NA	NA
	H. azteca toxicity (% Control)	NA	100	NA	NA	NA	NA	NA	96	NA
2015 WY MPM (@ Hoffman Ln)	Date	NA	3/17/15	NA	NA	NA	NA	NA	9/15/15	NA
	H. azteca toxicity (% Control)	NA	100	NA	NA	NA	NA	NA	96	NA

Add. – Additional monitoring conducted in 2007 and 2008 only.
MPM – Management Plan Monitoring.
NA – No monitoring occurred on this date for this constituent.
NM – Normal Monitoring

Source Identification Outreach

Sourcing analyses for past exceedances of the WQTLs for Kellogg Creek along Hoffman Lane management plan constituents are provided in past years' site subwatershed appendices.

The constituents listed in active management plans are DDE, DDT, *E. coli,* pH, SC, and TDS. As previously discussed, study results on the water quality parameters associated with DDE, DDT and pH have been or will be submitted to the Regional Board. Additional investigation of the sources for these constituents is pending further discussion with the Regional Board. Feedlots and dairies account for 45 acres out of a total 7,377 acres in the Kellogg Creek along Hoffman Lane site subwatershed. No work plan/study on the source of *E. coli* is currently being developed for the site pending a more region-wide collaborative approach to managing *E. coli* contamination in surface waters. No work plans will be conducted for SC and TDS due to these constituents being part of the CV-SALTS program.

Focused outreach to document management practices and track implementation of new management practices began in 2012 and was completed in 2014. The Coalition contacted 10 targeted growers, farming 402 acres within the Kellogg Creek site subwatershed in 2012 (2013 MPUR, Page 66). Targeted growers already had management practices in place. The follow-up survey responses provided in the 2014 MPUR indicated targeted growers implemented new management practices that included reducing pesticide use and irrigation tailwater runoff and installing sprinkler and micro irrigation systems.

Evaluation

Overall, water quality has improved since focused outreach began in the site subwatershed. Due to continued improvements, the Coalition received approval to complete the management plans for chlorpyrifos, copper, DO, water column toxicity to *C. dubia, P. promelas,* and *S. capricornutum,* and sediment toxicity to *H. azteca*. The Coalition received approval to complete the active management plan for sediment toxicity to *H. azteca*, and water toxicity to *P. promelas* on December 18, 2015. The remaining constituents in the active management plan are DDE, DDT, *E. coli,* pH, SC, and TDS. The Coalition is confident water quality will continue to improve with continued general outreach informed by the studies the Coalition conducted for DO and pH.

Next Steps

General outreach will continue in the 2016 WY within the Kellogg Creek along Hoffman Ln site subwatershed.

VI. LITTLEJOHNS CREEK @ JACK TONE RD

Overview

Monitoring at Littlejohns Creek @ Jack Tone Rd began in 2004 and continued through the 2015 WY. Management Plan Monitoring began in the site subwatershed in 2008 and then continued in 2010 through September 2015. The Coalition completed the focused outreach portion of its management plan strategy in 2012. Monitoring results through September 2015 indicate improved water quality. The remaining constituents under the site's active management plan include DO and *E. coli* (Table VI-1). The Coalition submitted results from a study on water quality parameters associated with the concentrations of DO in the Coalition region to the Regional Board on February 22, 2016. A summary of the results from this study is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.*

The Coalition conducted MPM during the 2015 WY for chlorpyrifos and copper; the remaining constituents did not require MPM (Table VI-1). Monitoring through September 2015 marked the fourth year with no exceedances of the WQTL for chlorpyrifos and copper. On December 18, 2015, the Coalition received approval to complete the Management Plans for chlorpyrifos and copper.

Littlejohns Creek @ Jack Tone Rd is a Represented site in Zone 2; Represented site monitoring is scheduled for diuron (2015 MPU). No MPM is scheduled in the 2016 WY although those management plan constituents which are field parameters (DO) will be measured during all monitoring events.

Table VI-1. Littlejohns Creek @ Jack Tone Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Constituents Requiring Source ID/Work Plans			
Dissolved Oxygen	2006	2010-2012	NA
E. coli	2006	2010-2012	NA
Completed Management Plans			
Chlorpyrifos	2006	2010-2012	2015
Copper	2008	2010-2012	2015
Diazinon	2008	2010-2012	2013
S. capricornutum water column toxicity	2006	2010-2012	2013

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Littlejohns Creek @ Jack Tone Rd site subwatershed consists of 16,167 irrigated acres of all of the major types of agriculture present in the Coalition region including, field crops, orchards, grains, vineyards, and pasture (Figure VI-1). Littlejohns Creek originates at the western edge of Woodward Reservoir, flows east through the Farmington Flood Control basin and eventually confluences with Lone Tree Creek to form French Camp Slough. The site subwatershed includes two upstream locations: Littlejohns Creek @ 26 Mile Rd and Littlejohns Creek @ Escalon Bellota (Table VI-2).

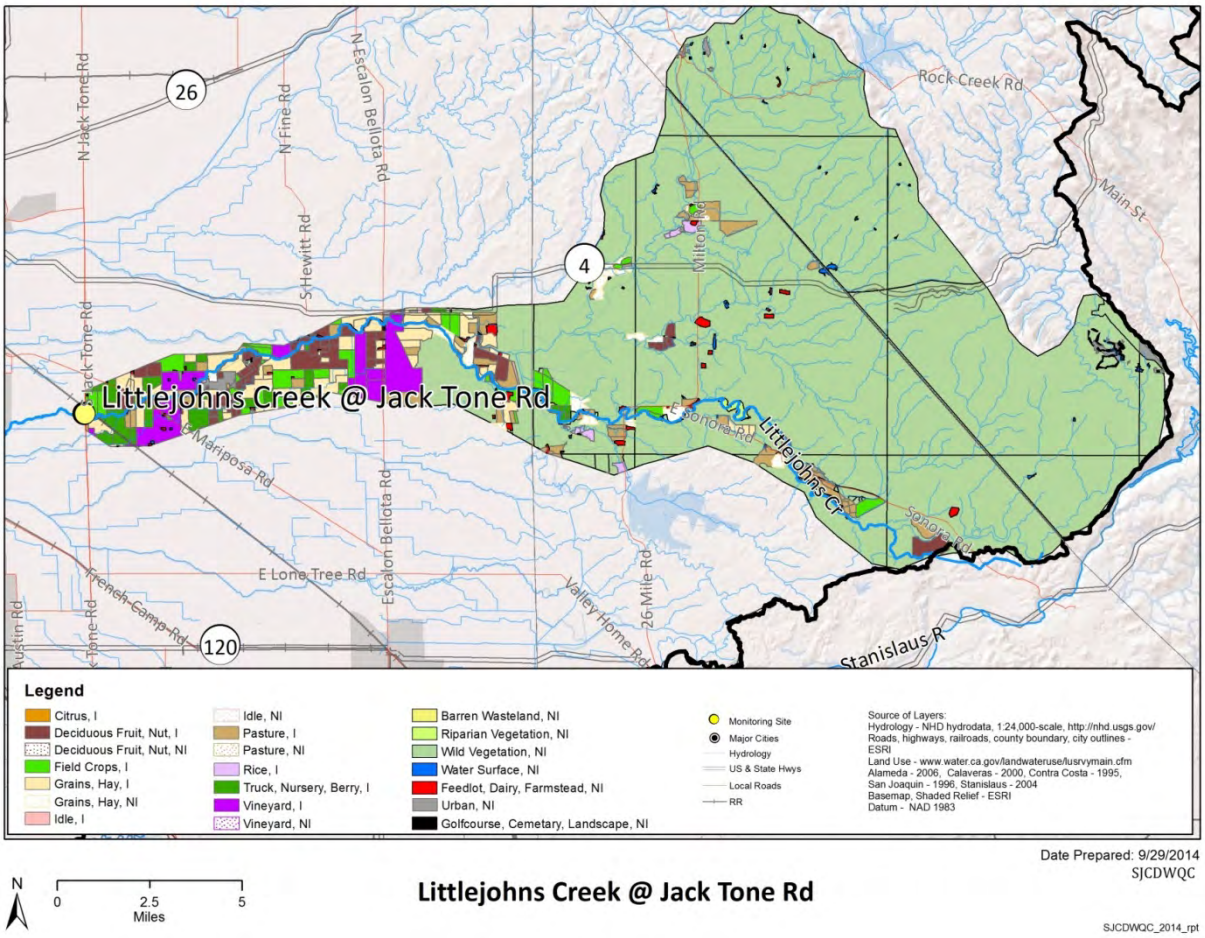
Littlejohns Creek is listed on California's 303(d) List of Impaired Waterbodies for *E. coli* and unknown toxicity (last updated in 2010).

Table VI-2. Littlejohns Creek site subwatershed sampling locations coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Littlejohns Creek @ Escalon Bellota [US]	531XLCAER	37.92550	-120.99910
Littlejohns Creek @ 26 Mile Rd [US]	531LCATMR	37.89320	-120.87760
Littlejohns Creek @ Jack Tone Rd*	531XLCAJR	37.88958	-121.14727

[US] Upstream sites
*Original SJCDWQC sampling site

Figure VI-1. Littlejohns Creek @ Jack Tone Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring was initiated at Littlejohns Creek @ Jack Tone Rd in 2004 and continued through the 2008 irrigation season. Table VI-3 contains the number of events monitored per year and the constituents from 2008 to September 2015. The last time the full suite of constituents was collected at the site was in 2008.

The Coalition initiated MPM at Littlejohns Creek @ Jack Tone Rd in 2007 (Table VI-4). In 2008, MPM was conducted at two upstream locations, Littlejohns Creek @ 26 Mile Rd and Littlejohns Creek @ Escalon Bellota Rd, in an attempt to source exceedances of chlorpyrifos, metals, and water column toxicity to *S. capricornutum.* Since 2010, MPM during months of past exceedances occurred to evaluate the effectiveness of the Coalition's outreach strategy (Table VI-4). There were no detections of chlorpyrifos or copper.

Table VI-3. Littlejohns Creek @ Jack Tone Rd sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	10	0	10	10	9	7	6	10
	Dry Sites	0	0	0	0	0	0	0	0
	Events Sampled	10	0	10	10	9	7	6	10
Field and Physical Parameters	Dissolved Oxygen	10	0	10	10	9	7	6	10
	Dissolved Solids	7	0	0	0	0	0	0	0
	E. coli	7	0	0	0	0	0	0	0
	Grain size (sediment)	0	0	0	0	0	0	0	0
	Hardness as CaCO3	7	0	3	4	4	4	4	5
	pH	10	0	10	10	9	7	6	10
	Specific Conductivity	10	0	10	10	9	7	6	10
	Suspended Solids	0	0	0	0	0	0	0	0
	Total Organic Carbon	7	0	0	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	0	0	0	0	0
	Turbidity	7	0	0	0	0	0	0	0
Nutrients	Ammonia as N	7	0	0	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0	0	0
	Nitrate as N	7	0	0	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	7	0	0	0	0	0	0	0
	Orthophosphate as P	7	0	0	0	0	0	0	0
	Phosphate as P	7	0	0	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0
	Copper	0	0	3	4	4	4	4	5
	Lead	0	0	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0	0	0
Metals (Total)	Arsenic	7	0	0	0	0	0	0	0
	Boron	7	0	0	0	0	0	0	0
	Cadmium	7	0	0	0	0	0	0	0
	Copper	7	0	3	4	4	4	4	0
	Lead	7	0	0	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0	0	0

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Nickel	7	0	0	0	0	0	0	0
	Selenium	7	0	0	0	0	0	0	0
	Zinc	7	0	0	0	0	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0	0	0
	Diuron	7	0	0	0	0	0	0	4
	Linuron	7	0	0	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0	0	0
	Methomyl	7	0	0	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0	0	0
	Atrazine	7	0	0	0	0	0	0	0
Herbicides	Cyanazine	7	0	0	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0	0	0
	Paraquat	7	0	0	0	0	0	0	0
	Simazine	7	0	0	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0	0	0
	Dicofol	7	0	0	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0	0	0
	Endrin	7	0	0	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0	0	0
	Chlorpyrifos	7	0	8	6	5	5	4	7
	Demeton-s	0	0	0	0	0	0	0	0
	Diazinon	7	0	7	2	1	1	0	0
	Dichlorvos	0	0	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0	0	0
	Malathion	7	0	0	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0	0	0
	Methidathion	7	0	0	0	0	0	0	0
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0	0	0
	Phorate	7	0	0	0	0	0	0	0
	Phosmet	7	0	0	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Cyhalothrin, lambda, total	7	0	0	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	7	0	0	0	0	0	0	0
	Pimephales promelas	7	0	0	0	0	0	0	0
	Selenastrum capricornutum	8	0	3	4	4	0	0	0
	Hyalella azteca	2	0	1	0	0	0	0	0

Table VI-4. Littlejohns Creek Management Plan Monitoring schedule (2007-2015 WY).

Site Name	Sample Date	Monitoring Type	Copper	Total Metals	Chlorpyrifos	Diazinon	*S. capricornutum*	*H. azteca*
Littlejohns Creek @ Jack Tone Rd	7/30/2007	Add.			X			
Littlejohns Creek @ Jack Tone Rd	8/28/2007	Add.					X	
Littlejohns Creek @ 26 Mile Rd	5/13/2008	US		X				
Littlejohns Creek @ Escalon Bellota Rd	5/13/2008	US		X				
Littlejohns Creek @ 26 Mile Rd	6/10/2008	US		X				
Littlejohns Creek @ Escalon Bellota Rd	6/10/2008	US		X				
Littlejohns Creek @ 26 Mile Rd	7/15/2008	US		X				
Littlejohns Creek @ Escalon Bellota Rd	7/15/2008	US			X		X	
Littlejohns Creek @ 26 Mile Rd	8/12/2008	US		X				
Littlejohns Creek @ Escalon Bellota Rd	8/12/2008	US			X		X	
Littlejohns Creek @ 26 Mile Rd	9/16/2008	US		X				
Littlejohns Creek @ Jack Tone Rd	4/13/2010	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	5/11/2010	MPM	X					
Littlejohns Creek @ Jack Tone Rd	6/8/2010	MPM	X		X[1]	X[2]		
Littlejohns Creek @ Jack Tone Rd	7/13/2010	MPM			X[1]	X[2]	X	
Littlejohns Creek @ Jack Tone Rd	8/10/2010	MPM			X[2]	X[2]	X	
Littlejohns Creek @ Jack Tone Rd	9/7/2010	MPM	X		X[2]	X[2]		X[2]
Littlejohns Creek @ Jack Tone Rd	10/12/2010	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	11/9/2010	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	12/7/2010	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	1/11/2011	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	2/8/2011	MPM	X		X[1]	X[1]		
Littlejohns Creek @ Jack Tone Rd	3/8/2011	MPM					X	
Littlejohns Creek @ Jack Tone Rd	4/12/2011	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	5/24/2011	MPM	X					
Littlejohns Creek @ Jack Tone Rd	6/28/2011	MPM	X		X			

Site Name	Sample Date	Monitoring Type	Copper	Total Metals	Chlorpyrifos	Diazinon	*S. capricornutum*	*H. azteca*
Littlejohns Creek @ Jack Tone Rd	7/26/2011	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	8/23/2011	MPM					X	
Littlejohns Creek @ Jack Tone Rd	9/20/2011	MPM	X					
Littlejohns Creek @ Jack Tone Rd	11/15/2011	MPM			X			
Littlejohns Creek @ Jack Tone Rd	2/14/2012	MPM	X		X	X		
Littlejohns Creek @ Jack Tone Rd	3/15/2012	MPM					X	
Littlejohns Creek @ Jack Tone Rd	4/12/2012	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	5/16/2012	MPM	X					
Littlejohns Creek @ Jack Tone Rd	6/19/2012	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	7/17/2012	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	8/21/2012	MPM					X	
Littlejohns Creek @ Jack Tone Rd	9/18/2012	MPM	X					
Littlejohns Creek @ Jack Tone Rd	11/6/2012	MPM			X			
Littlejohns Creek @ Jack Tone Rd	2/21/2013	MPM	X		X	X		
Littlejohns Creek @ Jack Tone Rd	4/2/2013	MPM			X			
Littlejohns Creek @ Jack Tone Rd	5/21/2013	MPM	X					
Littlejohns Creek @ Jack Tone Rd	6/18/2013	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	7/16/2013	MPM			X			
Littlejohns Creek @ Jack Tone Rd	9/17/2013	MPM	X					
Littlejohns Creek @ Jack Tone Rd	11/12/2013	MPM			X			
Littlejohns Creek @ Jack Tone Rd	2/11/2014	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	4/15/2014	MPM			X			
Littlejohns Creek @ Jack Tone Rd	5/20/2014	MPM	X					
Littlejohns Creek @ Jack Tone Rd	6/17/2014	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	7/15/2014	MPM			X			
Littlejohns Creek @ Jack Tone Rd	9/16/2014	MPM	X					
Littlejohns Creek @ Jack Tone Rd	11/18/2014	MPM			X			
Littlejohns Creek @ Jack Tone Rd	2/9/2015	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	4/21/2015	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	5/19/2015	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	6/16/2015	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	7/21/2015	MPM			X			
Littlejohns Creek @ Jack Tone Rd	8/18/2015	MPM			X			
Littlejohns Creek @ Jack Tone Rd	9/15/2015	MPM	X					

[1] MPM and Department of Pesticide Regulation (DPR) grant monitoring.

[2] DPR grant monitoring only.

Add. – Additional sampling

US – Upstream sampling

X – Constituent sampled for Management Plan Monitoring (MPM).

In the 2015 WY, MPM occurred at Littlejohns Creek @ Jack Tone Rd for chlorpyrifos (November, February, and April through August) and copper (February, April, May, and June) (Table VI-4). This year marked the fourth year with no exceedances of the WQTL for chlorpyrifos or copper (Table VI-5). The field parameter, DO, was measured during all MPM events and one exceedance of the WQTL occurred.

Table VI-5 is a tally of exceedances of WQTLs from 2004 through September 2015 for management plan constituents in the Littlejohns Creek @ Jack Tone Rd site subwatershed. Table VI-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances in the site subwatershed since monitoring began is provided in Appendix II, Table II-6.

Table VI-5. Littlejohns Creek @ Jack Tone Rd management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-6.

Monitoring Year	Management Plan Constituents		Completed Management Plans				
	Dissolved Oxygen, <5 mg/L	*E. coli*, >235 MPN/100 mL	Copper (Dissolved), Variable[1]	Copper (Total), Variable[2] or >1300 µg/L	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	*S. capricornutum*, (%Control)
2004	0	0	NA	NA	0	0	1
2005	0	4	NA	NA	1	0	1
2006	1	1	NA	1	1	0	0
2007	0	1	NA	2	2	1	1
2008	0	0	0	2	3	0	2
2009	NA	NA	NA	NA	NA	NA	NA
2010	0	NA	1	0	1	0	0
2011	0	NA	1	0	1	0	0
2012	1	NA	0	0	0	0	0
2013	3	NA	0	0	0	0	NA
2014 WY*	2	NA	0	0	0	NA	NA
2015WY	1	NA	0	NA	0	0	NA
Overall Tally	**8**	**6**	**2**	**5**	**9**	**1**	**5**

[1] Metal WQTL variable; based on hardness. Dissolved metals not analyzed until October 2008.
[2] Metal WQTL variable; based on hardness.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table VI-6. Littlejohns Creek site subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold and upstream sites are italicized. Resampling (RS) due to toxicity not included in table.

Month:		Jan	Feb		Mar	Apr	May	Jun	Jul	Aug	Sep		Oct	Nov	Dec
2007 NM (@Jack Tone Rd)	Date	NA	2/11/07	2/28/07	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/7/07	9/4/07		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	**0.029**	<0.003	NA	<0.003	<0.003	<0.003	0.013	<0.003	<0.003		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	230	125	NA	133	164	251	**71**	192	182		NA	NA	NA
2007 MPM Add. (@Jack Tone Rd)	Date	NA	NA		NA	4/10/07	5/22/07	6/12/07	7/30/07	8/28/07	NA		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA	NA	NA	NA	**0.018**	NA	NA		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA	NA	NA	NA	NA	363	NA		NA	NA	NA
2008 NM (@Jack Tone Rd)	Date	1/23/08	NA		NA	4/15/08	5/13/08	6/10/08	7/13/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	3.8	NA		NA	3.9	**4.2 (4.1)**	3.1	3.4	2.0	**4.2 (3.5)**		NA	NA	NA
	Chlorpyrifos (µg/L)	0.004	NA		NA	**0.034**	<0.003	**0.077**	**0.025**	<0.003	<0.003		NA	NA	NA
	S. capricornutum toxicity (% Control)	126	NA		NA	6	93	131	184	167	155		NA	NA	NA
2008 MPM US (@ 26 Mile Rd)	Date	NA	NA		NA	NA	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	NA	NA		NA	NA	1.6	0.9	**3.1**	0.8	1.0		NA	NA	NA
2008 MPM US (@ Escalon Bellota Rd)	Date	NA	NA		NA	NA	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	NA	NA		NA	1.9	1.8	NA	NA	NA	NA		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA	NA	NA	NA	<0.003	<0.003	NA		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA	NA	NA	NA	139	117	NA		NA	NA	NA
2010 MPM (@Jack Tone Rd)	Date	NA	NA		NA	4/13/10	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	9/14/10	10/12/10	11/9/10	12/7/10
	Copper, dissolved (µg/L)	NA	NA		NA	NA	**1.7**	2.2	NA	NA	2.5	NA	NA	NA	NA
	Copper, total (µg/L)	NA	NA		NA	NA	2.4	4.5	NA	NA	2.3	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA	<0.003	NA	<0.003	<0.003	<0.003*	0.013*	NA	<0.003*	**0.040***	0.014*
	Diazinon (µg/L)	NA	NA		NA	NA	NA	<0.004*	<0.004*	<0.004*	<0.004*	NA	<0.004*	<0.004*	<0.004*
	S. capricornutum toxicity (% Control)	NA	NA		NA	904	NA	NA	360	879	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA		NA	NA	NA	NA	NA	NA	NA	110*	NA	NA	NA
2011 MPM (@Jack Tone Rd)	Date	1/11/11	2/8/11		3/8/11	4/12/11	5/24/11	6/28/11	7/26/11	8/23/11	9/20/11		NA	11/15/11	NA
	Copper, dissolved (µg/L)	NA	2		NA	NA	**1.7**	1.1	NA	NA	1.2		NA	NA	NA
	Copper, total (µg/L)	NA	2.8		NA	NA	2.8	2.7	NA	NA	2.2		NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003*	<0.003		NA	<0.003	NA	<0.003	<0.003	NA	NA		NA	**0.022**	NA
	Diazinon (µg/L)	<0.004*	<0.004		NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

Month:		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	S. capricornutum toxicity (% Control)	NA	NA	679	1643	NA	NA	684	650	NA	NA	NA	NA
2012 MPM (@Jack Tone Rd)	Date	NA	2/14/12	3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12	9/18/12	NA	11/6/12	NA
	Copper, dissolved (µg/L)	NA	2.5	NA	NA	1.3	0.87	NA	NA	0.92	NA	NA	NA
	Copper, total (µg/L)	NA	3.4	NA	NA	2.5	2.4	NA	NA	1.5	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	NA	<0.003	<0.003	NA	NA	NA	<0.003	NA
	Diazinon (µg/L)	NA	<0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	142	329	NA	NA	273	346	NA	NA	NA	NA
2013 MPM (@ Jack Tone Rd)	Date	NA	2/21/13	NA	4/2/2013	5/21/13	6/18/13	7/16/13	NA	9/17/13	NA	11/19/13	NA
	Copper, dissolved (µg/L)	NA	1.6	NA	NA	1.4	0.96	NA	NA	1.8	NA	NA	NA
	Copper, total (µg/L)	NA	2.7	NA	NA	3.1	2.0	NA	NA	3.2	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	NA	<0.003	<0.003	NA	NA	NA	<0.003	NA
	Diazinon (µg/L)	NA	<0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2014 & 2015 WY MPM (@ Jack Tone Rd)	Date	NA	2/11/14	NA	4/15/14	5/20/14	6/17/14	7/15/14	NA	9/16/14	NA	11/18/14	12/4/14
	Copper, dissolved (µg/L)	NA	2.2	NA	NA	1.4	1.2	NA	NA	0.99	NA	NA	NA
	Copper, total (µg/L)	NA	4.6	NA	NA	2.4	3.8	NA	NA	2.1	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	NA	<0.003	<0.003	NA	NA	NA	<0.003	NA
	Diuron (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.2	<0.2
2015 WY MPM & NM (@ Jack Tone Rd)	Date	NA	2/9/15	NA	4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15	Oct	Nov	Dec
	Copper, dissolved (µg/L)	NA	2.2	NA	2.9	0.73	0.36	NA	NA	0.18			
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	<0.003	<0.003	<0.003	<0.003	NA			

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring.
NA – Not applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring
US – Upstream Monitoring, conducted in 2008 only.
*Additional Department of Pesticide Regulation (DPR) grant monitoring.

Source Identification and Outreach

Sourcing analyses for past exceedances of the WQTLs for Littlejohns Creek @ Jack Tone Rd management plan constituents are provided in past years' site subwatershed appendices.

The exceedance of the WQTL for DO occurred in August 2015. The exceedance of the WQTL for DO coincided with samples collected during non-contiguous water conditions. Low flow conditions and particularly stagnant water, most likely led to the exceedances of the WQTL for DO during these months. As previously discussed, study results on the water quality parameters associated with DO have been submitted to the Regional Board. Additional investigation of the sources of DO concentrations in surface waters is pending further discussion with the Regional Board.

Outreach

The Coalition carried out its management practice tracking and focused outreach in 2010 through 2012. The Coalition contacted 16 targeted growers farming 2,796 acres within the Littlejohns Creek @ Jack Tone Rd site subwatershed and documented their management practices. In 2012, further outreach and education occurred for six additional growers in the site subwatershed focusing on chlorpyrifos use. The six growers participated in follow-up contacts and documented newly implemented management practices in 2010 or 2011.

Evaluation

The Coalition's focused outreach strategy helped improve water quality in the Littlejohns Creek @ Jack Tone Rd site subwatershed as indicated with the approved completions of management plans for chlorpyrifos and copper in 2015 and diazinon and water column toxicity to *S. capricornutum* in 2013. The only remaining constituents in the active management plan are DO and *E. coli.*

Next Steps

Represented site monitoring will occur for diuron and sediment toxicity to *H. azteca* based on past exceedances in the Zone 2 Core site, French Camp Slough @ Airport Way. Field parameters, such as DO, and will be measured during all monitoring events. General outreach will continue in the site subwatershed.

VII. LONE TREE CREEK @ JACK TONE RD

Overview

Monitoring began at Lone Tree Creek @ Jack Tone Rd in 2004. The Coalition completed focused outreach in 2012 and monitoring results from 2009 through September 2015 indicate water quality improvements. By demonstrating improved water quality, the Coalition received approval to complete the management plans for SC, diazinon, diuron, copper, water column toxicity to *S. capricornutum,* and sediment toxicity to *H. azteca* May 21, 2012 and DO on February 27, 2013 (Table VII-1). The remaining constituents in the active management plan include ammonia chlorpyrifos, *E. coli,* pH, and water column toxicity to *P. promelas* (Table VII-1). On February 22 and April 22, 2016 the Coalition provided the Regional Board with results from studies it conducted on the water quality parameters in the Coalition region associated with 1) DO and pH and 2) ammonia, respectively. A summary of the results from these studies is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.*

During the 2015 WY, the Coalition conducted MPM for chlorpyrifos; there were no detections. Monitoring resulted in one exceedance of the WQTL for DO on January 20, 2015.

Lone Tree Creek @ Jack Tone Rd is a Represented site; no Represented site monitoring is scheduled in the 2016 WY (2015 MPU). Management Plan Monitoring will continue for chlorpyrifos and water column toxicity to *P. promelas*. Field parameters, including DO and pH, will be measured during all monitoring events.

Table VII-1. Lone Tree Creek @ Jack Tone Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Chlorpyrifos	2006	2008-2010	Active
P. promelas water column toxicity	2009	2008-2010	Active
Constituents Requiring Source ID/Work Plans			
Ammonia as N	2008	2008-2010	Active
Dissolved Oxygen[1]	2006, 2016	2008-2010	2013
E. coli	2006	2008-2010	Active
pH	2007	2008-2010	Active
Completed Management Plans			
Diazinon	2009	2008-2010	2012
Diuron	2008	2008-2010	2012
Copper	2008	2008-2010	2012
H. azteca sediment toxicity	2007	2008-2010	2012
S. capricornutum water column toxicity	2007	2008-2010	2012
Specific Conductivity	2013	2008-2010	2012

[1]The Coalition received approval to complete the management plan on February 27, 2013 but management plan was reinstated due to recent exceedances.
NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Lone Tree Creek @ Jack Tone Rd site subwatershed consists of 25,789 irrigated acres and upstream agricultural land use that include deciduous nuts, field crops, grains, irrigated pastures, rice, vineyards, and several dairies (Figure VII-1). The site is a 20 mile long modified natural channel, upstream from the French Camp Slough @ Airport Way site in San Joaquin County. This ephemeral stream carries natural storm runoff, agricultural supply, and return flows to Littlejohns Creek during periods of high flow and irrigation. Downstream of the monitoring location, Lone Tree Creek confluences with Littlejohns Creek, and eventually forms French Camp Slough. The site subwatershed includes two upstream locations where the Coalition has monitored in the past: Lone Tree Creek @ Brennan Rd and Lone Tree Creek @ Valley Home Rd (Table VII-2).

Lone Tree Creek (San Joaquin County) is listed as a 303(d) List of Impaired Waterbodies for ammonia, BOD, chlorpyrifos, diuron, *E. coli,* and sediment and unknown water column toxicity (lasted updated in 2010).

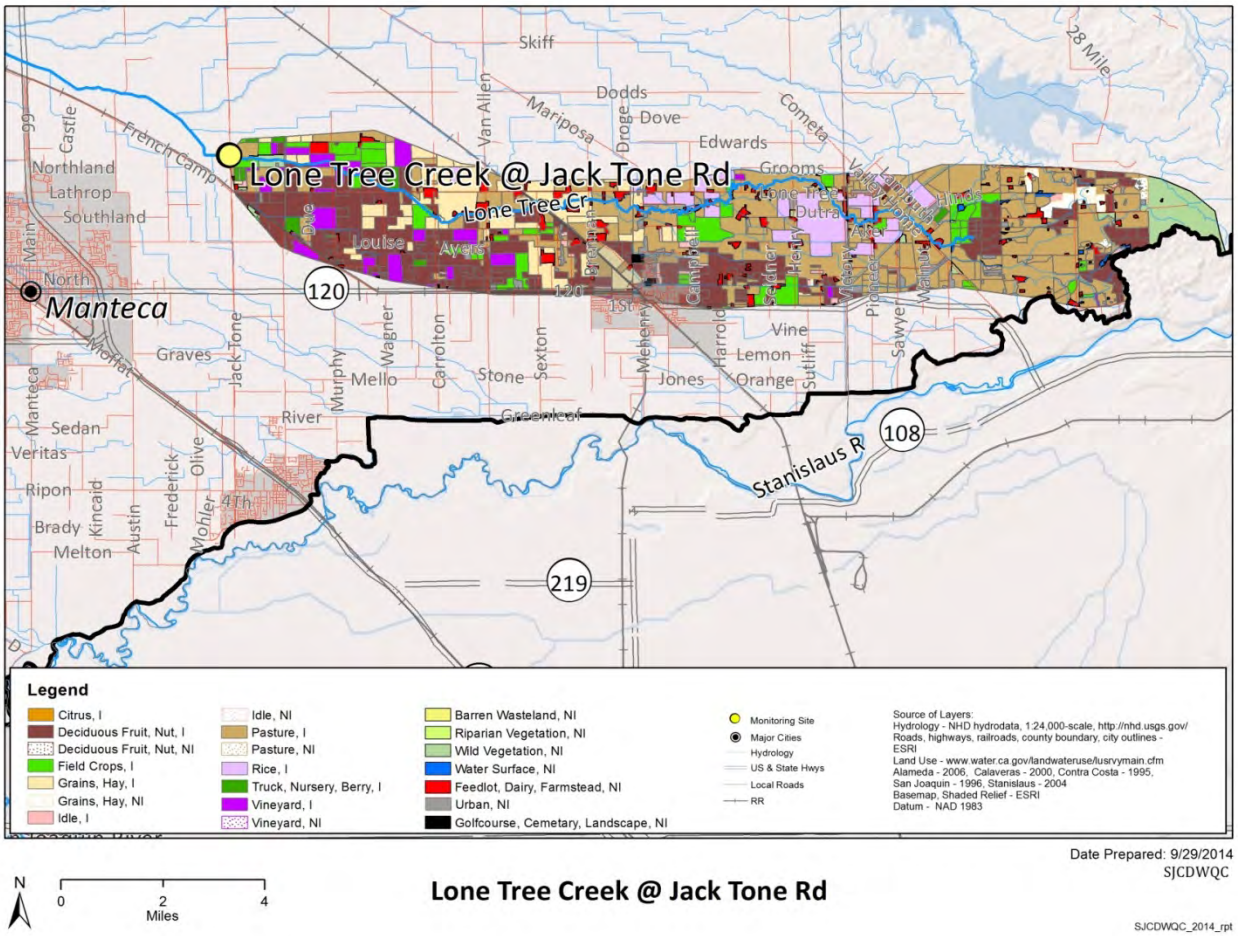
Table VII-2. Lone Tree Creek site subwatershed sampling locations coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Lone Tree Creek @ Jack Tone Rd*	531XLTCJR	37.83754	-121.14460
Lone Tree Creek @ Brennan Rd[US]	535XLTABR	37.82552	-121.01591
Lone Tree Creek @ Valley Home Rd[US]	535LTCVHR	37.82023	-120.90216

[US] Upstream sites

*Original SJCDWQC sampling site

Figure VII-1. Lone Tree Creek @ Jack Tone Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Lone Tree Creek @ Jack Tone Rd during the irrigation season of 2004 and has continued through September 2015. In the 2015 WY, Lone Tree Creek @ Jack Tone Rd was reclassified as a Represented site; monitoring was conducted in accordance with the strategy for Represented sites outlined in the 2014 MPU. Table VII-3 contains the number of events monitored per year and the constituents for years 2008 through September 2015.

In an effort to source exceedances, the Coalition monitored upstream for chlorpyrifos at Lone Tree Creek @ Brennan Rd in 2005, and additional sampling at Lone Tree Creek @ Jack Tone Rd for chlorpyrifos occurred in 2007. MPM was initiated in 2007 and in 2008, upstream MPM at Lone Tree Creek @ Brennan Rd and Lone Tree Creek @ Valley Home Rd occurred for copper and chlorpyrifos. MPM during months of past exceedances occurred since 2009 to evaluate the effectiveness of the Coalition's outreach strategy and the newly implemented management practices on water quality (Table VII-4). The last detections for chlorpyrifos, copper, diazinon, or diuron were in 2013, 2012, 2010, and 2011, respectively.

Table VII-3. Lone Tree Creek @ Jack Tone Rd sampling events and analyses per year.

Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	14	6	12	12	11	11	4	4
	Dry Sites	0	0	0	1	0	1	0	0
	Events Sampled	14	6	12	11	11	10	4	4
Field and Physical Parameters	Dissolved Oxygen	14	6	12	11	11	10	4	4
	Dissolved Solids	8	0	0	0	0	0	0	0
	E. coli	7	0	0	0	0	0	0	0
	Grain size (sediment)	0	0	1	2	1	2	0	0
	Hardness as CaCO3	6	5	5	5	5	5	0	0
	pH	14	6	12	11	11	10	4	4
	Specific Conductivity	14	6	12	11	11	10	4	4
	Suspended Solids	0	0	0	0	0	0	0	0
	Total Organic Carbon	7	0	1	2	0	0	0	0
	Total Organic Carbon (sediment)	7	0	1	2	2	2	0	0
	Turbidity	8	0	0	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0	0	0
	Orthophosphate as P	6	0	0	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0
	Copper	0	5	5	5	5	5	0	0
	Lead	0	0	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0	0	0
Metals (Total)	Arsenic	6	0	0	0	0	0	0	0
	Boron	6	0	0	0	0	0	0	0
	Cadmium	6	0	0	0	0	0	0	0
	Copper	6	5	5	5	5	5	0	0
	Lead	6	0	0	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0	0	0
	Nickel	6	0	0	0	0	0	0	0
	Selenium	6	0	0	0	0	0	0	0
	Zinc	6	0	0	0	0	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0	0	0
	Diuron	7	0	2	2	2	1	0	0
	Linuron	7	0	0	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0	0	0
	Methomyl	7	0	0	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Heptachlor	0	0	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0	0	0
	Paraquat	7	0	0	0	0	0	0	0
	Simazine	7	0	2	2	2	0	0	0
	Trifluralin	0	0	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0	0	0
	Dicofol	7	0	0	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0	0	0
	Endrin	7	0	0	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0	0	0
	Chlorpyrifos	7	4	10	8	9	8	4	4
	Demeton-s	0	0	0	0	0	0	0	0
	Diazinon	7	0	7	2	0	0	0	0
	Dichlorvos	0	0	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0	0	0
	Malathion	7	0	0	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0	0	0
	Methidathion	7	0	0	0	0	0	0	0
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0	0	0
	Phorate	7	0	0	0	0	0	0	0
	Phosmet	7	0	0	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	2	1	0	0	0
	Chlorpyrifos	0	0	1	2	1	0	0	0
	Cyfluthrin	0	0	1	2	1	0	0	0
	Cyhalothrin, lambda	0	0	1	2	1	0	0	0
	Cypermethrin	0	0	1	2	1	0	0	0
	Deltamethrin: Tralomethrin	0	0	1	2	1	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	1	2	1	0	0	0
	Fenpropathrin	0	0	1	2	1	0	0	0
	Permethrin	0	0	1	2	1	0	0	0
Toxicity	*Ceriodaphnia dubia*	9	1	3	3	2	0	0	0
	Pimephales promelas	7	0	0	0	0	0	0	2
	Selenastrum capricornutum	8	1	3	3	3	0	0	0
	Hyalella azteca	4	0	1	2	2	2	0	0

Table VII-4. Lone Tree Creek Management Plan Monitoring schedule (2007-2015 WY).

Site Name	Sample Date	Monitoring Type	Copper	Total Metals	Chlorpyrifos	Diazinon	Diuron	*S. capricornutum*	*P. promelas*	*H. azteca*
Lone Tree Creek @ Jack Tone Rd	7/30/2007	Add.			X					
Lone Tree Creek @ Jack Tone Rd	8/28/2007	Add.			X					
Lone Tree Creek @ Valley Home Rd	5/13/2008	US		X						
Lone Tree Creek @ Valley Home Rd	6/10/2008	US		X						
Lone Tree Creek @ Valley Home Rd	7/15/2008	US		X						
Lone Tree Creek @ Brennan Rd	7/15/2008	US		X	X					
Lone Tree Creek @ Valley Home Rd	8/12/2008	US		X						
Lone Tree Creek @ Brennan Rd	8/12/2008	US		X	X					
Lone Tree Creek @ Valley Home Rd	9/16/2008	US		X						
Lone Tree Creek @ Brennan Rd	9/16/2008	US		X						
Lone Tree Creek @ Jack Tone Rd	4/14/2009	MPM						X		
Lone Tree Creek @ Jack Tone Rd	5/12/2009	MPM						X		
Lone Tree Creek @ Jack Tone Rd	7/14/2009	MPM	X		X					
Lone Tree Creek @ Jack Tone Rd	8/11/2009	MPM	X		X					
Lone Tree Creek @ Jack Tone Rd	9/15/2009	MPM	X							
Lone Tree Creek @ Jack Tone Rd	1/13/2010	MPM	X		X	X	X	X		
Lone Tree Creek @ Jack Tone Rd	2/9/2010	MPM	X		X	X	X	X		
Lone Tree Creek @ Jack Tone Rd	3/16/2010	MPM						X		
Lone Tree Creek @ Jack Tone Rd	4/13/2010	MPM						X		
Lone Tree Creek @ Jack Tone Rd	5/11/2010	MPM						X		
Lone Tree Creek @ Jack Tone Rd	6/8/2010	MPM			X[2]	X[2]				
Lone Tree Creek @ Jack Tone Rd	7/13/2010	MPM	X		X[1]	X[2]				
Lone Tree Creek @ Jack Tone Rd	8/10/2010	MPM	X		X[1]	X[2]				
Lone Tree Creek @ Jack Tone Rd	9/7/2010	MPM	X		X[2]	X[2]				X[2]
Lone Tree Creek @ Jack Tone Rd	10/12/2010	MPM			X[2]	X[2]				
Lone Tree Creek @ Jack Tone Rd	11/9/2010	MPM			X[2]	X[2]				
Lone Tree Creek @ Jack Tone Rd	12/7/2010	MPM			X[2]	X[2]				
Lone Tree Creek @ Jack Tone Rd	1/11/2011	MPM	X		X[1]	X[1]	X	X		
Lone Tree Creek @ Jack Tone Rd	2/8/2011	MPM	X		X[1]	X[1]	X	X		
Lone Tree Creek @ Jack Tone Rd	3/8/2011	MPM						X		X
Lone Tree Creek @ Jack Tone Rd	4/12/2011	MPM						X		
Lone Tree Creek @ Jack Tone Rd	5/24/2011	MPM						X		
Lone Tree Creek @ Jack Tone Rd	7/26/2011	MPM	X		X					
Lone Tree Creek @ Jack Tone Rd	8/23/2011	MPM	X		X					
Lone Tree Creek @ Jack Tone Rd	9/20/2011	MPM	X							
Lone Tree Creek @ Jack Tone Rd	10/14/2011	MPM								X
Lone Tree Creek @ Jack Tone Rd	1/17/2012	MPM	X		X	X	X	X		
Lone Tree Creek @ Jack Tone Rd	2/14/2012	MPM	X		X	X	X	X		
Lone Tree Creek @ Jack Tone Rd	3/15/2012	MPM						X		X
Lone Tree Creek @ Jack Tone Rd	4/12/2012	MPM						X		
Lone Tree Creek @ Jack Tone Rd	5/16/2012	MPM						X		
Lone Tree Creek @ Jack Tone Rd	7/17/2012	MPM			X					
Lone Tree Creek @ Jack Tone Rd	8/21/2012	MPM			X					
Lone Tree Creek @ Jack Tone Rd	1/15/2013	MPM			X					
Lone Tree Creek @ Jack Tone Rd	2/21/2013	MPM			X					
Lone Tree Creek @ Jack Tone Rd	7/16/2013	MPM			X					
Lone Tree Creek @ Jack Tone Rd	8/20/2013	MPM			X					

Site Name	Sample Date	Monitoring Type	Copper	Total Metals	Chlorpyrifos	Diazinon	Diuron	*S. capricornutum*	*P. promelas*	*H. azteca*
Lone Tree Creek @ Jack Tone Rd	1/28/2014	MPM			X					
Lone Tree Creek @ Jack Tone Rd	2/11/2014	MPM			X					
Lone Tree Creek @ Jack Tone Rd	7/15/2014	MPM			X					
Lone Tree Creek @ Jack Tone Rd	8/19/2014	MPM			X					
Lone Tree Creek @ Jack Tone Rd	1/20/2015	MPM			X				X	
Lone Tree Creek @ Jack Tone Rd	2/9/2015	MPM			X				X	
Lone Tree Creek @ Jack Tone Rd	7/21/2015	MPM			X					
Lone Tree Creek @ Jack Tone Rd	8/18/2015	MPM			X					

[1] MPM and Department of Pesticide Regulation (DPR) grant monitoring.

[2] DPR grant monitoring only.

Add. – Additional sampling.

US – Upstream sampling.

X – Constituent sampled for Management Plan Monitoring (MPM).

Monitoring Results

During the 2015 WY, the Coalition conducted MPM for chlorpyrifos (January, February, July, and August) and water column toxicity to *P. promelas* (January and February) at Lone Tree Creek @ Jack Tone Rd; there were no detections (Table VII-5). The field parameter, DO, was monitored during all MPM events through September 2015; one exceedance of the WQTL for DO occurred during the month of January. On February 27, 2013, the Coalition received approval to remove DO from the active management plan; however due to the exceedance of the WQTL of DO in January 2015, the Coalition reinstated the management for DO for this site subwatershed.

Table VII-5 is a tally of exceedances of WQTLs from 2004 through September 2015 for management plan constituents in the Lone Tree Creek @ Jack Tone site subwatershed. Table VII-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances since monitoring began in the site subwatershed is provided in Appendix II, Table II-7.

Table VII-5. Lone Tree Creek @ Jack Tone Rd management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-7.

Monitoring Year	Management Plan Constituents						Completed Management Plans					
	Dissolved Oxygen, <5 mg/L	pH, <6.5 and >8.5 units	Ammonia as N, Variable[1] or >1.5 mg/L	*E. coli*, >235 MPN/100 mL	Chlorpyrifos, >0.015 µg/L	*P. promelas*, (%Control)	Specific Conductivity[3], >700 µS/cm or > 1000 µS/cm	Copper (Total), Variable[2] or >1300 µg/L	Diazinon, >0.1 µg/L	Diuron, >2 µg/L	*S. capricornutum*, (%Control)	*H. azteca*, (%Control)
2004	0	0	NA	1	0	0	0	NA	0	NA	0	0
2005	1	1	NA	7	2	1	0	NA	0	NA	1	0
2006	1	1	0	6	1	0	0	1	0	0	1	0
2007	0	0	3	6	2	0	0	5	1	2	1	0
2008	2	1	1	6	1	1	0	1	1	1	4	0
2009	0	0	NA	NA	1	NA	0	0	NA	NA	0	NA
2010	1	0	NA	NA	2	NA	0	0	0	0	0	0
2011	0	2	NA	NA	0	NA	0	0	0	0	0	0
2012	0	0	NA	NA	0	NA	0	0	0	0	0	0
2013	0	0	NA	NA	1	NA	0	NA	NA	NA	NA	NA
2014 WY*	0	1	NA	NA	0	NA	0	NA	NA	NA	NA	NA
2015 WY	1	0	NA	NA	0	0	0	NA	NA	NA	NA	NA
Overall Tally	**6**	**6**	**4**	**26**	**10**	**2**	**0**	**7**	**2**	**3**	**7**	**0**

[1] Ammonia WQTL variable based on pH and temperature.

[2] Metal WQTL variable based on hardness.

NA – Not Applicable; monitoring did not occur for this constituent during the year.

*2014 includes January through September results only.

[3] Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.

Table VII-6. Lone Tree Creek site subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

Month:		Jan	Feb	mar	Apr	May	Jun	Jul	Aug	Sep		Oct	Nov	Dec
2007 NM (@ Jack Tone Rd)	Date	NA	2/11/07	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/7/07	9/4/07		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	**0.052**	NA	<0.003	<0.003	0.011	**0.035**	<0.003	<0.003		NA	NA	NA
2007 MPM Add. (@ Jack Tone Rd)	Date	NA	2/28/07	NA	NA	NA	NA	7/30/07	8/28/07	NA		NA	NA	NA
	Copper (µg/L)	NA	**19**	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	0.01	<0.003	NA		NA	NA	NA
2008 NM (@ Jack Tone Rd)	Date	1/23/08	NA	NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	**40**	NA	NA	3.5	4.5	3	3.6	3.5	2.2		NA	NA	NA
	Chlorpyrifos (µg/L)	**1.7**	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		NA	NA	NA
2008 MPM US (@ Valley Home Rd)	Date	NA	NA	NA	NA	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	NA	NA	NA	NA	4.6	5.7	**7.0**	3.7	3.8		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
2008 MPM US (@ Brennan Rd)	Date	NA	NA	NA	NA	NA	NA	7/15/08	8/12/08	9/16/08		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	<0.003	<0.003	NA		NA	NA	NA
	Copper (µg/L)	NA	NA	NA	NA	NA	NA	3.8	3.3	2.9		NA	NA	NA
2009 MPM (@ Jack Tone Rd)	Date	NA	NA	NA	4/14/09	5/12/09	NA	7/14/09	8/11/09	9/15/09		NA	NA	NA
	Copper, dissolved(µg/L)	NA	NA	NA	NA	NA	NA	2.3	2.7	1.5		NA	NA	NA
	Copper, total (µg/L)	NA	NA	NA	NA	NA	NA	3.6	4.4	2.2		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	<0.003	**0.100**	NA		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	778	584	NA	NA	NA	NA		NA	NA	NA
2010 MPM (@ Jack Tone Rd)	Date	1/13/10	2/9/10	3/16/10	4/13/10	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	9/14/10	10/12/10	11/9/10	12/7/10
	Copper, dissolved(µg/L)	7	8.7	NA	NA	NA	NA	2.2	2.3	2.8	NA	NA	NA	NA
	Copper, total (µg/L)	26	17	NA	NA	NA	NA	3.4	3.7	4.1	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	**1.1**	<0.003	NA	NA	NA	<0.003*	**0.27**	0.015	0.0086*	NA	<0.003*	<0.003*	<0.003*
	Diazinon (µg/L)	0.074	<0.004	NA	NA	NA	<0.004*	<0.004*	<0.004*	<0.004*	NA	<0.004*	<0.004*	<0.004*
	Diuron (µg/L)	0.51	0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	636	860	922	2028	1305	NA	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	NA	NA	103*	NA	NA	NA
2011 MPM (@ Jack Tone Rd)	Date	1/11/11	2/8/11	3/8/11	4/12/11	5/24/11	NA	7/26/11	8/23/11	9/20/11		10/14/11	NA	NA
	Copper, dissolved(µg/L)	5.2	5	NA	NA	NA	NA	1.5	1.2	1.9		NA	NA	NA
	Copper, total (µg/L)	10	6	NA	NA	NA	NA	2.2	2.3	3.0		NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	NA	NA	<0.003	<0.003	NA		NA	NA	NA
	Diazinon (µg/L)	<0.004	<0.004	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Diuron (µg/L)	1.1	0.37	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	S. capricornutum toxicity (% Control)	638	1131	766	1693	1212	NA	NA	NA	NA		NA	NA	NA

Month:		Jan	Feb	mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	H. azteca toxicity (% Control)	NA	NA	100	NA	NA	NA	NA	NA	NA	98	NA	NA
2012 MPM (@ Jack Tone Rd)	Date	1/17/12	2/14/12	3/15/12	4/12/12	5/16/12	NA	7/17/12	8/21/12	NA	NA	NA	NA
	Copper, dissolved(µg/L)	1.9	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Copper, total (µg/L)	4.7	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	NA	NA	<0.003	<0.003	NA	NA	NA	NA
	Diazinon (µg/L)	<0.004	<0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Diuron (µg/L)	<0.2	<0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	2448	116	186	419	620	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	105	NA	NA	NA	NA	NA	NA	NA	NA	NA
2013 MPM (@ Jack Tone Rd)	Date	1/15/13	2/21/13	NA	NA	NA	NA	7/16/13	8/20/13	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	NA	NA	**0.026**	<0.003	NA	NA	NA	NA
2014 & 2015 WY MPM (@ Jack Tone Rd)	Date	1/28/14	2/11/14	NA	NA	NA	NA	7/15/14	8/19/14	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	NA	NA	<0.003	<0.003	NA	NA	NA	NA
2015 WY MPM (@ Jack Tone Rd)	Date	1/20/15	2/9/15	NA	NA	NA	NA	7/21/15	8/18/15	NA	Oct	Nov	Dec
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	NA	NA	<0.003	<0.003	NA			
	P. promelas toxicity (% Control)	100	100	NA	NA	NA	NA	NA	NA	NA			

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring.
NA – Not applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring.
US – Upstream Monitoring, conducted in 2008 only.
*Additional Department of Pesticide Regulation (DPR) grant monitoring.

Table VII-7. Lone Tree Creek @ Jack Tone Rd. site subwatershed instantaneous load calculations for chlorpyrifos.

If discharge was unable to be measured or the analyte was ND, the result is not included in the table.

Site Name	Analyte Name	Sample Date	Discharge, cfs	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	2/16/2005	22.26	0.014	µg/L	9	µg/sec
Lone Tree Creek @ Jack Tone Rd. *	Chlorpyrifos	8/16/2005	25.85	0.019	µg/L	14	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	8/16/2005	25.85	0.019	µg/L	14	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	2/27/2006	0.34	0.014	µg/L	0	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	3/15/2006	27.84	0.013	µg/L	10	µg/sec
Lone Tree Creek @ Jack Tone Rd. *	Chlorpyrifos	2/11/2007	26.70	0.421	µg/L	31	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	2/11/2007	26.70	0.052	µg/L	39	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	6/12/2007	39.21	0.011	µg/L	12	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	7/10/2007	35.9	0.035	µg/L	36	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	7/30/2007	26.77	0.010	µg/L	8	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	1/23/2008	18.88	1.70	µg/L	909	µg/sec
Lone Tree Creek @ Jack Tone Rd. *	Chlorpyrifos	1/13/2010	1.19	1.10	µg/L	37	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	1/13/2010	23.01	0.27	µg/L	176	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	8/10/2010	27.32	0.015	µg/L	12	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	9/7/2010	68.19	0.009	µg/L	17	µg/sec
Lone Tree Creek @ Jack Tone Rd.	Chlorpyrifos	7/16/2013	26.57	0.026	µg/L	20	µg/sec

[1] Load = Discharge (cfs) X 28.317L/ft3 X Concentration (µg/L). To convert a concentration measured in mg/L to µg/L multiply by 1000. The load values calculated represent instantaneous loads only, and should not be used to extrapolate loading over any period of time.

*Field Duplicate

Source Identification and Outreach

Sourcing analyses for past exceedances of the WQTLs for management plan constituents are provided in past years' site subwatershed appendices.

Monitoring from the 2015 WY resulted in an exceedance of the WQTL for DO on January 20, 2015. The exceedance of the WQTL for DO coincided with samples collected during non-contiguous water conditions. Low flow conditions and particularly stagnant water, most likely led to the exceedances of the WQTL for DO during these months. As previously discussed, study results on the water quality parameters associated with DO have been submitted to the Regional Board. Additional investigation of the sources of DO concentrations in surface waters is pending further discussion with the Regional Board.

Outreach

Focused outreach to document current management practices and track implementation of additional management practices in this site subwatershed began in 2008 and continued through 2010. The Coalition contacted 46 targeted growers farming 4,691 acres within the site subwatershed. The Coalition recommended management practices to reduce agricultural discharges which included reduction of application rates, alternative material application, spot treating, sprinkler or microspray irrigation, retention pond/hold basin construction, grass waterways or grass filter strip construction, reducing water volumes using irrigation management, and treating runoff waters with PAM or other

materials. The Coalition will conduct additional focused outreach in 2016 since the 10-year deadline for chlorpyrifos is approaching.

Evaluation

Overall, water quality has improved since focused outreach began in the Lone Tree Creek @ Jack Tone Rd site subwatershed. Due to improved water quality, the Coalition received approval to complete the management plans for copper, diazinon, diuron, SC, water column toxicity to *S. capricornutum,* and sediment toxicity to *H. azteca*. The remaining constituents in the active management plan are ammonia, chlorpyrifos, *E. coli,* pH, and water column toxicity to *P. promelas.*

Next Steps

The Coalition will continue to conduct general outreach in the site subwatershed. The Coalition will conduct additional focused outreach in 2016 since the 10-year deadline for chlorpyrifos is approaching. Management Plan Monitoring is scheduled to occur during months of past exceedances for chlorpyrifos and water column toxicity to *P. promelas.*

VIII. MOKELUMNE RIVER @ BRUELLA RD

Overview

Monitoring at Mokelumne River @ Bruella Rd began in 2004. The Coalition completed the focused outreach portion of its management plan strategy in 2013, and monitoring results from 2011 through September 2015 indicate improved water quality. The Coalition received approval to complete the management plans for copper and DO on May 30, 2012 and *C. dubia* on February 27, 2013. The remaining constituents in the active management plan are *E. coli*, pH, and water column toxicity to *S. capricornutum*, (Table VIII-1). The Coalition submitted results from a study on water quality parameters associated with the concentrations of pH in the Coalition region to the Regional Board on February 22, 2016. A summary of the results from this study is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.*

Mokelumne River @ Bruella Rd is a Core site in Zone 1; monthly Core site monitoring will occur in the 2016 WY. Management Plan Monitoring is scheduled for water column toxicity to *S. capricornutum*. The field parameter pH will be monitored during all sampling events. No MPM will be conducted for *E. coli*; however, the constituent will be monitored monthly under the monitoring strategy for Core sites (2015 MPU).

Table VIII-1. Mokelumne River @ Bruella Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
S. capricornutum water column toxicity[1]	2006, 2015	2011-2013	NA
Constituents Requiring Source ID/Work Plans			
E. coli	2010	2011-2013	NA
pH	2007	2011-2013	NA
Completed Management Plans			
Copper	2008	2011-2013	2012
C. dubia water column toxicity	2006	2011-2013	2013
Dissolved Oxygen	2006	2011-2013	2012

[1]The Coalition received approval to complete the management plan for *S. capricornutum* water column toxicity on February 27, 2013 but the management plan was reinstated due to recent exceedances of the WQTL at the site.
NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Mokelumne River @ Bruella Rd site subwatershed consists of 9,966 irrigated acres, and the upstream agriculture consists of vineyards, orchards, as well as field crops (Figure VIII-1). Flow in the Mokelumne River is controlled by water released from Comanche Reservoir. Water in the Mokelumne

River integrates the water quality signal from a relatively large upstream area. The site subwatershed includes an upstream location, Mokelumne River @ Fish Hatchery (Table VIII-2).

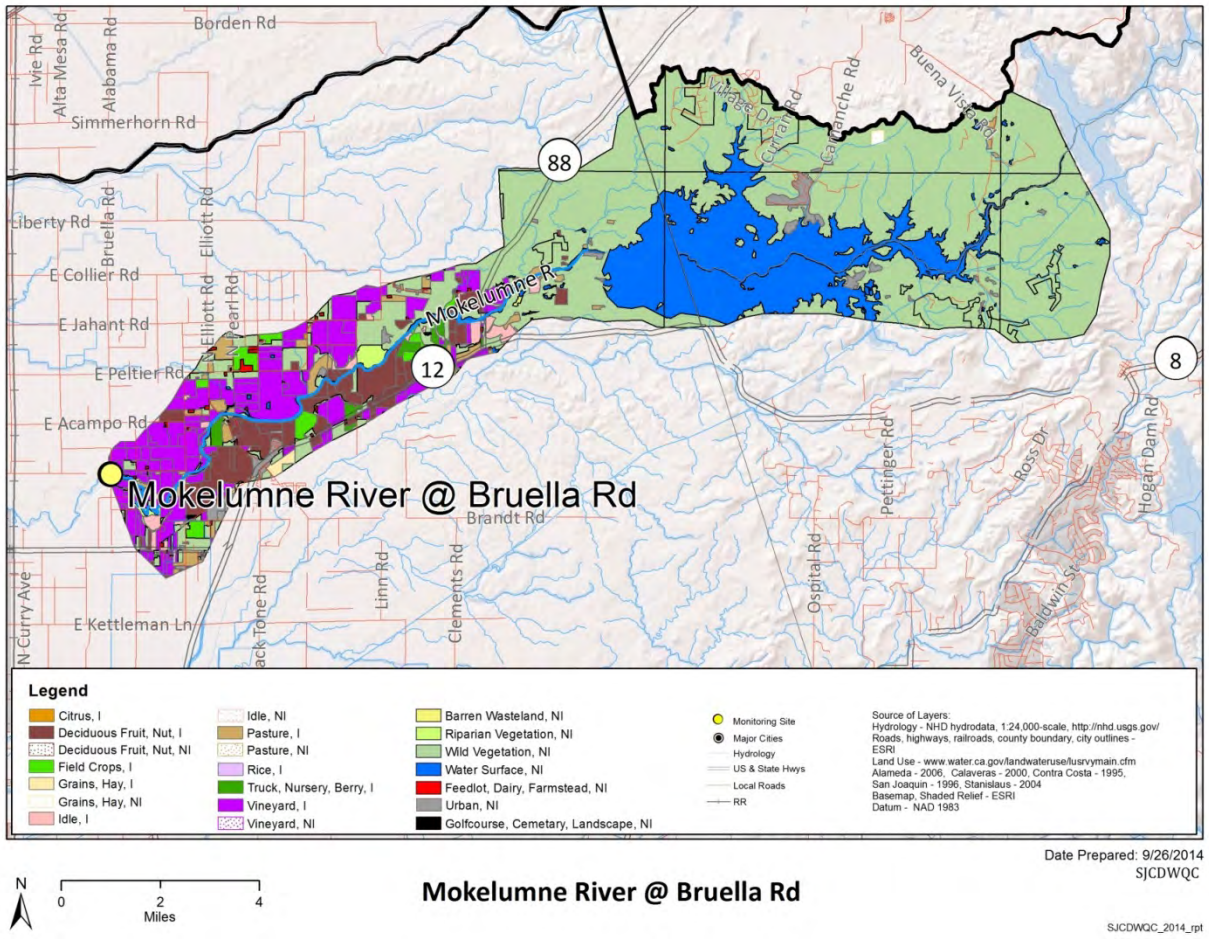
Mokelumne River, Lower (in Delta Waterways, eastern portion) is listed on California's 303(d) List of Impaired Waterbodies for chlorpyrifos, copper, mercury, zinc, unknown toxicity and DO.

Table VIII-2. Mokelumne River site subwatershed sampling locations coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Mokelumne River @ Bruella Rd*	531XMRABR	38.16022	-121.20643
Mokelumne River @ Fish Hatchery[US]	531XMRAFH	38.22640	-121.02640

[US] Upstream site
*Original SJCDWQC sampling site

Figure VIII-1. Mokelumne River @ Bruella Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring at Mokelumne River @ Bruella Rd began in August 2004 and has continued through the 2015 WY. The last time the full suite of constituents was collected at the site was in 2014. In the 2015 WY, monitoring was conducted based on the monitoring strategy for a Core site, as described in the

2015 MPU. Table VIII-3 contains the number of events monitored per year and the constituents from 2008 through September 2015.

The Coalition initiated MPM at the site subwatershed in 2010 (Table VIII-4). In an effort to source exceedances, additional sampling occurred in 2007 and 2008, and upstream monitoring occurred at Mokelumne River @ Fish Hatchery in 2005. The Coalition conducted MPM during months of past exceedances at Mokelumne River @ Bruella Rd from 2010 through 2013 to further evaluate water quality in the site subwatershed. The last detections of copper were in 2008.

Table VIII-3. Mokelumne River @ Bruella Rd sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	19	12	12	15	12	12	10	12
	Dry Sites	0	0	0	0	0	0	0	0
	Events Sampled	19	12	12	15	12	12	10	12
Field and Physical Parameters	Dissolved Oxygen	17	12	12	15	12	12	10	12
	Dissolved Solids	12	12	12	12	12	12	9	0
	E. coli	10	12	12	12	12	12	9	12
	Grain size (sediment)	2	0	0	2	0	0	2	2
	Hardness as CaCO3	12	0	3	12	0	0	9	4
	pH	17	12	12	15	12	12	10	12
	Specific Conductivity	17	12	12	15	12	12	10	12
	Suspended Solids	3	12	12	12	12	12	9	12
	Total Organic Carbon	10	12	12	12	12	12	9	12
	Total Organic Carbon (sediment)	2	0	0	2	0	0	2	2
	Turbidity	10	12	12	12	12	12	9	12
Nutrients	Ammonia as N	10	12	12	12	12	12	9	12
	Nitrate + Nitrite as N	3	12	12	12	12	12	9	12
	Nitrate as N	7	0	0	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	10	12	12	12	12	12	9	0
	Orthophosphate as P	10	12	12	12	12	12	9	12
	Phosphate as P	10	0	12	12	12	12	9	0
Metals (Dissolved)	Cadmium	7	0	0	12	0	0	9	0
	Copper	10	0	3	12	0	0	9	4
	Lead	7	0	0	0	0	0	9	0
	Nickel	7	0	0	0	0	0	9	0
	Zinc	7	0	0	12	0	0	9	0
Metals (Total)	Arsenic	7	0	0	12	0	0	9	0
	Boron	7	0	0	12	0	0	9	0
	Cadmium	7	0	0	12	0	0	9	0
	Copper	10	0	3	12	0	0	9	0
	Lead	7	0	0	0	0	0	9	0
	Molybdenum	7	0	0	0	0	0	9	0
	Nickel	7	0	0	12	0	0	9	0
	Selenium	7	0	0	12	0	0	9	0
	Zinc	7	0	0	12	0	0	9	0
Carbamates	Aldicarb	7	0	0	12	0	0	9	12
	Carbaryl	7	0	0	12	0	0	9	12
	Carbofuran	7	0	0	12	0	0	9	12

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Diuron	7	0	0	12	0	0	9	12
	Linuron	7	0	0	12	0	0	9	12
	Methiocarb	7	0	0	12	0	0	9	12
	Methomyl	7	0	0	12	0	0	9	12
	Oxamyl	7	0	0	12	0	0	9	12
Group A Pesticides	Aldrin	3	0	0	0	0	0	0	0
	Chlordane	3	0	0	0	0	0	0	0
	Endosulfan I	3	0	0	0	0	0	0	0
	Endosulfan II	3	0	0	0	0	0	0	0
	HCH, alpha	3	0	0	0	0	0	0	0
	HCH, beta	3	0	0	0	0	0	0	0
	HCH, delta	3	0	0	0	0	0	0	0
	HCH, gamma	3	0	0	0	0	0	0	0
	Heptachlor	3	0	0	0	0	0	0	0
	Heptachlor epoxide	3	0	0	0	0	0	0	0
	Toxaphene	3	0	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	12	0	0	9	12
	Cyanazine	7	0	0	12	0	0	9	12
	Glyphosate	7	0	0	12	0	0	9	2
	Paraquat	7	0	0	12	0	0	9	2
	Simazine	7	0	0	12	0	0	9	12
	Trifluralin	0	0	0	12	0	0	9	12
Organochlorines	DDD(p,p')	10	0	0	12	0	0	9	0
	DDE(p,p')	10	0	0	12	0	0	9	0
	DDT(p,p')	10	0	0	12	0	0	9	0
	Dicofol	10	0	0	12	0	0	9	0
	Dieldrin	10	0	0	12	0	0	9	0
	Endrin	10	0	0	12	0	0	9	0
	Methoxychlor	10	0	0	12	0	0	9	0
Organophosphates	Azinphos methyl	7	0	0	12	0	0	9	12
	Chlorpyrifos	7	0	0	12	0	0	9	12
	Demeton-s	0	0	0	0	12	0	9	12
	Diazinon	7	0	0	12	0	0	9	12
	Dichlorvos	0	0	0	0	12	0	9	12
	Dimethoate	7	0	0	12	0	0	9	12
	Disulfoton	7	0	0	12	0	0	9	12
	Malathion	7	0	0	12	0	0	9	12
	Methamidophos	7	0	0	12	0	0	9	12
	Methidathion	7	0	0	12	0	0	9	12
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	7	0	0	12	0	0	9	12
	Phorate	7	0	0	12	0	0	9	12
	Phosmet	7	0	0	12	0	0	9	12
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	0	0	0	0	0	0	0	0
	Cyfluthrin, total	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	0	0	0	0	0	0	0	0
	Cypermethrin, total	0	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	0	0	0	0	0	0	0	0
	Permethrin, total	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sediment Pesticides	Bifenthrin	0	0	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	9	0	0	12	4	1	9	12
	Pimephales promelas	0	0	0	12	0	0	9	12
	Selenastrum capricornutum	12	0	4	12	5	0	9	12
	Hyalella azteca	2	0	0	2	0	0	2	2

Table VIII-4. Mokelumne River @ Bruella Rd Management Plan Monitoring schedule (2007-2013, 2015 WY).
There was no MPM from January through September 2014.

Site Name	Sample Date	Monitoring Type	Copper	*C. dubia*	*S. capricornutum*
Mokelumne River @ Bruella Rd	6/20/2007	Add.		X	
Mokelumne River @ Bruella Rd	8/28/2007	Add.			X
Mokelumne River @ Bruella Rd	9/25/2007	Add.		X	
Mokelumne River @ Bruella Rd	5/7/2008	Add.			X
Mokelumne River @ Bruella Rd	6/3/2008	Add.	X	X	
Mokelumne River @ Bruella Rd	7/8/2008	Add.	X		X
Mokelumne River @ Bruella Rd	8/5/2008	Add.	X		X
Mokelumne River @ Bruella Rd	9/9/2008	Add.		X	
Mokelumne River @ Bruella Rd	4/13/2010	MPM			X
Mokelumne River @ Bruella Rd	5/11/2010	MPM			X
Mokelumne River @ Bruella Rd	6/8/2010	MPM	X		
Mokelumne River @ Bruella Rd	7/13/2010	MPM	X		X
Mokelumne River @ Bruella Rd	8/10/2010	MPM	X		X
Mokelumne River @ Bruella Rd	2/8/2011	MPM		X	
Mokelumne River @ Bruella Rd	3/8/2011	MPM		X	X
Mokelumne River @ Bruella Rd	4/12/2011	MPM			X
Mokelumne River @ Bruella Rd	5/24/2011	MPM			X
Mokelumne River @ Bruella Rd	6/28/2011	MPM	X	X	
Mokelumne River @ Bruella Rd	7/26/2011	MPM	X		X
Mokelumne River @ Bruella Rd	8/23/2011	MPM	X		X
Mokelumne River @ Bruella Rd	9/20/2011	MPM		X	
Mokelumne River @ Bruella Rd	2/14/2012	MPM		X	
Mokelumne River @ Bruella Rd	3/15/2012	MPM		X	X
Mokelumne River @ Bruella Rd	4/12/2012	MPM			X
Mokelumne River @ Bruella Rd	5/16/2012	MPM			X
Mokelumne River @ Bruella Rd	6/19/2012	MPM		X	
Mokelumne River @ Bruella Rd	7/17/2012	MPM			X
Mokelumne River @ Bruella Rd	8/21/2012	MPM			X
Mokelumne River @ Bruella Rd	9/18/2012	MPM		X	
Mokelumne River @ Bruella Rd	2/21/2013	MPM		X	
Mokelumne River @ Bruella Rd	3/17/2015	MPM			X
Mokelumne River @ Bruella Rd	4/21/2015	MPM			X
Mokelumne River @ Bruella Rd	5/19/2015	MPM			X
Mokelumne River @ Bruella Rd	7/21/2015	MPM			X

Site Name	Sample Date	Monitoring Type	Copper	*C. dubia*	*S. capricornutum*
Mokelumne River @ Bruella Rd	8/18/2015	MPM			X

Add. – Additional sampling
X – Constituent sampled for Management Plan Monitoring (MPM).

Monitoring Results

During the 2015 WY, water column toxicity to *S. capricornutum* was monitored in March, June and July, 2015. Five samples (including field duplicates) collected during monitoring at Mokelumne River @ Bruella Rd were toxic to *S. capricornutum*: on March 17, 2015 (63% of control), on June 16, 2015 (82% of control),and on July 21, 2015 (63% of control). There were also three exceedances of the WQTL for pH (Table VIII-5).

Table VIII-5 is a tally of exceedances of WQTLs from 2004 through September 2015 for management plan constituents in the Mokelumne River @ Bruella Rd site subwatershed. Table VIII-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances in the Mokelumne River @ Bruella Rd site subwatershed since monitoring began is provided in Appendix II, Table II-8.

Table VIII-5. Mokelumne River @ Bruella Rd management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-8.

Monitoring Year	Management Plan Constituents			Completed Management Plans		
	pH <6.5 and >8.5 units	*E. coli*, >235 MPN/100 mL	*S. capricornutum*, (%Control)	Dissolved oxygen, <7 mg/L	Copper (Total) Variable[1] or >1300 µg/L	*C. dubia*, (%Control)
2004	0	0	1	0	NA	1
2005	0	0	2	2	NA	2
2006	2	0	0	2	0	2
2007	1	0	1	0	3	0
2008	0	1	6	0	0	0
2009	2	1	NA	1	NA	NA
2010	1	0	0	0	0	NA
2011	3	2	0	0	0	0
2012	1	1	0	0	NA	0
2013	1	1	NA	0	NA	0
2014 WY*	1	0	1	0	0	0
2015 WY	3	0	3	0	0	0
Overall Tally	**15**	**6**	**14**	**5**	**3**	**5**

[1] Metal WQTL variable based on hardness.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table VIII-6. Mokelumne River site subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. There was no MPM from January through September 2014. Exceedance values are in bold.

	Month:	Jan	Feb		Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007 NM (@ Bruella Rd)	Date	NA	2/11/07	2/28/07	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07	NA	NA	NA
	C. dubia toxicity (% Control)	NA	100	100	NA	105	95	90	100	100	100	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	150	121	NA	132	141	186	**57**[1]	138	118	NA	NA	NA
2007 MPM (@ Bruella Rd)	Date	NA	NA		NA	NA	NA	6/20/07	NA	8/28/07	9/25/07	NA	NA	NA
	C. dubia toxicity (% Control)	NA	NA		NA	NA	NA	100	NA	NA	100	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA	NA	NA	NA	NA	76	NA	NA	NA	NA
2008 NM (@ Bruella Rd)	Date	1/23/08	NA		NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08	NA	NA	NA
	Copper, total (µg/L)	0.9	NA		NA	1.5	1.4	0.8	1.2	0.9	1.1	NA	NA	NA
	C. dubia toxicity (% Control)	100	NA		NA	100	100	100	100	100	100	NA	NA	NA
	S. capricornutum toxicity (% Control)	120	NA		NA	**44**	**27**	110	116	87	98	NA	NA	NA
2008 MPM (@ Bruella Rd)	Date	NA	NA		NA	NA	5/7/08	6/3/08	7/8/08	8/5/08	9/9/08	NA	NA	NA
	Copper, total (µg/L)	NA	NA		NA	NA	NA	1.4	1.2	1.1	NA	NA	NA	NA
	C. dubia toxicity (% Control)	NA	NA		NA	NA	NA	100	NA	NA	100	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA	NA	**10**	NA	**82**[1]	314	NA	NA	NA	NA
2010 MPM (@ Bruella Rd)	Date	NA	NA		NA	4/13/10	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	NA	NA	NA
	Copper, dissolved (µg/L)	NA	NA		NA	NA	NA	0.68	0.27	0.47	NA	NA	NA	NA
	Copper, total (µg/L)	NA	NA		NA	NA	NA	1	0.56	0.73	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA	189	444	NA	327	871	NA	NA	NA	NA
2011 NM & MPM (@ Bruella Rd)	Date	1/11/11	2/8/11		3/8/11	4/12/11	5/24/11	6/28/11	7/26/11	8/23/11	9/20/11	10/6/11	11/15/11	12/13/11
	Copper, dissolved (µg/L)	0.72	0.56		0.66	0.66	0.42	0.27*	0.36*	0.50*	0.62	0.41	0.51	0.51
	Copper, total (µg/L)	1.5	0.74		1.1	1.8	1.2	0.86*	0.80*	0.83*	1.2	1.2	1.4	0.84
	C. dubia toxicity (% Control)	100	100*		100*	100	100	105*	100	95	100*	100	100	100
	S. capricornutum toxicity (% Control)	211	470		590*	813*	419*	215	530*	371*	117	581	303	362
2012 MPM (@ Bruella Rd)	Date	NA	2/14/12		3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12	9/18/12	NA	NA	NA
	C. dubia toxicity (% Control)	NA	100		105	NA	NA	80	NA	NA	100	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		130	176	434	NA	159	102	NA	NA	NA	NA
2013 MPM (@Bruella Rd)	Date	NA	2/21/13		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C. dubia toxicity (% Control)	NA	100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014 WY & 2015 WY, NM & MPM	Date	1/28/14	2/11/14	3/3/14	4/15/14	5/20/14	6/17/14	7/15/14	8/19/14	9/16/14	10/21/14	11/18/14	12/4/14
	S. capricornutum toxicity (% Control)	165	210	177	161	58	232	342	206	179	216	184	318
2015 NM & MPM (@ Bruella Rd)	Date	1/20/15	2/9/15	3/17/15	4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15	Oct	Nov	Dec
	S. capricornutum toxicity (% Control)	117	175	**63***	107*	102*	**82**	**63***	110*	145			

[1] *S. capricornutum* toxicity was resampled the following week. Toxicity was not persistent.

MPM – Management Plan Monitoring.

NA – Not Applicable. No monitoring occurred on this date for this constituent.

NM – Normal Monitoring

*NM and MPM sampling occurred during this date for this constituent.

Resampling (RS) due to toxicity not included in table.

Source Identification and Outreach

Sourcing analyses for past exceedances of Mokelumne River @ Bruella Rd management plan constituents are evaluated in past years' site subwatershed appendices. During the 2015 WY, monitoring at Mokelumne River @ Bruella Rd resulted in five samples toxic to *S. capricornutum* (including field duplicates); there were also three exceedances of the WQTL for pH.

Samples collected during MPM on March 17, 2015 were toxic to *S. capricornutum* (63% growth compared to the control in the environmental samples and 69% growth compared to the control in the field duplicate). Based on PUR data associated with the toxicity in March, there were 169 applications of herbicides from January 10, 2015 through March 17, 2015 that potentially contributed to the water column toxicity to *S. capricornutum*. A variety of herbicides were applied across 4,592 acres of primarily wine grapes, cherry, walnut, and apple orchards containing a total of 199 lbs of differing AIs. The Coalition also sampled for a suite of herbicides on the corresponding sampling event and there were no detections.

Samples collected during NM on June 16, 2015 were toxic to *S. capricornutum* (June 16, 2015 (82% growth compared to the control in the field duplicate). Based on the PUR data associated with the toxicity in June, there were 170 applications of herbicides from March 25, 2015 through June 15, 2015 that potentially contributed to the water column toxicity to *S. capricornutum*. There were a total of 11,283 lbs of AI of herbicides applied across 4,999 acres of primarily wine grapes, and lesser of cherry, walnut, and corn. Similar to the March sampling event, the Coalition also sampled for a suite of herbicides on the corresponding June sampling event and there were no detections.

Samples collected during MPM on July 21, 2015 were toxic to *S. capricornutum* (63% growth compared to the control in the environmental sample and 60% growth compared to the control in the field duplicate). Based on the PUR data associated with the toxicity in July, there were 74 applications of herbicides from April 29, 2015 through July 21, 2015 that potentially contributed to the toxicity. There were a total of 2,585 lbs of AI of herbicides applied across 1,976 acres of primarily wine grapes and walnuts. During the corresponding sampling event, there was a detection of copper (0.58 µg/L in the environmental sample and 0.61 µg/L in the field duplicate) in the waterbody; although it was not an exceedance of the WQTL, the detected concentration of copper could have potentially contributed to the toxicity.

During the 2015 WY, there were three exceedances of the WQTL for pH. Causes of fluctuating levels of pH can be both natural and anthropogenic. Low pH is primarily caused by anthropogenic influences such as atmospheric deposition of air pollutants and mine drainage, neither of which is caused by agricultural sources. Agricultural factors that cause elevated pH level are limited to stormwater and irrigation runoffs; runoffs of lime-rich fertilizers or nitrogen-rich organic matter can cause fluctuations in pH levels. As previously discussed, study results on the water quality parameters associated with pH have been submitted to the Regional Board. Additional investigation of the factors affecting pH concentrations in surface waters is pending further discussion with the Regional Board.

Outreach

The Coalition initiated its management practice tracking and outreach at the Mokelumne River @ Bruella Rd site subwatershed during 2011 with targeted growers. Between 2011 and 2012, the Coalition contacted 12 growers farming 937 acres within the site subwatershed and documented current management practices (MPUR, 2013). The most common management practices in 2010 were use of center grass rows, grass waterways, or grass filter strips (32% of acres with recorded practices). Other management practices currently in place include reducing the use of pesticide of concern (28% of acres with recorded practices), reducing runoff volumes using irrigation management (25% of acres with recorded practices), and installation of sprinkler or micro irrigation (15% of acres with recorded practices). In 2010, 100% of targeted members had one or more management practices that were specific to runoff management and/or pesticide application management. Eleven growers participated in follow-up contacts and documented newly implemented management practices in 2012. A final analysis of follow up surveys indicate that reducing use of the pesticide of concern and reducing runoff water volume using irrigation management were the most popular newly implemented practices accounting for 47% and 32% of the acreage with new management practices respectively.

Evaluation

Water quality has improved since focused outreach began in the Mokelumne River @ Bruella Rd site subwatershed in 2011. The Coalition completed focused outreach in the site subwatershed in 2013. Due to improved water quality, the Coalition received approval to complete the management plans for copper and DO in 2012, and *C. dubia* on February 27, 2013.

Next Steps

General outreach will continue to occur within the site subwatershed. In the 2016 WY, the Coalition will monitor for water column toxicity of *S. capricornutum* at Mokelumne River @ Bruella Rd as part of MPM and based on the monitoring strategy at the Core site, as described in the 2015 MPU. The parameters, *E. coli* and pH, will continue to be monitored as part of monitoring at a Core site.

IX. MORMON SLOUGH @ JACK TONE RD

Overview

Monitoring began at Mormon Slough @ Jack Tone Rd in 2006. During 2008, the Coalition conducted MPM. The Coalition began MPM again in 2011 during months of past exceedances and continued through September 2015. The Coalition completed focused outreach activities in 2014. Water quality results through the 2015 WY indicate improved water quality. The Coalition received approval to complete the management plans for water column toxicity to *S. capricornutum* and *C. dubia* on August 22, 2014 and December 18, 2015 respectively (Table IX-1). The constituents remaining in the site's management plan are chlorpyrifos, DO, and pH. The Coalition submitted results from a study on water quality parameters associated with the concentrations of DO and pH in the Coalition region to the Regional Board on February 22, 2016; a summary of the results from this study is provided in the Introduction section of this Appendix.

From October 2014 through September 2015, MPM occurred for chlorpyrifos and water column toxicity to *C. dubia;* no toxicity occurred. In July 2015, there was an exceedance of the WQTL for chlorpyrifos. Dissolved Oxygen and pH were monitored during every MPM event through September 2015; four exceedances of the WQTL for DO and three exceedances of the WQTL for the upper limit of pH occurred.

Mormon Slough @ Jack Tone Rd is a Represented site in Zone 2; Represented site monitoring is scheduled for diuron and sediment toxicity to *H. azteca* (2015 MPU). The Coalition will also conduct MPM for chlorpyrifos during months of past exceedances.

Table IX-1. Mormon Slough @ Jack Tone Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Chlorpyrifos	2007	2012-2014	Active
Constituents Requiring Source ID/Work Plans			
Dissolved Oxygen	2007	2012-2014	Active
pH	2009	2012-2014	Active
Completed Management Plans			
C. dubia water column toxicity	2009	2012-2014	2015
S. capricornutum water column toxicity	2009	2012-2014	2014

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

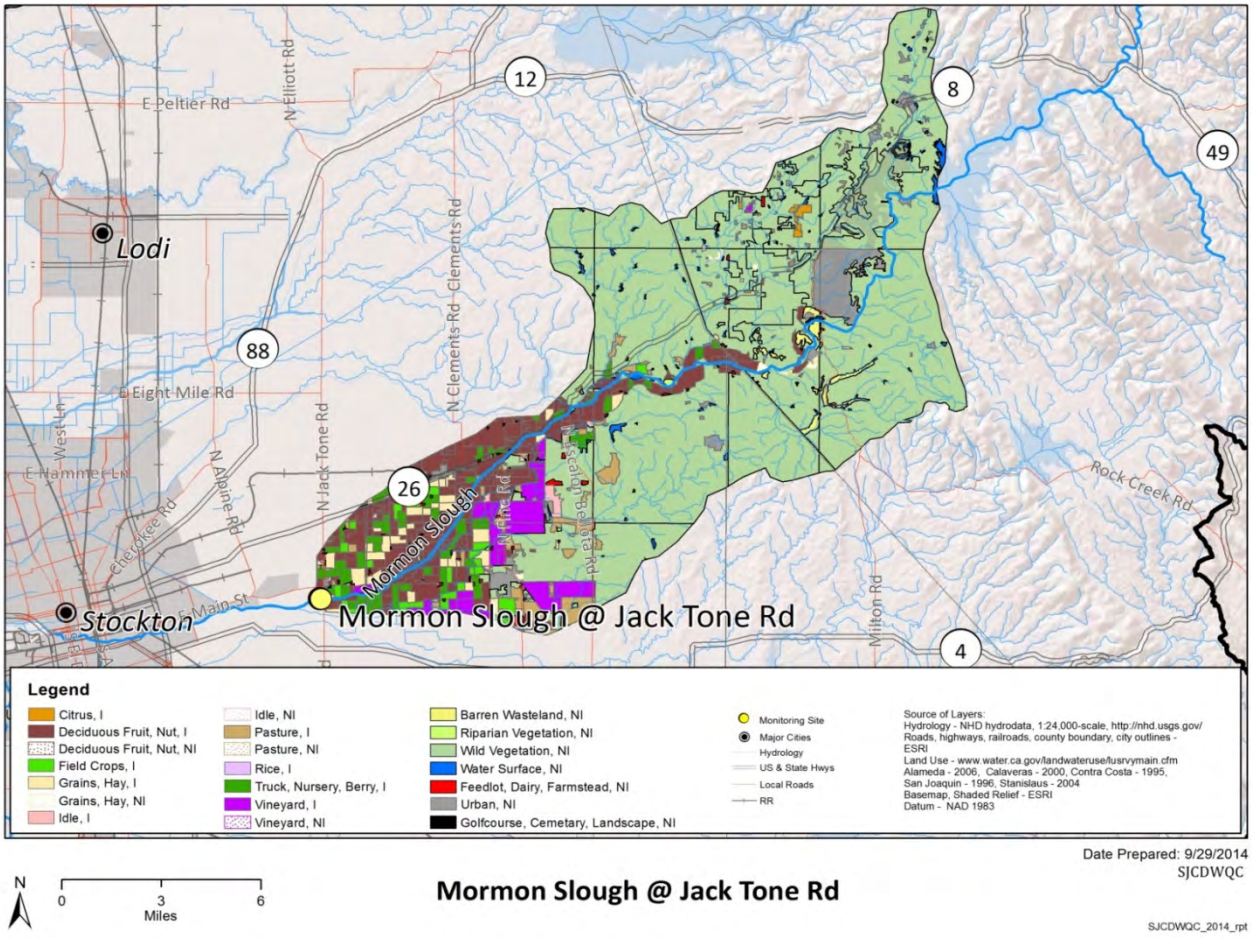
This Mormon Slough @ Jack Tone Rd site subwatershed is located on the eastern portion of San Joaquin County and extends upstream into Calaveras County (Table IX-2). This site subwatershed consists of 24,615 irrigated acres which primarily consist of deciduous trees with smaller amounts of vineyard, truck farm/nursery, and berry crops (Figure IX-1).

Mormon Slough (San Joaquin and Calaveras Counties) is on California's 303(d) List of Impaired Waterbodies for the section from Stockton Diverting Canal to Bellota Weir-Calaveras River for chlorpyrifos and unknown water column toxicity. The section of Mormon Slough from the Stockton Diverting Canal to Commerce Street is also listed for pathogens (last updated in 2010).

Table IX-2. Mormon Slough @ Jack Tone Rd site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Mormon Slough @ Jack Tone Rd	544MSAJTR	37.96470	-121.14880

Figure IX-1. Mormon Slough @ Jack Tone Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Mormon Slough @ Jack Tone Rd during the irrigation season of 2006 and continued through September 2008. No monitoring occurred from 2009 through 2010. Monitoring resumed in 2011 and has continued through the 2015 WY. The last time the full suite of constituents was collected at the site was in 2008 for this site subwatershed. Table IX-3 contains the number of events monitored per year and the constituents from 2008 through September 2015.

The Coalition initiated MPM at Mormon Slough @ Jack Tone Rd in 2008; actual MPM began in 2011. In an effort to source the chemicals that caused exceedances, additional MPM occurred for chlorpyrifos in 2008. In order to assess the efficacy of the Coalition's outreach strategy, MPM occurred for chlorpyrifos and toxicity to *C. dubia* from 2011 through September 2015 (Table IX-4). Prior to the approval of the completion of the management plan for toxicity to *S. capricornutum* on August 22, 2014, MPM occurred from 2011 through July 2014.

Table IX-3. Mormon Slough @ Jack Tone Rd sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	13	0	0	5	5	5	5	9
	Dry Sites	0	0	0	0	0	0	0	0
	Events Sampled	13	0	0	5	5	4[1]	5	9
Field and Physical Parameters	Dissolved Oxygen	0	0	0	5	5	4	5	9
	Dissolved Solids	7	0	0	0	0	0	0	0
	E. coli	7	0	0	0	0	0	0	0
	Grain size (sediment)	0	0	0	0	0	0	0	2
	Hardness as CaCO3	6	0	0	0	0	0	0	0
	pH	0	0	0	5	5	4	5	9
	Specific Conductivity	0	0	0	5	5	4	5	9
	Suspended Solids	0	0	0	0	0	0	0	0
	Total Organic Carbon	7	0	0	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	0	0	0	0	2
	Turbidity	7	0	0	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0	0	0
	Orthophosphate as P	6	0	0	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0
	Copper	0	0	0	0	0	0	0	0
	Lead	0	0	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0	0	0
Metals (Total)	Arsenic	6	0	0	0	0	0	0	0
	Boron	6	0	0	0	0	0	0	0
	Cadmium	6	0	0	0	0	0	0	0
	Copper	6	0	0	0	0	0	0	0
	Lead	6	0	0	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Nickel	6	0	0	0	0	0	0	0
	Selenium	6	0	0	0	0	0	0	0
	Zinc	6	0	0	0	0	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0	0	0
	Diuron	7	0	0	0	0	0	0	4
	Linuron	7	0	0	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0	0	0
	Methomyl	7	0	0	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0	0	0
	Paraquat	7	0	0	0	0	0	0	0
	Simazine	7	0	0	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0	0	0
	Dicofol	7	0	0	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0	0	0
	Endrin	7	0	0	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0	0	0
	Chlorpyrifos	9	0	0	4	4	3	4	4
	Demeton-s	0	0	0	0	0	0	0	0
	Diazinon	7	0	0	0	0	0	0	0
	Dichlorvos	0	0	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0	0	0
	Malathion	7	0	0	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0	0	0
	Methidathion	7	0	0	0	0	0	0	0
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0	0	0
	Phorate	7	0	0	0	0	0	0	0
	Phosmet	7	0	0	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Pyrethroids	Bifenthrin	7	0	0	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	8	0	0	2	2	1	2	2
	Pimephales promelas	7	0	0	0	0	0	0	0
	Selenastrum capricornutum	9	0	0	3	3	3	3	0
	Hyalella azteca	2	0	0	0	0	0	0	2

[1] Site was not accessible during September due to construction; samples were not collected.

Table IX-4. Mormon Slough @ Jack Tone Rd MPM schedule (2008-2015 WY).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	*C. dubia*	*S. capricornutum*
Mormon Slough @ Jack Tone Rd	5/7/2008	Add.	X		
Mormon Slough @ Jack Tone Rd	9/9/2008	Add.	X		
Mormon Slough @ Jack Tone Rd	4/12/2011	MPM			X
Mormon Slough @ Jack Tone Rd	5/24/2011	MPM	X	X	X
Mormon Slough @ Jack Tone Rd	7/26/2011	MPM	X		X
Mormon Slough @ Jack Tone Rd	8/23/2011	MPM	X		
Mormon Slough @ Jack Tone Rd	9/20/2011	MPM	X	X	
Mormon Slough @ Jack Tone Rd	4/12/2012	MPM			X
Mormon Slough @ Jack Tone Rd	5/16/2012	MPM	X	X	X
Mormon Slough @ Jack Tone Rd	7/17/2012	MPM	X		X
Mormon Slough @ Jack Tone Rd	8/21/2012	MPM	X		
Mormon Slough @ Jack Tone Rd	9/18/2012	MPM	X	X	
Mormon Slough @ Jack Tone Rd	4/2/2013	MPM			X
Mormon Slough @ Jack Tone Rd	5/21/2013	MPM	X	X	X
Mormon Slough @ Jack Tone Rd	7/16/2013	MPM	X		X
Mormon Slough @ Jack Tone Rd	8/20/2013	MPM	X		
Mormon Slough @ Jack Tone Rd	9/17/2013	MPM	X	X	
Mormon Slough @ Jack Tone Rd	4/15/2014	MPM			X
Mormon Slough @ Jack Tone Rd	5/20/2014	MPM	X	X	X
Mormon Slough @ Jack Tone Rd	7/15/2014	MPM	X		X
Mormon Slough @ Jack Tone Rd	8/19/2014	MPM	X		
Mormon Slough @ Jack Tone Rd	9/16/2014	MPM	X	X	
Mormon Slough @ Jack Tone Rd	5/19/2015	MPM	X	X	
Mormon Slough @ Jack Tone Rd	7/21/2015	MPM	X		
Mormon Slough @ Jack Tone Rd	8/18/2015	MPM	X		
Mormon Slough @ Jack Tone Rd	9/15/2015	MPM	X	X	

Add. – Additional sampling

X – Constituent sampled for Management Plan Monitoring (MPM)

In the 2015 WY, MPM occurred for chlorpyrifos (May, July, and August) and water column toxicity to *C. dubia* (May and September); no toxicity occurred (Table IX-5). On July 21, 2015, there was an exceedance of the WQTL for chlorpyrifos (0.029 µg/L). The last exceedance of the WQTL occurred in September 2011. On December 18, 2015 the Coalition received approval to complete the *C. dubia* management plan; the last toxicity occurred in 2008. Dissolved Oxygen and pH were measured during all MPM events during the 2015 WY. Four exceedances of the WQTL for DO occurred in November, December, March, and September, and three exceedances of the upper WQTL for pH occurred in January, May, and July of 2015.

Table IX-5 is a tally of exceedances of WQTLs from 2006 through September 2015 for management plan constituents in the site subwatershed. Table XI-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances in the site subwatershed since monitoring began is provided in Appendix II, Table II-9.

Table IX-5. Mormon Slough @ Jack Tone Rd management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-9.

Monitoring Year	Management Plan Constituents			Completed Management Plans	
	Dissolved Oxygen, <7 mg/L	pH, <6.5 and >8.5 units	Chlorpyrifos, >0.015 µg/L	*C. dubia*, (%Control)	*S. capricornutum*, (%Control)
2006	3	0	1	0	0
2007	3	0	1	1	1
2008	5	4	5	1	3
2011	0	2	1	0	0
2012	2	1	0	0	0
2013	1	2	0	0	0
2014 WY*	2	3	0	0	0
2015 WY	4	3	1	0	NA
Overall Tally	**20**	**15**	**9**	**2**	**4**

*2014 includes January through September results only.

Table IX-6. Mormon Slough @ Jack Tone Rd site subwatershed monitoring results for MPM constituents since management plan initiation.
Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Dec
2008 MPM (@ Jack Tone Rd)	Date:	NA	NA	NA	NA	5/7/08	NA	NA	NA	9/9/08	NA	NA
	Chlorpyrifos µg/L	NA	NA	NA	NA	<0.003	NA	NA	NA	**0.034**	NA	NA
2008 NM (@ Jack Tone Rd)	Date:	1/23/08	NA	NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08	NA	NA
	Chlorpyrifos µg/L	0.007	NA	NA	**0.15**	**0.066**	<0.003	**0.047**	**0.025**	**0.036**	NA	NA
2011 MPM (@ Jack Tone Rd)	Date:	NA	NA	NA	4/12/11	5/24/11	NA	7/26/11	8/23/11	9/20/11	NA	NA
	Chlorpyrifos µg/L	NA	NA	NA	NA	<0.003	NA	<0.003	<0.003	**0.11**	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	100	NA	NA	NA	100	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	1323	637	NA	699	NA	NA	NA	NA
2012 MPM (@ Jack Tone Rd)	Date:	NA	NA	NA	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12	9/18/12	NA	NA
	Chlorpyrifos µg/L	NA	NA	NA	NA	<0.003	NA	<0.003	<0.003	<0.003	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	100	NA	NA	NA	100	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	237	155	NA	129	NA	NA	NA	NA
2013 MPM (@ Jack Tone Rd)	Date	NA	NA	NA	4/2/13	5/21/13	NA	7/16/13	8/20/13	9/17/13	NA	NA
	Chlorpyrifos µg/L	NA	NA	NA	NA	<0.003	NA	<0.003	<0.003	NA[1]	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	100	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	480	467	NA	264	NA	NA	NA	NA
2014 MPM (@ Jack Tone Rd)	Date	NA	NA	NA	4/15/14	5/20/14	NA	7/15/14	8/19/14	9/16/14	NA	NA
	Chlorpyrifos µg/L	NA	NA	NA	NA	<0.003	NA	<0.003	<0.003	<0.003	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	100	NA	NA	NA	100	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	178	302	NA	319	NA	NA	NA	NA
2015 NM & MPM (@ Jack Tone Rd)	Date	NA	NA	NA	NA	5/19/15	NA	7/21/15	8/18/15	9/15/15		
	Chlorpyrifos µg/L	NA	NA	NA	NA	<0.003	NA	**0.029**	0.012	0.008		
	C. dubia toxicity (% Control)	NA	NA	NA	NA	100	NA	NA	NA	100		

MPM – Management Plan Monitoring.
NA – Not Applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring
[1] Site was not accessible due to construction; samples were not collected

Table IX-7. Mormon Slough @ Jack Tone Rd. site subwatershed instantaneous load calculations for chlorpyrifos.
If discharge was unable to be measured or the analyte was ND, the result is not included in the table.

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Mormon Slough @ Jack Tone Rd.	Chlorpyrifos	9/15/2015	0.3	0.008	µg/L	0	µg/sec

[1] Load = Discharge (cfs) X 28.317L/ft3 X Concentration (µg/L). To convert a concentration measured in mg/L to µg/L multiply by 1000. The load values calculated represent instantaneous loads only, and should not be used to extrapolate loading over any period of time.

Source Identification and Outreach

Sources for exceedances of the WQTLs for Mormon Slough @ Jack Tone Rd management plan constituents were evaluated in past year's site subwatershed appendices. During the 2015 WY, MPM resulted in one exceedance of the chlorpyrifos WQTL exceedance and no toxicity to *C. dubia*.

On July 21, 2015, sampling resulted in an exceedance of the WQTL for chlorpyrifos (0.029 µg/L). Based on PUR data associated with the exceedance, a total of 10 applications of chlorpyrifos occurred during the 20 days prior to the July 21, 2015 sampling event. The 10 applications resulted in a total of 1,764 lbs of AI chlorpyrifos being applied across 950 acres in the site subwatershed. The applications occurred during the peak of irrigation season, and therefore, it is likely that irrigation tailwater runoff carried the pesticides into the water.

Field parameters, DO and pH, were measured during all MPM events through September 2015. Exceedances of the WQTLs for DO (4) occurred and pH (3) occurred. Exceedances of field parameters such as DO and pH are difficult to track and source because the values are non-conserved, and can fluctuate as water moves downstream. However, low flow in the waterway can cause exceedances of the WQTL for DO. As previously discussed, study results on the water quality parameters associated with DO and pH has been submitted to the Regional Board.

Outreach

Focused outreach to document current management practices and track implementation of new management practices in the Mormon Slough @ Jack Tone Rd site subwatershed began in 2012 and continued through September 2014. The Coalition contacted 29 targeted growers farming 1,789 acres within the site subwatershed (2013 MPUR) and current management practices were documented in 2011. Targeted growers already had management practices in place. A final analysis of follow-up surveys indicate that reducing the use of chlorpyrifos and reducing tailwater volume were the most commonly implemented practices occurring on 51% and 31% of the acreage with new management practices, respectively. Installation of sprinklers or micro irrigation was the third most implemented practice at 15%.

Evaluation

Focused outreach was completed in 2014 within the Mormon Slough @ Jack Tone Rd site subwatershed. Water quality has improved over time since monitoring began in 2006. The management plans for water column toxicity to *S. capricornutum* and *C. dubia* have been approved for completion.

Next Steps

Represented site monitoring for diuron and sediment toxicity to *H. azteca* will occur based on past exceedances in the Zone 2 Core site, French Camp Slough @ Airport Way. The Coalition will conduct MPM for chlorpyrifos; field parameters, DO and pH, will continue to be monitored during all monitoring events.

X. ROBERTS ISLAND @ WHISKEY SLOUGH PUMP

Overview

Monitoring at Roberts Island @ Whiskey Pump Slough began in 2012 when the site replaced Roberts Island Drain along House Rd and Roberts Island Drain @ Holt Rd as the Core site in Zone 4. In 2015, focused outreach was completed within the site subwatershed. All members who planned to implement new management practices received follow-up surveys, and all returned their surveys. Tithe Roberts Island @ Whiskey Slough Pump management plan includes constituents that were listed in both the Roberts Island @ Holt Rd and Roberts Island Drain along House Rd management plans: chlorpyrifos, DDE, diuron, DO, *E. coli,* pH, SC, TDS, water column toxicity to *C. dubia* and *S. capricornutum,* and sediment toxicity to *H. azteca* (Table X-1).

On December 18, 2015, the Coalition received approval to complete the management plans for chlorpyrifos, diuron, and sediment toxicity to *H. azteca* due to three or more years of no exceedances of the WQTL. The Coalition submitted results from a study on water quality parameters associated with the concentrations of DO and pH in the Coalition region to the Regional Board on February 22, 2016 and will submit the results from a study on water quality parameters associated with the concentrations of DDE on May22, 2016. A summary of the results from the DO and pH study is provided in the Introduction section of this Appendix or, in the case of the DDE study, will be provided in the Annual Report for the 2017 WY. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.*

In the 2015 WY, the Coalition conducted MPM for chlorpyrifos, diuron, water column toxicity to *C. dubia* and *S. capricornutum,* and sediment toxicity to *H. azteca.* Monitoring resulted in two samples toxic to *S. capricornutum* in February and May 2015. In addition to MPM, monitoring occurred on a monthly basis at Roberts Island @ Whiskey Slough Pump to monitor general water quality parameters. Monitoring during the 2015 WY resulted in exceedances of the WQTLs for DO (11), *E. coli* (7), pH (1), and SC (10).

Roberts Island @ Whiskey Slough Pump is a Core site in Zone 4; monthly Core site monitoring will occur in the 2016 WY (2015 MPU). Management Plan Monitoring is scheduled for water column toxicity to *C. dubia* and *S. capricornutum.* Field parameters such as DO, pH, and SC will be measured during every monitoring event.

Table X-1. Roberts Island @ Whiskey Slough Pump management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
C. dubia water column toxicity	2009	2013-2015	NA
S. capricornutum water column toxicity	2009	2013-2015	NA
Constituents Requiring Source ID/Work Plans			
DDE	2007	2013-2015	NA

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Dissolved Oxygen	2007	2013-2015	NA
E. coli	2007	2013-2015	NA
pH	2007	2013-2015	NA
Specific Conductivity	2007	2013-2015	NA
Completed Management Plans			
Chlorpyrifos	2007	2013-2015	2015
Diuron	2009	2013-2015	2015
H. azteca sediment toxicity	2007	2013-2015	2015

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Roberts Island @ Whiskey Slough Pump site subwatershed consists of 11,716 irrigated acres, and the agriculture primarily includes asparagus, field crops, grains, alfalfa, and pasture (Figure X-1). Roberts Island @ Whiskey Slough Pump drains all of Roberts Island north of Hwy 4 through a pump located along McDonald Road on the western edge of the island. The Roberts Island @ Whiskey Slough Pump site replaced Roberts Island Drain along House Rd and Roberts Island Drain @ Holt Rd as the Core site on January 12, 2012 because it is more representative of the entire island (Table X-2).

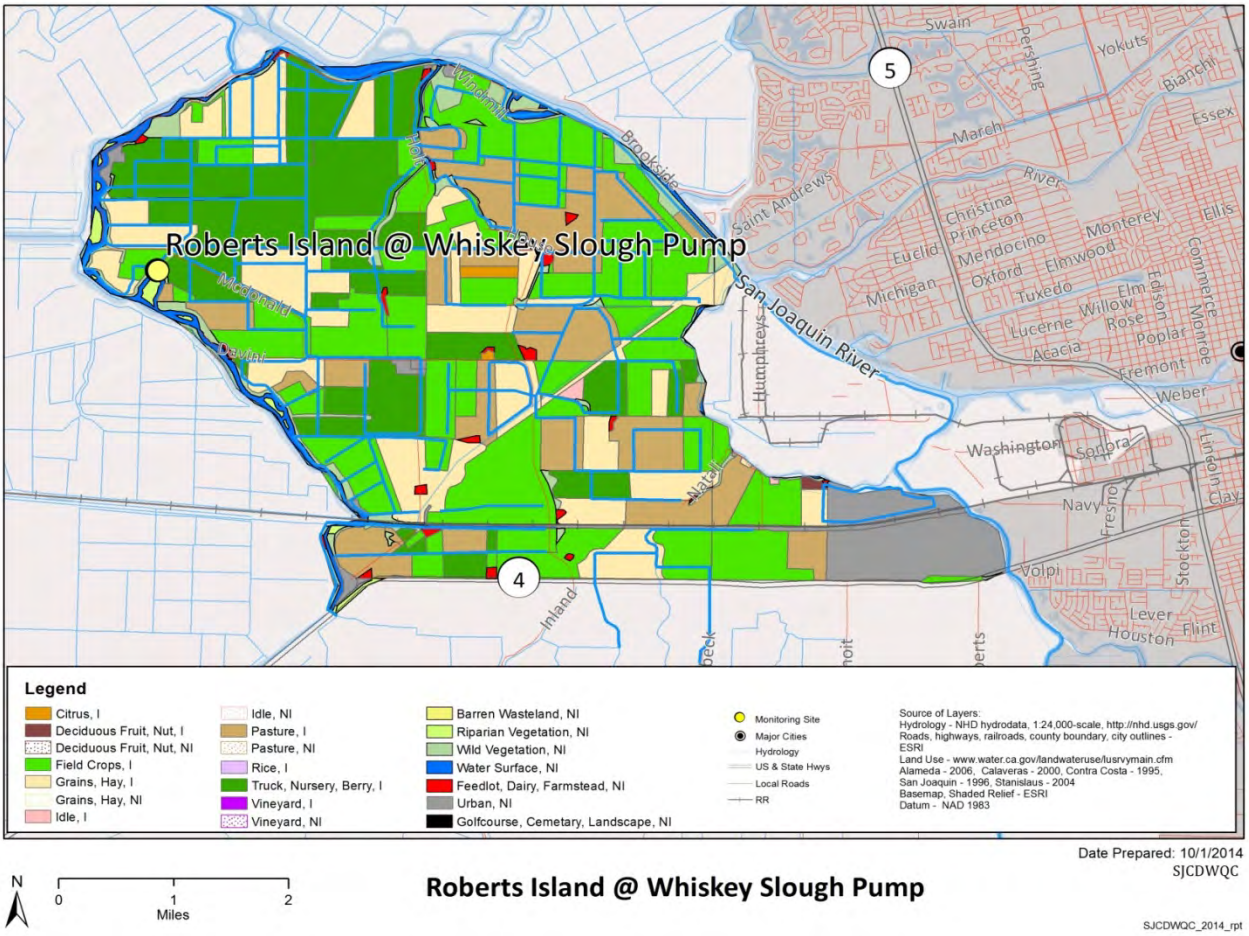
Roberts Island Drain is not considered impaired according to California's 303(d) List of Impaired Waterbodies. However, the represented TMDL subareas are listed as impaired (export area, central, southern and western portions) for chlorpyrifos, DDT, diazinon, electrical conductivity, group A pesticides, invasive species, mercury and unknown water column toxicity (303(d) list (last updated in 2010). The potential sources of the constituents are agriculture (chlorpyrifos, DDT, diazinon, EC and group A pesticides), unknown source (invasive species and unknown water column toxicity), and resource extraction (mercury).

Table X-2. Roberts Island site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Roberts Island @ Whiskey Slough Pump	544RIAWSP	37.96737	-121.46434
Roberts Island Drain @ Holt Rd [DS]	544RIDAHT	37.95560	-121.42230
Roberts Island Drain along House Rd [US]	544RIDAHR	37.97020	-121.40740

US Upstream site
DS Downstream site

Figure X-1. Roberts Island @ Whiskey Slough Pump site subwatershed land use map.



Subwatershed Monitoring History

Monitoring was conducted at Roberts Island Drain @ Holt Rd (544RIDAHR in Table X-3) and Roberts Island Drain along House Rd (544RIDAHT in Table X-3), from May 2006 through September 2008. Monitoring at Roberts Island Drain @ Holt Rd continued through 2011. On January 12, 2012 monitoring at Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd was discontinued because the sites were not representative of the entire island. Roberts Island @ Whiskey Slough Pump (544RIAWSP in Table X-3) replaced these two sites as the Core site in Zone 4 in 2012. The last time the full suite of constituents was collected at the site was in 2014 for the Roberts Island @ Whiskey Slough Pump site subwatershed. Table X-3 contains the number of events monitored per year and the constituents from 2006 through the 2015 WY. In addition to MPM, monitoring monthly for Core site constituents, as outline in the MPU, occurred at Roberts Island @ Whiskey Slough Pump in 2013.

The Coalition began MPM during months of past exceedances at Roberts Island @ Whiskey Slough Pump in 2012 and continued through September 2015 (Table X-4).

Table X-3. Roberts Island sampling events and analyses per year.

Listed by Group. Only environmental samples are counted.

Type	Analyte	544RIDAHR			544RIDAHT						544RIAWSP			
		2006	2007	2008	2006	2007	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	5	12	13	5	13	15	12	12	14	12	12	10	12
	Dry Sites	0	0	0	0	0	0	0	0	0	0	0	0	0
	Events Sampled	5	12	13	5	13	15	12	12	14	12	12	10	12
Field and Physical Parameters	Dissolved Oxygen	5	12	13	5	13	15	12	12	14	12	12	10	12
	Dissolved Solids	5	8	7	5	8	10	12	12	12	12	12	9	0
	E. coli	5	8	7	5	8	10	12	12	12	12	12	9	12
	Grain size (sediment)	0	0	0	0	0	0	0	0	2	2	2	2	2
	Hardness as CaCO3	0	0	6	0	0	6	0	0	12	0	0	9	4
	pH	5	12	13	5	13	15	12	12	14	12	12	10	12
	Specific Conductivity	5	12	13	5	13	15	12	12	14	12	12	10	12
	Suspended Solids	0	0	0	0	0	3	12	12	12	12	12	9	12
	Total Organic Carbon	5	8	7	5	8	10	12	12	12	12	12	9	12
	Total Organic Carbon (sediment)	0	0	0	0	0	0	0	0	2	2	2	2	2
	Turbidity	5	8	7	5	8	10	12	12	12	12	12	9	12
Nutrients	Ammonia as N	0	0	6	0	0	9	12	12	12	12	12	9	12
	Nitrate + Nitrite as N	0	0	0	0	0	3	12	12	12	12	12	9	12
	Nitrate as N	0	1	6	0	1	6	0	0	0	0	0	0	0
	Nitrite as N	0	1	6	0	1	6	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	0	0	6	0	0	9	12	12	12	12	12	9	0
	Orthophosphate as P	0	1	6	0	1	9	12	12	12	12	12	9	12
	Phosphate as P	0	0	6	0	0	9	12	12	12	12	12	9	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0	12	0	0	9	0
	Copper	0	0	0	0	0	0	0	0	12	0	0	9	4
	Lead	0	0	0	0	0	0	0	0	12	0	0	9	0
	Nickel	0	0	0	0	0	0	0	0	12	0	0	9	0
	Zinc	0	0	0	0	0	0	0	0	12	0	0	9	0
Metals (Total)	Arsenic	0	0	6	0	0	6	0	0	12	0	0	9	4
	Boron	0	0	6	0	0	6	0	0	12	0	0	9	0
	Cadmium	0	0	6	0	0	6	0	0	12	0	0	9	0
	Copper	0	0	6	0	0	6	0	0	12	0	0	9	0
	Lead	0	0	6	0	0	6	0	0	12	0	0	9	0
	Molybdenum	0	0	0	0	0	0	0	0	12	0	0	9	0
	Nickel	0	0	6	0	0	6	0	0	12	0	0	9	0
	Selenium	0	0	6	0	0	6	0	0	12	0	0	9	0
	Zinc	0	0	6	0	0	6	0	0	12	0	0	9	0
Carbamates	Aldicarb	5	8	7	5	8	7	0	0	12	0	0	9	12
	Carbaryl	5	8	7	5	8	7	0	0	12	0	0	9	12
	Carbofuran	5	8	7	5	8	7	0	0	12	0	0	9	12
	Diuron	5	8	7	5	8	7	0	0	12	2	2	9	12
	Linuron	5	8	7	5	8	7	0	0	12	0	0	9	12
	Methiocarb	5	8	7	5	8	7	0	0	12	0	0	9	12
	Methomyl	5	8	7	5	8	7	0	0	12	0	0	9	12
	Oxamyl	5	8	7	5	8	7	0	0	12	0	0	9	12
Group A Pesticides	Aldrin	0	0	0	0	0	3	12	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	3	12	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	3	12	0	0	0	0	0	0

Type	Analyte	544RIDAHR			544RIDAHT						544RIAWSP			
		2006	2007	2008	2006	2007	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Endosulfan II	0	0	0	0	0	3	12	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	3	12	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	3	12	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	3	12	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	3	12	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	3	12	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	3	12	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	3	12	0	0	0	0	0	0
Herbicides	Atrazine	5	8	7	5	8	7	0	0	12	0	0	9	12
	Cyanazine	5	8	7	5	8	7	0	0	12	0	0	9	12
	Glyphosate	5	8	7	5	8	7	0	0	12	0	0	9	2
	Paraquat	5	8	7	5	8	7	0	0	12	0	0	9	2
	Simazine	5	8	7	5	8	7	0	0	12	0	0	9	12
	Trifluralin	0	0	0	0	0	0	0	0	12	0	0	9	12
Organochlorines	DDD(p,p')	5	8	7	5	8	10	12	0	12	0	0	9	0
	DDE(p,p')	5	8	7	5	8	10	12	0	12	0	0	9	0
	DDT(p,p')	5	8	7	5	8	10	12	0	12	0	0	9	0
	Dicofol	5	8	7	5	8	10	12	0	12	0	0	9	0
	Dieldrin	5	8	7	5	8	10	12	0	12	0	0	9	0
	Endrin	5	8	7	5	8	10	12	0	12	0	0	9	0
	Methoxychlor	5	8	7	5	8	10	12	0	12	0	0	9	0
Organophosphates	Azinphos methyl	5	8	7	5	8	10	4	12	12	0	0	9	12
	Chlorpyrifos	5	8	7	5	8	10	4	12	12	12	12	9	12
	Demeton-s	0	0	0	0	0	3	4	12	12	0	0	9	12
	Diazinon	5	8	7	5	8	10	4	12	12	12	12	9	12
	Dichlorvos	0	0	0	0	0	3	4	12	12	0	0	9	12
	Dimethoate	5	8	7	5	8	10	4	12	12	0	0	9	12
	Disulfoton	5	8	7	5	8	10	4	12	12	0	0	9	12
	Malathion	5	8	7	5	8	10	4	12	12	0	0	9	12
	Methamidophos	5	8	7	5	8	10	4	0	12	0	0	9	12
	Methidathion	5	8	7	5	8	10	4	12	12	0	0	9	12
	Molinate	5	8	7	5	8	7	0	0	0	0	0	0	0
	Parathion, Methyl	5	8	7	5	8	10	4	12	12	0	0	9	12
	Phorate	5	8	7	5	8	10	4	12	12	0	0	9	12
	Phosmet	5	8	7	5	8	10	4	12	12	0	0	9	12
	Thiobencarb	5	8	7	5	8	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	5	8	7	5	8	7	0	0	0	0	0	0	0
	Cyfluthrin, total	5	8	7	5	8	7	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	5	9	7	5	10	7	0	0	0	0	0	0	0
	Cypermethrin, total	5	8	7	5	10	7	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	5	8	7	5	8	7	0	0	0	0	0	0	0
	Permethrin, total	5	8	7	5	8	7	0	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	0	0	0	0	0	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0	0	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0	0	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0	0	0	0	0	0	0	0

Type	Analyte	544RIDAHR			544RIDAHT						544RIAWSP			
		2006	2007	2008	2006	2007	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Permethrin	0	0	0	0	0	0	0	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	5	8	8	5	9	7	9	12	12	2	2	9	12
	Pimephales promelas	5	8	7	5	8	10	3	0	12	0	0	9	12
	Selenastrum capricornutum	5	8	9	5	9	10	0	0	12	4	4	9	12
	Hyalella azteca	1	3	3	2	2	2	0	0	2	2	2	2	2

Table X-4. Roberts Island @ Whiskey Slough Pump Management Plan Monitoring schedule (2012-2015 WY).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Diuron	*C. dubia*	*S. capricornutum*	*H. azteca*
Roberts Island @ Whiskey Slough Pump	1/17/2012	MPM	X	X		X	
Roberts Island @ Whiskey Slough Pump	2/14/2012	MPM	X				
Roberts Island @ Whiskey Slough Pump	3/15/2012	MPM			X		X
Roberts Island @ Whiskey Slough Pump	4/12/2012	MPM				X	
Roberts Island @ Whiskey Slough Pump	5/16/2012	MPM				X	
Roberts Island @ Whiskey Slough Pump	7/17/2012	MPM		X	X	X	
Roberts Island @ Whiskey Slough Pump	8/21/2012	MPM	X				
Roberts Island @ Whiskey Slough Pump	9/18/2012	MPM	X				X
Roberts Island @ Whiskey Slough Pump	1/15/2013	MPM	X	X		X	
Roberts Island @ Whiskey Slough Pump	2/21/2013	MPM	X				
Roberts Island @ Whiskey Slough Pump	3/19/2013	MPM			X		X
Roberts Island @ Whiskey Slough Pump	4/2/2013	MPM				X	
Roberts Island @ Whiskey Slough Pump	5/21/2013	MPM				X	
Roberts Island @ Whiskey Slough Pump	7/16/2013	MPM		X	X	X	
Roberts Island @ Whiskey Slough Pump	8/20/2013	MPM	X				
Roberts Island @ Whiskey Slough Pump	9/17/2013	MPM	X				X
Roberts Island @ Whiskey Slough Pump	1/28/2014	MPM	X	X		X	
Roberts Island @ Whiskey Slough Pump	2/11/2014	MPM	X				
Roberts Island @ Whiskey Slough Pump	3/3/2014	MPM			X		X
Roberts Island @ Whiskey Slough Pump	4/15/2014	MPM				X	
Roberts Island @ Whiskey Slough Pump	5/20/2014	MPM				X	
Roberts Island @ Whiskey Slough Pump	7/15/2014	MPM		X	X	X	
Roberts Island @ Whiskey Slough Pump	8/19/2014	MPM	X				
Roberts Island @ Whiskey Slough Pump	9/6/2014	MPM	X				X
Roberts Island @ Whiskey Slough Pump	1/20/2015	MPM	X	X		X	
Roberts Island @ Whiskey Slough Pump	2/9/2015	MPM	X			X	
Roberts Island @ Whiskey Slough Pump	3/17/2015	MPM			X		X
Roberts Island @ Whiskey Slough Pump	4/21/2015	MPM				X	
Roberts Island @ Whiskey Slough Pump	5/19/2015	MPM				X	
Roberts Island @ Whiskey Slough Pump	7/21/2015	MPM		X	X	X	
Roberts Island @ Whiskey Slough Pump	8/18/2015	MPM	X				
Roberts Island @ Whiskey Slough Pump	9/15/2015	MPM	X				X

During the 2015 WY, the Coalition conducted MPM for chlorpyrifos, diuron, and water column toxicity to *C. dubia* and *S. capricornutum* every month from October 2014 through September 2015. Management Plan Monitoring for sediment toxicity to *H. azteca* occurred in March and September of 2015. Monthly monitoring at the Core site also occurred in the site subwatershed during the 2015 WY. No exceedances of the WQTLs for chlorpyrifos, diuron, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca* occurred. Samples collected on February 9, 2015 and on May 19, 2015 were toxic to *S. capricornutum* resulting in 60% and 75% survival compared to the control, respectively. During all Core site monitoring events, *E. coli* and field parameters DO, pH, and SC were monitored. There were exceedances of the WQTL for all these constituents: DO (11), pH (1), SC (10), and *E. coli* (7) (Table X-5).

Table X-5 is a tally of exceedances of the WQTLs from 2006 through September 2015 for management plan constituents in the site subwatershed. Table XIV-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances in the Roberts Island site subwatershed since monitoring began is provided in Appendix II, Table II-10.

Table X-5. Roberts Island management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-10.

	Management Plan Constituents								Completed Management Plans		
Monitoring Year	Dissolved Oxygen, <7 mg/L	pH, <6.5 and >8.5 units	Specific Conductivity[1], >700 µS/cm or > 1000 µS/cm	Total Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	DDE (p,p'), >0.00059 µg/L	*C. dubia*, (%Control)	*S. capricornutum*, (%Control)	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	*H. azteca*, (%Control)
2006	5	3	3	4	4	1	0	0	1	0	2
2007	12	0	12	9	3	2	1	1	0	1	2
2008	13	0	10	9	4	1	2	8	2	1	2
2009	4	0	9	10	1	0	0	NA	0	NA	NA
2010	4	0	10	11	3	NA	1	NA	0	NA	NA
2011	4	1	8	8	3	0	0	0	2	0	0
2012	9	0	11	11	4	NA	0	0	0	0	0
2013	5	0	10	12	0	NA	0	0	0	0	0
2014 WY*	9	0	9	9	1	0	1	2	0	0	0
2015 WY	11	1	10	NA	7	NA	0	2	0	0	0
Overall Tally	**76**	**5**	**92**	**83**	**30**	**4**	**5**	**13**	**5**	**2**	**6**

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table X-6. Roberts Island site subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

Month:		Jan	Feb	Mar		Apr	May	Jun	Jul	Aug	Sep	Oct		Nov	Dec
2009 NM (@ Holt Rd)1	Date	1/13/09	2/10/09	3/10/09		4/14/09	5/12/09	6/9/09	7/14/09	8/11/09	9/15/09	10/6/09		11/10/09	12/8/09
	Chlorpyrifos (µg/L)	<0.003	0.0057	<0.003		<0.003	NA	NA	NA	NA	NA	NA		NA	NA
2010 NM (@ Holt Rd)2	Date	1/13/10	2/9/10	3/16/10		4/13/10	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	10/12/10		11/9/10	12/7/10
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003	0.0074	<0.003		<0.003	<0.003
2011 NM (@ Holt Rd)	Date	1/11/11	2/8/11	3/8/11		4/12/11	5/24/11	6/28/11	7/26/11	8/23/11	9/20/11	10/6/11	10/14/11	11/15/11	12/13/11
	Chlorpyrifos (µg/L)	**0.016**	**0.016**	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	NA	<0.003	<0.003
	Diuron (µg/L)	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA	<0.2	<0.2
	C. dubia toxicity (% Control)	100	100	100		95	95	105	100	100	100	95	NA	95	80
	S. capricornutum toxicity (% Control)	130	417	231		135	221	197	1041	781	251	828	NA	421	131
	H. azteca toxicity (% Control)	NA	NA	100		NA	NA	NA	NA	NA	NA	NA	105	NA	NA
2012 MPM (@ Whiskey Slough Pump)	Date	1/17/12	2/14/12	3/15/12		4/12/12	5/16/12	6/19/12	7/17/12	8/21/12	9/18/12	10/16/12		11/6/12	12/3/12
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA		NA	NA	NA	NA	<0.003	<0.003	NA		NA	NA
	Diuron (µg/L)	<0.2	NA	NA		NA	NA	NA	<0.2	NA	NA	NA		NA	NA
	C. dubia toxicity (% Control)	NA	NA	105		NA	NA	NA	100	NA	NA	NA		NA	NA
	S. capricornutum toxicity (% Control)	938	NA	NA		139	228	NA	174	NA	NA	NA		NA	NA
	H. azteca toxicity (% Control)	NA	NA	109		NA	NA	NA	NA	NA	102	NA		NA	NA
2013 MPM, NM (@ Whiskey Slough Pump)3	Date	1/15/13	2/21/13	3/19/13		4/2/2013	5/21/13	NA	7/16/13	8/20/13	9/17/13	10/8/13		11/19/13	12/17/13
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA		NA	NA	NA	NA	<0.003	<0.003	<0.003		<0.003	<0.003
	Diuron (µg/L)	<0.2	NA	NA		NA	NA	NA	<0.2	NA	NA	NA		NA	NA
	C. dubia toxicity (% Control)	NA	NA	100		NA	NA	NA	100	NA	NA	NA		NA	NA
	S. capricornutum toxicity (% Control)	200	NA	NA		247	565	NA	614	NA	NA	NA		NA	NA
	H. azteca toxicity (% Control)	NA	NA	101		NA	NA	NA	NA	NA	100	NA		NA	NA
2014 & 2015 WY MPM, NM (@ Whiskey Slough Pump)	Date	1/28/14	2/11/14	3/3/14	3/5/14	4/15/14	5/20/14	6/17/14	7/15/14	8/19/14	9/16/14	10/21/14		11/18/14	12/4/14
	Chlorpyrifos (µg/L)	<0.003*	<0.003*	<0.003	NA	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003
	Diuron (µg/L)	<0.2*	<0.2	<0.2	NA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2
	C. dubia toxicity (% Control)	100	100	100*	NA	100	100	100	**0**	100	100	100		100	105
	S. capricornutum toxicity (% Control)	533*	**67**	108	NA	**50***	111*	152	183	270	103	231		259	136
	H. azteca toxicity (% Control)	NA	NA	NA	100*	NA	NA	NA	NA	NA	98	NA		NA	NA
2015 WY MPM, NM (@ Whiskey Slough Pump)	Date	1/20/15	2/9/15	3/17/15		4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15	Oct		Nov	Dec
	Chlorpyrifos (µg/L)	<0.003*	<0.003*	<0.003		<0.003	<0.003	<0.003	<0.003	<0.003*	<0.003*				
	Diuron (µg/L)	<0.2*	0.45	<0.2		<0.2	<0.2	<0.2	<0.2*	<0.2	<0.2				
	C. dubia toxicity (% Control)	100	100	100*		105	100	100	100*	95	100				
	S. capricornutum toxicity (% Control)	201*	**60***	131		92*	**75***	179	100*	131	128				

Month:		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	H. azteca toxicity (% Control)	NA	NA	100*	NA	NA	NA	NA	NA	98*			

[1]Roberts Island Drain @ Holt Rd was monitored for all constituents including chlorpyrifos during NM in 2009 until the April 8, 2009 MRPP monitoring modification. Monitoring according to the April 2009 modification began in May 2009.

[2]During 2010, Roberts Island Drain @ Holt Rd was a TMDL compliance location for the Central Delta Subarea portion of the Delta Waterways and samples were collected for chlorpyrifos and diazinon.

[3] During 2013, Core Monitoring occurred at Roberts Island @Whiskey Slough Pump and samples were collected monthly for chlorpyrifos and diazinon.

MPM – Management Plan Monitoring.

NA – Not Applicable. No monitoring occurred on this date for this constituent.

NM – Normal Monitoring.

Source Identification and Outreach

The Coalition evaluated PUR data and considered past monitoring results at both Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd to determine sources of constituents listed in the Roberts Island @ Whiskey Slough Pump management plan. Sourcing analyses for past exceedances of management plan constituents are evaluated in past years' site subwatershed appendices.

Water samples collected in February 2015 (60% survival compared to control) and May 2015 (75 % survival compared to control) were toxic to *S. capricornutum* occurred. No TIE was conducted for either event, and therefore the cause of toxicity cannot be sourced. However, there was an exceedance of the WQTL for arsenic coinciding with the February toxicity. Metal contamination and non-polar organics can lead to toxicity in the water column. Based on the PUR data associated with the February 2015 exceedance, there were 150 applications totaling 4,006 lbs Al of herbicides associated with the exceedance of the WQTL for the water column toxicity to *S. capricornutum*. Irrigation tailwater and stormwater runoff during the storm event could lead to non-polar organics in waterways.

Exceedances of field parameters such as DO, *E. coli*, pH, and SC are difficult to source. Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. Of the 11 exceedances, 7 occurred during irrigation season (April through September) when temperatures were elevated (between 68-77 degrees F), which potentially contributed to lower levels of DO in the waterbody.

Roberts Island @ Whiskey Slough Pump is an agricultural drain within the Delta islands and pumping is required to remove water from the drains. In most cases there is no flow in the drains unless the pumps are activated. Furthermore, algal production and decay along with stagnant, warm water at these sites can contribute to low DO detections. Therefore, exceedances of the WQTL for DO and SC are common at the site due to a lack of flow. . As previously discussed, study results on the water quality parameters associated with DO and pH have been submitted to the Regional Board. Additional investigation of the sources of DO and pH concentrations in surface waters is pending further discussion with the Regional Board. The outcome of the CV-SALTS program will determine management of salts/SC in the Central Valley.

Elevated levels of *E. coli* in the waterways could be due to 1) storm runoff carrying bacteria from dairy facilities in the subwatershed (past instances of direct dairy discharges have been noted in the Coalition region), 2) manure from dairies is sold to adjacent farms and if improperly composted and stored can contribute to elevated levels of bacteria in the waterway, and 3) naturally occurring *E. coli* bacteria in the waterways. The Roberts Island @ Whiskey Slough Pump site subwatershed includes only 90 total acres of dairies out of 13,711 total acres represented by the site subwatershed. Exceedances of the WQTL for *E. coli* occurred during primarily storm and irrigation sampling events; therefore, storm and irrigation tailwater runoff potentially transported bacteria into the waterbody.

Outreach

Focused outreach to document current management practices and track implementation of new management practices began in 2013 and was completed in 2015. The Coalition contacted seven targeted growers farming 1,618 irrigated acres in the site subwatershed (MPUR, 2013, Page 43). Existing management practices were documented and six of the seven growers indicated new management practices were implemented. The most common management practices implemented include reducing the use of the pesticides causing exceedances and reducing runoff water volume. The Coalition believes the implementation of the additional management practices and increased grower awareness will continue to improve water quality within the site subwatershed.

Evaluation

The Coalition conducted MPM for chlorpyrifos, diuron, water column toxicity to *C. dubia* and *S. capricornutum*, and sediment toxicity to *H. azteca* from 2012 through September 2015 and monitoring results indicate improvements in water quality. The Coalition's strategy is to encourage growers to reduce the offsite movement of agricultural constituents and reduce or eliminate water quality impairments. Based on the PUR data, applications of both chlorpyrifos and diuron are in decline in recent years within the site subwatershed. Active management plans for chlorpyrifos, diuron, and sediment toxicity to *H. azteca*, were approved for completion on December 18, 2015 after three or more years of no exceedances of the respective WQTLs.

Next Steps

The Coalition will continue general outreach in the site subwatershed in the 2016 WY. The Coalition will monitor monthly at Roberts Island @ Whiskey Slough Pump based on the monitoring strategy at a Core site. Additionally, MPM is scheduled to occur for water column toxicity to *C. dubia* and *S. capricornutum* in months of past exceedances. Field parameters such as DO, pH, and SC will be measured during every monitoring event.

XI. SAND CREEK @ HWY 4 BYPASS

Overview

Monitoring at Sand Creek @ Hwy 4 Bypass began in 2006; management plans were established in 2007. Focused outreach to targeted growers occurred from 2012 through 2014 and growers implemented new management practices in 2012 and 2013. To evaluate the effectiveness of outreach, the Coalition conducted MPM during months of past exceedances from 2011 through September 2015. By demonstrating improved water quality, the Coalition received approval for completion of the management plans for chlorpyrifos, diazinon, and water toxicity to *C. dubia* on February 27, 2013. The Coalition received approval for completion of the management plans for disulfoton and water column toxicity to *S. capricornutum* on August 22, 2014. The last exceedance of the WQTL for dieldrin occurred in 2012. The Coalition received approval for the completion of the management plan for dieldrin on December 18, 2015. The remaining constituents in the subwatersheds management plan are DDE, DDT, DO, *E. coli,* SC, TDS, and sediment toxicity to *H. azteca* (Table XI-1).

The Coalition submitted results to the Regional Board from studies on water quality parameters in the Coalition region associated with the concentrations of DO on February 22, 2016; a summary of the results from this study is provided in the Introduction section of this Appendix. The Coalition is currently conducting a study on the water quality parameters associated with the concentrations of DDE and DDT in the Coalition region and will submit results to the Regional Board on May 22, 2016; a summary of results from this study will be provided in the Annual Report for the 2017 WY.

The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* Exceedances of the WQTL for SC and TDS are currently being addressed as part of the CV-SALTS program.

During the 2015 WY, the Coalition conducted MPM for dieldrin, and sediment toxicity to *H. azteca*. Field parameters, including DO and SC, were measured during all MPM events. Exceedances of the WQTLs for DO and SC are common in the Sand Creek @ Hwy 4 Bypass site subwatershed; during the 2015 WY, exceedances for DO and SC occurred three times each.

Sand Creek @ Hwy 4 Bypass is a Represented site in Zone 6; no Represented site monitoring is scheduled for the 2016 WY (2015 MPU). In the 2016 WY, MPM will continue for sediment toxicity to *H. azteca.* Field parameters, including DO and SC, will continue to be monitored during all monitoring events.

Table XI-1. Sand Creek @ Hwy 4 Bypass management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	YEARS OF FOCUSED OUTREACH	MANAGEMENT PLAN COMPLETION YEAR
H. azteca sediment toxicity	2007	2012-2014	NA

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Constituents Requiring Source ID/Work Plans			
DDE	2007	2012-2014	NA
DDT	2007	2012-2014	NA
Dissolved Oxygen	2007	2012-2014	NA
E. coli	2007	2012-2014	NA
Specific Conductivity	2007	2012-2014	NA
Completed Management Plans			
Chlorpyrifos	2007	2012-2014	2013
Diazinon	2007	2012-2014	2013
Dieldrin	2007	2012-2014	2015
Disulfoton	2009	2012-2014	2014
C. dubia water column toxicity	2007	2012-2014	2013
S. capricornutum water column toxicity	2009	2012-2014	2014

[1]The Coalition petitioned to remove the constituent from the management plan on 9/2/15; approval pending.
NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

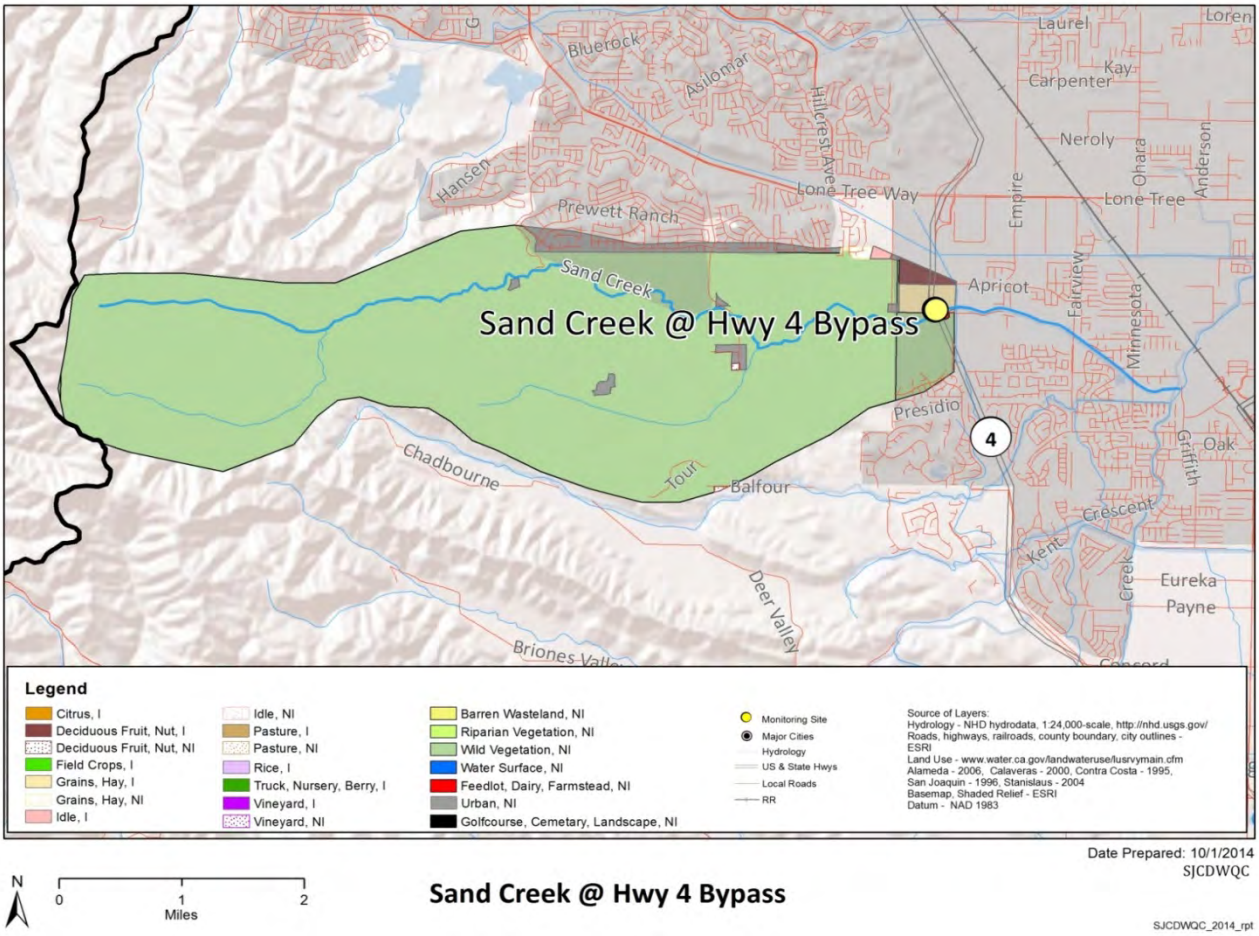
The Sand Creek @ Hwy 4 Bypass site subwatershed is located west of Brentwood where the creek crosses Hwy 4 Bypass. The creek drains approximately 14.4 square miles of combined seasonal flow of the natural lands and tailwater return flow from lowland agriculture (Table XI-2). The site subwatershed consists of 402 irrigated acres which include primarily deciduous nuts and grains; a dairy/feedlot is located south of the site (Figure XI-1).

Sand Creek (tributary to Marsh Creek, Contra Costa County; partly in Delta Waterways, western portion) is listed on California's 303(d) List of Impaired Waterbodies for chlorpyrifos, DDE, DDT, dieldrin, *E. coli,* salinity, and unknown water column toxicity (last updated in 2010). The potential source of all the listed constituents is unknown.

Table XI-2. Sand Creek @ Hwy 4 Bypass site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Sand Creek @ Hwy 4 Bypass	544SCAHFB	37.94750	-121.74300

Figure XI-1. Sand Creek @ Hwy 4 Bypass site subwatershed land use map.



Subwatershed Monitoring History

Monitoring was initiated at Sand Creek @ Hwy 4 Bypass during the irrigation season of 2006 and continued through the irrigation season of 2008. Sampling resumed in 2011 and has continued through the 2015 WY. Table XI-3 contains the number of events monitored per year and the constituents from 2008 through September 2015.

In an effort to source exceedances, additional MPM for chlorpyrifos, dieldrin, and water column toxicity to *C. dubia* occurred from 2007 through 2008 (Table XI-4). The Coalition conducted MPM during months of past exceedances from 2011 through September 2015 to evaluate the effectiveness of management practices. The last detections of chlorpyrifos, diazinon, dieldrin, and disulfoton occurred in 2006, 2008, 2012, and 2008, respectively.. In 2012, there was construction on the State Route 4 Bypass Segment 2 (Lone Tree Way to Balfour Road) that was approximately 50 feet west of the monitoring location; since the site was still accessible, monitoring was conducted as scheduled.

Table XI-3. Sand Creek @ Hwy 4 Bypass sampling events and analyses per year.

Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	16	0	0	9	8	7	6	5
	Dry Sites	0	0	0	0	0	0	0	2
	Events Sampled	16	0	0	9	8	7	6	3
Field and Physical Parameters	Dissolved Oxygen	16	0	0	9	8	7	6	3
	Dissolved Solids	7	0	0	0	0	0	0	0
	E. coli	7	0	0	0	0	0	0	0
	Grain size (sediment)	0	0	0	2	2	2	2	1
	Hardness as CaCO3	6	0	0	0	0	0	0	0
	pH	16	0	0	9	8	7	6	3
	Specific Conductivity	16	0	0	9	8	7	6	3
	Suspended Solids	0	0	0	0	0	0	0	0
	Total Organic Carbon	7	0	0	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	2	2	2	2	1
	Turbidity	7	0	0	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0	0	0
	Orthophosphate as P	6	0	0	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0
	Copper	0	0	0	0	0	0	0	0
	Lead	0	0	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0	0	0
Metals (Total)	Arsenic	6	0	0	0	6	0	0	0
	Boron	6	0	0	0	6	0	0	0
	Cadmium	6	0	0	0	6	0	0	0
	Copper	6	0	0	0	6	0	0	0
	Lead	6	0	0	0	6	0	0	0
	Molybdenum	6	0	0	0	0	0	0	0
	Nickel	6	0	0	0	6	0	0	0
	Selenium	6	0	0	0	6	0	0	0
	Zinc	6	0	0	0	6	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0	0	0
	Diuron	7	0	0	0	0	0	0	0
	Linuron	7	0	0	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0	0	0
	Methomyl	7	0	0	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	HCH, delta	0	0	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0	0	0
	Paraquat	7	0	0	0	0	0	0	0
	Simazine	7	0	0	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0	0	0
	Dicofol	7	0	0	0	0	0	0	0
	Dieldrin	9	0	0	0	3	3	3	2
	Endrin	7	0	0	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0	0	0
	Chlorpyrifos	9	0	0	2	2	0	0	0
	Demeton-s	0	0	0	0	0	0	0	0
	Diazinon	7	0	0	2	2	1	0	0
	Dichlorvos	0	0	0	0	0	0	0	0
	Dimethoate	7	0	0	2	2	0	0	0
	Disulfoton	7	0	0	3	3	3	3	0
	Malathion	7	0	0	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0	0	0
	Methidathion	7	0	0	0	0	0	0	0
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0	0	0
	Phorate	7	0	0	0	0	0	0	0
	Phosmet	7	0	0	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0	0	0
Sediment Pesticide	Bifenthrin	0	0	0	2	1	0	0	0
	Chlorpyrifos	0	0	0	2	1	0	0	0
	Cyfluthrin	0	0	0	2	1	0	0	0
	Cyhalothrin, lambda	0	0	0	2	1	0	0	0
	Cypermethrin	0	0	0	2	1	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	2	1	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	2	1	0	0	0
	Fenpropathrin	0	0	0	2	1	0	0	0
	Permethrin	0	0	0	2	1	0	0	0
Toxicity	*Ceriodaphnia dubia*	10	0	0	3	3	0	0	0
	Pimephales promelas	7	0	0	0	0	0	0	0
	Selenastrum capricornutum	9	0	0	2	3	2	2	0
	Hyalella azteca	4	0	0	0	2	2	2	1

Table XI-4. Sand Creek @ Hwy 4 Bypass site subwatershed MPM schedule (2007- 2015 WY).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	*C. dubia*	*S. capricornutum*	*H. azteca*
Sand Creek @ Hwy 4 Bypass	6/20/2007	Add.	X		X				
Sand Creek @ Hwy 4 Bypass	7/30/2007	Add.					X		
Sand Creek @ Hwy 4 Bypass	5/7/2008	Add.	X		X		X		
Sand Creek @ Hwy 4 Bypass	6/3/2008	Add.	X		X		X		
Sand Creek @ Hwy 4 Bypass	7/8/2008	Add.					X		
Sand Creek @ Hwy 4 Bypass	1/11/2011	MPM		X					
Sand Creek @ Hwy 4 Bypass	3/8/2011	MPM							X
Sand Creek @ Hwy 4 Bypass	4/12/2011	MPM						X	
Sand Creek @ Hwy 4 Bypass	5/24/2011	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	6/28/2011	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	7/26/2011	MPM		X			X		
Sand Creek @ Hwy 4 Bypass	8/23/2011	MPM			X	X		X	
Sand Creek @ Hwy 4 Bypass	10/14/2011	MPM							X
Sand Creek @ Hwy 4 Bypass	1/17/2012	MPM		X					
Sand Creek @ Hwy 4 Bypass	3/15/2012	MPM							X
Sand Creek @ Hwy 4 Bypass	4/12/2012	MPM						X	
Sand Creek @ Hwy 4 Bypass	5/16/2012	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	6/19/2012	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	7/17/2012	MPM		X			X		
Sand Creek @ Hwy 4 Bypass	8/21/2012	MPM			X	X		X	
Sand Creek @ Hwy 4 Bypass	9/18/2012	MPM							X
Sand Creek @ Hwy 4 Bypass	1/15/2013	MPM		X					
Sand Creek @ Hwy 4 Bypass	3/19/2013	MPM							X
Sand Creek @ Hwy 4 Bypass	4/2/2013	MPM						X	
Sand Creek @ Hwy 4 Bypass	5/21/2013	MPM			X	X			
Sand Creek @ Hwy 4 Bypass	6/18/2013	MPM			X	X			
Sand Creek @ Hwy 4 Bypass	8/20/2013	MPM			X	X		X	
Sand Creek @ Hwy 4 Bypass	9/17/2013	MPM							X
Sand Creek @ Hwy 4 Bypass	3/3/2014	MPM							X
Sand Creek @ Hwy 4 Bypass	4/15/2014	MPM						X	
Sand Creek @ Hwy 4 Bypass	5/20/2014	MPM			X	X			
Sand Creek @ Hwy 4 Bypass	6/17/2014	MPM			X	X			
Sand Creek @ Hwy 4 Bypass	8/19/2014	MPM			X	X		X	
Sand Creek @ Hwy 4 Bypass	9/16/2014	MPM							X
Sand Creek @ Hwy 4 Bypass	3/17/2015	MPM							X
Sand Creek @ Hwy 4 Bypass	5/19/2015	MPM			X				
Sand Creek @ Hwy 4 Bypass	6/16/2015	MPM			X				
Sand Creek @ Hwy 4 Bypass	8/18/2015	MPM			X				
Sand Creek @ Hwy 4 Bypass	9/15/2015	MPM							X

Add. – Additional sampling.

X – Constituent sampled for Management Plan Monitoring (MPM).

During the 2015 WY, the Coalition conducted MPM for dieldrin (May, June, and August), and sediment toxicity to *H. azteca* (March and September) occurred at Sand Creek @ Hwy 4 Bypass. No exceedances of the WQTLs for dieldrin or sediment toxicity to *H. azteca* occurred. No monitoring occurred at the site during monitoring events in August and September due to the site being dry. The field parameters, DO and SC, were measured during all MPM events through September 2015. Exceedances of the WQTL for DO and SC occurred three times each.

Table XI-5 is a tally of exceedances of WQTLs from 2006 through September 2015 for management plan constituents in the site subwatershed. Table XI-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances in the site subwatershed since monitoring began is provided in Appendix II, Table II-11.

Table XI-5. Sand Creek @ Hwy 4 Bypass management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-11.

	Management Plan Constituents							Completed Management Plans					
Monitoring Year	Dissolved Oxygen, <5 mg/L	Specific Conductivity[1], >700 µS/cm or > 1000 µS/cm	Total Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L	*H. azteca*, (%Control)	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	Dieldrin, >0.00014 µg/L	Disulfoton, >0.05 µg/L	*C. dubia*, (%Control)	*S. capricornutum*, (%Control)
2006	0	6	4	5	2	2	2	2	1	2	0	3	0
2007	1	14	8	5	1	0	4	0	0	0	0	0	0
2008	4	16	7	7	2	1	4	0	1	2	3	0	3
2011	4	9	NA	NA	NA	NA	1	0	0	1	0	0	0
2012	3	7	NA	NA	NA	NA	1	0	0	1	0	0	0
2013	2	7	NA	NA	NA	NA	0	NA	0	0	0	NA	0
2014 WY*	1	6	NA	NA	NA	NA	0	NA	NA	0	0	NA	0
2015 WY	2	3	NA	NA	NA	NA	0	NA	NA	0	NA	NA	NA
Overall Tally	**17**	**68**	**19**	**17**	**5**	**3**	**12**	**2**	**2**	**6**	**3**	**3**	**3**

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table XI-6. Sand Creek @ Hwy 4 Bypass site subwatershed monitoring results for MPM constituents since management plan initiation.
Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

	Month:	Jan	Mar	Apr	May	Jun	Jul	Aug		Sep	Oct
2007 MPM Add. (@ Hwy 4 Bypass)	Date	NA	NA	NA	NA	6/20/07	7/30/07	NA		NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	<0.003	NA	NA		NA	NA
	Dieldrin (µg/L)	NA	NA	NA	NA	<0.005	NA	NA		NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	NA	100	NA		NA	NA
2008 NM (@ Hwy 4 Bypass)	Date	1/23/08	3/18/08	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	8/13/08	9/16/08	NA
	Chlorpyrifos (µg/L)	<0.003	NA	<0.003	<0.003	<0.003	<0.003	<0.003	NA	<0.003	NA
	Dieldrin (µg/L)	<0.005	NA	<0.005	<0.005	<0.005	<0.005	**0.0058**	NA	<0.005	NA
	C. dubia toxicity (% Control)	100	NA	100	100	NA	NA	95	NA	100	NA
	H. azteca toxicity (% Control)	NA	0	NA	NA	NA	NA	NA	**2.13**	NA	NA
2008 MPM Add. (@ Hwy 4 Bypass)	Date	NA	NA	NA	5/7/08	6/3/08	7/8/08	NA		NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA	NA		NA	NA
	Dieldrin (µg/L)	NA	NA	NA	**0.012**	<0.005	NA	NA		NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	100	100	100	NA		NA	NA
2011 MPM (@ Hwy 4 Bypass)	Date	1/11/11	3/8/11	4/12/11	5/24/11	6/28/11	7/26/11	8/23/11		9/20/11	10/14/11
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA	NA		NA	NA
	Diazinon (µg/L)	<0.004	NA	NA	NA	NA	<0.004	NA		NA	NA
	Dieldrin (µg/L)	NA	NA	NA	**0.027**	<0.005	NA	<0.005		NA	NA
	Disulfoton (µg/L)	NA	NA	NA	<0.02	<0.02	NA	<0.02		NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	100	105	100	NA		NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	262	NA	NA	NA	611		NA	NA
	H. azteca toxicity (% Control)	NA	**29**	NA	NA	NA	NA	NA		NA	79
2012 MPM (@ Hwy 4 Bypass)	Date	1/17/12	3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12		9/18/12	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA	NA		NA	NA
	Diazinon (µg/L)	<0.004	NA	NA	NA	NA	<0.004	NA		NA	NA
	Dieldrin (µg/L)	NA	NA	NA	<0.005	**0.096**	NA	<0.005		NA	NA
	Disulfoton (µg/L)	NA	NA	NA	<0.02	<0.02	NA	<0.02		NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	100	100	100	NA		NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	381	486*	NA	NA	198		NA	NA
	H. azteca toxicity (% Control)	NA	**63**	NA	NA	NA	NA	NA		95	NA
2013 MPM (@ Hwy 4 Bypass)	Date	1/15/13	3/19/13	4/2/13	5/21/13	6/18/13	NA	8/20/13		9/17/13	NA
	Diazinon (µg/L)	<0.004	NA	NA	NA	NA	NA	NA		NA	NA
	Dieldrin (µg/L)	NA	NA	NA	<0.005	<0.005	NA	<0.005		NA	NA
	Disulfoton (µg/L)	NA	NA	NA	<0.02	<0.02	NA	<0.02		NA	NA

	Month:	Jan	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	S. capricornutum toxicity (% Control)	NA	NA	1011	NA	NA	NA	364	NA	NA
	H. azteca, toxicity (% Control)	NA	90	NA	NA	NA	NA	NA	92	NA
2014 WY & 2015 WY MPM (@ Hwy 4 Bypass)	Date	NA	3/5/2014	4/15/14	5/20/14	6/17/14	NA	8/19/14	9/16/14	NA
	Dieldrin (µg/L)	NA	NA	NA	<0.005	<0.005	NA	<0.005	NA	NA
	Disulfoton (µg/L)	NA	NA	NA	<0.02	<0.02	NA	<0.02	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	161	NA	NA	NA	409	NA	NA
	H. azteca toxicity (% Control)	NA	96	NA	NA	NA	NA	NA	98	NA
2015 WY MPM (@ Hwy 4 Bypass)	Date	NA	3/17/15	NA	5/19/15	6/16/15	NA	8/18/15	9/15/15	Oct
	Dieldrin (µg/L)	NA	NA	NA	<0.005	<0.005	NA	Dry	NA	
	H. azteca toxicity (% Control)	NA	96	NA	NA	NA	NA	NA	Dry	

Add. – Additional monitoring conducted in 2007 and 2008 only.
MPM – Management Plan Monitoring.
NA – Not Applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring.
**S. capricornutum* samples were not collected for MPM; however, the laboratory analyzed the samples and the results were included in the table.

Source Identification and Outreach

If there was an exceedance of the WQTL for a constituent listed in the Sand Creek @ Hwy 4 Bypass management plan and if that constituent is sourceable, the Coalition would evaluate PUR data and past monitoring results to determine its possible sources. Sourcing analyses for past exceedances of the WQTLs for management plan constituents are provided in past years' site subwatershed appendices. During the 2015 WY, no exceedance of the WQTL for dieldrin or sediment toxicity to *H. azteca* was detected during MPM. Since there were no exceedances of sourceable constituents, a sourcing analysis is not included here.

Exceedances of non-conserved constituents such as DO and SC are hard to source, but urbanization of the area likely played a role in the exceedances. As previously discussed, study results on the water quality parameters associated with DDE, DDT, and DO have been or will be submitted to the Regional Board. Additional investigation of the sources of DDE, DDT, and DO concentrations in surface waters is pending further discussion with the Regional Board. Exceedances of SC are at elevated levels with exceedances consistently above 1000 µS/cm. Water for municipal and industrial use within the subwatershed area is supplied by Los Vaqueros Reservoir. The recycling salty water from the Delta to the Los Vaqueros reservoir and back to the creek could lead to the high levels of SC in the site subwatershed. It is possible that water quality impairments in site subwatershed are the result of urban influences that are common in newly developed areas.

Outreach

Despite extensive urbanization and reductions in agriculture in the Sand Creek @ Hwy 4 Bypass site subwatershed, the Coalition continued with focused outreach in Zone 6. The Coalition contacted the single targeted grower representing 116 acres in the site subwatershed and documented management practices in 2011 (2013 MPUR, Pages 78). The grower indicated irrigation tailwater and storm water runoff occur on the 116 acres farmed; therefore, the Coalition encouraged the implementation of practices to improve management of irrigation tailwater and storm water runoff. Follow-up surveys from 2012 indicated the grower intended to implement five of six recommended management practices. A final analysis indicated the grower installed a micro irrigation system, reduced runoff water volume using irrigation management, and reduced use of the pesticide types found in exceedances on 100% of the reported acres. The Coalition completed focused outreach in the Sand Creek @ Hwy 4 Bypass site subwatershed in 2014.

Evaluation

Water quality at the site has greatly improved as is indicated by the numerous complete management plans for constituents that were previously sources of impairment. Chlorpyrifos, diazinon, dieldrin, disulfoton, and water column toxicity to *C. dubia* and *S. capricornutum* were all approved for completion from the active management plan over the past three years. During the 2015 WY, MPM for dieldrin and sediment toxicity to *H. azteca* occurred without any exceedances or toxicity. The last exceedance of the WQTL for dieldrin occurred in 2012. The Coalition received approval for completion of the management

plan for dieldrin on December 18, 2015. Reductions in agriculture and implementation of management practices on remaining irrigated lands have reduced negative impacts on water quality. Extensive urban development near the site could be contributing to water quality impairments.

Next Steps

Management Plan Monitoring is scheduled to continue for sediment toxicity to *H. azteca.* Field parameters, including DO and SC, will continue to be monitored during all monitoring events. General outreach will continue in the 2016 WY.

XII. TERMINOUS TRACT DRAIN @ HWY 12

Overview

Monitoring was initiated in 2005 and continued through 2008. The Coalition began focused outreach and MPM for constituents of concern as part of the management plan strategy in 2010, and completed focused outreach in the site subwatershed in 2013. The Coalition will continue general outreach through the 2016 WY. To evaluate the effectiveness of outreach, MPM during months of past exceedances occurred from 2010 through September 2015 and monitoring results indicate improved water quality. Based on three or more years of no toxicity during monitoring events, the Coalition received approval for completion of the management plan for chlorpyrifos and water column toxicity to *P. promelas* from the active management plan at Terminous Tract @ Hwy 12 on April 17, 2012 (Table XII-1); however the management plan for chlorpyrifos was reinitiated in 2015 due to recent exceedances of the WQTL

The remaining constituents in the site's management plan include: arsenic, chlorpyrifos, diuron, DO, *E. coli,* nitrate + nitrite, SC, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca.* On February 22, March 23, and April 22, 2016 the Coalition provided the Regional Board with results from studies it conducted on the water quality parameters in the Coalition region associated with DO, arsenic, and nitrate +nitrite respectively. A summary of the results from these studies is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* Exceedances of the WQTL for SC and TDS are currently being addressed as part of the CV-SALTS program.

Core site monitoring occurred through the 2015 WY. Additionally, MPM for arsenic, chlorpyrifos, and sediment toxicity to *H. azteca* occurred during months of past exceedances and toxicity. During the 2015 WY there were exceedances of the WQTLs for chlorpyrifos, diuron, nitrate + nitrite, water column toxicity to *C. dubia,* and *S. capricornutum*, DO, *E. coli,* and SC.

Terminous Tract Drain @ Hwy 12 is a Core site in Zone 3; monthly Core site monitoring will occur in the 2016 WY (2015 MPU). Additionally, MPM for arsenic, chlorpyrifos, diuron, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* are scheduled. Field parameters, including DO and SC, will be monitored during every sampling event.

Table XII-1. Terminous Tract Drain @ Hwy 12 management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Chlorpyrifos	2009	2011-2013	NA
Diuron	2016	2011-2013	NA
H. azteca sediment toxicity	2007	2011-2013	NA

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Constituents Requiring Source ID/Work Plans			
Arsenic	2008	2011-2013	NA
Dissolved Oxygen	2006	2011-2013	NA
E. coli	2006	2011-2013	NA
Nitrate + Nitrite	2016	2011-2013	NA
Specific Conductivity	2006	2011-2013	NA
Total Dissolved Solids	2006	2011-2013	NA
Completed Management Plans			
P. promelas water column toxicity	2006	2011-2013	2012
S. capricornutum water column toxicity	2007	2011-2013	NA
Chlorpyrifos	2009	2011-2013	2015

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Terminous Tract Drain @ Highway 1 site subwatershed consists of 9,728 acres which include field crops, turf, truck/nursery/berry crops, grains, and hay (Figure XII-1). The site drains all of the acreage north of State Highway 12 and most of the acreage south of Highway 12 on Terminous Tract. This site subwatershed receives drainage from recent urban developments, industrial sites, field crops, grains, and pastureland. The site subwatershed includes two upstream locations, Delta Drain-Terminous Tract off Glasscock Rd and Delta Drain-Terminous Tract off Guard Rd (Table XII-2).

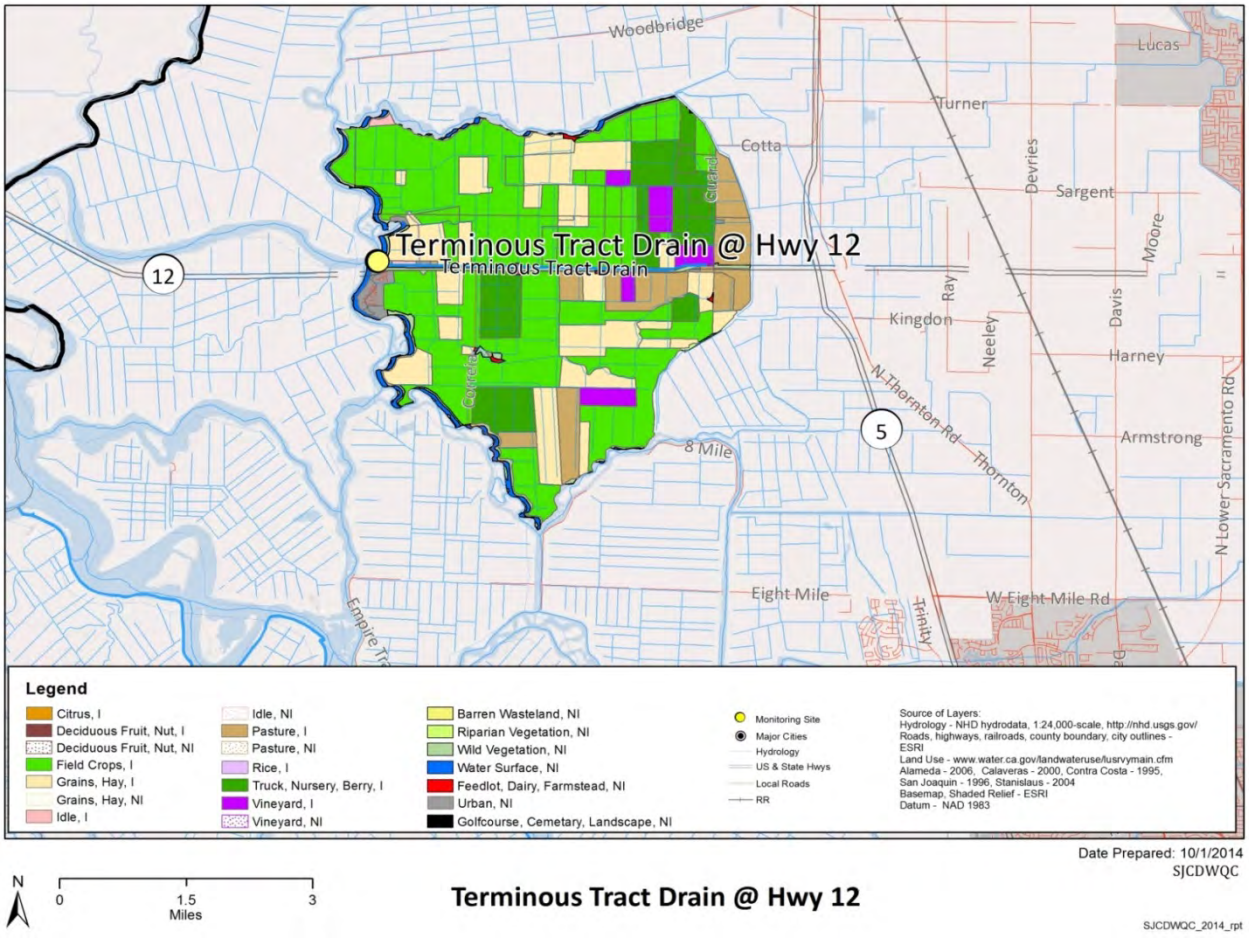
Terminous Tract Drain is not considered an impaired waterway on California's 303(d) List of Impaired Waterbodies (last updated in 2010). However, the represented TMDL subareas in the Delta Waterways (central and eastern portions) where Terminous Tract Drain eventually drains are listed for: chlorpyrifos, DDT, diazinon, group A pesticides, invasive species, mercury, and unknown water column toxicity.

Table XII-2. Terminous Tract Drain site subwatershed sampling locations coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Terminous Tract Drain @ Hwy 12	544XTTHWT	38.11558	-121.49380
Terminous Tract off Glascock Rd [US]	544XTTGLR	38.12550	-121.48940
Terminous Tract off Guard Rd [US]	544XTTGUR	38.11670	-121.42110

[US] Upstream site

Figure XII-1. Terminous Tract Drain @ Hwy 12 site subwatershed land use map.



Subwatershed Monitoring History

Monitoring was initiated at Terminous Tract Drain @ Hwy 12 in 2005 and has continued through the 2015 WY. The last time the full suite of constituents was collected at the site was in 2013. Table XII-3 contains the number of events monitored per year and the constituents from 2008 through September 2015.

Two upstream sites, Delta Drain-Terminous Tract off Glasscock Rd and Delta Drain-Terminous Tract off Guard Rd, were monitored in 2005 and 2006 to determine if sampling at Terminous Tract Drain @ Hwy 12 was representative of the irrigation drainage on Terminous Tract. After one year of monitoring at Terminous Tract off Glasscock Rd and Terminous Tract off Guard Rd, it was determined that sampling at Terminous Tract Drain @ Hwy 12 was representative of the irrigation drainage on Terminous Tract and monitoring at upstream sites was no longer necessary.

The Coalition conducted MPM during months of past exceedances at Terminous Tract Drain @ Hwy 12 from 2010 through September 2015 (Table XII-4). A management plan was initiated for diuron due to an exceedance of the WQTL for diuron in 2015.

Table XII-3. Terminous Tract Drain @ Hwy 12 sampling events and analyses per year.

Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	13	12	12	14	12	13	10	12
	Dry Sites	0	0	0	0	0	0	0	0
	Events Sampled	13	12	12	14	12	13	10	12
Field and Physical Parameters	Dissolved Oxygen	13	12	12	14	12	13	10	12
	Dissolved Solids	10	12	12	12	12	12	9	0
	E. coli	10	12	12	12	12	12	9	12
	Grain size (sediment)	0	0	2	1	2	2	2	2
	Hardness as CaCO3	7	0	12	0	0	12	0	4
	pH	13	12	12	14	12	13	10	12
	Specific Conductivity	13	12	12	14	12	13	10	12
	Suspended Solids	3	12	12	12	12	12	9	12
	Total Organic Carbon	10	12	12	12	12	12	9	12
	Total Organic Carbon (sediment)	0	0	2	1	0	2	2	2
	Turbidity	10	12	12	12	12	12	9	12
Nutrients	Ammonia as N	10	12	12	12	12	12	9	12
	Nitrate + Nitrite as N	3	12	12	12	12	12	9	12
	Nitrate as N	7	0	0	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	10	12	12	12	12	12	9	0
	Orthophosphate as P	10	12	12	12	12	12	9	12
	Phosphate as P	10	12	12	12	12	12	9	0
Metals (Dissolved)	Cadmium	0	0	12	0	0	12	0	0
	Copper	0	0	12	0	0	12	0	4
	Lead	0	0	12	0	0	12	0	0
	Nickel	0	0	12	0	0	12	0	0
	Zinc	0	0	12	0	0	12	0	0
Metals (Total)	Arsenic	7	0	12	0	0	12	0	12
	Boron	7	0	12	0	0	12	0	0
	Cadmium	7	0	12	0	0	12	0	0
	Copper	7	0	12	0	0	12	0	0
	Lead	7	0	12	0	0	12	0	0
	Molybdenum	0	0	12	0	0	12	0	0
	Nickel	7	0	12	0	0	12	0	0
	Selenium	7	0	12	0	0	12	0	0
	Zinc	7	0	12	0	0	12	0	0
Carbamates	Aldicarb	7	0	12	0	0	12	0	12
	Carbaryl	7	0	12	0	0	12	0	12
	Carbofuran	7	0	12	0	0	12	0	12
	Diuron	7	0	12	0	0	12	0	12
	Linuron	7	0	12	0	0	12	0	12
	Methiocarb	7	0	12	0	0	12	0	12
	Methomyl	7	0	12	0	0	12	0	12
	Oxamyl	7	0	12	0	0	12	0	12
Group A Pesticides	Aldrin	0	8	0	0	0	0	0	0
	Chlordane	0	8	0	0	0	0	0	0
	Endosulfan I	0	8	0	0	0	0	0	0
	Endosulfan II	0	8	0	0	0	0	0	0
	HCH, alpha	0	8	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	HCH, beta	0	8	0	0	0	0	0	0
	HCH, delta	0	8	0	0	0	0	0	0
	HCH, gamma	0	8	0	0	0	0	0	0
	Heptachlor	0	8	0	0	0	0	0	0
	Heptachlor epoxide	0	8	0	0	0	0	0	0
	Toxaphene	0	8	0	0	0	0	0	0
Herbicides	Atrazine	7	0	12	0	0	12	0	12
	Cyanazine	7	0	12	0	0	12	0	12
	Glyphosate	7	0	12	0	0	12	0	2
	Paraquat	7	0	12	0	0	12	0	2
	Simazine	7	0	12	0	0	12	0	12
	Trifluralin	0	0	12	0	0	12	0	12
Organochlorines	DDD(p,p')	7	8	12	0	0	12	0	0
	DDE(p,p')	7	8	12	0	0	12	0	0
	DDT(p,p')	7	8	12	0	0	12	0	0
	Dicofol	7	8	12	0	0	12	0	0
	Dieldrin	7	8	12	0	0	12	0	0
	Endrin	7	8	12	0	0	12	0	0
	Methoxychlor	7	8	12	0	0	12	0	0
Organophosphates	Azinphos methyl	7	0	12	0	0	12	0	12
	Chlorpyrifos	7	0	12	2	2	12	2	12
	Demeton-s	0	0	0	12	0	12	0	12
	Diazinon	7	0	12	0	0	12	0	12
	Dichlorvos	0	0	0	12	0	12	0	12
	Dimethoate	7	0	12	0	0	12	0	12
	Disulfoton	7	0	12	0	0	12	0	12
	Malathion	7	0	12	0	0	12	0	12
	Methamidophos	7	0	12	0	0	12	0	12
	Methidathion	7	0	12	0	0	12	0	12
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	7	0	12	0	0	12	0	12
	Phorate	7	0	12	0	0	12	0	12
	Phosmet	7	0	12	0	0	12	0	12
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	0	0	0	0	0	0	0	0
	Cyfluthrin, total	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	0	0	0	0	0	0	0	0
	Cypermethrin, total	0	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	0	0	0	0	0	0	0	0
	Permethrin, total	0	0	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	0	0	1	0	0
	Chlorpyrifos	0	0	1	0	0	1	0	0
	Cyfluthrin	0	0	1	0	0	1	0	0
	Cyhalothrin, lambda	0	0	1	0	0	1	0	0
	Cypermethrin	0	0	1	0	0	1	0	0
	Deltamethrin: Tralomethrin	0	0	1	0	0	1	0	0
	Esfenvalerate/ Fenvalerate	0	0	1	0	0	1	0	0
	Fenpropathrin	0	0	1	0	0	1	0	0
	Permethrin	0	0	1	0	0	1	0	0
Toxicity	*Ceriodaphnia dubia*	7	0	12	0	0	12	0	12
	Pimephales promelas	7	0	12	0	0	12	0	12

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Selenastrum capricornutum	10	0	12	4	3	12	0	12
	Hyalella azteca	0	0	2	1	2	2	2	2

Table XII-4. Terminous Tract Drain @ Hwy 12 Management Plan Monitoring schedule (2010-2015 WY).

Site Name	Sample Date	Monitoring Type	Arsenic	Chlorpyrifos	*S. capricornutum*	*H. azteca*
Terminous Tract Drain @ Hwy 12	4/13/2010	MPM			X	
Terminous Tract Drain @ Hwy 12	5/11/2010	MPM			X	
Terminous Tract Drain @ Hwy 12	8/10/2010	MPM		X		
Terminous Tract Drain @ Hwy 12	9/7/2010	MPM		X		
Terminous Tract Drain @ Hwy 12	1/11/2011	MPM			X	
Terminous Tract Drain @ Hwy 12	2/8/2011	MPM			X	
Terminous Tract Drain @ Hwy 12	4/12/2011	MPM			X	
Terminous Tract Drain @ Hwy 12	5/24/2011	MPM			X	
Terminous Tract Drain @ Hwy 12	8/23/2011	MPM		X		
Terminous Tract Drain @ Hwy 12	9/20/2011	MPM		X		
Terminous Tract Drain @ Hwy 12	10/14/2011	MPM				X
Terminous Tract Drain @ Hwy 12	1/17/2012	MPM			X	
Terminous Tract Drain @ Hwy 12	2/14/2012	MPM			X	
Terminous Tract Drain @ Hwy 12	3/15/2012	MPM				X
Terminous Tract Drain @ Hwy 12	4/12/2012	MPM			X	
Terminous Tract Drain @ Hwy 12	8/21/2012	MPM		X		
Terminous Tract Drain @ Hwy 12	9/18/2012	MPM		X		X
Terminous Tract Drain @ Hwy 12	3/19/2013	MPM				X
Terminous Tract Drain @ Hwy 12	8/20/2013	MPM		X		
Terminous Tract Drain @ Hwy 12	9/17/2013	MPM		X		X
Terminous Tract Drain @ Hwy 12	3/3/2014	MPM				X
Terminous Tract Drain @ Hwy 12	8/19/2014	MPM		X		
Terminous Tract Drain @ Hwy 12	9/16/2014	MPM		X		X
Terminous Tract Drain @ Hwy 12	10/21/2014	MPM	X			
Terminous Tract Drain @ Hwy 12	11/18/2014	MPM	X			
Terminous Tract Drain @ Hwy 12	12/4/2014	MPM	X			
Terminous Tract Drain @ Hwy 12	1/20/2015	MPM	X			
Terminous Tract Drain @ Hwy 12	2/9/2015	MPM	X			
Terminous Tract Drain @ Hwy 12	3/17/2015	MPM	X			X
Terminous Tract Drain @ Hwy 12	4/21/2015	MPM	X			
Terminous Tract Drain @ Hwy 12	5/19/2015	MPM	X			
Terminous Tract Drain @ Hwy 12	6/16/2015	MPM	X			
Terminous Tract Drain @ Hwy 12	7/21/2015	MPM	X			
Terminous Tract Drain @ Hwy 12	8/18/2015	MPM	X	X		
Terminous Tract Drain @ Hwy 12	9/15/2015	MPM	X	X		X

X – Constituent sampled for Management Plan Monitoring (MPM).

During the 2015 WY, monthly Core site monitoring occurred at Terminous Tract Drain @ Hwy 12 in addition to MPM for arsenic, chlorpyrifos, and water column toxicity to *S. capricornutum* during all months (October 2014 through September 2015), and for sediment toxicity to *H. azteca* (March and September). An exceedance of the WQTL for chlorpyrifos occurred on January 20, 2015 (0.074 µg/L), for diuron on February 9 and March 17, 2015 (12 µg/L and 2.5 µg/L, respectively), and for water column toxicity to *S. capricornutum* on February 9, 2015 (21% of control) (Table XII-5). In addition, exceedances of the following management plan constituents occurred in the 2015 WY during Core site monitoring: DO (9), *E. coli* (5), nitrate + nitrite (1), and SC (2).

Table XII-5 is a tally of exceedances of WQTLs from 2005 through September 2015 for management plan constituents in the Terminous Tract Drain @ Hwy 12 site subwatershed. Table XI-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. A record of all exceedances in the site subwatershed since monitoring began is provided in Appendix II, Table II-12.

Table XII-5. Terminous Tract Drain @ Hwy 12 management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-12.

Monitoring Year	Management Plan Constituents										Completed Management Plan
	Dissolved Oxygen, <7 mg/L	Specific Conductivity[1], >700 µS/cm or > 1000 µS/cm	Total Dissolved Solids, >450 mg/L	Nitrate + Nitrite, >10 mg/L	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	*S. capricornutum*, (%Control)	*H. azteca*, (%Control)	*P. promelas*, (%Control)
2005	4	3	2	NA	2	NA	0	NA	1	0	1
2006	6	3	3	NA	3	1	0	0	0	0	0
2007	8	2	2	NA	3	2	0	0	0	0	0
2008	5	9	6	0	0	2	2	0	3	0	0
2009	6	5	5	0	1	NA	NA	NA	NA	NA	NA
2010	7	5	6	0	1	2	0	0	0	1	0
2011	9	5	7	0	2	NA	1	NA	0	0	NA
2012	9	4	6	1	2	NA	0	NA	0	0	NA
2013	7	3	4	0	1	1	0	0	0	1	0
2014 WY*	8	3	3	0	2	NA	0	NA	NA	0	NA
2015 WY	9	2	NA	1	5	0	1	2	1	0	0
Overall Tally	**78**	**44**	**44**	**2**	**23**	**8**	**4**	**2**	**5**	**2**	**1**

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
*2014 includes January through September results only.

Table XII-6. Terminous Tract Drain @ Hwy 12 site subwatershed monitoring results for MPM constituents since management plan initiation.
Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

	MONTH:	JAN	FEB		MAR		APR	MAY	JUN	JUL	AUG		SEP	OCT	NOV	DEC
2007 NM (@ Hwy 12)	Date:	NA	2/11/07	2/28/07	3/6/07		4/10/07	5/22/07	6/12/07	7/10/07	8/7/07	8/9/07	9/4/07	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	280	90.8	NA		181	190	811	205	286	NA	301	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	95		NA	NA	NA	NA	NA	94	NA	NA	NA	NA
2008 NM (@ Hwy 12)	Date:	1/23/08	NA		NA		4/15/08	5/13/08	6/10/08	7/15/08	8/12/08		9/16/08	NA	NA	NA
	S. capricornutum toxicity (% Control)	**8.3**	NA		NA		**51**	**0.50**	256	285	246		454	NA	NA	NA
2010 NM (@ Hwy 12)	Date:	1/13/10	2/9/10		3/16/10		4/13/10	5/11/10	6/8/10	7/13/10	8/10/10		9/7/10	10/12/10	11/9/10	12/7/10
	Chlorpyrifos (µg/L)	<0.003	<0.003		<0.003		<0.003	<0.003	<0.003	<0.003	NA		NA	<0.003	<0.003	<0.003
	S. capricornutum toxicity (% Control)	231	339		985		NA	NA	352	687	1092		369	445	569	171
	H. azteca toxicity (% Control)	NA	NA		101		NA	NA	NA	NA	NA		**45**	NA	NA	NA
2010 MPM (@ Hwy 12)	Date:	NA	NA		NA		4/13/10	5/11/10	NA	NA	8/10/10		9/7/10	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA		NA	NA	NA	NA	<0.003		0.011	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA		1480	1121	NA	NA	NA		NA	NA	NA	NA
2011 MPM (@ Hwy 12)	Date:	1/11/11	2/8/11		NA		4/12/11	5/24/11	NA	NA	8/23/11		9/20/11	10/14/11	NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA		NA	NA	NA	NA	<0.003		**0.082**	NA	NA	NA
	S. capricornutum toxicity (% Control)	207	836		NA		1509	1138	NA	NA	NA		NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA		NA		NA	NA	NA	NA	NA		NA	109	NA	NA
2012 MPM (@ Hwy 12)	Date:	1/17/12	2/14/12		3/15/12		4/12/12	NA	NA	NA	8/21/12		9/18/12	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA		NA		NA	NA	NA	NA	<0.003		<0.003	NA	NA	NA
	S. capricornutum toxicity (% Control)	915	464		NA		332	NA	NA	NA	NA		NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA		107		NA	NA	NA	NA	NA		107	NA	NA	NA
2013 MPM & NM (@Hwy 12)	Date	1/15/13	2/21/13		3/19/13		4/2/13	5/21/13	6/18/13	7/16/13	8/20/13		9/17/13	10/8/13	11/19/13	12/17/13
	Chlorpyrifos (µg/L)	<0.003	<0.003		<0.003		<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003
	H. azteca toxicity (% Control)	NA	NA		97		NA	NA	NA	NA	NA		**48**	NA	NA	NA
2014 & 2015 WY MPM & NM (@ Hwy 12)	Date	NA	NA		NA	3/5/14	NA	NA	NA	NA	8/19/14		9/16/14	10/21/14	11/18/14	12/4/14
	Chlorpyrifos (µg/L)	NA	NA		NA	NA	NA	NA	NA	NA	<0.003*		<0.003*	<0.003	<0.003	<0.003
	Diuron (µg/L)	NA	NA		NA	NA	NA	NA	NA	NA	NA		NA	<0.2	<0.2	<0.2
	S. capricornutum toxicity (% Control)	NA	NA		NA	NA	NA	NA	NA	NA	NA		NA	763	699	233
	H. azteca toxicity (% Control)	NA	NA		NA	100*	NA	NA	NA	NA	NA		98*	NA	NA	NA
2015 WY MPM & NM (@ Hwy 12)	Date	1/20/15	2/9/15		3/17/15		4/21/15	5/19/15	6/16/15	7/21/15	8/18/15		9/15/15	Oct	Nov	Dec
	Chlorpyrifos (µg/L)	**0.074**	<0.003		<0.003		<0.003	<0.003	<0.003	<0.003	<0.003*		0.009*			
	Diuron (µg/L)	<0.2	**12**		**2.5**		<0.2	<0.2	<0.2	<0.2	<0.2		<0.2			
	S. capricornutum toxicity (% Control)	348	**21**		156		174	192	299	190	262		256			

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	H. azteca toxicity (% Control)	NA	NA	100*	NA	NA	NA	NA	NA	98*			

MPM – Management Plan Monitoring.
NA – Not Applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring.
*MPM and NM occurred during sampling event.

Table XII-7. Terminous Tract Drain site subwatershed instantaneous load calculations for chlorpyrifos and nitrate + nitrite.
If discharge was unable to be measured or the analyte was ND, the result is not included in the table.

Site Name	Analyte Name	Sample Date	Discharge, cfs	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	3/21/2005	9.06	0.012	µg/L	3	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	1/23/2008	33.93	0.0047	µg/L	5	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	9/16/2008	18.58	0.020	µg/L	11	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	9/7/2010	4.07	0.011	µg/L	1	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	9/20/2011	22.89	0.082	µg/L	53	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	1/20/2015	19.82	0.074	µg/L	42	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	9/15/2015	16.73	0.009	µg/L	4	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	10/14/2008	3.69	0.46	mg/L	48	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	11/4/2008	24.59	7	mg/L	4874	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	12/9/2008	5.34	0.75	mg/L	113	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	1/13/2009	21.81	6.6	mg/L	4076	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	2/10/2009	3.18	1	mg/L	90	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	3/10/2009	23.46	2.6	mg/L	1727	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	4/14/2009	4.54	0.5	mg/L	64	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	5/12/2009	18	0.77	mg/L	392	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	6/9/2009	38.05	1	mg/L	1077	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	8/11/2009	47.45	1.8	mg/L	2419	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	9/15/2009	17.36	0.38	mg/L	187	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	10/6/2009	47.24	1	mg/L	1338	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	11/10/2009	6.84	2.5	mg/L	484	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	12/8/2009	1.08	6.5	mg/L	199	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	1/13/2010	26.45	7.5	mg/L	5617	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	2/9/2010	24.19	2.1	mg/L	1438	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	3/16/2010	18.4	1.7	mg/L	886	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	4/13/2010	12.55	0.96	mg/L	341	µg/sec

Site Name	Analyte Name	Sample Date	Discharge, cfs	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	5/11/2010	23.36	1.6	mg/L	1058	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	6/8/2010	32.36	0.11	mg/L	101	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	9/7/2010	4.07	0.35	mg/L	40	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	10/12/2010	16.46	0.53	mg/L	247	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	11/9/2010	2.7	0.78	mg/L	60	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	12/7/2010	29.18	5.8	mg/L	4792	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	1/11/2011	46.35	4.5	mg/L	5906	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	2/8/2011	18.25	1.9	mg/L	982	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	3/8/2011	17.2	2.6	mg/L	1266	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	4/12/2011	16.96	1.8	mg/L	864	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	5/24/2011	15.57	0.52	mg/L	229	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	6/28/2011	49.7	1.2	mg/L	1689	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	7/26/2011	62.82	0.52	mg/L	925	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	8/23/2011	50.7	0.44	mg/L	632	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	9/20/2011	22.89	0.14	mg/L	91	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	10/6/2011	13.12	0.45	mg/L	167	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	11/15/2011	15.13	4	mg/L	1714	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	12/13/2011	40.34	3.7	mg/L	4227	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	1/17/2012	38.71	1.9	mg/L	2083	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	2/14/2012	12.3	0.7	mg/L	244	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	3/15/2012	12.8	2.8	mg/L	1015	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	4/12/2012	13.44	0.44	mg/L	167	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	5/16/2012	32.04	0.25	mg/L	227	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	6/19/2012	44.82	0.72	mg/L	914	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	7/17/2012	82.87	0.9	mg/L	2112	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	8/21/2012	47.98	1.1	mg/L	1495	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	9/18/2012	8.59	0.18	mg/L	44	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	10/16/2012	15.19	0.23	mg/L	99	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	11/6/2012	13.28	0.91	mg/L	342	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	1/15/2013	22.87	2.5	mg/L	1619	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	2/21/2013	2.02	1.8	mg/L	103	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	3/19/2012	3.88	0.66	mg/L	73	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	4/2/2013	32.23	0.34	mg/L	310	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	5/21/2013	32.4	0.26	mg/L	239	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	6/18/2013	48.58	0.9	mg/L	1238	µg/sec

Site Name	Analyte Name	Sample Date	Discharge, cfs	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	7/16/2013	38.3	0.62	mg/L	672	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	8/20/2013	41.66	1.2	mg/L	1416	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	9/17/2013	23.21	0.47	mg/L	309	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	10/8/2013	28.44	0.31	mg/L	250	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	11/19/2013	20.04	0.63	mg/L	358	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	12/17/2013	26.32	1.6	mg/L	1192	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	1/28/2014	58.11	3.2	mg/L	5266	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	2/11/2014	55.28	4.9	mg/L	7671	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	3/3/2014	58.85	3.3	mg/L	5499	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	4/15/2014	24.53	0.21	mg/L	146	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	5/20/2014	39.02	0.59	mg/L	652	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	6/17/2014	57.31	1.4	mg/L	2272	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	7/15/2014	57.46	0.32	mg/L	521	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	8/19/2014	55.1	0.32	mg/L	499	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	9/16/2014	35.34	0.54	mg/L	540	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	10/21/2014	45.4	0.55	mg/L	707	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	11/18/2014	32.86	2.3	mg/L	2140	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	1/20/2015	19.82	1.6	mg/L	898	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	2/9/2015	28.93	3.5	mg/L	2867	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	3/17/2015	31.2	1.3	mg/L	1149	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	4/21/2015	31.76	0.6	mg/L	540	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	5/19/2015	34.51	0.56	mg/L	547	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	7/21/2015	55.98	1	mg/L	1585	µg/sec
Terminous Tract Drain @ Hwy 12	Nitrate + Nitrite	9/15/2015	16.73	0.23	mg/L	109	µg/sec

[1] Load = Discharge (cfs) X 28.317L/ft3 X Concentration (µg/L). To convert a concentration measured in mg/L to µg/L multiply by 1000. The load values calculated represent instantaneous loads only, and should not be used to extrapolate loading over any period of time.

Source Identification and Outreach

The Coalition evaluates past monitoring results and associated PUR data to identify sources of management plan constituents and develop an outreach strategy. The Coalition attempts to source constituents through PUR data, and outreach efforts are designed to target the sources of water quality impairments associated with these constituents.

Sourceable constituents are associated with pesticide applications to assist in determining potential sources of water quality impairments and in focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices intended to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in the Management Practices sections of the main body of the 2016 Annual Report.

An exceedance of the WQTL for chlorpyrifos (0.074 µg/L) occurred during the January 20, 2015 monitoring event at Terminous Tract Drain @ Hwy 12. Chlorpyrifos is an organophosphate pesticide used for agricultural insect pest control on a wide variety of crops. Based on PUR data associated with the exceedance, there were eight applications of 260 lbs of AI chlorpyrifos applied from November 17 through 19, 2015 over 280 acres of asparagus. The applications of chlorpyrifos occurred approximately 62 days before the sampling event and exceedance, which is well out of the date range for pesticides in soils. The sample site drains the entire island; therefore, irrigation tailwater runoff potentially contributed to the exceedance. Further analysis indicated that three members were responsible for the applications of chlorpyrifos associated with the exceedance. As a result of this exceedance, the Coalition will conduct additional focused outreach in the site during 2016.

Two exceedances of the WQTL for diuron occurred in the 2015 WY; once in February 2015 (12.0 µg/L) and once in March 2015 (2.5 µg/L). Diuron is a broad-spectrum herbicide used for weed control on agriculture, highway rights of way, railroads, industrial sites, and by homeowners. Applications of diuron in this site subwatershed have gradually decreased over time. Based on PUR data associated with the exceedance, one application was made in January, prior to sampling on February 9, 2015. An application of 400.4 lbs of Al of product was made on 100 acres of non-agricultural land on January 28, 2015. A storm event resulting in 1.42 inches of rain triggered the sampling event, which occurred 12 days before the application of diuron. The sample site drains the entire island; stormwater runoff likely mobilized diuron in soil particles into the waterbody. The exceedance in February was nearly six times the trigger limit of 2 µg/L; the exceedance in March was likely related to the exceedance during the storm event. The soil half-life of diuron, according to the USDA is approximately 90 days; therefore applications that occurred in January prior to sampling could have persisted in the water column or soil and remobilized due to storm runoff.

One exceedance of the WQTL for nitrate + nitrite (11 mg/L) occurred during storm monitoring on December 4, 2014. Potential sources of nitrate in surface waters include runoff of fertilizer or organic matter from irrigated fields, leaking septic systems, waste-treatment facility effluent, and inputs from animal waste. These sources can move to surface waters through above ground runoff or shallow subsurface flows. Total Kjeldahl nitrogen (TKN) and ammonium in animal waste that enter surface waters can be converted to nitrate by nitrifying bacteria. Possible sources of animal waste in a

waterbody include dairies, poultry operations, pasture, and/or wildlife. Due to their extreme solubility, nitrates in fertilizer could move to surface waters immediately after application. Nitrates may move past the root zone to the shallow subsurface (vadose zone) and move laterally to surface waters although the extent of this potential pathway is not known.

Samples collected in October 2014 were toxic to *C. dubia* (15% survival compared to the control); the Coalition conducted a TIE which indicated cationic metals and organophosphate insecticides as the causes of toxicity; there was no Phase III TIE conclusion because all chemistry results were non-detect. Based on PUR data associated with the exceedance, 38 applications totaling 1,480 lbs of Al from a range of insecticides and fungicides were applied over 2,538 acres of tomato processing plants, blueberry, corn, and walnut crops from May through October 2014. The presence of arsenic (6 µg/L) was detected in the sample from October 21, 2014; although not an exceedance of the trigger limit, the detection of arsenic, as stated by the TIE, may have contributed to the toxicity.

Samples collected during storm monitoring in February 2015 were toxic to *S. capricornutum* (21% survival compared to the control); the Coalition conducted a TIE which indicated non-polar organics as the cause of toxicity; a Phase III TIE confirmed that a corresponding concentration of diuron (12.0 µg/L) detected in the sample as the cause of toxicity. Based on PUR data associated with the exceedance, 33 applications of various herbicides totaling 2,802 lbs of Al were applied from January 12, 2015 through February 2, 2015, with one large application of 400 lbs of Al of diuron on January 28, 2015. Over 1.4 inches of rain fell during the storm which triggered this storm monitoring sampling event on February 2, 2015; therefore, it is likely that the diuron detected in the waterbody was due to stormwater runoff. The management plan for water column toxicity to *S. capricornutum* was previously approved for completion from the site subwatershed's management plan. However, on February 9, 2015, toxicity to *S. capricornutum* occurred.

As previously discussed, study results on the water quality parameters associated with arsenic and DO have been submitted to the Regional Board. Additional investigation of the sources of arsenic and DO concentrations in surface waters is pending further discussion with the Regional Board. Dairies were identified as the source of the exceedance of the WQTL for *E. coli* and therefore no work plan or study will be conducted. Exceedances of the WQTL for SC will be addressed with the CV-SALTS program.

Outreach

The Coalition carried out its management practice tracking and outreach which included contacting targeted growers in 2011 and following up with the growers in 2012. The Coalition contacted four targeted growers farming 1,778 acres within the site subwatershed (2013 MPUR, Pages 35-37) and documented current management practices (2012 MPUR, Pages 61-66). The Coalition's recommended management practices for reducing negative impacts of agricultural discharges on water quality include: reduction of application rates, alternative material application, spot treating, sprinkler or microspray irrigation, retention pond/hold basin construction, grass waterways or grass filter strip construction, reducing water volumes using irrigation management, and treating runoff waters with PAM or other materials. All four growers participated in follow-up contacts and documented newly implemented management practices during 2012 (2013 MPUR, Pages 63-65). Reducing water volume using irrigation

management accounted for 50% of the acreage on which new management practices were implemented. Installation of sprinkler or micro irrigation and use of center grass rows, grass waterways, or grass filter strips make up the remaining 50%.

Evaluation

Water quality has improved within the Terminous Tract Drain @ Hwy 12 site subwatershed but is clearly still impaired. The Coalition conducted Core site monitoring at Terminous Tract Drain @ Hwy 12 in addition to MPM for arsenic, chlorpyrifos, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca.* After three or more years with no toxicity, water column toxicity to *P. promelas* and *S. capricornutum* were approved for removal from the active management plan on April 17, 2012. The remaining sourceable constituents under the management plan include chlorpyrifos, diuron, and sediment toxicity to *H. azteca.* The remaining management plan constituents (DO, *E. coli,* and SC) were discussed during general outreach, and will continue to be discussed at annual grower meetings.

Next Steps

Focused outreach will be conducted in 2016 to address ongoing water quality impairments and recent water column toxicity to *S. capricornutum*. In the 2016 WY, monthly Core site monitoring will occur in addition to MPM for arsenic, chlorpyrifos, diuron, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* is scheduled.

XIII. UNION ISLAND DRAIN @ BONETTI RD

Overview

Monitoring at Union Island Drain @ Bonetti Rd began in the 2015 WY when the site replaced the Grant Line Canal near Calpack Rd and Grant Line Canal @ Clifton Rd site subwatersheds. The site represents the same hydrologic unit of the two Grant Line Canal sites, but better represents the drainage of the entire island. Management plans from the two Grant Line sites were transferred to the site for the 2015 WY and MPM began in October 2014 (Table XIII-1). The constituents in the site subwatershed management plan include, arsenic, DDE, DO, *E. coli*, SC, water column toxicity to *C. dubia* and *S. capricornutum*, and sediment toxicity to *H. azteca*.

On February 22 and March 23, 2016 the Coalition provided the Regional Board with results from studies it conducted on the water quality parameters associated with DO and arsenic, respectively. The Coalition will also submit the results from a study on the water quality parameters associated with DDE to the Regional Board on May 22, 2016. A summary of the results from these studies is provided in the Introduction section of this Appendix or, in the case of DDE, will be provided in the Annual Report for the 2017 WY. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* Exceedances of the WQTL for SC and TDS are currently being addressed as part of the CV-SALTS program. The Coalition will continue general outreach in the site in the 2016 WY.

Union Island Drain @ Bonetti Rd is a Core site in Zone 7; monthly Core site monitoring is scheduled in the 2016 WY (2015 MPU). Management Plan Monitoring is scheduled for chlorpyrifos, water column toxicity to C*. dubia* and *S. capricornutum* and sediment toxicity to *H. azteca* in the 2016 WY. Field parameters, including DO and SC, will be monitored during every sampling event.

Table XIII-1. Union Island Drain @ Bonetti Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent[1]	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Chlorpyrifos	2016	2010-2012	NA
C. dubia water column toxicity	2006	2010-2012	NA
H. azteca sediment toxicity	2006	2010-2012	NA
S. capricornutum water column toxicity	2008	2010-2012	NA
Constituents Requiring Source ID/Work Plans			
Arsenic	2007	2010-2012	NA
DDE	2008	2010-2012	NA
Dissolved Oxygen	2006	2010-2012	NA
E. coli	2006	2010-2012	NA
Specific Conductivity	2006	2010-2012	NA

[1]Management plan constituents were carried over from the Grant Line Canal @ Clifton Court Rd and the Grant Line Canal near Calpack Rd management plans due to site substitution for Union Island Drain @ Bonetti.
NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

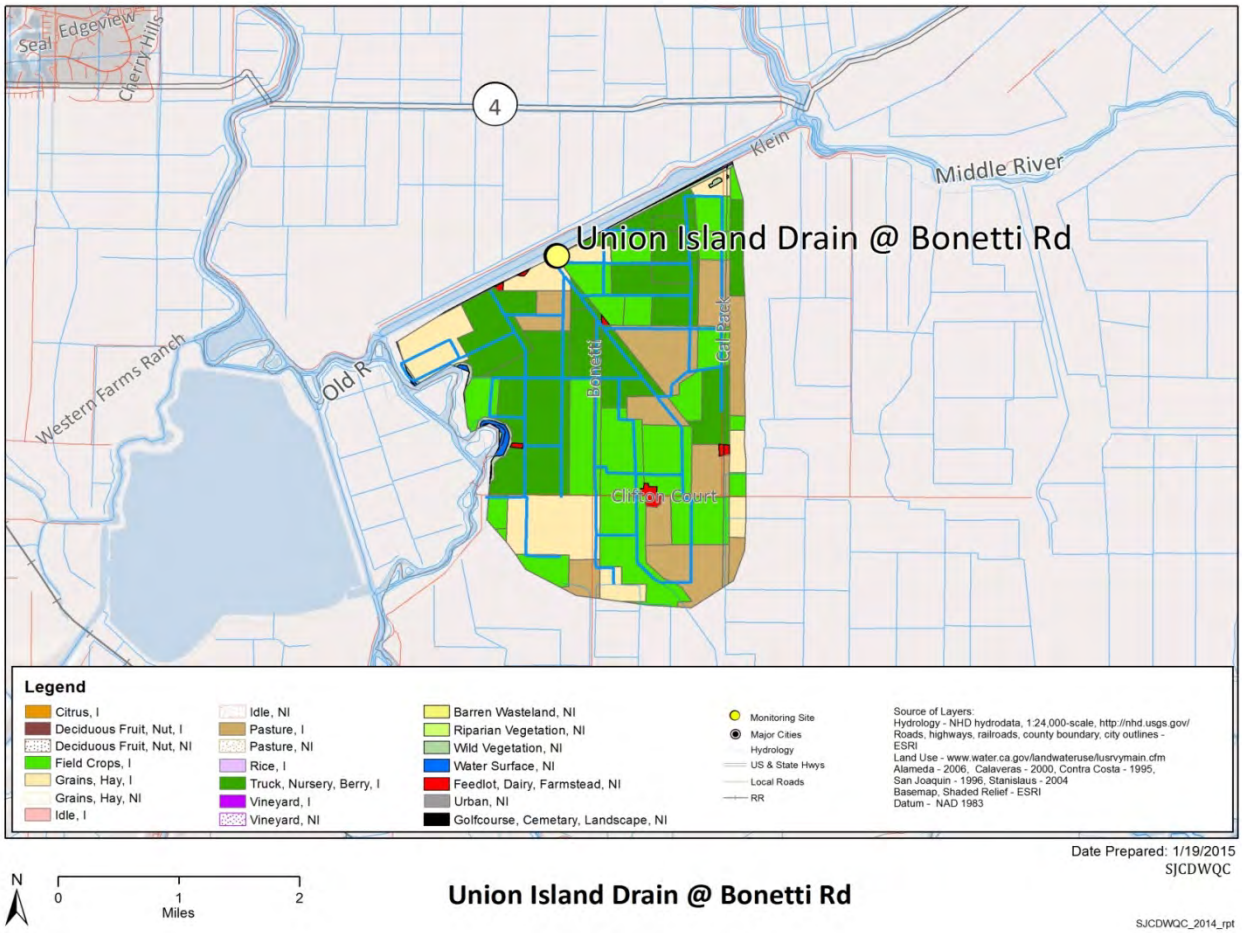
The Union Island Drain @ Bonetti Rd site subwatershed is located east of Clifton Court Forebay and is bordered by North Canal to the north and Grant Line Canal on the south. The Union Island Drain @ Bonetti Rd site subwatershed replaced Grant Line Canal near Calpack Rd and Grant Line Canal @ Clifton Court Rd monitoring locations in 2014 because it is more representative of drainage from the entire island. The sample location is the pumping station located on the north side and drains into the North Canal (Table XIII-2). The site consists of 4,410 irrigated acres that is primarily field and truck crops, nursery, and berry. A smaller portion of land is grains and pasture (Figure XIII-1).

The Union Island Drain @ Bonetti Rd site subwatershed is not considered impaired on California's 303(d) List of Impaired Waterbodies (last updated in 2010).

Table XIII-2. Union Island Drain @ Bonetti Rd site subwatershed sampling location and coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Union Island Drain @ Bonetti Rd	544UIDABR	37.87170	-121.52551

Figure XIII-1. Union Island Drain @ Bonetti Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Union Island Drain @ Bonetti Rd in October 2014. Union Island Drain @ Bonetti Rd is new the Core site in Zone 7 under the Order; monitoring was scheduled monthly during the 2015 WY. The site replaced the Grant Line Canal @ Clifton Court Rd and Grant Line Canal along Calpack Rd sites. It represents the same hydrologic unit of the two Grant Line Canal sites, but better represents the drainage of the entire island. Monitoring history for the two Grant Line Canal sites can be found in past years site subwatershed appendices. Table XIII-3 contains the number of events monitored per year and the constituents for the 2015 WY.

Management plans from the two Grant Line Canal sites were transferred to Union Island Drain @ Bonetti Rd; the Coalition conducted MPM from October 2014 through the 2015 WY during months of past exceedances. Table XIII-4 contains the schedule for MPM for Union Island Drain @ Bonetti Rd during the 2015 WY.

Table XIII-3. Union Island Drain @ Bonetti Rd sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2015 WY
Sampling Events	Events Scheduled	12
	Dry Sites	0
	Events Sampled	12
Field and Physical Parameters	Dissolved Oxygen	12
	Dissolved Solids	0
	E. coli	12
	Grain size (sediment)	2
	Hardness as CaCO3	4
	pH	12
	Specific Conductivity	12
	Suspended Solids	12
	Total Organic Carbon	12
	Total Organic Carbon (sediment)	2
	Turbidity	12
	Ammonia as N	12
Nutrients	Nitrate + Nitrite as N	12
	Nitrate as N	0
	Nitrite as N	0
	Nitrogen, Total Kjeldahl	0
	Orthophosphate as P	12
	Phosphate as P	0
	Cadmium	0
Metals (Dissolved)	Copper	4
	Lead	0
	Nickel	0
	Zinc	0
Metals (Total)	Arsenic	4
	Boron	0
	Cadmium	0
	Copper	0

TYPE	ANALYTE	2015 WY
	Lead	0
	Molybdenum	0
	Nickel	0
	Selenium	0
	Zinc	0
Carbamates	Aldicarb	12
	Carbaryl	12
	Carbofuran	12
	Diuron	12
	Linuron	12
	Methiocarb	12
	Methomyl	12
	Oxamyl	12
Group A Pesticides	Aldrin	0
	Chlordane	0
	Endosulfan I	0
	Endosulfan II	0
	HCH, alpha	0
	HCH, beta	0
	HCH, delta	0
	HCH, gamma	0
	Heptachlor	0
	Heptachlor epoxide	0
	Toxaphene	0
Herbicides	Atrazine	12
	Cyanazine	12
	Glyphosate	2
	Paraquat	2
	Simazine	12
	Trifluralin	12
Organochlorines	DDD(p,p')	0
	DDE(p,p')	0
	DDT(p,p')	0
	Dicofol	0
	Dieldrin	0
	Endrin	0
	Methoxychlor	0
Organophosphates	Azinphos methyl	12
	Chlorpyrifos	12
	Demeton-s	12
	Diazinon	12
	Dichlorvos	12
	Dimethoate	12
	Disulfoton	12
	Malathion	12
	Methamidophos	12
	Methidathion	12
	Molinate	0
	Parathion, Methyl	12
	Phorate	12
	Phosmet	12
	Thiobencarb	0

Type	Analyte	2015 WY
Pyrethroids	Bifenthrin	0
	Cyfluthrin, total	0
	Cyhalothrin, lambda, total	0
	Cypermethrin, total	0
	Esfenvalerate/Fenvalerate, total	0
	Permethrin, total	0
Sediment Pesticides	Bifenthrin	0
	Chlorpyrifos	0
	Cyfluthrin	0
	Cyhalothrin, lambda	0
	Cypermethrin	0
	Deltamethrin: Tralomethrin	0
	Esfenvalerate/ Fenvalerate	0
	Fenpropathrin	0
	Permethrin	0
Toxicity	*Ceriodaphnia dubia*	12
	Pimephales promelas	12
	Selenastrum capricornutum	12
	Hyalella azteca	2

Table XIII-4. Union Island Drain @ Bonetti Rd Management Plan Monitoring schedule (2015 WY)

Site Name	Sample Date	Monitoring Type	*C. dubia*	*S. capricornutum*	*H. azteca*
Union Island Drain @ Bonetti Rd	1/20/2015	MPM		X	
Union Island Drain @ Bonetti Rd	2/9/2015	MPM		X	
Union Island Drain @ Bonetti Rd	3/17/2015	MPM	X		X
Union Island Drain @ Bonetti Rd	4/21/2015	MPM		X	
Union Island Drain @ Bonetti Rd	5/19/2015	MPM	X	X	
Union Island Drain @ Bonetti Rd	7/21/2015	MPM		X	
Union Island Drain @ Bonetti Rd	8/18/2015	MPM	X		
Union Island Drain @ Bonetti Rd	9/15/2015	MPM			X

X – Constituent sampled for Management Plan Monitoring (MPM).

Monitoring Results

During the 2015 WY, the Coalition conducted MPM for water column toxicity to *C. dubia* and *S. capricornutum* during all months (October 2014 through September 2015), and for sediment toxicity to *H. azteca* (March and September) (Table XIII-4). In addition to MPM, monitoring for the full suite of constituents occurred monthly at the Core site. One exceedance of the WQTL for chlorpyrifos occurred on January 20, 2015 (0.077 µg/L) triggered a new management plan for the site in the 2016 WY. Monitoring from the 2015 WY resulted in no toxic samples to *C. dubia* or *H. azteca*. In the 2016 WY, six water column samples were toxic to *S. capricornutum*: January 20, 2015 (87% of control), February 9, 2015 (61% of control), April 21, 2015 (88% of control), June 16, 2016 (76% of control), July 21, 2015 (67% of control), and September 15, 2015 (41% of control). In addition, exceedances of the WQTLs for the

following management plan constituents occurred: DO (11), SC (10), *E. coli* (4), and arsenic (3) (Table XIII-5).

Table XIII-5 is a tally of exceedances of WQTLs for the 2015 WY for management plan constituents. Table XIII-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatersheds management plan. A record of all exceedances since monitoring began is provided in Appendix II, Table II-13.

Table XIII-5. Union Island Drain @ Bonetti Rd management plan constituent exceedance tally.
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-13.

Monitoring Year	Management Plan Constituents								
	Dissolved Oxygen, <7 mg/L	Specific Conductivity[1], >700µS/cm or > 1000 µS/cm	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	DDE (p,p'), >0.00059 µg/L	Chlorpyrifos >0.015 µg/L	*C. dubia* (% Control)	*S. capricornutum*, (%Control)	*H. azteca* (% Control)
2015 WY	11	10	4	3	NA	1	0	6	0
Overall Tally	11	10	4	3	NA	1	0	6	0

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.
NA – Not Applicable; monitoring for constituent did not occur.

Table XIII-6. Union Island Drain @ Bonetti Rd site subwatershed monitoring results for MPM constituent since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

	Month:	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
2015 WY MPM & NM (@ Bonetti Rd)	Date:	10/21/14	11/18/14	12/4/14	1/20/15	2/9/15	3/17/15	4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	**0.077**	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	C. dubia toxicity (% Control)	100	100	105	100	95	100*	105	**95***	90	95	90*	100
	S. capricornutum toxicity (% Control)	465	197	103	**87***	**61***	100	**88***	89*	**76**	**67***	278	**41**
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	94*	NA	NA	NA	NA	90*

MPM – Management Plan Monitoring.

NA – Not applicable. No monitoring occurred on this date for this constituent.

NM – Normal Monitoring.

* MPM and NM occurred during sampling event.

Source Identification and Outreach

The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the Union Island Drain @ Bonetti Rd management plan. Details of the sourcing for exceedances that occurred during the 2015 WY are below.

Monitoring during the 2015 WY resulted in exceedances of the WQTL for field parameters and *E. coli*: DO (11), *E. coli* (4), and SC (10). Union Island Drain @ Bonetti Rd is an agricultural drain within the Delta islands and pumping is required to remove water from the drain. In most cases there is no flow in the drain unless the pumps are activated. Furthermore, algal production and decay along with stagnant, warm water at the site can contribute to low DO detections. Therefore, exceedances of the WQTL for DO and SC are common in the site due to a lack of flow. As previously discussed, study results on the water quality parameters associated with DO have been submitted to the Regional Board. Additional investigation of the sources of DO concentrations in surface waters is pending further discussion with the Regional Board.

There were four exceedances of the WQTL for *E. coli* ranging from 344.8 MPN/ 100 mL to >2419.6 MPN/ 100 mL (2016 Annual Report; Table 47). Feedlots and dairies accounted for less than 10% of the site subwatershed acres (2016 Annual Report; Table 4). The exceedances occurred during a storm event and during irrigation season; therefore, storm water and irrigation tail water runoff could have transported bacteria into the waterbody. There was often no flow at both sample locations, therefore leaving the bacteria in stagnant water.

Monitoring during the 2015 WY resulted in one exceedance of the WQTL for chlorpyrifos. The exceedance occurred in January 2015. Applications of chlorpyrifos in the Union Island Drain @ Bonetti Rd site subwatershed occurred November 2014 and February 2015 (Table IIV-7). Asparagus and alfalfa received the majority of applications in the site subwatershed (Table XIII-8). A single exceedance of the WQTL for chlorpyrifos occurred during monthly monitoring at the Core site in January 2015 (0.077 µg/L). This is the first exceedance of the WQTL since monitoring began and has resulted in a new management plan in the 2016 WY for the TMDL constituent chlorpyrifos. According to the PUR data associated with the January exceedance, two applications of chlorpyrifos, about 36 and 145 lbs AI, were applied in early November 2014.

Monitoring during the 2015 WY resulted in six samples that were toxic to *S. capricornutum*. The toxic sample in January coincided with the exceedance of the WQTL for chlorpyrifos (0.077 µg/L) and according to the PUR data, there were multiple applications of herbicides in the site subwatershed associated with the toxicity. A Phase I TIE was performed on the September 15, 2015 sample (41% survival compared to control) and the results indicated that the non-polar organics and/or cationic metals were the cause of the toxicity.

Outreach

Focused outreach has not yet occurred in the Union Island Drain @ Bonetti Rd site subwatershed. However, in 2010, outreach was conducted in the two Grant Line Canal sites that the Union Island Drain

@ Bonetti Rd site now represents. Information regarding the 2010 focused outreach can be found in the 2012 MPUR.

Table XIII-7. Union Island Drain @ Bonetti Rd site subwatershed chlorpyrifos applications, lbs AI applied, and acres treated by year.
Pesticide Use Report data complete through July 2015 for San Joaquin County.

Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
2012	6	168	166
2013	17	633	648
2014	20	423	806
2015	12	278	478

Table XIII-8. Pounds of chlorpyrifos applied by crop in the Union Island Drain @ Bonetti Rd site subwatershed (top five crops per year shown).
Pesticide Use Report data complete through July 2015 for San Joaquin County.

Year	Commodity	Pounds of AI Applied
2012	Asparagus	168
2013	Asparagus	595
	Corn	38
2014	Alfalfa	329
2015	Alfalfa	184
	Asparagus	94

Evaluation

As neither a second year of monitoring nor focused outreach have yet occurred in the Union Island Drain @ Bonetti Rd site subwatershed, water quality improvements are unknown. The new management plan for chlorpyrifos that will be initiated in the 2016 WY will allow the Coalition to better track water quality throughout the site subwatershed.

Next Steps

Core site monitoring will occur monthly at Union Island Drain @ Bonetti Rd. Management Plan Monitoring will continue to occur for water column toxicity to *C. dubia*, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca*, and MPM will be initiated for chlorpyrifos in months of past exceedances. General outreach will continue to occur in the site subwatershed.

XIV. UNNAMED DRAIN TO LONE TREE CREEK @ JACK TONE RD

Overview

Monitoring at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed began during the irrigation season of 2006, and management plans were first established during the irrigation season in 2007 and continued through September 2015. The Coalition completed the focused outreach portion of its management plan strategy in the site subwatershed in 2012 (including additional outreach), and monitoring results through September 2015 indicate improved water quality. The Coalition received approval to complete the management plans for simazine and water column toxicity to *C. dubia* and *S. capricornutum* on May 21, 2012. On December 18, 2015 the Coalition received approval to complete the management plans for copper and SC. The remaining constituents in the site subwatershed management plan include chlorpyrifos, diuron, DO, *E. coli,* lead, and sediment toxicity to *H. azteca* (Table XIV-1).

On February 22, 2016 the Coalition provided the Regional Board with results from studies it conducted on the water quality parameters associated with DO. The Coalition will also submit the results from a study on the water quality parameters associated with lead to the Regional Board on May 22, 2016. A summary of the results from these studies is provided in the Introduction section of this Appendix or, in the case of lead, will be provided in the Annual Report for the 2017 WY. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* The Coalition will continue general outreach in the site in the 2016 WY.

In addition to focused outreach from 2008 through 2010, the Coalition conducted additional focused outreach with two new growers in 2012 to address continued chlorpyrifos use.

During the 2015 WY, the Coalition conducted MPM for chlorpyrifos, copper, diuron, and sediment toxicity to *H. azteca.* Two exceedances of the WQTL for chlorpyrifos occurred in January and June 2015, respectively. No toxicity occurred during the 2015 WY.

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd is a Represented site in Zone 2; no Represented site monitoring is scheduled for the 2016 WY (2015 MPU). Management Plan Monitoring will continue for chlorpyrifos, diuron and sediment toxicity to *H. azteca.* The field parameter DO will be measured during all MPM events.

Table XIV-1. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Chlorpyrifos	2007	2008-2010	NA
Diuron	2008	2008-2010	NA
H. azteca sediment toxicity	2009	2008-2010	NA
Constituents Requiring Source ID/Work Plans			

Dissolved Oxygen	2007	2008-2010	NA
E. coli	2008	2008-2010	NA
Lead	2009	2008-2010	NA
Completed Management Plans			
Copper	2009	2008-2010	2015
Simazine	2009	2008-2010	2012
Specific Conductivity	2008	2008-2010	2015
C. dubia water column toxicity	2009	2008-2010	2012
S. capricornutum water column toxicity	2008	2008-2010	2012

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

The Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed consists of 28,505 irrigated acres which includes rice, grains, vineyards, and pasture (Figure XIV-1). The drain forms in the eastern portion of San Joaquin County, flows west, and eventually confluences with Lone Tree Creek just west of Jack Tone Road. This site subwatershed receives drainage from recent urban developments, industrial sites, field crops, grains, and pastureland. Unnamed Drain to Lone Tree Creek subwatershed includes an upstream sample location, Unnamed Drain to Lone Tree Creek @ Wagner Rd (Table XIV-2).

Unnamed Drain to Lone Tree Creek (Temple Creek) (San Joaquin County) is listed on California's 303(d) List of Impaired Waterbodies for ammonia and electrical conductivity with the potential source listed as dairies (last updated in 2010).

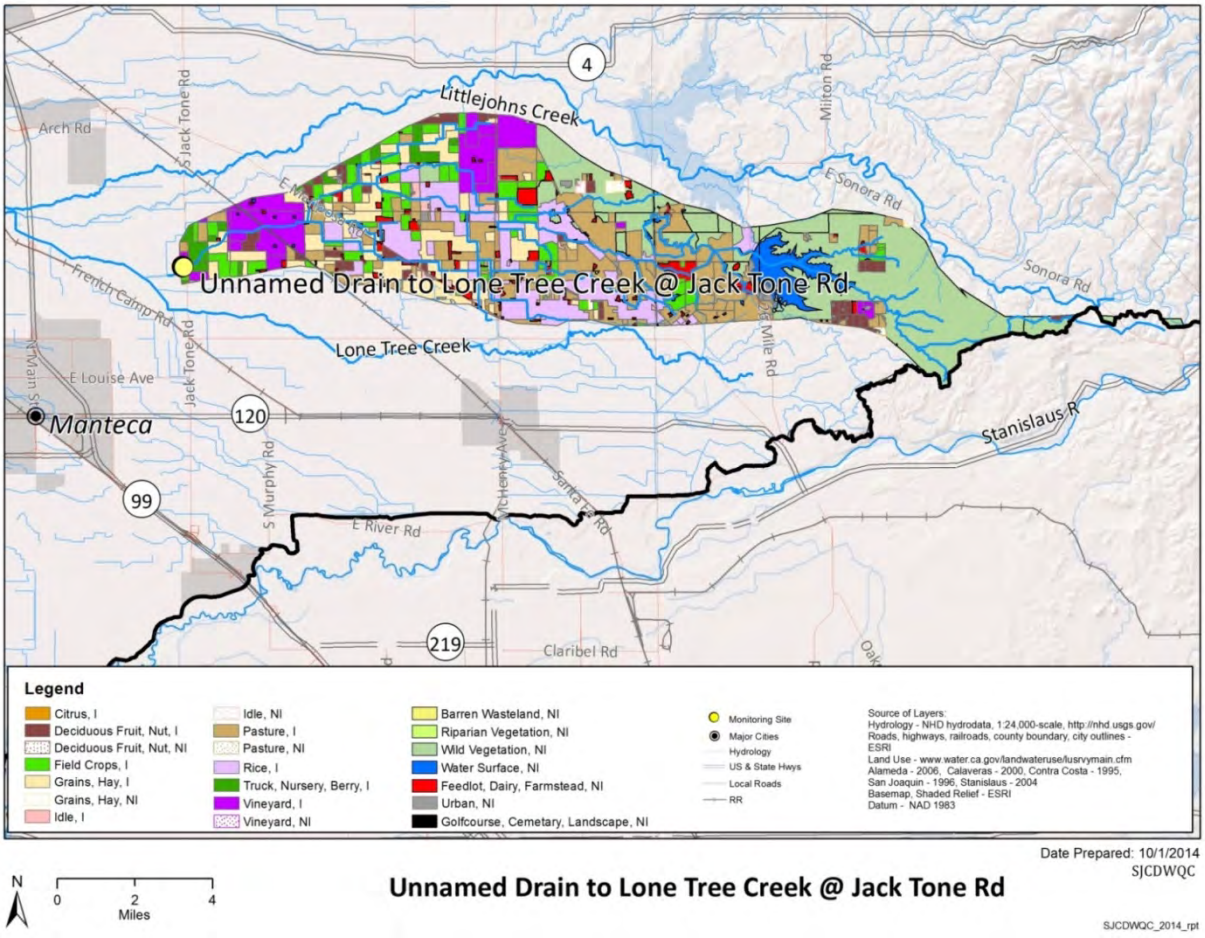
Table XIV-2. Unnamed Drain to Lone Tree Creek site subwatershed sampling locations and coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Unnamed Drain to Lone Tree Creek @ Wagner Rd[US]	531UDLTWR	37.87085	-121.09109
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	531UDLTAJ	37.85360	-121.14570

[US] Upstream site

*Original SJCDWQC sampling site

Figure XIV-1. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd during the irrigation season of 2006 and has continued through September 2015. Table XIV-3 contains the number of events monitored per year and the constituents from 2008 through September 2015.

The Coalition initiated MPM during the irrigation season in 2007 and continued through September 2015 (Table XIV-4). In an effort to source past exceedances, additional MPM for chlorpyrifos occurred at the site in 2007 and at an upstream monitoring location, Unnamed Drain to Lone Tree Creek @ Wagner Rd in 2008. Since 2008, MPM for constituents of concern occurred during months of past exceedances (Table XIV-4). There were no detections of diuron, copper, or sediment toxicity to *H. azteca* during the 2015 WY..

Table XIV-3. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	14	6	12	12	11	11	9	11
	Dry Sites	0	0	0	1	0	1	0	0
	Events Sampled	14	6	12	11	11	10	9	11

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Field and Physical Parameters	Dissolved Oxygen	14	6	12	11	11	10	9	11
	Dissolved Solids	8	0	0	0	0	0	0	0
	E. coli	7	0	0	0	0	0	0	0
	Grain size (sediment)	0	0	1	2	1	2	2	2
	Hardness as CaCO3	6	5	5	5	5	5	5	5
	pH	14	6	12	11	11	10	9	11
	Specific Conductivity	14	6	12	11	11	10	9	11
	Suspended Solids	0	0	0	0	0	0	0	0
	Total Organic Carbon	7	0	1	2	0	0	0	0
	Total Organic Carbon (sediment)	7	0	1	2	2	2	2	2
	Turbidity	8	0	0	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0	0	0
	Orthophosphate as P	6	0	0	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0
	Copper	0	5	5	5	5	5	5	5
	Lead	0	0	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0	0	0
Metals (Total)	Arsenic	6	0	0	0	0	0	0	0
	Boron	6	0	0	0	0	0	0	0
	Cadmium	6	0	0	0	0	0	0	0
	Copper	6	5	5	5	5	5	5	0
	Lead	6	0	0	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0	0	0
	Nickel	6	0	0	0	0	0	0	0
	Selenium	6	0	0	0	0	0	0	0
	Zinc	6	0	0	0	0	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0	0	0
	Diuron	7	0	2	2	2	1	2	4
	Linuron	7	0	0	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0	0	0
	Methomyl	7	0	0	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013	2014 WY	2015 WY
Herbicides	Atrazine	7	0	0	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0	0	0
	Paraquat	7	0	0	0	0	0	0	0
	Simazine	7	0	2	2	2	0	0	0
	Trifluralin	0	0	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0	0	0
	Dicofol	7	0	0	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0	0	0
	Endrin	7	0	0	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0	0	0
	Chlorpyrifos	7	4	10	8	9	8	7	9
	Demeton-s	0	0	0	0	0	0	0	0
	Diazinon	7	0	7	2	0	0	0	0
	Dichlorvos	0	0	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0	0	0
	Malathion	7	0	0	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0	0	0
	Methidathion	7	0	0	0	0	0	0	0
	Molinate	7	0	0	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0	0	0
	Phorate	7	0	0	0	0	0	0	0
	Phosmet	7	0	0	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	2	1	0	0	0
	Chlorpyrifos	0	0	1	2	1	0	0	0
	Cyfluthrin	0	0	1	2	1	0	0	0
	Cyhalothrin, lambda	0	0	1	2	1	0	0	0
	Cypermethrin	0	0	1	2	1	0	0	0
	Deltamethrin: Tralomethrin	0	0	1	2	1	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	1	2	1	0	0	0
	Fenpropathrin	0	0	1	2	1	0	0	0
	Permethrin	0	0	1	2	1	0	0	0
Toxicity	*Ceriodaphnia dubia*	9	1	3	3	2	0	0	0
	Pimephales promelas	7	0	0	0	0	0	0	0
	Selenastrum capricornutum	8	1	3	3	3	0	0	0
	Hyalella azteca	4	0	1	2	2	2	2	2

Table XIV-4. Unnamed Drain to Lone Tree Creek Management Plan Monitoring schedule (2007-2015 WY).

Site Name	Sample Date	Monitoring Type	Copper	Chlorpyrifos	Diazinon	Diuron	Simazine	*C. dubia*	*S. capricornutum*	*H. azteca*
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/30/2007	Add.		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/25/2007	Add.		X						
Unnamed Drain to Lone Tree Creek @ Wagner Rd	7/15/2008	US		X						
Unnamed Drain to Lone Tree Creek @ Wagner Rd	9/16/2008	US		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/14/2009	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/12/2009	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/9/2009	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/14/2009	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/11/2009	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/15/2009	MPM	X	X				X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/13/2010	MPM		X		X	X	X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/9/2010	MPM		X		X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/16/2010	MPM							X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/13/2010	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/11/2010	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/8/2010	MPM		X[1]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/13/2010	MPM	X	X[1]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/10/2010	MPM	X	X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/7/2010	MPM	X	X[1]	X[2]			X		X[1]
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	10/12/2010	MPM		X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/9/2010	MPM		X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/7/2010	MPM		X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/11/2011	MPM		X[1]	X[2]	X	X	X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/8/2011	MPM		X[1]	X[2]	X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/8/2011	MPM							X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/12/2011	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/24/2011	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/28/2011	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/26/2011	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/23/2011	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/20/2011	MPM	X	X				X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	10/14/2011	MPM								X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/15/2011	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/13/2011	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/17/2012	MPM		X		X	X	X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/14/2012	MPM		X		X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/15/2012	MPM							X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/12/2012	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/16/2012	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/19/2012	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/17/2012	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/21/2012	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/18/2012	MPM	X	X						X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/6/2012	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/3/2012	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/15/2013	MPM		X		X				

Site Name	Sample Date	Monitoring Type	Copper	Chlorpyrifos	Diazinon	Diuron	Simazine	*C. dubia*	*S. capricornutum*	*H. azteca*
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/21/2013	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/19/2013	MPM								X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/2/2013	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/21/2013	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/18/2013	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/16/2013	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/20/2013	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/17/2013	MPM	X	X						X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/12/2013	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/10/2013	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/28/2014	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/11/2014	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/3/2014	MPM								X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/15/2014	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/20/2014	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/17/2014	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/15/2014	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/19/2014	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/16/2014	MPM	X	X						X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/28/2014	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/11/2014	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/5/2014	MPM								X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/15/2014	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/20/2014	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/17/2014	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/15/2014	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/19/2014	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/16/2014	MPM	X	X						X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/18/2014	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/4/2014	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/20/2015	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/9/2015	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/17/2015	MPM								X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	4/21/2015	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/19/2015	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	6/16/2015	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/21/2015	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/18/2015	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/15/2015	MPM	X	X						X

[1] MPM and Department of Pesticide Regulation (DPR) grant monitoring.

[2] DPR grant monitoring only.

Add. – Additional sampling.

US – Upstream sampling.

X – Constituent sampled for Management Plan Monitoring (MPM).

During the 2015 WY, the Coalition conducted MPM at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd for chlorpyrifos (November 2014 through February 2015 and May through September 2015), copper (April, May, and July through September), diuron (November 2014 through February 2015 and May through September 2015), and sediment toxicity to *H. azteca* (March and September); no exceedances of the WQTLs for copper, diuron or sediment toxicity occurred (Table XIV-5). Two exceedances of the WQTL for chlorpyrifos occurred during the 2015 WY: January 20, 2015 (0.075 µg/L) and June 16, 2016 (0.025 µg/L). There were five detections of copper, but none exceeded the WQTL (Table XIV-6). The Coalition measured the field parameters, DO and SC, during all MPM events through September 2015; one exceedance of the WQTL for DO occurred in January 2015 (Table XIV-5).

Table XIV-5 is a tally of yearly exceedances of WQTLs from 2006 through September 2015 for management plan constituents in this site subwatershed. Table XIV-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table XIV-7 contains the instantaneous loads for copper since monitoring began in the site subwatershed. A record of all exceedances since monitoring began is provided in Appendix II, Table II-14.

Table XIV-5. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd management plan constituent exceedance tally.

A complete list of exceedances can be found in Appendix II, Table II-14. Exceedances that occurred during resampling for field parameters and toxicity are included in the tally

	Management Plan Constituents							Completed Management Plans					
Monitoring Year	Dissolved Oxygen, <5 mg/L	Total Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	Lead (Total), Variable[1] or > 15 µg/L	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	*H. azteca*, (%Control)	Specific Conductivity[2], >700µS/cm or > 1000 µS/cm	Copper (Dissolved), Variable[1]	Copper (Total), Variable[1] or >1300 µg/L	Simazine, >4 µg/L	*C. dubia*, (%Control)	*S. capricornutum*, (%Control)
2006	1	0	1	NA	2	0	0	0	NA	NA	0	0	0
2007	0	1	4	NA	3	2	1	1	NA	NA	1	1	4
2008	0	0	5	2	5	1	2	0	NA	5	1	3	1
2009	0	0	NA	NA	3	NA	NA	0	0	0	NA	1	0
2010	1	0	NA	NA	3	0	1	0	1	0	0	0	0
2011	0	0	NA	NA	2	0	2	0	1	0	0	0	0
2012	0	0	NA	NA	1	1	1	0	0	0	0	0	0
2013	0	NA	NA	NA	1	0	0	0	0	0	NA	NA	NA
2014 WY*	1	NA	NA	NA	0	0	0	0	0	0	NA	NA	NA
2015 WY	1	NA	NA	NA	2	0	0	0	0	NA	NA	NA	NA
Overall Tally	**4**	**1**	**10**	**2**	**22**	**4**	**7**	**1**	**2**	**5**	**2**	**5**	**5**

[1] Metal WQTL variable based on hardness.

[2] Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.

NA – Not Applicable; monitoring for constituent did not occur.

*2014 includes January through September results only.

Table XIV-6. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed monitoring results for MPM constituents since management plan initiation.

Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

MONTH:		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2007 NM (@ Jack Tone Rd)	Date	NA	2/11/07	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/7/07	9/4/07	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	**0.048**	NA	<0.003	<0.003	<0.003	**0.034**	<0.003	<0.003	NA	NA	NA
2007 MPM Add. (@ Jack Tone Rd)	Date	NA	NA	NA	NA	NA	NA	7/30/07	NA	9/25/07	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	0.014	NA	**0.017**	NA	NA	NA
2008 NM (@ Jack Tone Rd)	Date	1/23/08	NA	NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08	NA	NA	NA
	Chlorpyrifos (µg/L)	**0.045**	NA	NA	<0.003	**0.410**	**0.120**	**0.028**	0.014	**0.120**	NA	NA	NA
2008 MPM US (@ Wagner Rd)	Date	NA	NA	NA	NA	NA	NA	7/15/08	NA	9/16/08	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	<0.003	NA	**0.140**	NA	NA	NA
2009 MPM (@ Jack Tone Rd)	Date	NA	NA	NA	4/14/09	5/12/09	6/9/09	7/14/09	8/11/09	9/15/09	NA	NA	NA
	Copper, dissolved (µg/L)	NA	NA	NA	4.3	5.0	NA	1.5	1.5	2.5	NA	NA	NA
	Copper, total (µg/L)	NA	NA	NA	8.5	7.3	NA	4.6	3.8	5.0	NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	**0.032**	<0.003	**0.660**	NA	**0.086**	NA	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	NA	**30**	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	NA	500	NA	NA	NA	NA	NA	NA	NA
2010 MPM (@ Jack Tone Rd)	Date	1/13/10	2/9/10	3/16/10	4/13/10	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	10/12/10	11/9/10	12/7/10
	Copper, dissolved (µg/L)	NA	NA	NA	**5.5**	2.1	NA	0.81	2.3	1.9	NA	NA	NA
	Copper, total (µg/L)	NA	NA	NA	11	4.3	NA	5	4.7	4.9	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	<0.003	<0.003	0.008	**0.039***	0.013	<0.003*	**0.052***	**0.068***
	Diazinon (µg/L)	NA	NA	NA	NA	NA	<0.004*	<0.004*	<0.004*	<0.004*	<0.004*	<0.004*	<0.004*
	Diuron (µg/L)	0.62	0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Simazine (µg/L)	0.69	0.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C. dubia toxicity (% Survival)	100	100	NA	NA	NA	NA	NA	NA	95	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	807	1394	NA	1107	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	NA	**76**	NA	NA	NA
2011 MPM (@ Jack Tone Rd)	Date	1/11/11	2/8/11	3/8/11	4/12/11	5/24/11	6/28/11	7/26/11	8/23/11	9/20/11	10/14/11	11/15/11	12/13/11
	Copper, dissolved (µg/L)	NA	NA	NA	3.2	**11**	NA	2.1	1.7	2.7	NA	NA	NA
	Copper, total (µg/L)	NA	NA	NA	7.6	26	NA	5.7	4.7	5.2	NA	NA	NA
	Chlorpyrifos (µg/L)	**0.020**	<0.003	NA	NA	<0.003	<0.003	**0.028**	<0.003	<0.003	NA	<0.003	Dry
	Diazinon (µg/L)	<0.004*	<0.004*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Diuron (µg/L)	<0.2	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Simazine (µg/L)	<0.08	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C. dubia toxicity (% Survival)	100	100	NA	NA	NA	NA	NA	NA	100	NA	NA	NA

MONTH:		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	S. capricornutum toxicity (% Control)	NA	1101	484	NA	1341	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	33	NA	NA	NA	NA	NA	NA	**46**	NA	NA
2012 MPM (@ Jack Tone Rd)	Date	1/17/12	2/14/12	3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12	9/18/12	NA	11/6/12	12/3/12
	Copper, dissolved (µg/L)	NA	NA	NA	4.4	2.3	NA	2.3	1.6	2.2	NA	NA	NA
	Copper, total (µg/L)	NA	NA	NA	9.4	4.8	NA	7.6	4.8	6.5	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003	NA	<0.003	**0.019**
	Diuron (µg/L)	0.46	**2.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Simazine (µg/L)	<0.08	0.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C. dubia toxicity (% Survival)	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	576	143	NA	585	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	106	NA	NA	NA	NA	NA	**10**	NA	NA	NA
2013 MPM (@ Jack Tone Rd)	Date	1/15/13	2/21/13	3/19/13	4/2/13	5/21/13	6/18/13	7/16/13	8/20/13	9/17/13	NA	11/19/13	12/17/13
	Copper, dissolved (µg/L)	NA	NA	NA	4.4	3.4	NA	1.6	1.9	2.9	NA	NA	NA
	Copper, total (µg/L)	NA	NA	NA	6.4	6.5	NA	4.6	4.9	5.6	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	DRY	NA	NA	<0.003	<0.003	**0.041**	0.011	<0.003	NA	<0.003	<0.003
	Diuron (µg/L)	<0.2	DRY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	94	NA	NA	NA	NA	NA	94	NA	NA	NA
2014 & 2015 WY MPM (@ Jack Tone Rd)	Date	1/28/14	2/11/14	3/05/14	4/15/14	5/20/14	6/17/14	7/15/14	8/19/14	9/16/14	NA	11/18/14	12/4/14
	Copper, dissolved (µg/L)	NA	NA	NA	2	2.1	NA	1.4	0.97	1.2	NA	NA	NA
	Copper, total (µg/L)	NA	NA	NA	8.4	8.9	NA	4.4	3.6	3.6	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003	NA	<0.003	<0.003
	Diuron (µg/L)	<0.2	<0.2	NA	NA	NA	NA	NA	NA	NA	NA	<0.2	<0.2
	H. azteca toxicity (% Control)	NA	NA	96	NA	NA	NA	NA	NA	94	NA	NA	NA
2015 WY MPM (@ Jack Tone Rd)	Date	1/20/15	2/9/15	3/17/15	4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15	Oct	Nov	Dec
	Copper, dissolved (µg/L)	NA	NA	NA	5.2	5.1	NA	1.5	1.2	1.9			
	Chlorpyrifos (µg/L)	**0.075**	<0.003	NA	NA	<0.003	**0.025**	<0.003	<0.003	<0.003			
	Diuron (µg/L)	<0.2	0.23	NA	NA	NA	NA	NA	NA	NA			
	H. azteca toxicity (% Control)	NA	NA	96	NA	NA	NA	NA	NA	88			

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring.
NA – Not applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring.
US – Upstream Monitoring, conducted in 2008 only.
*Additional Department of Pesticide Regulation (DPR) grant monitoring.

Table XIV-7. Unnamed Drain to Lone Tree Creek subwatershed instantaneous load calculations for chlorpyrifos and copper.

Upstream sites italicized. If discharge was unable to be measured or the analyte was ND, the result is not included in the table. Load information for diuron and simazine can be found in the 2014 MPUR, Appendix I.

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/18/2006	40.64	0.031	µg/L	36	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	8/15/2006	17.86	0.011	µg/L	6	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	9/19/2006	10.41	0.045	µg/L	13	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	2/11/2007	27.09	0.048	µg/L	37	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/10/2007	21.51	0.034	µg/L	21	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/30/2007	32.45	0.014	µg/L	13	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	9/25/2007	15.92	0.017	µg/L	8	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	1/23/2008	12.18	0.079	µg/L	27	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	1/23/2008	12.18	0.045	µg/L	16	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	5/13/2008	21.52	0.41	µg/L	250	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	6/10/2008	15.85	0.12	µg/L	54	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/15/2008	17.55	0.028	µg/L	14	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	8/12/2008	11.11	0.014	µg/L	4	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	9/16/2008	18.38	0.12	µg/L	62	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	9/16/2008	18.38	0.12	µg/L	62	µg/sec
Unnamed Drain to Lone Tree Creek @ Wagner Rd	Chlorpyrifos	9/16/2008	30.9	0.14	µg/L	122	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	5/12/2009	2.48	0.032	µg/L	2	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/14/2009	2.12	0.66	µg/L	40	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	9/15/2009	15.82	0.086	µg/L	39	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/13/2010	13.84	0.008	µg/L	3	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	8/10/2010	11.19	0.039	µg/L	12	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	9/7/2010	27.32	0.013	µg/L	10	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	11/9/2010	0.28	0.052	µg/L	0	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12/7/2010	3.3	0.068	µg/L	6	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	1/11/2011	0.93	0.02	µg/L	1	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/26/2011	5.18	0.028	µg/L	4	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12/3/2012	42.71	0.019	µg/L	23	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	7/16/2013	16.39	0.041	µg/L	19	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	8/20/2013	27.42	0.011	µg/L	9	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	2/11/2007	27.09	19	µg/L	14575	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	2/28/2007	7.49	29	µg/L	6151	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	4/10/2007	3.56	1.6	µg/L	161	µg/sec

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	5/22/2007	0	1.5	µg/L	0	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Diuron	1/23/2008	12.18	7.8	µg/L	2690	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	1/23/2008	12.18	7.7	µg/L	2656	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	4/15/2008	4.67	0.72	µg/L	95	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	5/13/2008	21.52	0.54	µg/L	329	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	6/10/2008	15.85	0.29	µg/L	130	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	1/13/2010	1.59	0.62	µg/L	28	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	2/9/2010	7.44	0.26	µg/L	55	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	1/17/2012	0	0.46	µg/L	0	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	2/14/2012	0.26	2.4	µg/L	18	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	2/9/2015	0.24	0.23	µg/L	2	µg/sec

[1] Load = Discharge (cfs) X 28.317L/ft3 X Concentration (µg/L). To convert a concentration measured in mg/L to µg/L multiply by 1000. The load values calculated represent instantaneous loads only, and should not be used to extrapolate loading over any period of time.

*Field Duplicate

Copper (D)-Dissolved Copper

Source Identification and Outreach

The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd management plan. Sourcing analyses for past exceedances of management plan constituents are evaluated in past years' site subwatershed appendices. During the 2015 WY, there were no exceedances of the WQTL for copper, diuron, or sediment toxicity to *H. azteca.* Two exceedances of the WQTL for chlorpyrifos in January and June 2015, which means that the 10 year Compliance Deadline for chlorpyrifos will not be met within the site subwatershed. An evaluation of potential sources of the exceedances of the WQTL is provided below.

Exceedances of non-conserved constituents such as DO and SC are hard to source, but low flow in the waterway can cause exceedances of the WQTL for DO, and minerals leaching into the water column from soils can cause elevated levels of SC. On February 22 the Coalition provided the Regional Board with results from a study it conducted on the water quality parameters associated with DO in the Coalition region. A summary of the results from these studies is provided in the Introduction section of this Appendix. During all MPM events, field parameters, such as DO and SC are measured; one exceedance of the WQTL for DO occurred in January 2015. The Coalition is not required to conduct MPM for non-conserved constituents; however, all constituents are discussed with growers during focused outreach and the Coalition believes the management of applied constituents will also address non-conserved constituents.

The first exceedance of the WQTL for chlorpyrifos (0.075 µg/L) occurred during the January 20, 2015 monitoring event. The second exceedance for the WQTL for chlorpyrifos (0.025 µg/L) occurred during the June 16, 2015 monitoring event. Chlorpyrifos is an organophosphate pesticide used for agricultural insect pest control on a wide variety of crops. According to the PUR data, there are no recorded applications of chlorpyrifos associated with the exceedance on January 20, 2015. According to the PUR data associated with the exceedance of the WQTL for chlorpyrifos on June 16, there were a total of 148.49 lbs Al applied six days prior to the sampling event at the site. As a result of the exceedances of the WQTL for chlorpyrifos during the 2015 WY, the Coalition will conduct additional focused outreach in the site during 2016.

Outreach

As part of the management practices tracking process, the Coalition contacted 34 growers farming 6,463 acres (22% of direct drainage) within the site subwatershed and documented current and newly implemented management practices. The Coalition recommended management practices to reduce negative impacts of agricultural discharges on water quality that included reduction of application rates, alternative material application, spot treating, sprinkler or microspray irrigation, retention pond/hold basin construction, grass waterways or grass filter strip construction, reducing water volumes using irrigation management, and treating runoff waters with PAM or other materials. Growers in the site subwatershed implemented new management practices such as center grass rows, retention ponds and holding basins (2011 MPUR, Page 54). In 2012, the Coalition conducted additional focused outreach for two growers, farming 1,238 acres, to address continued exceedances of the WQTL for chlorpyrifos (2013

MPUR, Page 143). These growers implemented management practices such as reducing runoff water volumes using irrigation systems and reducing use of pesticides, such as chlorpyrifos (2013 MPUR, Page 51).

Evaluation

Overall, water quality is improving; the Coalition will continue to conduct general outreach within the site subwatershed. Due to improvements in water quality, the Coalition received approval for completion of the management plans for simazine and water column toxicity to *C. dubia* and *S. capricornutum* in 2012 And in 2015, the Coalition received approval for completion of the management plans for copper and SC. The remaining management plan constituents include chlorpyrifos, DO, diuron, *E.coli*, lead, and sediment toxicity to *H. azteca.* Monitoring results indicate exceedances of the WQTLs for management plan constituents are in decline. The Coalition will continue to discuss all constituents of concern during annual grower meetings.

Next Steps

Management Plan Monitoring is scheduled during months of past exceedances for chlorpyrifos, copper, diuron, and sediment toxicity to *H. azteca*. The field parameters DO and SC are measured during all monitoring events.

XV. WALTHALL SLOUGH @ WOODWARD AVE

Overview

Monitoring began at Walthall Slough @ Woodward Ave in 2009; management plans were established in 2012. The Coalition completed the third year of its focused management plan strategy in the site subwatershed in 2015. Water quality concerns were discussed and management practices were documented. Growers in the site subwatershed were informed of water quality impairments and encouraged to prevent offsite movement of agricultural constituents. The site is in a management plan for nitrate + nitrite as N. The Coalition received approval for the completion of the management plans for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* on December 18, 2015. On February 22 and April 22, 2016 the Coalition provided the Regional Board with results from studies it conducted on the water quality parameters in the Coalition region associated with DO and nitrate + nitrite, respectively. A summary of the results from these studies is provided in the Introduction section of this Appendix. The Coalition currently relies on implemented management practices to manage *E. coli* contamination of surface water. The Coalition will continue with this approach pending further discussion and/or direction from the Regional Board regarding a region-wide source identification and management program for *E. coli.* Exceedances of the WQTL for SC and TDS are currently being addressed as part of the CV-SALTS program.

During the 2015 WY the Coalition conducted MPM for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* during months of past exceedances and no exceedances or toxicity occurred. Core site monitoring also occurred on a monthly basis at Walthall Slough @ Woodward Ave. Additionally, this site is a TMDL compliance monitoring location for the Sacramento-San Joaquin Delta TMDL monitoring program. Monitoring for TMDL constituents of chlorpyrifos and diazinon occurred during February storm sampling and from May through August 2015. Monitoring during the 2015 WY resulted in exceedances of the WQTLs for DO (5), *E. coli* (1), SC (1), and water column toxicity to *S. capricornutum* (1).

Walthall Slough @ Woodward Ave is a Core site in Zone 5; monthly monitoring is scheduled for the 2016 WY (2015 MPU). No MPM is scheduled in the 2016 WY although those management plan constituents which are field parameters (DO and SC) will be measured during Core site monitoring.

Table XV-1. Walthall Slough @ Woodward Ave management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCDWQC MPURs and in the Management Plan Progress Report sections of the Annual Reports.

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
Constituents Requiring Source ID/Work Plans			
Dissolved Oxygen	2010	2013-2015	NA
E. coli	2010	2013-2015	NA
Nitrate + Nitrite	2012	2013-2015	NA
Specific Conductivity	2010	2013-2015	NA
Completed Management Plans			
Chlorpyrifos	2012	2013-2015	2015

Constituent	Management Plan Initiation Year	Years of Focused Outreach	Management Plan Completion Year
HCH-delta	2010	2013-2015	2015
H. azteca sediment toxicity	2011	2013-2015	2015

NA – Not Applicable. Management plan for this constituent is currently active.

Description of Site Subwatershed

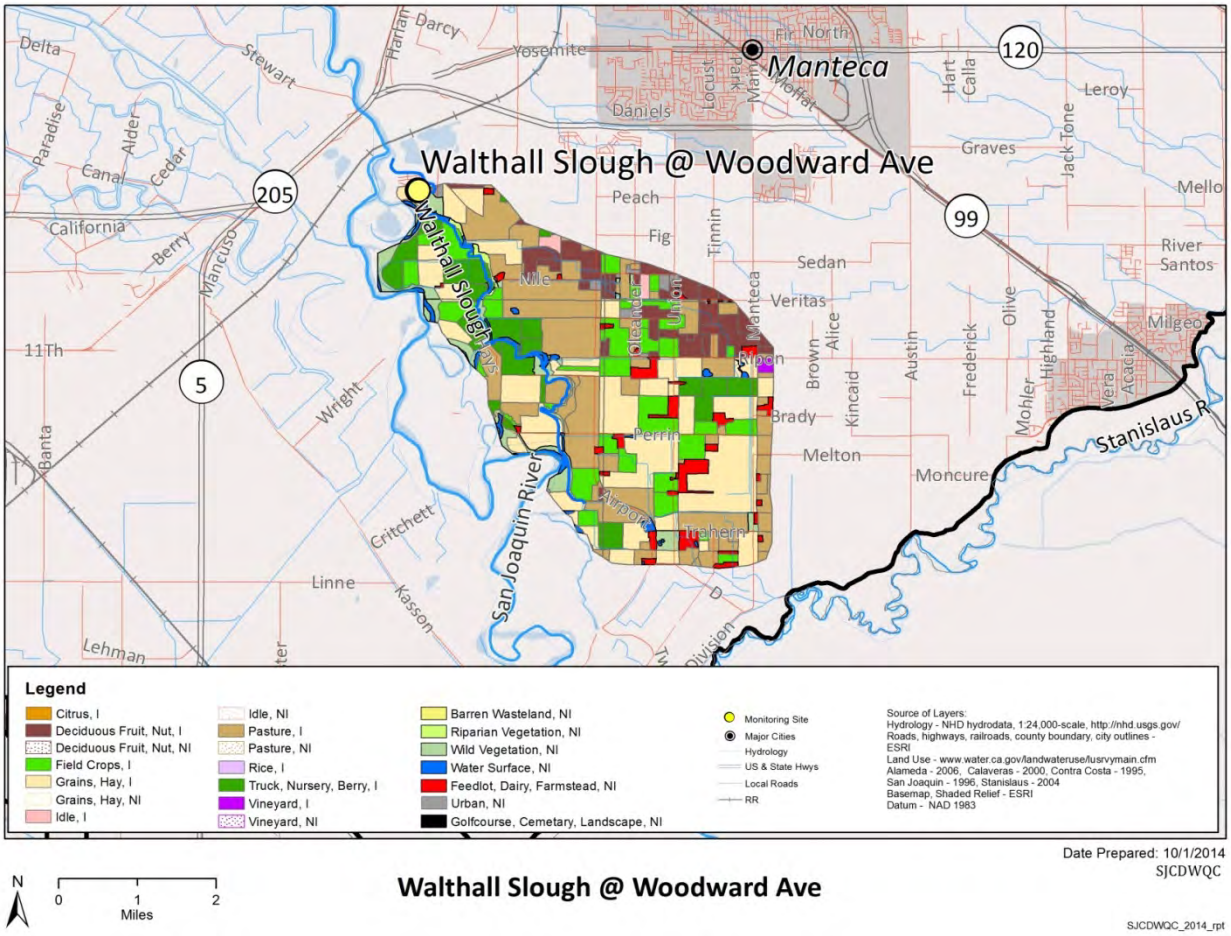
The Walthall Slough @ Woodward Ave site subwatershed consists of 8,426 irrigated acres which include pasture, field crops, truck/nursery/berry crops, fruits, nuts, grains/hay, and dairy (Figure XV-1). This monitoring site is located just upstream of a residential area at the confluence of Walthall Slough and the San Joaquin River and drains land to the south and to the east (Table XV-2). This site subwatershed receives drainage from recent urban developments, industrial sites, field crops, grains, and pastureland.

Walthall Slough is not listed as a 303(d) Impaired Waterbody in the state of California. However, the represented TMDL subareas in the eastern portion of the Delta Waterways are listed as impaired for chlorpyrifos, DDT, diazinon, group A pesticides, invasive species, mercury, and unknown water column toxicity.

Table XV-2. Walthall Slough @ Woodward Ave site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Walthall Slough @ Woodward Ave	544WSAWAV	37.77046	-121.29227

Figure XV-1. Walthall Slough @ Woodward Ave site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Walthall Slough @ Woodward Ave in 2009 and continued through the 2015 WY. The last time the full suite of constituents was collected at the site was in 2013. Table XV-3 contains the number of events monitored per year and the constituents from 2009 through September 2015.

The Coalition initiated MPM in 2012 through September 2015 for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* (Table XV-4). The last detection of chlorpyrifos occurred in 2011.

Table XV-3. Walthall Slough @ Woodward Ave sampling events and analyses per year.
Listed by Group. Only environmental samples are counted.

TYPE	ANALYTE	2009	2010	2011	2012	2013	2014 WY	2015 WY
Sampling Events	Events Scheduled	13	12	12	12	13	10	12
	Dry Sites	0	0	0	0	0	0	1
	Events Sampled	13	12	12	12	13	10	11
Field and Physical Parameters	Dissolved Oxygen	13	12	12	12	13	10	11
	Dissolved Solids	12	12	12	12	12	9	0
	E. coli	12	12	12	12	12	9	11
	Grain size (sediment)	2	2	0	2	2	2	2
	Hardness as CaCO3	12	12	0	0	12	9	0

Type	Analyte	2009	2010	2011	2012	2013	2014 WY	2015 WY
	pH	13	12	12	12	13	10	11
	Specific Conductivity	13	12	12	12	13	10	11
	Suspended Solids	12	12	12	12	12	9	11
	Total Organic Carbon	12	12	12	12	12	9	11
	Total Organic Carbon (sediment)	2	2	0	2	2	2	2
	Turbidity	12	12	12	12	12	9	11
Nutrients	Ammonia as N	12	12	12	12	12	9	11
	Nitrate + Nitrite as N	12	12	12	12	12	9	11
	Nitrate as N	0	0	0	0	0	0	0
	Nitrite as N	0	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	12	12	12	12	12	9	0
	Orthophosphate as P	12	12	12	12	12	9	11
	Phosphate as P	12	12	12	12	12	9	0
Metals (Dissolved)	Cadmium	12	12	0	0	12	0	0
	Copper	12	12	0	0	12	0	0
	Lead	12	12	0	0	12	0	0
	Nickel	12	12	0	0	12	0	0
	Zinc	12	12	0	0	12	0	0
Metals (Total)	Arsenic	12	12	0	0	12	0	0
	Boron	12	12	0	0	12	0	0
	Cadmium	12	12	0	0	12	0	0
	Copper	12	12	0	0	12	0	0
	Lead	12	12	0	0	12	0	0
	Molybdenum	12	12	0	0	12	0	0
	Nickel	12	12	0	0	12	0	0
	Selenium	12	12	0	0	12	0	0
	Zinc	12	12	0	0	12	0	0
Carbamates	Aldicarb	12	12	0	0	12	0	11
	Carbaryl	12	12	0	0	12	0	11
	Carbofuran	12	12	0	0	12	0	11
	Diuron	12	12	0	0	12	0	11
	Linuron	12	12	0	0	12	0	11
	Methiocarb	12	12	0	0	12	0	11
	Methomyl	12	12	0	0	12	0	11
	Oxamyl	12	12	0	0	12	0	11
Group A Pesticides	Aldrin	12	12	0	0	0	0	0
	Chlordane	12	12	0	0	0	0	0
	Endosulfan I	12	12	0	0	0	0	0
	Endosulfan II	12	12	0	0	0	0	0
	HCH, alpha	12	12	0	0	3	1	3
	HCH, beta	12	12	0	0	3	1	3
	HCH, delta	12	12	0	0	3	1	3
	HCH, gamma	12	12	0	0	3	1	3
	Heptachlor	12	12	0	0	0	0	0
	Heptachlor epoxide	12	12	0	0	0	0	0
	Toxaphene	12	12	0	0	0	0	0
Herbicides	Atrazine	12	12	0	0	12	0	11
	Cyanazine	12	12	0	0	12	0	11
	Glyphosate	12	12	0	0	12	0	2
	Paraquat	12	12	0	0	12	0	2
	Simazine	12	12	0	0	12	0	11

TYPE	ANALYTE	2009	2010	2011	2012	2013	2014 WY	2015 WY
	Trifluralin	12	12	0	0	12	0	11
Organochlorines	DDD(p,p')	12	12	0	0	12	0	0
	DDE(p,p')	12	12	0	0	12	0	0
	DDT(p,p')	12	12	0	0	12	0	0
	Dicofol	12	12	0	0	12	0	0
	Dieldrin	12	12	0	0	12	0	0
	Endrin	12	12	0	0	12	0	0
	Methoxychlor	12	12	0	0	12	0	0
Organophosphates	Azinphos methyl	12	12	0	0	12	0	11
	Chlorpyrifos	12	12	12	12	12	6	11
	Demeton-s	12	12	0	0	12	0	11
	Diazinon	12	12	12	12	12	5	11
	Dichlorvos	12	12	0	0	12	0	11
	Dimethoate	12	12	0	0	12	0	11
	Disulfoton	12	12	0	0	12	0	11
	Malathion	12	12	0	0	12	0	11
	Methamidophos	12	12	0	0	12	0	11
	Methidathion	12	12	0	0	12	0	11
	Molinate	0	0	0	0	0	0	0
	Parathion, Methyl	12	12	0	0	12	0	11
	Phorate	12	12	0	0	12	0	11
	Phosmet	12	12	0	0	12	0	11
	Thiobencarb	0	0	0	0	0	0	0
Pyrethroids	Bifenthrin	0	0	0	0	0	0	0
	Cyfluthrin, total	0	0	0	0	0	0	0
	Cyhalothrin, lambda, total	0	0	0	0	0	0	0
	Cypermethrin, total	0	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	0	0	0	0	0	0	0
	Permethrin, total	0	0	0	0	0	0	0
Sediment Pesticide	Bifenthrin	0	1	0	0	0	0	0
	Chlorpyrifos	0	1	0	0	0	0	0
	Cyfluthrin	0	1	0	0	0	0	0
	Cyhalothrin, lambda	0	1	0	0	0	0	0
	Cypermethrin	0	1	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	1	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	1	0	0	0	0	0
	Fenpropathrin	0	1	0	0	0	0	0
	Permethrin	0	1	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	0	12	0	0	12	0	11
	Pimephales promelas	0	12	0	0	12	0	11
	Selenastrum capricornutum	0	12	0	0	12	0	11
	Hyalella azteca	0	2	0	2	2	2	2

Table XV-4. Walthall Slough @ Woodward Ave Management Plan Monitoring schedule (2012-September 2014).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	HCH	*H. azteca*
Walthall Slough @ Woodward Ave	3/15/2012	MPM			X
Walthall Slough @ Woodward Ave	9/18/2012	MPM	X		X
Walthall Slough @ Woodward Ave	10/16/2012	MPM	X		
Walthall Slough @ Woodward Ave	1/15/2013	MPM		X	
Walthall Slough @ Woodward Ave	3/19/2013	MPM			X
Walthall Slough @ Woodward Ave	9/17/2013	MPM	X		X
Walthall Slough @ Woodward Ave	10/15/2013	MPM	X		
Walthall Slough @ Woodward Ave	11/19/2013	MPM		X	
Walthall Slough @ Woodward Ave	12/17/2013	MPM		X	
Walthall Slough @ Woodward Ave	1/28/2014	MPM		X	
Walthall Slough @ Woodward Ave	3/3/2014	MPM			X
Walthall Slough @ Woodward Ave	9/16/2014	MPM	X		X
Walthall Slough @ Woodward Ave	10/21/2014	MPM	X		
Walthall Slough @ Woodward Ave	11/18/2014	MPM		X	
Walthall Slough @ Woodward Ave	12/4/2014	MPM		X	
Walthall Slough @ Woodward Ave	1/20/2015	MPM		X	
Walthall Slough @ Woodward Ave	3/17/2015	MPM			X
Walthall Slough @ Woodward Ave	9/15/2015	MPM	X		X

Monitoring Results

During the 2015 WY, the Coalition conducted MPM for chlorpyrifos (October 2014 through September 2015), HCH-delta (November and December 2014 and January 2015), and sediment toxicity to *H. azteca* (March and September); no exceedances occurred. The Coalition does not conduct MPM for nitrate; however, nitrate was monitored monthly during the 2015 WY under Core site monitoring and resulted in no exceedances. During Core site monitoring an exceedance of the WQTL for *E. coli* occurred on April 21, 2015 (2,419.6 MPN/100 mL) and for water column toxicity to *S. capricornutum* on May 19, 2015 (78% of control). In addition, the field parameters, DO and SC, were measured during all MPM events through September 2015. Exceedances of the WQTL for DO occurred during five sampling events and once for SC (Table XV-5).

Table XV-5 is a tally of exceedances of WQTLs from 2009 through September 2015 for management plan constituents in the site subwatershed. Table XV-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table XV-7 contains the instantaneous loads for chlorpyrifos and nitrate since monitoring began in the site subwatershed. A record of all exceedances in the site subwatershed since monitoring began is provided in Appendix II, Table II-15.

Table XV-5. Walthall Slough @ Woodward Ave management plan constituent exceedance tally.

Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. A complete list of exceedances can be found in Appendix II, Table II-15.

Monitoring Year	Management Plan Constituents					Completed Management Plans		
	Dissolved Oxygen, <5 mg/L	Specific Conductivity[1], >700 µS/cm or >1000 µS/cm	Total Dissolved Solids, >450 mg/L	Nitrate + Nitrite, >10 mg/L	*E. coli*, >235 MPN/100 mL	Chlorpyrifos, >0.015 µg/L	HCH, delta, >0.0039 µg/L	*H. azteca*, (%Control)
2009	10	0	3	0	2	0	3	0
2010	3	0	1	1	2	0	0	1
2011	7	0	3	2	1	2	NA	NA
2012	9	0	4	1	0	0	NA	0
2013	5	0	4	3	0	0	0	0
2014 WY*	9	1	2	0	1	0	0	0
2015 WY	5	1	NA	0	1	0	0	0
Overall Tally	**48**	**2**	**17**	**7**	**7**	**2**	**3**	**1**

[1]Based on the 2015 Revised SQMP (approved November 24, 2015), the WQTL for SC was updated to >700 µS/cm from April through August and >1,000 µS/cm from September through March.

NA – Not Applicable; monitoring did not occur for this constituent during the year.

*2014 includes January through September results only.

Table XV-6. Walthall Slough @ Woodward Ave site subwatershed monitoring results for MPM constituents since management plan initiation.
Organized alphabetically by constituent. Grey cells- indicate the 2015 WY. Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012 MPM[1] (@ Woodward Ave)	Date	1/17/12	2/14/12	3/15/12	4/12/12	5/16/12	6/19/12	7/17/12	8/21/12	9/18/12	10/16/12	11/6/12	12/3/12
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	H. azteca toxicity (% Control)	NA	NA	109	NA	NA	NA	NA	NA	107	NA	NA	NA
2013 NM & MPM (@ Woodward Ave)	Date	1/15/13	2/21/13	3/19/13	4/2/13	5/21/13	6/18/13	7/16/13	8/20/13	9/17/13	10/15/13	11/19/13	12/17/13
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	H. azteca toxicity (% Control)	NA	NA	99	NA	NA	NA	NA	NA	98	NA	NA	NA
	HCH-delta (µg/L)	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005
2014 & 2015 WY NM & MPM (@ Woodward Ave)	Date	1/28/14	2/11/14	3/5/14	4/15/14	5/20/14	6/17/14	7/15/14	8/19/14	9/16/14	10/21/14	11/18/14	12/4/14
	Chlorpyrifos (µg/L)	NA	<0.003	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003*	<0.003*	<0.003	<0.003
	H. azteca toxicity (% Control)	NA	NA	100*	NA	NA	NA	NA	NA	107*	NA	NA	NA
	HCH-delta (µg/L)	<0.005*	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005
2015 WY NM & MPM (@ Woodward Ave)	Date	1/20/15	2/9/15	3/17/15	4/21/15	5/19/15	6/16/15	7/21/15	8/18/15	9/15/15			
	Chlorpyrifos (µg/L)	<0.003	<0.003	Dry	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003*			
	H. azteca toxicity (% Control)	NA	NA	98*	NA	NA	NA	NA	NA	96*			
	HCH-delta (µg/L)	<0.005	NA	NA	NA	NA	NA	NA	NA	NA			

[1]Walthall Slough @ Woodward Ave is a TMDL compliance location representative of the San Joaquin River (Stanislaus River to Delta Boundary) 303(d) listed portion of the Delta Waterways. Samples are collected monthly (during either Core or Assessment Monitoring) at the site for chlorpyrifos and diazinon TMDL monitoring; compliance monitoring began at the site in 2009.
MPM – Management Plan Monitoring.
NA – Not Applicable. No monitoring occurred on this date for this constituent.

Table XV-7. Walthall Slough @ Woodward Ave site subwatershed instantaneous load calculations for nitrate + nitrite.

If discharge was unable to be measured or the analyte was ND, the result is not included in the table. Load information for chlorpyrifos can be found in in the 2014 MPUR, Appendix I, Table XV-7.

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	1/13/2009	2.42	6.7	mg/L	459	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	2/10/2009	0	0.70	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	3/10/2009	0	0.02	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	4/14/2009	35.37	0.28	mg/L	280	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	4/14/2009	35.37	0.33	mg/L	331	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	5/12/2009	15.87	0.24	mg/L	108	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	5/12/2009	15.87	0.25	mg/L	112	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	6/9/2009	2.11	0.16	mg/L	10	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	6/9/2009	2.11	0.11	mg/L	7	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	7/14/2009	16.90	1.0	mg/L	479	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	7/14/2009	16.90	0.89	mg/L	426	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	8/11/2009	17.23	0.26	mg/L	127	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	8/11/2009	17.23	0.21	mg/L	102	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	9/15/2009	20.09	2.1	mg/L	1195	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	9/15/2009	20.09	2.2	mg/L	1252	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	10/6/2009	27.16	0.74	mg/L	569	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	10/6/2009	27.16	0.78	mg/L	600	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	11/10/2009	1.03	2.5	mg/L	73	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	11/10/2009	1.03	2.5	mg/L	73	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	12/8/2009	2.37	4.0	mg/L	268	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	12/8/2009	2.37	4.0	mg/L	268	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	1/13/2010	1.09	0.37	mg/L	11	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	1/13/2010	1.09	0.29	mg/L	9	µg/sec

Site Name	Analyte Name	Sample date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	2/9/2010	3.48	4.1	mg/L	404	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	2/9/2010	3.48	4.3	mg/L	424	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	3/16/2010	3.95	5.7	mg/L	638	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	3/16/2010	3.95	6.2	mg/L	693	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	4/13/2010	5.15	1.2	mg/L	175	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	4/13/2010	5.15	1.2	mg/L	175	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	5/11/2010	8.42	0.82	mg/L	196	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	5/11/2010	8.42	0.87	mg/L	208	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	6/8/2010	16.27	0.78	mg/L	359	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	6/8/2010	16.27	0.83	mg/L	383	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	7/13/2010	19.92	0.78	mg/L	440	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	7/13/2010	19.92	0.76	mg/L	429	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	8/10/2010	12.83	0.67	mg/L	243	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	8/10/2010	12.83	0.72	mg/L	262	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	9/7/2010	17.91	0.70	mg/L	355	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	9/7/2010	17.91	0.69	mg/L	350	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	10/12/2010	8.18	3.7	mg/L	857	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	10/12/2010	8.18	5.2	mg/L	1204	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	11/9/2010	2.01	8.6	mg/L	489	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	11/9/2010	2.01	8.8	mg/L	501	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	12/7/2010	3.06	10	mg/L	867	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	12/7/2010	3.06	11	mg/L	953	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	1/11/2011	0	9.5	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	2/8/2011	0	4.7	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	3/8/2011	0	6.9	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	7/26/2011	15.11	0.74	mg/L	317	µg/sec

Site Name	Analyte Name	Sample date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	8/23/2011	36.75	1.7	mg/L	1769	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	9/20/2011	42.40	0.88	mg/L	1057	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	10/6/2011	36.13	1.5	mg/L	1535	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	11/15/2011	2.41	11	mg/L	751	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	12/13/2011	1.39	14	mg/L	551	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	1/17/2012	6.86	2.4	mg/L	466	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	2/14/2012	1.61	4.2	mg/L	191	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	3/15/2012	2.66	0.91	mg/L	69	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	3/15/2012	2.66	0.92	mg/L	69	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	4/12/2012	16.56	0.5	mg/L	234	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	5/16/2012	10.71	0.31	mg/L	94	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	6/19/2012	17.25	1.2	mg/L	586	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	7/17/2012	15.00	0.52	mg/L	221	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	8/21/2012	4.74	0.086	mg/L	12	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	9/18/2012	15.99	1.4	mg/L	634	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	10/16/2012	14.27	1.5	mg/L	606	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	11/6/2012	1.80	5.4	mg/L	275	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	12/3/2012	4.45	12	mg/L	1512	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	1/15/2013	14.84	5.9	mg/L	2479	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	1/15/2013	14.84	5.8	mg/L	2437	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	2/21/2013	1.79	15	mg/L	760	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	2/21/2013	1.79	14	mg/L	710	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	3/19/2013	23.39	2.8	mg/L	1855	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	3/19/2013	23.39	2.8	mg/L	1855	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	4/2/2013	27.58	2.8	mg/L	2187	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	4/2/2013	27.58	2.8	mg/L	2187	µg/sec

Site Name	Analyte Name	Sample date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	5/21/2013	17.86	4.1	mg/L	2074	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	5/21/2013	17.86	3.7	mg/L	1871	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	6/18/2013	11.58	1.4	mg/L	459	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	6/18/2013	11.58	1.4	mg/L	459	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	7/16/2013	18.27	0.98	mg/L	507	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	7/16/2013	18.27	0.97	mg/L	502	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	8/20/2013	15.54	1.7	mg/L	748	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	8/20/2013	15.54	1.7	mg/L	748	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	9/17/2013	9.75	3.6	mg/L	994	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	9/17/2013	9.75	3.5	mg/L	966	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	10/8/2013	16.61	0.57	mg/L	268	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	10/8/2013	16.61	1.7	mg/L	800	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	11/19/2013	0	12	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	11/19/2013	0	13	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	12/17/2013	0.90	16	mg/L	408	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	12/17/2013	0.90	15	mg/L	382	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	1/28/2014	12.70	2.7	mg/L	971	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	2/11/2014	2.21	1.1	mg/L	69	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	5/20/2014	12.97	0.66	mg/L	242	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	6/17/2014	10.61	0.48	mg/L	144	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	7/15/2014	6.13	0.22	mg/L	38	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	8/19/2014	7.69	1.2	mg/L	261	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	9/16/2014	6.75	2.3	mg/L	440	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	10/21/2014	0.35	0.067	mg/L	1	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	11/18/2014	0	0.13	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	11/18/2014	0	0.08	mg/L	0	µg/sec

Site Name	Analyte Name	Sample date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	12/4/2014	0.85	1.9	mg/L	46	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	12/4/2014	0.85	1.8	mg/L	43	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	1/20/2015	7.24	4.2	mg/L	861	µg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite	1/20/2015	7.24	4.2	mg/L	861	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	2/9/2015	1.43	5.5	mg/L	223	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	4/21/2015	0	0.02	mg/L	0	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite	7/21/2015	2.97	0.026	mg/L	2	µg/sec

[1] Load = Discharge (cfs) X 28.317L/ft3 X Concentration (µg/L). To convert a concentration measured in mg/L to µg/L multiply by 1000. The load values calculated represent instantaneous loads only, and should not be used to extrapolate loading over any period of time.
*Field Duplicate

Source Identification and Outreach

The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the Walthall Slough @ Woodward Ave management plan. Sourcing analyses for past exceedances of management plan constituents are evaluated in past years' site subwatershed appendices. During the 2015 WY, MPM for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* resulted in no exceedances of the respective WQTLs. Samples collected from one sampling event were toxic to *S. capricornutum* occurred.

Toxicity to *S. capricornutum* occurred in May 2015 (78% survival compared to control). No TIE was conducted because survival was greater than 50% compared to the control and therefore the cause of toxicity cannot be sourced. However, ammonia (0.23 mg/L) was detected in samples collected during this event, coinciding with the May toxicity. Metal contamination and non-polar organics can lead to toxicity in the water column. Based on the PUR data associated with the May 2015 exceedance, there were 52 applications totaling 1189.4 lbs Al of herbicides applied in the watershed. Irrigation tailwater and stormwater runoff could lead to non-polar organics in waterways.

During the 2015 WY, exceedances of the WQTLs for DO (5), *E. coli* (1), and SC (1) occurred. Exceedances of non-conserved constituents such as DO and SC are hard to source, but urbanization of the area likely played a role in the exceedances. As previously discussed, study results on the water quality parameters associated with DO have been submitted to the Regional Board. Additional investigation of the sources of DO concentrations in surface waters is pending further discussion with the Regional Board. Non-conserved constituents are discussed during general outreach and will continue to be discussed at annual grower meetings.

Feedlots and dairies account for 370 acres out of a total 9555 acres in the Walthall Slough @ Woodward Ave site subwatershed and are likely the source of *E. coli* contamination at the site. Exceedances of the WQTL for SC will be addressed with the CV-SALTS program.

Outreach

Focused outreach to document current management practices and track implemented management practices began in 2013 and ended in 2015. The Coalition contacted eight targeted growers that operate farms adjacent to the waterway farming 1,490 acres within the site subwatershed. Existing management practices were documented and new management practices were implemented. Common management practices implemented include reducing the use of the pesticide types found in exceedances, reducing runoff water volume, and installing sprinkler or micro irrigation. The Coalition believes the implementation of management practices and increased grower awareness will continue to improve water quality within the site subwatershed.

Evaluation

Water quality within the site subwatershed is improving as is evident with decreasing exceedances of WQTLs for a variety of constituents. No exceedances of the WQTL occurred for chlorpyrifos, nitrate, sediment toxicity to *H. azteca,* and HCH-delta occurred during the 2015 WY MPM. The Coalition received approval for completion of the management plan for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* on December 18, 2015. The Coalition completed focused outreach in the Walthall Slough @ Woodward Ave site subwatershed in 2015. Grower surveys documenting current and implemented management practices are complete. Monitoring results and PUR data indicate reductions in pesticide use and management practices are contributing to improved water quality.

Next Steps

Monthly Core site monitoring will occur during the2016 WY. TMDL compliance monitoring for chlorpyrifos and diazinon is also scheduled during one storm event and from May through August.