APPENDIX I

SAN JOAQUIN COUNTY & DELTA WATER QUALITY COALITION

HIGH PRIORITY SITE SUBWATERSHED ANALYSIS

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INTRODUCTION

It is important for the Coalition to assess management of water quality at two levels: at the Coalition regional level and an individual subwatershed level. Therefore, the SJCDWQC Management Plan is divided into two parts, an overall Management Plan approach with a regional analysis and individual Site Subwatershed Management Plans for high priority sites. Individual Site Subwatershed Management Plans include:

- discussions of specific water quality impairments for each site subwatershed including all exceedances of WQTLs,
- analysis of sourcing techniques,
- recommendations of management practices to improve water quality, and
- specific schedules for outreach and evaluation of management practice effectiveness.

The Site Subwatershed Management Plans give an overview of the status of water quality, including management practice effectiveness. If there are no new data to report, the section will reference the previously submitted MPUR.

Updates to Coalition Monitoring Plan

Addition of Dissolved Metals Fraction

Before October 2008, the concentration of dissolved metals was determined by performing a calculation based on total metals concentrations. The Environmental Protection Agency (EPA) recommends "the use of dissolved metal to set and measure compliance with aquatic life water quality standards." The EPA states that dissolved metals "more closely approximates the bioavailable fraction of the metal in the water column than total recoverable metal." Dissolved metals were added to the Coalition monitoring plan in 2008 as a result of a new provision in the MRP Order R5-2008-0005.

Beginning in October 2008, the Coalition initiated focused grower outreach and education, management practice implementation, and began analyzing for both the total and hardness based dissolved fractions of cadmium, copper, lead, nickel, and zinc to better characterize contamination in the water column. The remaining metals are analyzed for total concentrations only. Dissolved metals more adequately reflect the bioavailable toxic fraction in the water column. Since the Coalition adopted this method for analyzing dissolved metals, exceedances of the hardness based WQTLs of metals have declined. This decline in exceedances of metals demonstrates that the analysis of dissolved metals improved the capabilities of the Coalition to effectively address water quality impairments associated with metals in the water column.

Reevaluation of DO and SC WQTL Criteria

The Coalition reevaluated previously reported exceedances of DO in 2013 at Kellogg Creek along Hoffman Ln and exceedances of DO and SC at Lone Tree Creek @ Jack Tone Rd in 2012 based on current Water Quality Control Basin Plans. The Fourth Edition of the Water Quality Control Plan (Basin Plan) for

the Sacramento River and San Joaquin River Basins (Page III-5) indicates the lower DO trigger limit of 5 mg/L should be utilized for Delta waterways that are 'warm' and/or not considered a resource for fisheries. Therefore, the Coalition reevaluated the DO measurements at the two sites based on the lower DO trigger limit and neither was considered an exceedance. The San Francisco Bay/Sacramento-San Joaquin Delta Basin Plan (Table 2, Page 13) indicates detections of SC from September through March are not considered exceedances when they are below 1,000 µmhos/cm; therefore, the value was not considered an exceedance. The Coalition is in the process of reevaluating all previously reported exceedances of DO and SC based on the criteria outlined in Basin Plan. The Coalition will send an amendment to the SJCDWQC Management Plan on July 1, 2014.

HIGH PRIORITY SITE SUBWATERSHEDS (2008–2010)

I. DUCK CREEK @ HWY 4

Overview

Duck Creek @ Hwy 4 is one of the Coalition's first priority site subwatersheds. The Coalition completed the focused outreach portion of its management plan strategy in the Duck Creek @ Hwy 4 site subwatershed in 2012 (including additional outreach) and monitoring results from 2009 through 2013 indicate water quality improved within the site subwatershed. The Coalition received approval to remove diazinon, pH, and toxicity to *S. capricornutum* from the active management plan on March 22, 2012 (Table I-1). The remaining constituents in the Duck Creek @ Hwy 4 site subwatershed management plan include: chlorpyrifos, water column toxicity to *C. dubia*, sediment toxicity to *H. azteca*, DO, and *E. coli* (Table I-1).

In addition to focused outreach from 2008 through 2010, the Coalition conducted additional focused outreach to growers in 2010 and 2012 in response to continued chlorpyrifos exceedances and associated toxicities to *C. dubia*. Exceedances of the WQTL for chlorpyrifos and toxicity to *C. dubia* have not occurred since 2011, this is further evidence that additional outreach activities have been successful in improving water quality within the site subwatershed.

Management Plan Monitoring occurred in 2013 for chlorpyrifos, toxicity to *C. dubia*, and sediment toxicity to *H. azteca*; a single sediment toxicity to *H. azteca* occurred in March 2013. Exceedances of the WQTL for DO occurred in 2013; however, the frequency of exceedances decreased from 2012. *E. coli* is a priority E constituent and therefore was not included in MPM in 2013. In 2014, MPM will continue for chlorpyrifos, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca*. Field parameters, including DO and pH will be measured during all MPM events.

Table I-1. Duck Creek @ Hwy 4 management plan constituents.

Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2007	Active
D	*C. dubia* water column toxicity	2009	Active
D	*H. azteca* sediment toxicity	2013	Active
E	Dissolved Oxygen	2007	Active
E	*E. coli*	2007	Active
CONSTITUENT (REMOVED)			
A/B	Diazinon	2008	2012
E	pH	2008	2012
E	*S. capricornutum* water column toxicity	2009	2012

Description of Site Subwatershed

Duck Creek @ Hwy 4 is a rotating Assessment Monitoring location within Zone 2 under the 2008 MRPP. Duck Creek @ Hwy 4 consists of 12,958 irrigated acres which include grains, hay and field crops (Figure I-1). There are also relatively large amounts of deciduous nuts, truck farm/nursery, berry crops, irrigated pasture and vineyards in this site subwatershed. This site 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 I-2).

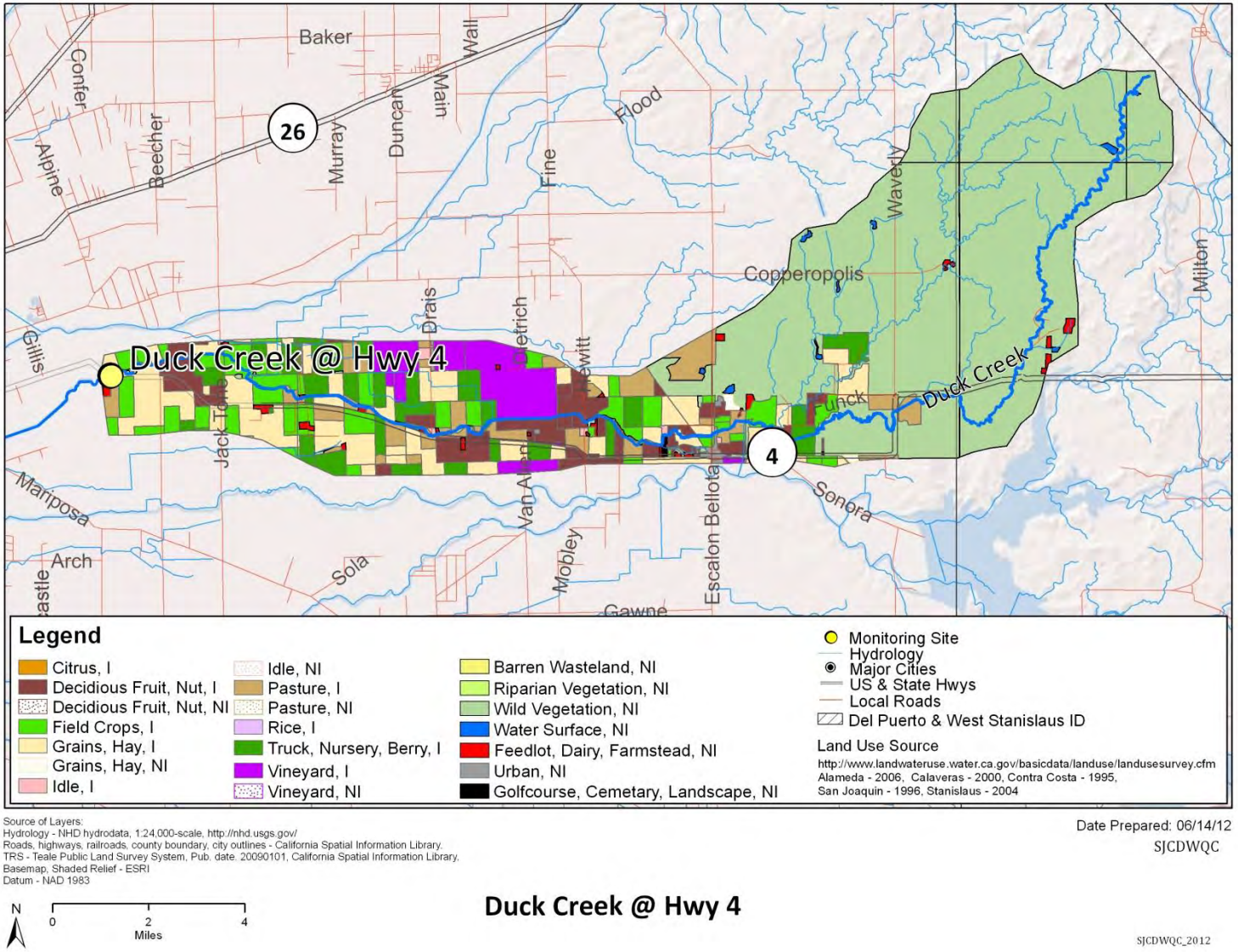
Duck Creek (San Joaquin County) is listed on California's 303(d) List of Impaired Waterbodies for chlorpyrifos, *E. coli* and mercury (last updated in 2010).

Table I-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	37.9348	-121.08412

[US] Upstream sites
*Original SJCDWQC sampling site

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



Subwatershed Monitoring History

Normal Monitoring began at Duck Creek @ Hwy 4 in 2004. No monitoring occurred in 2005; however sampling resumed in 2006 and continued through 2013. Table I-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table I-3 for analytes sampled prior to 2008). The most recent Assessment Monitoring at Duck Creek @ Hwy 4 occurred in 2012.

Management Plan Monitoring was initiated at Duck Creek @ Hwy 4 in 2007. In an effort to source exceedances of the WQTL for chlorpyrifos, additional sampling occurred at Duck Creek @ Hwy 4 in 2007 and in 2008 at the upstream location: Duck Creek @ Drais Rd. Management Plan Monitoring during months of past exceedances has occurred at Duck Creek @ Hwy 4 since 2009 to evaluate the effectiveness of the Coalition's outreach strategy and the newly implemented management practices on water quality in the site subwatershed (Table I-4).

From June 2010 through February 2011, additional samples were collected for chlorpyrifos, diazinon, and sediment toxicity to *H. azteca* as part of a DPR grant to reduce the impact of agricultural discharge on water quality.

Table I-3. Duck Creek @ Hwy 4 sampling events and analyses per year.

Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	15	9	11	8	13	7
	Dry Sites	0	0	0	0	0	0
	Events Sampled	15	9	11	8	13	7
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	15	9	11	8	13	7
	Dissolved Solids	10	3	0	0	12	0
	E. coli	10	3	0	0	12	0
	Grain size (sediment)	0	0	1	0	2	2
	Hardness as CaCO3	9	3	0	0	12	0
	pH	15	9	11	8	13	7
	Specific Conductivity	15	9	11	8	13	7
	Suspended Solids	0	3	3	0	12	0
	Total Organic Carbon	10	3	0	0	14	0
	Total Organic Carbon (sediment)	0	0	0	1	2	2
	Turbidity	10	3	0	0	12	0
Nutrients	Ammonia as N	9	3	0	0	12	0
	Nitrate + Nitrite as N	0	3	3	0	12	0
	Nitrate as N	6	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0
	Nitrogen, Total Kjeldahl	9	3	0	0	12	0
	OrthoPhosphate as P	9	3	0	0	12	0
	Phosphate as P	9	3	0	0	12	0
Metals (Dissolved)	Cadmium	3	3	0	0	12	0
	Copper	3	3	0	0	12	0
	Lead	3	3	0	0	12	0
	Nickel	3	3	0	0	12	0
	Zinc	3	3	0	0	12	0

Type	Analyte	2008	2009	2010	2011	2012	2013
Metals (Total)	Arsenic	9	3	0	0	12	0
	Boron	9	3	0	0	12	0
	Cadmium	9	3	0	0	12	0
	Copper	9	3	0	0	12	0
	Lead	9	3	0	0	12	0
	Molybdenum	3	3	0	0	12	0
	Nickel	9	3	0	0	12	0
	Selenium	9	3	0	0	12	0
	Zinc	9	3	0	0	12	0
Carbamates	Aldicarb	10	3	0	0	12	0
	Carbaryl	10	3	0	0	12	0
	Carbofuran	10	3	0	0	12	0
	Diuron	10	3	0	0	12	0
	Linuron	10	3	0	0	12	0
	Methiocarb	10	3	0	0	12	0
	Methomyl	10	3	0	0	12	0
	Oxamyl	10	3	0	0	12	0
Group A Pesticides	Aldrin	3	3	0	0	0	0
	Chlordane	3	3	0	0	0	0
	Endosulfan I	3	3	0	0	0	0
	Endosulfan II	3	3	0	0	0	0
	HCH, alpha	0	3	3	0	0	0
	HCH, beta	0	3	3	0	0	0
	HCH, delta	0	3	3	0	0	0
	HCH, gamma	0	3	3	0	0	0
	Heptachlor	0	3	3	0	0	0
	Heptachlor epoxide	0	3	3	0	0	0
	Toxaphene	0	3	3	0	0	0
Herbicides	Atrazine	10	3	0	0	12	0
	Cyanazine	10	3	0	0	12	0
	Glyphosate	10	3	0	0	12	0
	Paraquat	10	3	0	0	12	0
	Simazine	10	3	0	0	12	0
	Trifluralin	0	3	3	0	12	0
Organochlorines	DDD(p,p')	10	3	0	0	12	0
	DDE(p,p')	10	3	0	0	12	0
	DDT(p,p')	10	3	0	0	12	0
	Dicofol	10	3	0	0	12	0
	Dieldrin	10	3	0	0	12	0
	Endrin	10	3	0	0	12	0
	Methoxychlor	10	3	0	0	12	0
Organophosphates	Azinphos methyl	10	3	0	0	12	0
	Chlorpyrifos	10	9	9	8	12	6
	Demeton-s	3	3	0	0	12	0
	Diazinon	10	3	8	2	12	0
	Dichlorvos	3	3	0	0	12	0
	Dimethoate	10	3	0	0	12	0
	Disulfoton	10	3	0	0	12	0
	Malathion	10	3	0	0	12	0
	Methamidophos	10	3	0	0	12	0
	Methidathion	10	3	0	0	12	0
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	10	3	0	0	12	0
	Phorate	10	3	0	0	12	0
	Phosmet	10	3	0	0	12	0
	Thiobencarb	7	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
Pyrethroids	Bifenthrin	7	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	2	0
	Cyhalothrin, lambda, total	7	0	0	0	2	0
	Cypermethrin, total	7	0	0	0	2	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	2	0
	Permethrin, total	7	0	0	0	2	0
Sediment Pesticides	Bifenthrin	0	0	1	0	2	0
	Chlorpyrifos	0	0	1	0	2	0
	Cyfluthrin	0	0	1	0	0	0
	Cyhalothrin, lambda	0	0	1	0	0	0
	Cypermethrin	0	0	1	0	0	0
	Deltamethrin: Tralomethrin	0	0	1	0	2	0
	Esfenvalerate/ Fenvalerate	0	0	1	0	0	0
	Fenpropathrin	0	0	1	0	2	0
	Permethrin	0	0	1	0	2	0
Toxicity	*Ceriodaphnia dubia*	12	6	3	3	12	3
	Pimephales promelas	10	3	0	0	12	0
	Selenastrum capricornutum	12	5	3	3	12	0
	Hyalella azteca	1	0	2	0	2	2

Table I-4. Duck Creek Management Plan Monitoring schedule (2007-2013).

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		
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

[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 2013, MPM occurred at Duck Creek @ Hwy 4 for chlorpyrifos, water column toxicity to *C. dubia* and sediment toxicity to *H. azteca*. No exceedances of the WQTL for chlorpyrifos or toxicity to *C. dubia* occurred. The last exceedance of the WQTL for chlorpyrifos as well as the last toxicity to *C. dubia* occurred in 2011 (Table I-5). A single sediment toxicity to *H. azteca* occurred in March 2013 (Table I-6). During MPM in 2013, DO, and pH were measured; three exceedances of the WQTL occurred for DO and no exceedances of the WQTL for pH occurred. *E. coli* was last monitored in 2012 during Assessment Monitoring and one exceedance of the WQTL occurred during December 2012 (Table I-5).

Table I-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Duck Creek @ Hwy 4 site subwatershed (organized alphabetically by constituent priority). Table I-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table I-7 contains the instantaneous loads for chlorpyrifos and diazinon since monitoring began in the site subwatershed. A record of all exceedances since monitoring began is provided in Appendix II, Table I-A.

Table I-5. Duck Creek @ Hwy 4 management plan constituent exceedance tally (2006-2013).

Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table I-A.

	Active Management Plan Constituents					Removed Management Plan Constituents		
Monitoring Year	Chlorpyrifos, >0.015 µg/L	*C. dubia*, (%Control)	*H. azteca*, (%Control)	*E. coli*, >235 MPN/100 mL	Oxygen, Dissolved, <7 mg/L	Diazinon, >0.1 µg/L	pH, <6.5 and >8.5 units	*S. capricornutum*, (% control)
2006	2	1	0	2	3	0	1	0
2007	3	0	0	3	5	1	1	1
2008	5	4	0	1	8	0	1	2
2009	3	1	NA	0	6	0	0	0
2010	4	0	1	NA	8	0	0	0
2011	1	1	NA	NA	4	0	0	0
2012	0	0	2	1	10	0	0	0
2013	0	0	1	NA	6	NA	0	NA
Overall Tally	**18**	**7**	**4**	**7**	**50**	**1**	**3**	**3**
Constituent Priority	**A/B**	**D**	**D**	**E**	**E**	**A/B[R]**	**E[R]**	**E[R]**

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

[R] – Removed from active management plan.

Table I-6. Duck Creek @ Hwy 4 subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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	8/07/07	9/04/07		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	6/09/09	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
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

[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 (see Table 4 for MPM schedule)..

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 I-7. Duck Creek @ Hwy 4 subwatershed instantaneous load calculations for chlorpyrifos and diazinon.
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	05/16/06	12.68	0.029	µg/L	10	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	09/19/06	6.02	0.15	µg/L	26	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	07/10/07	14.43	0.024	µg/L	10	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	09/04/07	0	0.025	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	09/25/07	2.16	0.029	µg/L	2	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	01/23/08	2.11	0.0081	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	04/15/08	13.07	0.057	µg/L	21	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	06/10/08	15.51	0.11	µg/L	48	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	07/15/08	13.67	0.066	µg/L	26	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	08/12/08	4.97	0.017	µg/L	2	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	09/16/08	20.80	0.027	µg/L	16	µg/sec
Duck Creek @ Hwy 4*	Chlorpyrifos	01/13/09	0	0.0048	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	01/13/09	0	0.0050	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	02/10/09	0	0.0037	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	05/12/09	5.57	0.011	µg/L	2	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	06/09/09	11.54	0.070	µg/L	23	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	07/14/09	23.44	0.15	µg/L	100	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	05/11/10	18.49	0.055	µg/L	29	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	07/13/10	20.73	0.020	µg/L	12	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	09/07/10	14.56	0.023	µg/L	9	µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	02/08/11	0	0.0040	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Diazinon	02/11/07	0	0.055	µg/L	0	µg/sec
Duck Creek @ Hwy 4	Diazinon	02/28/07	45.83	0.11	µg/L	143	µg/sec
Duck Creek @ Hwy 4	Diazinon	01/23/08	2.11	0.018	µg/L	1	µg/sec
Duck Creek @ Hwy 4	Diazinon	01/13/09	0	0.012	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

A complete review of source identification and outreach activities in the Duck Creek @ Hwy 4 site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 14-25). The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the Duck Creek @ Hwy 4 management plan. Chlorpyrifos is the only priority A/B constituent listed under the Duck Creek @ Hwy 4 management plan. Overall, applications of chlorpyrifos have declined since 2004. The last exceedance of the WQTL for chlorpyrifos occurred during MPM in September 2011. In 2011, chlorpyrifos applications occurred from May through September; August had the highest amount of lbs applied (2013 MPUR Appendix I, page 17).

Water column toxicity to *C. dubia* last occurred in September 2011 and was associated with the 2011 exceedance of the WQTL for chlorpyrifos. Prior to 2011, toxicity to *C. dubia* occurred four times, once in July 2009, twice in April and July 2008 (samples collected to test for persistence of toxicity were also toxic), and once in September 2006. All *C. dubia* toxicities coincided with the timing of exceedances of

the WQTL for chlorpyrifos. The last water column toxicity to *S. capricornutum* occurred in April and May 2008.

H. azteca sediment toxicity was added to the Duck Creek @ Hwy 4 management plan and MPM schedule due to sediment toxicity during DPR grant monitoring in September 2010 and Assessment Monitoring in March 2012. Sediment toxicity to *H. azteca* most recently occurred in March 2013; survival of *H. azteca* was greater than 80 % compared to the control and therefore additional sediment chemistry analyses was not required.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the 2013 MPUR (pages 20-32).

The Coalition carried out its management practice tracking and outreach which included contacting targeted growers in 2008 and following up with the growers in 2009 and 2010. The Coalition contacted 35 targeted growers representing 4,978 acres within the Duck Creek @ Hwy 4 site subwatershed (2013 MPUR, pages 30-32) and documented current management practices (2012 MPUR, pages 43-48). Additional contacts were made with twelve growers in 2010 and three growers in 2012 (2012 MPUR, page 45-47). These growers were targeted for supplementary focused outreach based on their recent use of chlorpyrifos associated with the September 2011 exceedance. Following focused outreach, all three growers indicated they have discontinued use of chlorpyrifos and are implementing management practices to control runoff and manage pesticide applications. Nineteen growers participated in follow-up contacts and documented newly implemented management practices in 2009 or 2010 (2013 MPUR, page 49).

Evaluation

Overall, water quality has improved since focused outreach to targeted growers began in the Duck Creek @ Hwy 4 site subwatershed. Due to these water quality improvements, the Coalition received approval on March 22, 2012 to remove diazinon, pH and toxicity to *S. capricornutum* from the Duck Creek @ Hwy 4 active management plan. The remaining high priority constituents include chlorpyrifos, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca.* The last exceedance of the WQTL for chlorpyrifos and toxicity to *C. dubia* occurred in September 2011. Implemented management practices to reduce the number of exceedances of the WQTL for chlorpyrifos and associated toxicity include controlling the offsite movement of chlorpyrifos and managing applications of chlorpyrifos. Three additional growers were contacted in 2012 in response to continued chlorpyrifos exceedances and associated toxicities to *C. dubia*. Coalition representatives recommended new management practices to these growers. In 2013, water quality improvements were evident and no exceedances of the WQTL for chlorpyrifos or toxicity to *C. dubia* occurred. Sediment toxicity to *H. azteca* occurred in March 2013 during MPM; however, additional sediment chemistry analysis was not required because the survival of

H. azteca was greater than 80 % compared to the control. The remaining priority E constituents, DO and *E. coli*, have been discussed during focused and general outreach, and will continue to be discussed at annual grower meetings.

Next Steps

Focused outreach is completed within this site subwatershed; however, the Coalition will continue to conduct general outreach. In 2014, Duck Creek @ Hwy 4 is scheduled for MPM during months of past exceedances for chlorpyrifos, water column toxicity to *C. dubia,* and sediment toxicity to *H. azteca.* Dissolved Oxygen and pH are field parameters and are measured during all monitoring events.

II. LONE TREE CREEK @ JACK TONE RD

Overview

Lone Tree Creek @ Jack Tone Rd is a first priority site subwatershed. The Coalition completed the focused outreach portion of its management plan strategy in the Lone Tree Creek @ Jack Tone Rd site subwatershed in 2012 (including additional outreach) and monitoring results from 2009 through 2013 indicate water quality improvements. After demonstrating improved water quality and no exceedances, the Coalition received approval to remove diazinon, copper, diuron, water column toxicity to *S. capricornutum*, sediment toxicity to *H. azteca*, and SC from the active management plan on May 21, 2012 and DO on February 27, 2013 (Table II-1). The remaining constituents in the Lone Tree Creek @ Jack Tone Rd site subwatershed active management plan include chlorpyrifos, water column toxicity to *P. promelas*, ammonia, *E. coli*, pH and TDS (Table II-1).

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

Management Plan Monitoring occurred in 2013 for chlorpyrifos; the other remaining constituents do no require MPM since they are priority E (Table II-1). In 2013, one exceedance of the WQTL for chlorpyrifos occurred during MPM in July. In 2014, MPM will continue for chlorpyrifos; field parameters, including pH will be measured during all MPM events.

Table II-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 SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2007	Active
D	*P. promelas* water column toxicity	2009	Active
E	Ammonia	2008	Active
E	*E. coli*	2006	Active
E	pH	2007	Active
E	Total Dissolved Solids (TDS)	2007	Active
CONSTITUENT (REMOVED)			
A/B	Diazinon	2009	2012
C	Copper	2008	2012
C	Diuron	2008	2012
D	*H. azteca* sediment toxicity	2007	2012
D	*S. capricornutum* water column toxicity	2007	2012
E	Dissolved Oxygen	2006	2013
E	Specific Conductivity	2013	2012

Description of Site Subwatershed

Lone Tree Creek @ Jack Tone Rd is a rotating Assessment Monitoring location within Zone 2 under the 2008 MRPP. The site consists of 25,789 irrigated acres and upstream agricultural land use primarily includes deciduous nuts, field crops, grains, irrigated pastures, and several dairies (Figure II-1). This 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. Lone Tree Creek confluences downstream of the monitoring location with Littlejohns Creek and eventually 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 II-2).

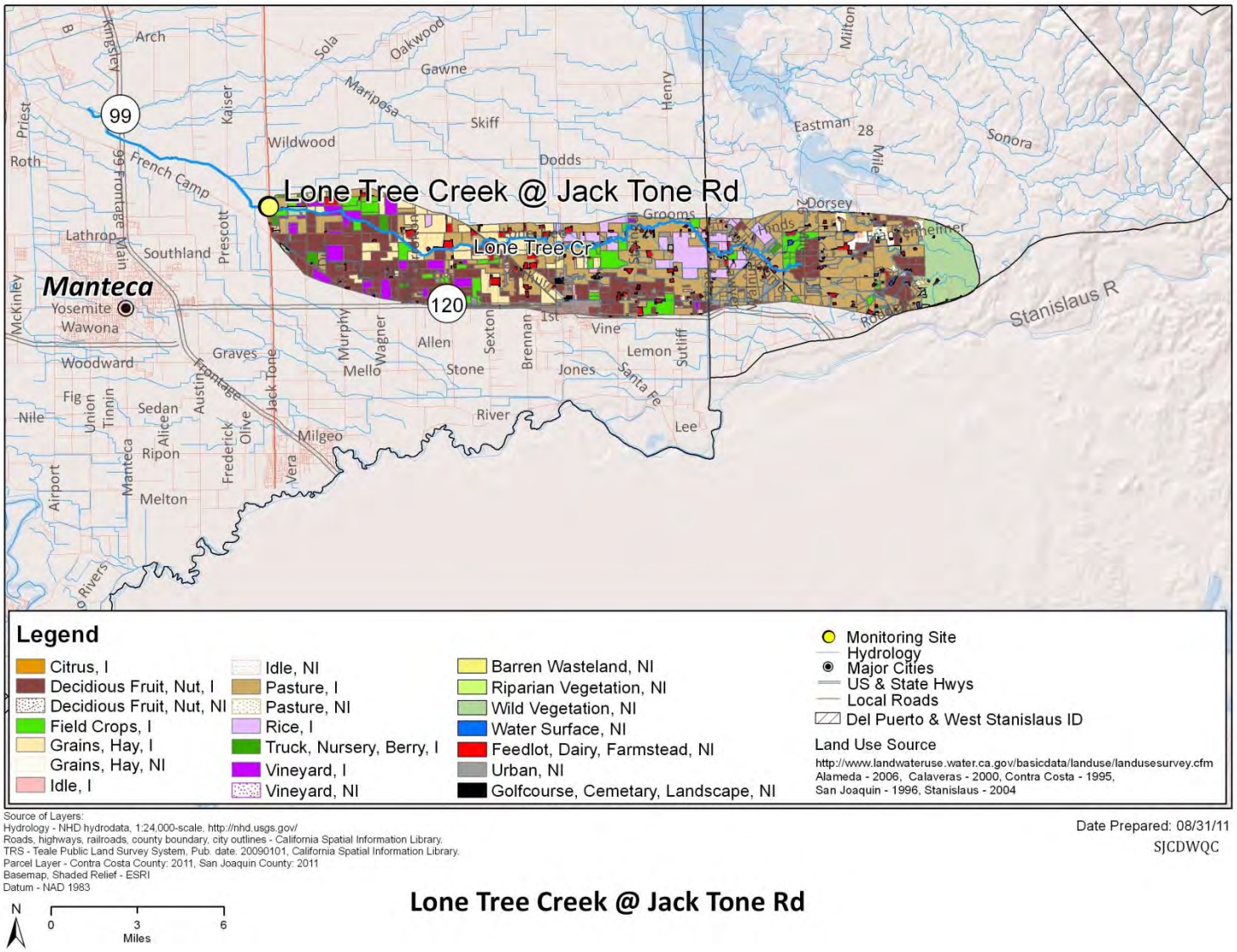
Lone Tree Creek @ Jack Tone Rd is listed as a 303 (d) List of Impaired Waterbodies for ammonia, BOD, chlorpyrifos, diuron, *E. coli*, and sediment and unknown water column toxicity (lasted updated in 2010).

Table II-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 II-1. Lone Tree Creek @ Jack Tone Rd site subwatershed land use map.



Subwatershed Monitoring History

Normal Monitoring began at Lone Tree Creek @ Jack Tone Rd during the irrigation season of 2004 and continued through September 2008 at which time the site became an Assessment Monitoring location. Table II-3 contains the number of events monitored per year and the constituents (by group) for years 2008 to 2013 (see 2013 MPUR Appendix I, Table II-3 for analytes sampled prior to 2008).

Management Plan Monitoring was initiated at Lone Tree Creek @ Jack Tone Rd in 2007. In an effort to source the chemicals that caused exceedances, upstream monitoring occurred 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. In 2008, upstream MPM at Lone Tree Creek @ Brennan Rd and Lone Tree Creek @ Valley Home Rd occurred for copper and chlorpyrifos. Management Plan Monitoring during months of past exceedances has occurred at Lone Tree Creek @ Jack Tone Rd since 2009 to evaluate the effectiveness of the Coalition's outreach strategy and the newly implemented management practices on water quality (Table II-4).

From June 2010 through February 2011, additional samples were collected for chlorpyrifos, diazinon, and sediment toxicity to *H. azteca* as part of a DPR grant to reduce the impact of agricultural discharge on water quality.

Table II-3. Lone Tree Creek @ Jack Tone Rd sampling events and analyses per year.
Only environmental samples are counted.

Type	Analyte	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	14	6	12	12	11	11
	Dry Sites	0	0	0	1	0	1
	Events Sampled	14	6	12	11	11	10
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	14	6	12	11	11	10
	Dissolved Solids	8	0	0	0	0	0
	E. coli	7	0	0	0	0	0
	Grain size (sediment)	0	0	1	2	1	2
	Hardness as CaCO3	6	5	5	5	5	5
	pH	14	6	12	11	11	10
	Specific Conductivity	14	6	12	11	11	10
	Suspended Solids	0	0	0	0	0	0
	Total Organic Carbon	7	0	1	2	0	0
	Total Organic Carbon (sediment)	7	0	1	2	2	2
	Turbidity	8	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0
	OrthoPhosphate as P	6	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0
	Copper	0	5	5	5	5	5
	Lead	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
Metals (Total)	Arsenic	6	0	0	0	0	0
	Boron	6	0	0	0	0	0
	Cadmium	6	0	0	0	0	0
	Copper	6	5	5	5	5	5
	Lead	6	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0
	Nickel	6	0	0	0	0	0
	Selenium	6	0	0	0	0	0
	Zinc	6	0	0	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0
	Diuron	7	0	2	2	2	1
	Linuron	7	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0
	Methomyl	7	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0
	Paraquat	7	0	0	0	0	0
	Simazine	7	0	2	2	2	0
	Trifluralin	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0
	Dicofol	7	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0
	Endrin	7	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0
	Chlorpyrifos	7	4	10	8	9	8
	Demeton-s	0	0	0	0	0	0
	Diazinon	7	0	7	2	0	0
	Dichlorvos	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0
	Malathion	7	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0
	Methidathion	7	0	0	0	0	0
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0
	Phorate	7	0	0	0	0	0
	Phosmet	7	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
Pyrethroids	Bifenthrin	7	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	2	1	0
	Chlorpyrifos	0	0	1	2	1	0
	Cyfluthrin	0	0	1	2	1	0
	Cyhalothrin, lambda	0	0	1	2	1	0
	Cypermethrin	0	0	1	2	1	0
	Deltamethrin: Tralomethrin	0	0	1	2	1	0
	Esfenvalerate/ Fenvalerate	0	0	1	2	1	0
	Fenpropathrin	0	0	1	2	1	0
	Permethrin	0	0	1	2	1	0
Toxicity	*Ceriodaphnia dubia*	9	1	3	3	2	0
	Pimephales promelas	7	0	0	0	0	0
	Selenastrum capricornutum	8	1	3	3	3	0
	Hyalella azteca	4	0	1	2	2	2

Table II-4. Lone Tree Creek Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Copper	Total Metals	Chlorpyrifos	Diazinon	Diuron	*S. capricornutum*	*H. azteca*
Lone Tree Creek @ Jack Tone Rd	07/30/07	Add.			X				
Lone Tree Creek @ Jack Tone Rd	08/28/07	Add.			X				
Lone Tree Creek @ Valley Home Rd	05/13/08	US		X					
Lone Tree Creek @ Valley Home Rd	06/10/08	US		X					
Lone Tree Creek @ Valley Home Rd	07/15/08	US		X					
Lone Tree Creek @ Brennan Rd	07/15/08	US		X	X				
Lone Tree Creek @ Valley Home Rd	08/12/08	US		X					
Lone Tree Creek @ Brennan Rd	08/12/08	US		X	X				
Lone Tree Creek @ Valley Home Rd	09/16/08	US		X					
Lone Tree Creek @ Brennan Rd	09/16/08	US		X					
Lone Tree Creek @ Jack Tone Rd	04/14/09	MPM						X	
Lone Tree Creek @ Jack Tone Rd	05/12/09	MPM						X	
Lone Tree Creek @ Jack Tone Rd	07/14/09	MPM	X		X				
Lone Tree Creek @ Jack Tone Rd	08/11/09	MPM	X		X				
Lone Tree Creek @ Jack Tone Rd	09/15/09	MPM	X						
Lone Tree Creek @ Jack Tone Rd	01/13/10	MPM	X		X	X	X	X	
Lone Tree Creek @ Jack Tone Rd	02/09/10	MPM	X		X	X	X	X	
Lone Tree Creek @ Jack Tone Rd	03/16/10	MPM						X	
Lone Tree Creek @ Jack Tone Rd	04/13/10	MPM						X	
Lone Tree Creek @ Jack Tone Rd	05/11/10	MPM						X	
Lone Tree Creek @ Jack Tone Rd	06/08/10	MPM			X[2]	X[2]			
Lone Tree Creek @ Jack Tone Rd	07/13/10	MPM	X		X[1]	X[2]			
Lone Tree Creek @ Jack Tone Rd	08/10/10	MPM	X		X[1]	X[2]			
Lone Tree Creek @ Jack Tone Rd	09/07/10	MPM	X		X[2]	X[2]			X[2]
Lone Tree Creek @ Jack Tone Rd	10/12/10	MPM			X[2]	X[2]			
Lone Tree Creek @ Jack Tone Rd	11/09/10	MPM			X[2]	X[2]			
Lone Tree Creek @ Jack Tone Rd	12/07/10	MPM			X[2]	X[2]			
Lone Tree Creek @ Jack Tone Rd	01/11/11	MPM	X		X[1]	X[1]	X	X	
Lone Tree Creek @ Jack Tone Rd	02/08/11	MPM	X		X[1]	X[1]	X	X	
Lone Tree Creek @ Jack Tone Rd	03/08/11	MPM						X	X
Lone Tree Creek @ Jack Tone Rd	04/12/11	MPM						X	
Lone Tree Creek @ Jack Tone Rd	05/24/11	MPM						X	
Lone Tree Creek @ Jack Tone Rd	07/26/11	MPM	X		X				
Lone Tree Creek @ Jack Tone Rd	08/23/11	MPM	X		X				
Lone Tree Creek @ Jack Tone Rd	09/20/11	MPM	X						
Lone Tree Creek @ Jack Tone Rd	10/14/11	MPM							X
Lone Tree Creek @ Jack Tone Rd	01/17/12	MPM	X		X	X	X	X	
Lone Tree Creek @ Jack Tone Rd	02/14/12	MPM	X		X	X	X	X	
Lone Tree Creek @ Jack Tone Rd	03/15/12	MPM						X	X
Lone Tree Creek @ Jack Tone Rd	04/12/12	MPM						X	
Lone Tree Creek @ Jack Tone Rd	05/16/12	MPM						X	
Lone Tree Creek @ Jack Tone Rd	07/17/12	MPM			X				
Lone Tree Creek @ Jack Tone Rd	08/21/12	MPM			X				
Lone Tree Creek @ Jack Tone Rd	01/15/13	MPM			X				
Lone Tree Creek @ Jack Tone Rd	02/21/13	MPM			X				
Lone Tree Creek @ Jack Tone Rd	07/16/13	MPM			X				
Lone Tree Creek @ Jack Tone Rd	08/20/13	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).

During 2013, MPM occurred for chlorpyrifos in January, February, July, and August. During 2013 MPM, concentrations of chlorpyrifos exceeded the WQTL (Table II-5). The Priority E constituent, pH was monitored during all MPM events in 2013; no exceedances of the WQTL occurred.

On February 27, 2013, the Coalition received approval to remove DO from the active management plan; however DO was measured during all 2013 MPM events (Table III-6). In July 2013, the DO concentration was 5.82 mg/L and was considered an exceedance of the upper WQTL of 7.00 mg/L for DO. However, the Coalition reevaluated the criteria for exceedances of the WQTL for DO provided in the Sacramento and San Joaquin Rivers Basin Plan (September 1998, Chapter III, page 5). The Beneficial Use of the immediate downstream waterbody is protective to warm water aquatic life and the WQTL for DO of 5 mg/L should be utilized for this site. Therefore, the DO concentration of 5.82 mg/L measured during July 2013 MPM was not an exceedance based on the 5.00 mg/L WQTL and DO was not reinstated into the active management plan. The Coalition also reevaluated the SC measurement at Lone Tree Creek @ Jack Tone Rd (799 µmhos/cm) from February 14, 2012 based on the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Basin Plan (Table 2, Page 13). The Basin Planindicates that detections of SC from September through March are not considered exceedances when they are below 1,000 µmhos/cm; therefore, the value was not considered an exceedance and the consitutent will remain removed from the site's active management plan.

Table II-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Lone Tree Creek @ Jack Tone site subwatershed (organized alphabetically by constituent priority). Table II-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table II-7 contains the instantaneous loads for chlorpyrifos, copper, diazinon and diuron since monitoring began in the site subwatershed. A record of all exceedances since monitoring began in the site subwatershed is provided in Appendix II, Table II-A.

Table II-5. Lone Tree Creek @ Jack Tone Rd management plan constituent exceedance tally (2004-2013).

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

	Active Management Plan Constituents					Removed Management Plan Constituents						
Monitoring Year	Chlorpyrifos, >0.015 µg/L	*P. promelas*, (%Control)	Ammonia, Variable[1] or >1.5 mg/L	*E. coli*, >235 MPN/100 mL	pH, <6.5 and >8.5 units	Diazinon, >0.1 µg/L	Copper (Total), Variable[2] or >1300 µg/L	Diuron, >2 µg/L	*H. azteca*, (%Control)	*S. capricornutum*, (%Control)	Dissolved Oxygen, <7 mg/L	Specific Conductivity, >700 µS/cm
2004	0	0	NA	1	0	0	NA	NA	0	0	1	0
2005	2	1	NA	7	1	0	NA	NA	1	1	4	0
2006	1	0	0	6	1	0	1	0	1	1	6	0
2007	2	0	3	6	0	1	5	2	0	1	1	0
2008	1	1	1	6	1	1	1	1	0	4	3	0
2009	1	NA	NA	NA	0	NA	0	NA	NA	0	2	0
2010	2	NA	NA	NA	0	0	0	0	0	0	1	0
2011	0	NA	NA	NA	2	0	0	0	0	0	0	0
2012	0	NA	NA	NA	0	0	0	0	0	0	0	0
2013	1	NA	NA	NA	0	NA	NA	NA	NA	NA	0	0
Overall Tally	**10**	**2**	**4**	**26**	**5**	**2**	**7**	**3**	**2**	**7**	**18**	**0**
Constituent Priority	**A/B**	**D**	**E**	**E**	**E**	**A/B[R]**	**C[R]**	**C[R]**	**D[R]**	**D[R]**	**E[R]**	**E[R]**

[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.

[R] – Removed from active management plan.

Table II-6. Lone Tree Creek site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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	8/07/07	9/04/07		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
	H. azteca toxicity (% Control)	NA	NA	100	NA	NA	NA	NA	NA	NA		98	NA	NA

	Month:	Jan	Feb	mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
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 II-7. Lone Tree Creek site subwatershed instantaneous load calculations for chlorpyrifos, copper, diazinon, and, diuron.

Upstream site is italicized. 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	02/16/05	22.26	0.014	µg/L	9	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/16/05	25.85	0.019	µg/L	14	µg/sec
Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	08/16/05	25.85	0.019	µg/L	14	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	02/27/06	0.34	0.014	µg/L	0	µg/sec
Lone Tree Creek @ Brennan Rd	*Chlorpyrifos*	*02/27/06*	*0*	*0.018*	*µg/L*	*0*	*µg/sec*
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	03/15/06	27.84	0.013	µg/L	10	µg/sec
Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	02/11/07	26.70	0.041	µg/L	31	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	02/11/07	26.70	0.052	µg/L	39	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	06/12/07	39.21	0.011	µg/L	12	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/10/07	35.90	0.035	µg/L	36	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/30/07	26.77	0.01	µg/L	8	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	01/23/08	18.88	1.7	µg/L	909	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	01/13/10	1.19	1.1	µg/L	37	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/13/10	23.01	0.27	µg/L	176	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/10/10	27.32	0.015	µg/L	12	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/07/10	68.19	0.0086	µg/L	17	µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/16/13	26.57	0.026	µg/L	20	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	05/16/06	13.95	3.6	µg/L	1422	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	08/15/06	49.49	8.9	µg/L	12473	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	02/11/07	26.70	21	µg/L	15877	µg/sec
Lone Tree Creek @ Jack Tone Rd*	Copper	02/11/07	26.70	21	µg/L	15877	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	02/28/07	7.85	19	µg/L	4223	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	04/10/07	24.90	3.4	µg/L	2397	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	06/12/07	39.21	5.1	µg/L	5663	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	07/10/07	35.90	12	µg/L	12199	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	08/07/07	19.43	4.6	µg/L	2531	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	01/23/08	18.88	40	µg/L	21385	µg/sec
Lone Tree Creek @ Valley Home Rd	*Copper*	*05/13/08*	*10.83*	*4.6*	*µg/L*	*1411*	*µg/sec*
Lone Tree Creek @ Valley Home Rd	*Copper*	*06/10/08*	*7.94*	*5.7*	*µg/L*	*1282*	*µg/sec*
Lone Tree Creek @ Jack Tone Rd	Copper	07/15/08	24.15	3.6	µg/L	2462	µg/sec
Lone Tree Creek @ Brennan Rd	*Copper*	*07/15/08*	*33.05*	*3.8*	*µg/L*	*3556*	*µg/sec*
Lone Tree Creek @ Valley Home Rd	*Copper*	*07/15/08*	*9.76*	*7.0*	*µg/L*	*1935*	*µg/sec*
Lone Tree Creek @ Jack Tone Rd	Copper	08/12/08	13.94	3.5	µg/L	1382	µg/sec
Lone Tree Creek @ Brennan Rd	*Copper*	*08/12/08*	*12.43*	*3.3*	*µg/L*	*1162*	*µg/sec*
Lone Tree Creek @ Valley Home Rd	*Copper*	*08/12/08*	*12.89*	*3.7*	*µg/L*	*1351*	*µg/sec*
Lone Tree Creek @ Brennan Rd	*Copper*	*09/16/08*	*12.07*	*2.9*	*µg/L*	*991*	*µg/sec*
Lone Tree Creek @ Valley Home Rd	*Copper*	*09/16/08*	*8.63*	*3.8*	*µg/L*	*929*	*µg/sec*
Lone Tree Creek @ Jack Tone Rd	Copper	01/13/10	1.19	26	µg/L	876	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	02/09/10	3.99	17	µg/L	1921	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	07/13/10	23.01	3.4	µg/L	2215	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	08/10/10	27.32	3.7	µg/L	2862	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	09/07/10	68.19	4.1	µg/L	7917	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	01/11/11	1.31	10	µg/L	371	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	02/08/11	0	6.0	µg/L	0	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	07/26/11	4.80	2.2	µg/L	299	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	08/23/11	27.95	2.3	µg/L	1820	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	09/20/11	39.14	3.0	µg/L	3325	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	01/17/12	30.15	4.7	µg/L	4013	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper	02/14/12	0.29	18	µg/L	148	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	01/13/10	1.19	7.0	µg/L	236	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	02/09/10	3.99	8.7	µg/L	983	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/13/10	23.01	2.2	µg/L	1433	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/10/10	27.32	2.3	µg/L	1779	µg/sec

Site Name	Analyte Name	Sample Date	Discharge, cfs	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/07/10	68.19	2.8	µg/L	5407	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	01/11/11	1.31	5.2	µg/L	193	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	02/08/11	0	5.0	µg/L	0	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/26/11	4.80	1.5	µg/L	204	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/23/11	27.95	1.2	µg/L	950	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/20/11	39.14	1.9	µg/L	2106	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	01/17/12	30.15	1.9	µg/L	1622	µg/sec
Lone Tree Creek @ Jack Tone Rd	Copper (D)	02/14/12	0.29	3.1	µg/L	25	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diazinon	02/16/05	22.26	0.089	µg/L	56	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diazinon	02/27/06	0.34	0.014	µg/L	0	µg/sec
Lone Tree Creek @ Brennan Rd	*Diazinon*	*02/27/06*	*0*	*0.017*	*µg/L*	*0*	*µg/sec*
Lone Tree Creek @ Jack Tone Rd	Diazinon	03/15/06	27.84	0.023	µg/L	18	µg/sec
Lone Tree Creek @ Brennan Rd	*Diazinon*	*03/15/06*	*12.09*	*0.031*	*µg/L*	*11*	*µg/sec*
Lone Tree Creek @ Jack Tone Rd*	Diazinon	02/11/07	26.70	0.12	µg/L	91	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diazinon	02/11/07	26.70	0.14	µg/L	106	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diazinon	01/23/08	18.88	0.20	µg/L	107	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diazinon	01/13/10	1.19	0.074	µg/L	2	µg/sec
Lone Tree Creek @ Jack Tone Rd*	Diuron	02/11/07	26.70	5.1	µg/L	3856	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	02/11/07	26.70	12	µg/L	9073	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	02/28/07	7.85	4.3	µg/L	956	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	04/10/07	24.90	0.23	µg/L	162	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	01/23/08	18.88	4.9	µg/L	2620	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	01/13/10	1.19	0.51	µg/L	17	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	02/09/10	3.99	0.26	µg/L	29	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	01/11/11	1.31	1.1	µg/L	41	µg/sec
Lone Tree Creek @ Jack Tone Rd	Diuron	02/08/11	0	0.37	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
Copper (D)-Dissolved Copper

Source Identification and Outreach

A complete review of the source identification and outreach activities in the Lone Tree Creek @ Jack Tone Rd site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 27-67).

Chlorpyrifos is the only A/B priority constituent in the active management plan. Overall, most applications of chlorpyrifos occur during the irrigation season and PUR data indicate a decline in use since 2007 (2013 MPUR Appendix I, page 46). Between 2004 and 2013, exceedances of the WQTL for chlorpyrifos occurred ten times; five of those exceedances of the WQTL occurred following months of high use (2013 MPUR Appendix I, page 47). The last exceedance of the WQTL for chlorpyrifos to occur was in July 2013 (0.026 µg/L). July is an irrigation month and flow levels in these waterways tend to increase during the irrigation season; the discharge measurement recorded during the July monitoring event was 26.57 cfs. During the same event there was a chlorpyrifos exceedance at Unnamed Drain to Lone Tree Creek and downstream at French Camp Slough (French Camp Slough receives drainage from both the Unnamed Drain and Lone Tree Creek subwatersheds). The Coalition mapped chlorpyrifos applications by members and nonmembers that occurred within four weeks of the exceedances. All parcels with applications associated with the exceedance in the Lone Tree Creek @ Jack Tone Rd site

subwatershed were either non member parcels or parcels not previously targeted for contact due to not meeting the criteria used for determining high priority focused outreach and education (Figure VII-2, French Camp Slough site subwatershed section).

The remaining active management plan constituents include toxicy to *P. promelas,* ammonia, *E. coli,* and pH. Of these, only pH was measured in 2013. The Lone Tree Creek @ Jack Tone Rd site subwatershed has several parcels of land consisting of dairies /feedlots and irrigated pastures. Between 2005 and 2008, water column toxicity occurred six times to *C. dubia* (2), *P. promelas* (3), and *S. capricornutum* (1). These toxicities were linked to high levels of suspended solids and ammonia that are commonly associated with dairy discharges. A TIE was not conducted on samples collected for water column toxicity to *C. dubia*, *P. promelas* and *S. capricornutum* in January 2008 because the mortality was likely caused by the elevated amounts of suspended solids and ammonia in the samples. The Coalition was informed by the CVRWQCB that wastewater from a dairy lagoon was discharging into Lone Tree Creek @ Jack Tone Rd prior to this sampling event (2008 SAMR, pages 93-94). Due to all water column toxicities to *P. promelas* in the site subwatershed being linked to high ammonia levels, MPM has not occurred since 2009.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the 2013 MPUR (pages 20-21).

Focused outreach to document current management practices and track implementation of additional management practices in the Lone Tree Creek @ Jack Tone Rd site subwatershed began in 2008 and continued through 2010. The Coalition contacted 46 targeted growers, representing 4,691 acres within the Lone Tree Creek @ Jack Tone Rd site subwatershed (2010 MPUR, pages 23). Due to no pesticide use reported in the returned surveys, three of the 46 growers were removed from the targeted grower list; therefore, 43 targeted growers consisting of 3,742 irrigated acres participated in follow-up surveys to document current and newly implemented practices (2011 MPUR, page 49-53). During 2012, the Coalition targeted two new growers using chlorpyrifos for additional outreach and education on reducing chlorpyrifos use or using alternatives to chlorpyrifos, and results from these contacts were included in the overall assessment of new management practices implemented within first priority site subwatersheds (2012 MPUR, page 48).

Evaluation

Overall, water quality has improved since focused outreach began in the Lone Tree Creek @ Jack Tone Rd site subwatershed. Due to these improvements, the Coalition received approval to remove diazinon, copper, diuron, water column toxicity to *S. capricornutum*, sediment toxicity to *H. azteca*, and SC from the active management plan on May 21, 2012 and DO on February 27, 2013. The remaining constituents in the active management plan are: chlorpyrifos, water column toxicity to *P. promales*,

ammonia, *E. coli*, pH, and TDS. With the exception of pesticides containing copper, targeted growers in the site subwatershed reduced applications of pesticides that historically resulted in exceedances of WQTLs (2011 MPUR, page 49-53). Subsequently, the decreased frequencies of exceedances of WQTLs, and the removal of several high priority constituents from the management plan, demonstrate water quality improvements. There was a single exceedance of the chlorpyrifos WQTL and the Coalition has reviewed associated applications to determine if Coalition members who were targeted for focused outreach applied during that time period. The applications that occurred during the four weeks prior to the exceedance (7 applications) were made by nonmembers and members who were not targeted because they were not considered to have direct drainage and/or they had no previous chlorpyrifos use.

Dairy operations, feedlots, and manure fertilizer applications may contribute to elevated levels of ammonia and suspended solids. Even though landowners and operators are required to follow crop specific manure application practices, including regulatory guidelines provided by the CVRWQCB, contamination does occur. Past water column toxicities to *C. dubia*, *P. promelas*, and *S. capricornutum* were linked to sources other than agriculture, indicating multiple causes of toxicity. The Coalition discussed these constituents with targeted growers during focused outreach and will continue to do so through general outreach.

Next Steps

Focused outreach is completed within this site subwatershed; the Coalition will continue to conduct general outreach. In 2014, Lone Tree Creek @ Jack Tone Rd is scheduled for MPM during months of past exceedances for chlorpyrifos. Since pH is a field parameter it will be measured during all monitoring events.

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

Overview

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd is one of the Coalition's first priority site subwatersheds. The Coalition completed the focused outreach portion of its management plan strategy in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed in 2012 (including additional outreach) and monitoring results through 2013 indicate improved water quality. The Coalition received approval to remove simazine and water column toxicity to *C. dubia* and *S. capricornutum* from the active management plan on May 21, 2012. The remaining constituents in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed management plan include: chlorpyrifos, copper, diuron, sediment toxicity to *H. azteca*, DO, *E. coli*, lead, SC, and TDS (Table III-1).

In addition to the focused outreach from 2008 through 2010, the Coalition conducted additional focused outreach with two new growers in 2012 bspecifically to address chlorpyrifos use, and management practices were recommended to improve water quality.

In 2013, MPM for chlorpyrifos, copper, diuron, and sediment toxicity to *H. azteca* occurred. Only one exceedance of the WQTL for chlorpyrifos (1 of 9 samples, 11%) and one sediment toxicity to *H. azteca* occurred (1 of 2 samples, 50%). There has not been any exceedances of the hardness based WQTL for copper since May 2011 or diuron since February 2012, demonstrating water quality improvements in the site subwatershed. In 2014, MPM will continue for chlorpyrifos, copper, diuron and sediment toxicity to *H. azteca*.

Table III-1. Unnamed Drain to Lone Tree Creek management plan constituents.

Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2007	Active
C	Copper	2009	Active
C	Diuron	2008	Active
D	*H. azteca* sediment toxicity	2009	Active
E	Dissolved Oxygen	2007	Active
E	*E. coli*	2008	Active
E	Lead	2009	Active
E	Specific Conductivity	2008	Active
E	Total Dissolved Solids	2008	Active
CONSTITUENT (REMOVED)			
C	Simazine	2009	2012
D	*C. dubia* water column toxicity	2009	2012
D	*S. capricornutum* water column toxicity	2008	2012

Description of Site Subwatershed

The Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (also known as Temple Creek) site subwatershed is a rotating Assessment Monitoring location in Zone 2 under the 2008 MRPP. The site subwatershed consists of 27, 900 irrigated acres which primarily includes irrigated rice, grains, vineyards and irrigated pastureland (Figure III-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. Unnamed Drain to Lone Tree Creek subwatershed includes an upstream location, Unnamed Drain to Lone Tree Creek @ Wagner Rd (Table III-2).

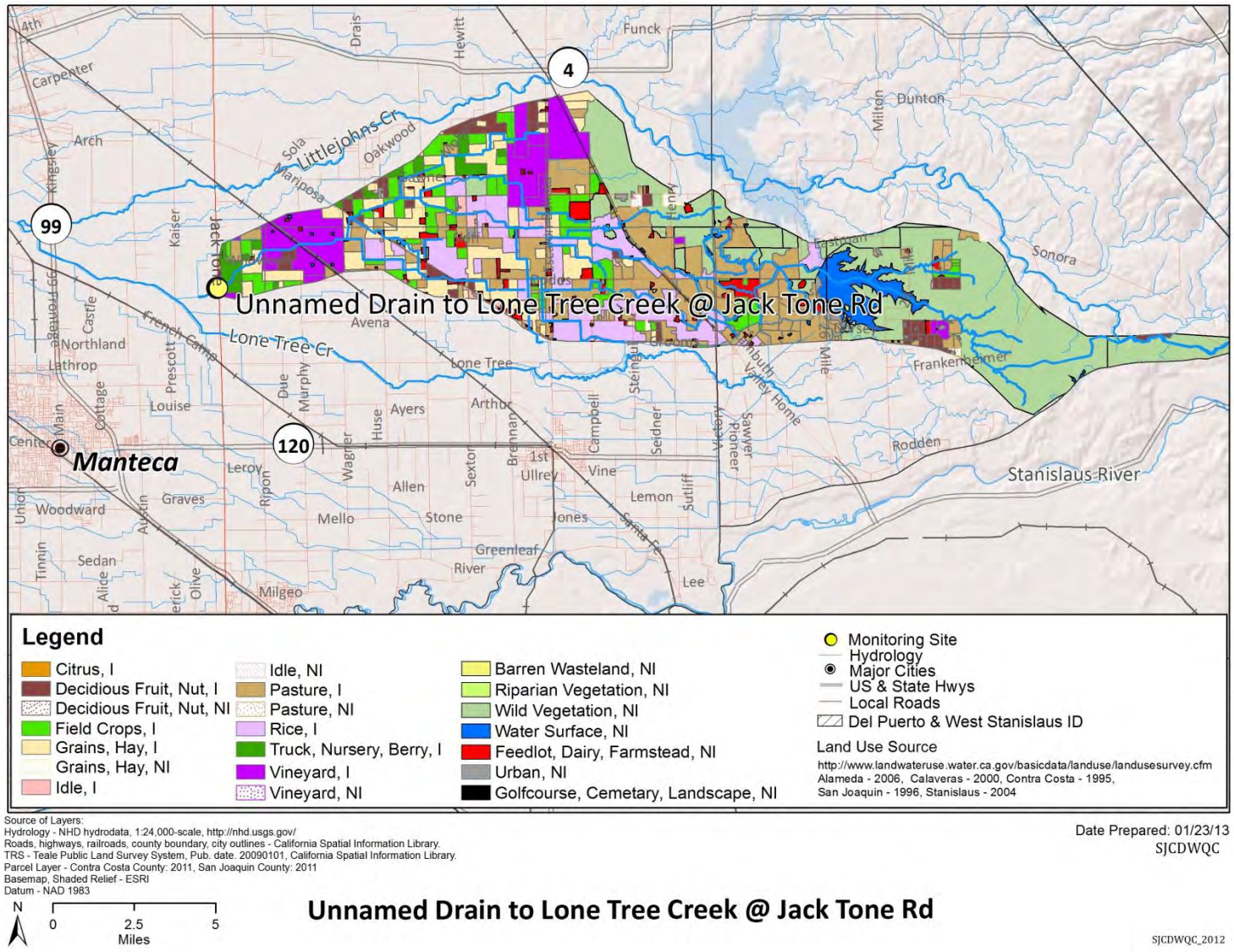
Unnamed Drain to Lone Tree Creek (Temple Creek) is listed on California's 303(d) List of Impaired Waterbodies for ammonia and electrical conductivity with the potential source listed as dairies (last updated in 2010).

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



Subwatershed Monitoring History

Normal Monitoring began at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd during the irrigation season of 2006 and continued through September 2008 at which time the site became an Assessment Monitoring location. Table III-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table III-3 for analytes sampled prior to 2008).

Management Plan Monitoring began during the irrigation season in 2007 and has continued through 2013 at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Table III-4). In an effort to source the chemicals that caused exceedances, additional MPM for chlorpyrifos occurred at the site in 2007 and at an upstream monitoring location at Unnamed Drain to Lone Tree Creek @ Wagner Rd in 2008. Management Plan Monitoring for high priority constituents has occurred at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd during months of past exceedances since 2008 to evaluate the effectiveness of the Coalition's outreach strategy on water quality (Table III-4).

From June 2010 through February 2011, additional samples were collected for chlorpyrifos, diazinon, and sediment toxicity to *H. azteca* as part of a DPR grant to reduce the impact of agricultural discharge on water quality.

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

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	14	6	12	12	11	11
	Dry Sites	0	0	0	1	0	1
	Events Sampled	14	6	12	11	11	10
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	14	6	12	11	11	10
	Dissolved Solids	8	0	0	0	0	0
	E. coli	7	0	0	0	0	0
	Grain size (sediment)	0	0	1	2	1	2
	Hardness as CaCO3	6	5	5	5	5	5
	pH	14	6	12	11	11	10
	Specific Conductivity	14	6	12	11	11	10
	Suspended Solids	0	0	0	0	0	0
	Total Organic Carbon	7	0	1	2	0	0
	Total Organic Carbon (sediment)	7	0	1	2	2	2
	Turbidity	8	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0
	OrthoPhosphate as P	6	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0
	Copper	0	5	5	5	5	5
	Lead	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
Metals (Total)	Arsenic	6	0	0	0	0	0
	Boron	6	0	0	0	0	0
	Cadmium	6	0	0	0	0	0
	Copper	6	5	5	5	5	5
	Lead	6	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0
	Nickel	6	0	0	0	0	0
	Selenium	6	0	0	0	0	0
	Zinc	6	0	0	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0
	Diuron	7	0	2	2	2	1
	Linuron	7	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0
	Methomyl	7	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0
	Paraquat	7	0	0	0	0	0
	Simazine	7	0	2	2	2	0
	Trifluralin	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0
	Dicofol	7	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0
	Endrin	7	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0
	Chlorpyrifos	7	4	10	8	9	8
	Demeton-s	0	0	0	0	0	0
	Diazinon	7	0	7	2	0	0
	Dichlorvos	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0
	Malathion	7	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0
	Methidathion	7	0	0	0	0	0
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0
	Phorate	7	0	0	0	0	0
	Phosmet	7	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0
Pyreth-roids	Bifenthrin	7	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
	Cypermethrin, total	7	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	2	1	0
	Chlorpyrifos	0	0	1	2	1	0
	Cyfluthrin	0	0	1	2	1	0
	Cyhalothrin, lambda	0	0	1	2	1	0
	Cypermethrin	0	0	1	2	1	0
	Deltamethrin: Tralomethrin	0	0	1	2	1	0
	Esfenvalerate/ Fenvalerate	0	0	1	2	1	0
	Fenpropathrin	0	0	1	2	1	0
	Permethrin	0	0	1	2	1	0
Toxicity	*Ceriodaphnia dubia*	9	1	3	3	2	0
	Pimephales promelas	7	0	0	0	0	0
	Selenastrum capricornutum	8	1	3	3	3	0
	Hyalella azteca	4	0	1	2	2	2

Table III-4. Unnamed Drain to Lone Tree Creek Management Plan Monitoring schedule (2007-2013).

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	07/30/07	Add.		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	09/25/07	Add.		X						
Unnamed Drain to Lone Tree Creek @ Wagner Rd	07/15/08	US		X						
Unnamed Drain to Lone Tree Creek @ Wagner Rd	09/16/08	US		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	04/14/09	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	05/12/09	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	06/09/09	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	07/14/09	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	08/11/09	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	09/15/09	MPM	X	X				X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	01/13/10	MPM		X		X	X	X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	02/09/10	MPM		X		X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	03/16/10	MPM							X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	04/13/10	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	05/11/10	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	06/08/10	MPM		X[1]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	07/13/10	MPM	X	X[1]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	08/10/10	MPM	X	X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	09/07/10	MPM	X	X[1]	X[2]			X		X[1]
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	10/12/10	MPM		X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/09/10	MPM		X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/07/10	MPM		X[2]	X[2]					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	01/11/11	MPM		X[1]	X[2]	X	X	X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	02/08/11	MPM		X[1]	X[2]	X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	03/08/11	MPM							X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	04/12/11	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	05/24/11	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	06/28/11	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	07/26/11	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	08/23/11	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	09/20/11	MPM	X	X				X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	10/14/11	MPM								X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/15/11	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/13/11	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	01/17/12	MPM		X		X	X	X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	02/14/12	MPM		X		X	X	X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	03/15/12	MPM							X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	04/12/12	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	05/16/12	MPM	X	X					X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	06/19/12	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	07/17/12	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	08/21/12	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	09/18/12	MPM	X	X						X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/06/12	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/03/12	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	01/15/13	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	02/21/13	MPM		X		X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	03/19/13	MPM								X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	04/02/13	MPM	X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	05/21/13	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	06/18/13	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	07/16/13	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	08/20/13	MPM	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	09/17/13	MPM	X	X						X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/12/13	MPM		X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/10/13	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).

2013 Monitoring Results

During 2013, MPM occurred at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd for chlorpyrifos, copper, diuron, and sediment toxicity to *H. azteca*. A single exceedance of the WQTL for chlorpyrifos occurred in 2013 (Table III-5). No exceedances of the hardness based WQTL for copper or the WQTL for diuron occurred. The last exceedance of copper occurred in May 2011 and diuron in February 2011. Sediment toxicity to *H. azteca* occurred in March 2013, resulting in 94% survival compared to the control (Table III-6). The Priority E constituent, DO, was monitored during all MPM events in 2013; two exceedances of the WQTL occurred in July and August 2013 (Table III-5).

Table III-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed (organized alphabetically by constituent priority). Table III-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table III-7 contains the instantaneous loads for chlorpyrifos, copper, diuron and simazine since monitoring began in the site subwatershed. A record of all exceedances since monitoring began is provided in Appendix II, Table III-A.

Table III-5. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd management plan constituent exceedance tally (2006-2013).

Exceedances that occurred during resampling for field parameters and toxicity are included in the tally Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table III-A.

	Active Management Plan Constituents										Removed Management Plan Constituents		
Monitoring Year	Chlorpyrifos, >0.015 µg/L	Copper (Dissolved), Variable1	Copper (Total), Variable[1] or >1300 µg/L	Diuron, >2 µg/L	*H. azteca*, (%Control)	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	Lead (Total), variable[1] or > 15 µg/L	Specific Conductivity, >700µS/cm	Total Dissolved Solids, >450 mg/L	Simazine, >4 µg/L	*C. dubia*, (%Control)	*S. capricornutum*, (%Control)
2006	2	NA	NA	0	0	2	1	NA	0	0	0	0	0
2007	3	NA	NA	2	1	0	4	NA	2	1	1	1	4
2008	5	NA	5	1	3	2	5	2	0	0	1	3	1
2009	3	0	0	NA	NA	1	NA	NA	0	0	NA	1	0
2010	3	1	0	0	1	1	NA	NA	0	0	0	0	0
2011	2	1	0	0	2	0	NA	NA	1	0	0	0	0
2012	1	0	0	1	1	1	NA	NA	0	0	0	0	0
2013	1	0	0	0	1	2	NA	NA	0	NA	NA	NA	NA
Overall Tally	**20**	**2**	**5**	**4**	**9**	**9**	**10**	**2**	**3**	**1**	**2**	**5**	**5**
Constituent Priority	**A/B**	**C**	**C**	**C**	**D**	**E**	**E**	**E**	**E**	**E**	**C[R]**	**D[R]**	**D[R]**

[1] Metal WQTL variable based on hardness.

[R] – Removed from active management plan.

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

Table III-6. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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	8/07/07	9/04/07	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	6/09/09	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
	S. capricornutum toxicity (% Control)	NA	1101	484	NA	1341	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	**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

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
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 III-7. Unnamed Drain to Lone Tree Creek subwatershed instantaneous load calculations for chlorpyrifos, copper, diuron, and simazine.

Upstream sites italicized. 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
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/18/06	40.64	0.031	µg/L	36	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/15/06	17.86	0.011	µg/L	6	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/19/06	10.41	0.045	µg/L	13	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	02/11/07	27.09	0.048	µg/L	37	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/10/07	21.51	0.034	µg/L	21	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/30/07	32.45	0.014	µg/L	13	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/25/07	15.92	0.017	µg/L	8	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	01/23/08	12.18	0.045	µg/L	16	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	01/23/08	12.18	0.079	µg/L	27	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	05/13/08	21.52	0.41	µg/L	250	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	06/10/08	15.85	0.12	µg/L	54	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/15/08	17.55	0.028	µg/L	14	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/12/08	11.11	0.014	µg/L	4	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/16/08	18.38	0.12	µg/L	62	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	09/16/08	18.38	0.12	µg/L	62	µg/sec
Unnamed Drain to Lone Tree Creek @ Wagner Rd	*Chlorpyrifos*	*09/16/08*	*30.90*	*0.14*	*µg/L*	*122*	*µg/sec*
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	05/12/09	2.48	0.032	µg/L	2	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/14/09	2.12	0.66	µg/L	40	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/15/09	15.82	0.086	µg/L	39	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/13/10	13.84	0.008	µg/L	3	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/10/10	11.19	0.039	µg/L	12	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/07/10	27.32	0.013	µg/L	10	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	11/09/10	0.28	0.052	µg/L	0	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12/07/10	3.30	0.068	µg/L	6	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	01/11/11	0.93	0.020	µg/L	1	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/26/11	5.18	0.028	µg/L	4	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12/03/12	42.71	0.019	µg/L	23	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/16/13	16.39	0.041	µg/L	19	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/20/13	27.42	0.011	µg/L	9	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/15/08	4.67	23	µg/L	3042	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/13/08	21.52	7.8	µg/L	4753	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	06/10/08	15.85	4.8	µg/L	2154	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/15/08	17.55	6.9	µg/L	3429	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/12/08	11.11	6.8	µg/L	2139	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Copper	09/16/08	18.38	6.2	µg/L	3227	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/16/08	18.38	6.5	µg/L	3383	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/14/09	2.74	4.3	µg/L	334	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/14/09	2.74	8.5	µg/L	660	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/12/09	2.48	5.0	µg/L	351	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/12/09	2.48	7.3	µg/L	513	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/14/09	2.12	1.5	µg/L	90	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/14/09	2.12	4.6	µg/L	276	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/11/09	10.50	1.5	µg/L	446	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/11/09	10.50	3.8	µg/L	1130	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/15/09	15.82	2.5	µg/L	1120	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/15/09	15.82	5.0	µg/L	2240	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/13/10	5.88	11	µg/L	1832	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	Copper	05/11/10	4.11	4.3	µg/L	500	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/13/10	13.84	5.0	µg/L	1960	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/10/10	11.19	4.7	µg/L	1489	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/07/10	27.32	4.9	µg/L	3791	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/12/11	9.26	7.6	µg/L	1993	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/24/11	16.75	26	µg/L	12332	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/26/11	5.18	5.7	µg/L	836	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/23/11	14.77	4.7	µg/L	1966	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/20/11	18.52	5.2	µg/L	2727	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/12/12	10.23	9.4	µg/L	2723	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/16/12	3.71	4.8	µg/L	504	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/17/12	9.35	7.6	µg/L	2012	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/21/12	3.64	4.8	µg/L	495	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/18/12	16.01	6.5	µg/L	2947	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/02/13	7.53	6.4	µg/L	1365	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/21/13	7.49	6.5	µg/L	1379	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/16/13	16.39	4.6	µg/L	2135	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/20/13	27.42	4.9	µg/L	3805	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/17/13	4.08	5.6	µg/L	647	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	04/13/10	5.88	5.5	µg/L	916	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	05/11/10	4.11	2.1	µg/L	244	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/13/10	13.84	0.81	µg/L	317	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/10/10	11.19	2.3	µg/L	729	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/07/10	27.32	1.9	µg/L	1470	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	04/12/11	9.26	3.2	µg/L	839	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	05/24/11	16.75	11	µg/L	5217	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/26/11	5.18	2.1	µg/L	308	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/23/11	14.77	1.7	µg/L	711	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/20/11	18.52	2.7	µg/L	1416	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	04/12/12	10.23	4.4	µg/L	1275	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	05/16/12	3.71	2.3	µg/L	242	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/17/12	9.35	2.3	µg/L	609	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/21/12	3.64	1.6	µg/L	165	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/18/12	16.01	2.2	µg/L	997	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	04/02/13	7.53	4.4	µg/L	938	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	05/21/13	7.49	3.4	µg/L	721	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/16/13	16.39	1.6	µg/L	743	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/20/13	27.42	1.9	µg/L	1475	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/17/13	4.08	2.9	µg/L	335	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	02/11/07	27.09	19	µg/L	14575	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	02/28/07	7.49	29	µg/L	6151	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	04/10/07	3.56	1.6	µg/L	161	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	05/22/07	0	1.5	µg/L	0	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	01/23/08	12.18	7.7	µg/L	2656	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Diuron	01/23/08	12.18	7.8	µg/L	2690	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	04/15/08	4.67	0.72	µg/L	95	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	05/13/08	21.52	0.54	µg/L	329	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	06/10/08	15.85	0.29	µg/L	130	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	01/13/10	1.59	0.62	µg/L	28	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	02/09/10	7.44	0.26	µg/L	55	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	01/17/12	0	0.46	µg/L	0	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	02/14/12	0.26	2.4	µg/L	18	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	02/11/07	27.09	7.0	µg/L	5370	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	02/28/07	7.49	2.4	µg/L	509	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	04/10/07	3.56	0.08	µg/L	8	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	05/22/07	0	3.4	µg/L	0	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	01/23/08	12.18	6.4	µg/L	2207	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Simazine	01/23/08	12.18	8.4	µg/L	2897	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	04/15/08	4.67	1.0	µg/L	132	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	01/13/10	1.59	0.69	µg/L	31	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	02/09/10	7.44	0.66	µg/L	139	µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	02/14/12	0.26	0.42	µg/L	3	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

A complete review of source identification and outreach activities was provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 85-105). For exceedances occurring in 2012 and 2013, the Coalition also evaluated current 2013 PUR data to determine any sources in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed.

Chlorpyrifos is the only priority A/B constituent listed in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd active management plan. Overall, total applications of chlorpyrifos have fluctuated over time; however the PUR data indicate a decline in annual use since 2009 (2013 MPUR, Table III-9). Between 2007 and 2008, eight exceedances of the WQTL for chlorpyrifos occurred, most of which occurred during the irrigation season in 2008 (Table III-5). Not all of the exceedances of the WQTL for chlorpyrifos are related to the months of highest use (2013 MPUR Appendix I, Figure III-2). For example, chlorpyrifos applications were highest in October 2009 (2,537 lbs of AI); however, there were no exceedances of the WQTL for chlorpyrifos until the following year in August 2010. According to current PUR data, chlorpyrifos applications were made in March through November 2012; therefore, the December exceedance was likely caused by storm water runoff. Conversely, the exceedance of the WQTL for chlorpyrifos in July 2013 was likely due to spray drift; increased flow conditions could have allowed runoff carrying chlorpyrifos to enter the waterways contributing to the exceedance. The current PUR data indicate 13 applications totaling 1,403 lbs of chlorpyrifos occured within 4 weeks prior to the exceedance date. This is the fifth time during MPM history that there has been an exceedance of the chlorpyrifos WQTL at this location in July specifically. Applications of chlorpyrifos to walnuts are typical during the irrigation season to control coddling moth; 1,249 of AI were applied to walnuts in July. Of the 13 applications, one application was conducted by an SJCDWQC member. This member was contacted during focused outreach in 2009 and filled out a management practice survey for practices in 2008 and any newly implemented practices in 2009. Based on survey results, this member is doing reduces runoff water volumes using irrigation management to ensure that chlorpyrifos does not leave their property.

This subwatershed drains into the French Camp Slough @ Airport Way subwatershed which also had a concentration of chlorpyrifos above the WQTL in July 2013. The Coalition mapped the members and non members who applied chlorpyrifos 4 weeks prior to the July exceedances including the Lone Tree Creek, Unnamed Drain to Lone Tree Creek and French Camp Slough (Figure VII-2; French Camp Slough site subwatershed section).

Pesticides containing copper are heavily applied in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed and annual applications have remained relatively constant over time. The highest applications typically occur in May; the largest amount of copper applied from 2006 through May 2012 was to rice (75,096 lbs AI) followed by walnuts (42,266 lbs AI, Table III-12). Not all exceedances of the hardness based WQTL for copper coincide with months of greatest use; however, irrigation runoff appears to be the source of all exceedances of the hardness based WQTL for copper in the site subwatershed. Exceedances of the hardness based WQTL for copper occurred seven times since monitoring began in 2006; five total copper exceedances prior to 2008 and two dissolved copper exceedances after October 2008. During May 2008, nearly 15,498 lbs of AI were applied and 7.8 mg/L of copper was detected which exceeded the hardness based WQTL (Appendix II, III-A). Irrigation runoff from the applications in May 2008 likely caused three consecutive exceedances of the hardness based WQTL for copper from July through September 2008, concentrations ragned from 6.5 mg/L to 23 mg/L. The last exceedance of the hardness based WQTL for copper occurred in May 2011 which had the largest amout of AI applied in that year. Compared to applications of copper in 2011 (11,429 AI) and 2012 (13,317 AI), applications were similar, and 2013 (2563 AI) when applications significantly decreased, no exceedances of the WQTL occurred in the last two years.

Applications of diuron typically occur during winter months (November through February) and all three exceedances of the WQTL coincide with winter applications (2013 MPUR Appendix I, Figure III-4). The PUR data indicate the amount of AI applied has decreased overall from 2007 through 2012, however current PUR data indicate an increase in 2013. The exceedance of the WQTL for diuron in February 2012 was most likely the result of storm water runoff from applications made in December 2011 (120 lbs of AI) and January 2011 applications (20 lbs of AI). In 2013, approximately 1,274 lbs of AI were applied in the site subwatershed and 98% (1,260 lbs) of the applications occurred between January and February; no exceedances of the WQTL for diuron occurred.

Sediment toxicity to *H. azteca* occurred nine times (75% of samples) at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd in samples collected from 2007 through 2013. Pyrethroids and chlorpyrifos were detected in all sediment samples tested for pesticides (September 2010, March and October 2011 and September 2012). Sediment toxicity to *H. azteca* occurred in March 2013, resulting in 94% survival compared to the control and is not considered ecologically relevant. The September sediment sample also had 94% survival but was not statistically different from the control (Table 111-6).

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management

practices that can be implemented to reduce agricultural discharge of constituents of concern. During all MPM events, field parameters, such as DO are measured; exceedances of the WQTL for DO occurred in July and August 2013. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy section of the main body of the 2014 MPUR.

The Coalition documented several management practices implemented by growers in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed (2013 MPUR, page 51). The Coalition contacted 34 growers, representing 6,463 acres (22% of direct drainage) within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed and documented current and newly implemented management practices (2013 MPUR, pages 30-32). 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 provided additional focused outreach for two growers, totaling 1,238 acres, to address 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 of concern, such as chlorpyrifos (2013 MPUR, page 51).

Evaluation

Overall, water quality improvements are occurring; the Coalition will continue to conduct general outreach within the site subwatershed. Due to improvements, the Coalition received approval to remove simazine and water column toxicity to *C. dubia* and *S. capricornutum* from active the management plan on May 21, 2012. The remaining high priority management plan constituents include chlorpyrifos, copper, diuron, and sediment toxicity to *H. azteca*. Monitoring results indicate exceedances of the WQTLs for the management plan constituents are declining. Management practices implemented by targeted growers include reducing use of pesticides of concern, such as chlorpyrifos, reducing runoff water volumes, and installing sprinklers and micro irrigation systems. Implemented management practices are preventing water quality impairments related to copper exceedances, despite high applications of pesticides containing copper in the site subwatershed. Furthermore, the results from the March 2013 sediment toxicity to *H. azteca* indicate that although statistically significant, the toxicity is not ecologically significant. There have been two exceedances of the chlorpyrifos WQTL in the last two years; however applications were made by both members and non members. The number of chlorpyrifos exceedances is still lower than years prior to focused outreach and is most likely due to the implementation of practices mentioned above. The Coalition continues to measure field parameters, such as DO, during each monitoring event. Exceedances of the WQTL for DO occurred at the site in July and August 2013. The remaining priority E constituents in the active management plan are Dissolved oxygen, lead, SC, *E. coli*, and TDS. Priority E constituents are discussed during individual contacts and will continue to be discussed at annual grower meetings.

Next Steps

Although focused outreach is completed within the site subwatershed, the Coalition will continue to conduct general outreach and collect MPM results to determine is additional contacts are warranted. In 2014, Unnamed Drain to Lone Tree Creek @ Jack Tone Rd is scheduled for MPM during months of past

exceedances for chlorpyrifos, copper, diuron, and sediment toxicity to *H. azteca*. The field parameter, DO, will be measured during all high priority MPM events.

HIGH PRIORITY SITE SUBWATERSHEDS (2010–2012)

IV. GRANT LINE CANAL @ CLIFTON COURT RD

Overview

Grant Line Canal @ Clifton Court is one of the Coalition's second priority site subwatersheds. The Coalition completed the focused outreach portion of its management plan strategy in 2012 and monitoring results through 2013 indicate improved water quality within the site subwatershed. The Coalition received approval on April 17, 2012 to remove copper and lead, and on February 2, 2013 to remove pH from the site's active management plan. The remaining high priority constituents in the Grant Line Canal @ Clifton Court management plan include: chlorpyrifos, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* (Table IV-1).

Management Plan Monitoring occurred for chlorpyrifos, toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* in 2013; the other remaining constituents do no require MPM since they are priority E (Table IV-1). The only exceedance or toxicity of high priority constituents to occur was sediment toxicity to *H. azteca* in March 2013. In 2014, the Coalition will continue to discuss all constituents during general outreach and MPM for chlorpyrifos, toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* will continue to occur during months of past exceedances.

Table IV-1. Grant Line Canal @ Clifton Court Rd management plan constituents.

Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2006	Active
D	*H. azteca* sediment toxicity	2007	Active
D	*S. capricornutum* water column toxicity	2009	Active
E	Arsenic	2007	Active
E	DDE	2008	Active
E	Dissolved Oxygen	2006	Active
E	*E. coli*	2006	Active
E	Specific Conductivity	2006	Active
E	Total Dissolved Solids	2006	Active
CONSTITUENT (REMOVED)			
C	Copper	2007	2012
E	Lead	2007	2012
E	pH	2007	2013

Description of Site Subwatershed

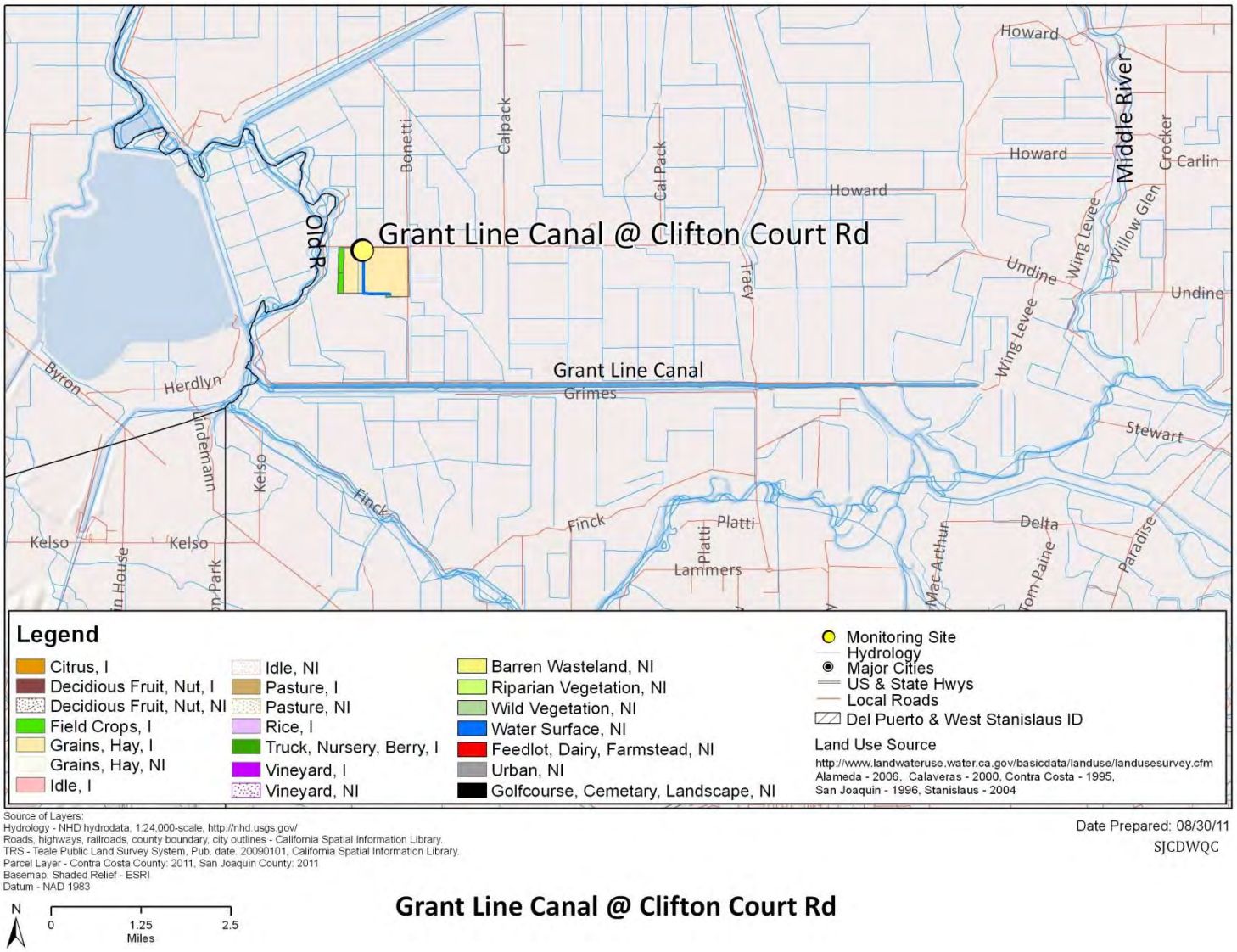
Grant Line @ Clifton Court Rd is a rotating Assessment Monitoring location within Zone 4 under the 2008 MRPP. The site subwatershed consists of 260 irrigated acres which include alfalfa, field crops, and grain (Figure IV-1). The site subwatershed is located west of the Grant Line Canal @ Calpack Rd site, immediately south of Clifton Court Rd, and drains fields east and south (Table IV-2). Source water of the Grant Line Canal depends on delta tides, the natural flows of large waterbodies such as the San Joaquin River, and the operation of agricultural barriers.

The Grant Line Canal is not considered impaired on California's 303(d) List of Impaired Waterbodies (last updated in 2010). However, the section of Old River from the SJR to the Delta Mendota Canal that runs parallel to Grant Line Canal is listed for chlorpyrifos, low DO, TDS, and electrical conductivity.

Table IV-2. Grant Line Canal @ Clifton Court Rd site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Grant Line Canal @ Clifton Court Rd	544XGLCAA	37.84182	-121.52999

Figure IV-1. Grant Line Canal @ Clifton Court Rd site subwatershed land use map.



Subwatershed Monitoring History

Normal Monitoring began at Grant Line Canal @ Clifton Court Rd in the storm season of 2005 and continued through the storm and irrigation seasons of 2006 through 2008. Table VI-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table IV-3 for analytes sampled prior to 2008).

In an effort to source the chemicals that caused exceedances, additional MPM for copper occurred in 2007 at Grant Line Canal @ Clifton Court Rd. Management Plan Monitoring during months of past exceedances has occurred for high priority constituents since 2010 to evaluate the effectiveness of the Coalition's outreach strategy and the newly implemented management practices on water quality (Table VI-4).

Table IV-3. Grant Line Canal @ Clifton Court Rd sampling events and analyses per year.

Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	11	0	5	9	5	5
	Dry Sites	0	0	0	0	0	0
	Events Sampled	11	0	5	9	5	5
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	11	0	5	9	5	5
	Dissolved Solids	7	0	0	0	0	0
	E. coli	7	0	0	0	0	0
	Grain size (sediment)	0	0	1	2	2	2
	Hardness as CaCO3	7	0	5	5	0	0
	pH	11	0	5	9	5	5
	Specific Conductivity	11	0	5	9	5	5
	Suspended Solids	0	0	0	0	0	0
	Total Organic Carbon	7	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	1	2	2	2
	Turbidity	7	0	0	0	0	0
Nutrients	Ammonia as N	7	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0
	Nitrate as N	7	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0
	Nitrogen, Total Kjeldahl	7	0	0	0	0	0
	OrthoPhosphate as P	7	0	0	0	0	0
	Phosphate as P	7	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0
	Copper	0	0	5	5	0	0
	Lead	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0
Metals (Total)	Arsenic	7	0	0	0	0	0
	Boron	7	0	0	0	0	0
	Cadmium	7	0	0	0	0	0
	Copper	7	0	5	5	0	0
	Lead	7	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0
	Nickel	7	0	0	0	0	0
	Selenium	7	0	0	0	0	0
	Zinc	7	0	0	0	0	0

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

Type	Analyte	2008	2009	2010	2011	2012	2013
	Esfenvalerate/ Fenvalerate	0	0	1	2	1	2
	Fenpropathrin	0	0	1	2	1	2
	Permethrin	0	0	1	2	1	2
Toxicity	*Ceriodaphnia dubia*	8	0	0	0	0	0
	Pimephales promelas	7	0	0	0	0	0
	Selenastrum capricornutum	9	1	2	0	2	2
	Hyalella azteca	2	0	0	0	2	2

Table IV-4. Grant Line Canal Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Copper	*S. capricornutum*	*H. azteca*
Grant Line Canal @ Clifton Court Rd	06/20/07	Add.		X		
Grant Line Canal @ Clifton Court Rd	07/30/07	Add.		X		
Grant Line Canal @ Clifton Court Rd	09/25/07	Add.		X		
Grant Line Canal @ Clifton Court Rd	05/11/10	MPM		X	X	
Grant Line Canal @ Clifton Court Rd	06/08/10	MPM		X		
Grant Line Canal @ Clifton Court Rd	07/13/10	MPM		X		
Grant Line Canal @ Clifton Court Rd	08/10/10	MPM		X		
Grant Line Canal @ Clifton Court Rd	09/07/10	MPM	X	X		X
Grant Line Canal @ Clifton Court Rd	01/11/11	MPM	X		X	
Grant Line Canal @ Clifton Court Rd	02/08/11	MPM	X			
Grant Line Canal @ Clifton Court Rd	03/08/11	MPM	X			X
Grant Line Canal @ Clifton Court Rd	05/24/11	MPM		X	X	
Grant Line Canal @ Clifton Court Rd	06/28/11	MPM		X		
Grant Line Canal @ Clifton Court Rd	07/26/11	MPM		X		
Grant Line Canal @ Clifton Court Rd	08/23/11	MPM		X		
Grant Line Canal @ Clifton Court Rd	09/20/11	MPM	X	X		
Grant Line Canal @ Clifton Court Rd	10/14/11	MPM				X
Grant Line Canal @ Clifton Court Rd	01/17/12	MPM	X		X	
Grant Line Canal @ Clifton Court Rd	02/14/12	MPM	X			
Grant Line Canal @ Clifton Court Rd	03/15/12	MPM	X			X
Grant Line Canal @ Clifton Court Rd	05/16/12	MPM			X	
Grant Line Canal @ Clifton Court Rd	09/18/12	MPM	X			X
Grant Line Canal @ Clifton Court Rd	01/08/13	MPM	X		X	
Grant Line Canal @ Clifton Court Rd	02/21/13	MPM	X			
Grant Line Canal @ Clifton Court Rd	03/19/13	MPM	X			X
Grant Line Canal @ Clifton Court Rd	05/21/13	MPM			X	
Grant Line Canal @ Clifton Court Rd	09/17/13	MPM	X			X

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

2013 Monitoring Results

During 2013, MPM occurred at Grant Line Canal @ Clifton Court Rd for chlorpyrifos, toxicity to *S. capricornutum,* and sediment toxicity to *H. azteca* (Table IV-4). No exceedances of the WQTL for chlorpyrifos or toxicity *S. capricornutum* occurred during 2013; the last exceedance of the WQTL for chlorpyrifos occurred in September 2010 and the last toxicity to *S. capricornutum* occurred in May 2012. Toxicity to *H. azteca* occurred once in 2013 (Table IV-5); bifenthrin was detected in the toxic sample during additional sediment chemistry.

On February 27, 2013, pH was removed from active management plan after two or more consecutive years with no exceedances. Dissolved Oxygen, pH, and SC were monitored during every MPM event in 2013; two exceedances of the WQTL for DO and four exceedances of the WQTL for SC occurred. Arsenic, DDE, *E. coli*, and TDS were not monitored in 2013. The last WQTL exceedance of DDE was in 2007 and the last exceedances of the WQTLs for arsenic, *E. coli*, and TDS occurred in 2008.

Table IV-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Grant Line Canal @ Clifton Court Rd site subwatershed (organized alphabetically by constituent priority). The constituents are organized by priority and status (active or removed). 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 IV-7 contains the instantaneous loads for chlorpyrifos and copper since monitoring began in the site subwatershed. A record of all exceedances at Grant Line Canal @ Clifton Court since monitoring began is provided in Appendix II, Table IV-A.

Table IV-5. Grant Line Canal @ Clifton Court Rd management plan constituent exceedance tally (2005-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table IV-A.

	Active Management Plan Constituents									Removed Management Plan Constituents		
Monitoring Year	Chlorpyrifos, >0.015 µg/L	*H. azteca*, (%Control)	*S. capricornutum*, (%Control)	Arsenic, >10 µg/L	DDE (p,p'), >0.00059 µg/L	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L	Copper (Total), Variable[1] or >1300 µg/L	Lead, (Total), Variable[1] or >15 µg/L	pH, <6.5 and > 8.5 units
2005	1	1	0	NA	NA	6	4	3	3	NA	NA	0
2006	0	1	0	2	1	5	7	2	2	3	3	4
2007	3	0	0	4	1	6	5	6	5	2	0	2
2008	1	0	2	4	0	6	3	8	6	1	0	1
2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010	1	2	1	NA	NA	4	NA	3	NA	0	NA	0
2011	0	2	0	NA	NA	4	NA	6	NA	0	NA	0
2012	0	1	1	NA	NA	4	NA	5	NA	NA	NA	0
2013	0	1	0	NA	NA	2	NA	4	NA	NA	NA	0
Overall Tally	**6**	**8**	**4**	**10**	**2**	**37**	**19**	**37**	**16**	**6**	**3**	**7**
Constituent Priority	**A/B**	**D**	**D**	**E**	**E**	**E**	**E**	**E**	**E**	**C[R]**	**E[R]**	**E[R]**

[1] Metal WQTL variable based on hardness.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
[R] – Removed from active management plan.

Table IV-6. Grant Line Canal @ Clifton Court Rd site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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
2007 NM (@ Clifton Court Rd)	Date	NA	2/11/07	2/28/07	NA	4/11/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07	NA
	Copper (µg/L)	NA	4.7	6.7	NA	5.5	**24**	10	**17**	10	8.5	NA
2007 MPM Add. (@ Clifton Court Rd)	Date	NA	NA		NA	NA	NA	6/20/07	7/30/07	NA	9/25/07	NA
	Copper (µg/L)	NA	NA		NA	NA	NA	8.5	<0.01	NA	3.7	NA
2008 NM (@ Clifton Court Rd)	Date	NA	NA		NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08	NA
	Copper (µg/L)	NA	NA		NA	6.5	7.9	5.9	6.2	**28**	5.9	NA
2010 MPM (@ Clifton Court Rd)	Date	NA	NA		NA	NA	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10	NA
	Copper, dissolved (µg/L)	NA	NA		NA	NA	6	1.6	2.7	2.1	2.3	NA
	Copper, total (µg/L)	NA	NA		NA	NA	15	3.4	65	40	32	NA
	Chlorpyrifos (µg/L)	NA	NA		NA	NA	NA	NA	NA	NA	**0.044**	NA
	S. capricornutum toxicity (% Control)	NA	NA		NA	NA	**11**	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA		NA	NA	NA	NA	NA	NA	**30**	NA
2011 MPM (@ Clifton Court Rd)	Date	1/11/11	2/8/11		3/8/11	NA	5/24/11	6/28/11	7/26/11	8/23/11	9/20/11	10/14/11
	Copper, dissolved (µg/L)	NA	NA		NA	NA	0.79	4.8	1.9	4.7	2.1	NA
	Copper, total (µg/L)	NA	NA		NA	NA	2	10	9.8	7.8	66	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003		<0.003	NA	NA	NA	NA	NA	<0.003	NA
	S. capricornutum toxicity(% Control)	286	NA		NA	NA	556	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA		**80**	NA	NA	NA	NA	NA	NA	**79**
2012 MPM (@ Clifton Court Rd)	Date	1/17/12	2/14/12		3/15/12	NA	5/16/12	NA	NA	NA	9/18/12	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003		<0.003	NA	NA	NA	NA	NA	<0.003	NA
	S. capricornutum toxicity(% Control)	207	NA		NA	NA	**57**	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA		97	NA	NA	NA	NA	NA	**4**	NA
2013 MPM (@ Clifton Court Rd)	Date	1/15/13	2/21/13		3/19/13	NA	5/21/13	NA	NA	NA	9/17/13	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003		<0.003	NA	NA	NA	NA	NA	<0.003	NA
	S. capricornutum toxicity(% Control)	492	NA		NA	NA	3183	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA		**36**	NA	NA	NA	NA	NA	98	NA

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
NA – Not applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring.

Table IV-7. Grant Line Canal @ Clifton Court site subwatershed instantaneous load calculations for chlorpyrifos and copper.

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
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	03/21/05	0	0.020	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	02/11/07	0	0.080	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	02/28/07	0	0.018	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	01/23/08	0	0.14	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	09/07/10	4.61	0.044	µg/L	6	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	05/16/06	1.47	9.0	µg/L	375	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	06/20/06	3.58	52	µg/L	5272	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	07/18/06	0	31	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	08/15/06	0	11	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	09/19/06	0	100	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	02/11/07	0	4.7	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	02/28/07	0	6.7	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	05/22/07	0	24	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd*	Copper	05/22/07	0	26	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	06/12/07	0	10	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	06/20/07	0	8.5	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	08/07/07	0	10	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	09/25/07	0	3.7	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	01/23/08	0	7.3	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	04/15/08	0	6.5	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	05/13/08	0	7.9	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	06/10/08	0	5.9	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	07/15/08	0	6.2	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	08/12/08	0	28	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	09/16/08	0	5.9	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	05/11/10	7.55	15	µg/L	3207	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	06/08/10	0	3.4	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	07/13/10	0	65	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	08/10/10	7.68	40	µg/L	8699	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	09/07/10	4.61	32	µg/L	4177	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	05/24/11	1.17	2.0	µg/L	66	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	06/28/11	3.77	10	µg/L	1068	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	07/26/11	0	9.8	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	08/23/11	0	7.8	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	09/20/11	5.01	66	µg/L	9363	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	05/11/10	7.55	6.0	µg/L	1283	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	06/08/10	0	1.6	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	07/13/10	0	2.7	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	08/10/10	7.68	2.1	µg/L	457	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	09/07/10	4.61	2.3	µg/L	300	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	05/24/11	1.17	0.79	µg/L	26	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	06/28/11	3.77	4.8	µg/L	512	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	07/26/11	0	1.9	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	08/23/11	0	4.7	µg/L	0	µg/sec
Grant Line Canal @ Clifton Court Rd	Copper (D)	09/20/11	5.01	2.1	µg/L	298	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

A complete review of source identification and outreach activities in the Grant Line Canal @ Clifton Court Rd site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 121-128). The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the Grant Line Canal @ Clifton Court Rd management plan. Chlorpyrifos is the only priority A/B constituent listed under the site's subwatershed management plan. Since the Coalition began monitoring for chlorpyrifos in 2005, six exceedances of the WQTL of chlorpyrifos have occurred (Table IV-5). The last exceedance of the WQTL of chlorpyrifos occurred during September 2010 MPM. Current PUR data indicate that chlorpyrifos use has declined over time with 2007 representing the year with the highest use. No applications were reported in 2008, 2009 (2013 MPUR Appendix I, pages 122-124) or 2013. Not all exceedances of the chlorpyrifos WQTL occurred during months of the greatest amount of use, some exceedances occurred after several months with no reported use (2012 MPUR Appendix I, pages 129-133).

The last water column toxicity to *S. capricornutum* occurred during May 2012; this was the fourth toxicity to occur since MPM began in 2010. Toxicity Indication Evaluations were conducted on three of the four toxic samples; metals and non-polar organic chemicals were detected in the water from these three samples. The Coalition believes that management of copper and herbicides will eliminate the toxicity to algae.

Since 2005, eight sediment samples were toxic to *H. azteca*, with the most recent toxicity in March 2013 (Table IV-6). Additional sediment chemistry analysis from March 2013 indicated bifenthrin was present in the sediment, which was most likely the source of toxicity to *H. azteca.*

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR.

In 2010, the Coalition contacted two targeted growers, representing 259 acres within the site subwatershed (2012 MPUR, pages 29-31) and documented their management practices (2011 MPUR, pages 59-62). Follow-up surveys from 100% of growers indicates that all intended management practices were implemented, such as reducing tailwater water volume using irrigation management, reducing the use of pesticides causing exceedances, and applying PAM or other materials.

Evaluation

Water quality has improved in the Grant Line Canal @ Clifton Court site subwatershed since focused outreach began in 2010. Due to improved water quality, several constituents have been removed from the active management plan, including copper and lead (approved on April 17, 2012), and pH (approved

on February 27, 2013). The remaining high priority constituents in the site's management plan are: chlorpyrifos, water column toxicity to *S. capricornutum,* sediment toxicity to *H. azteca,* arsenic, DDE, DO, *E. coli*, pH, SC, and TDS. The Coalition focused on chlorpyrifos water quality impairments, the management of tailwater, and minimizing spray drift in the subwatershed. No exceedances of the WQTL for chlorpyrifos occurred in 2013; the last exceedance occurred September 2010. The number of *H. azteca* toxicities has decreased since 2011; two sediment toxicities occurred in 2011 and only one in 2012 and 2013. Additional sediment chemistry including, analysis for chlorpyrifos and pyrethroids, will continue to identify the sources of sediment toxicity to *H. azteca.*

Priority E constituents DO, pH, and SC, will continue to be monitored during all MPM events; however, arsenic, DDE, *E. coli*, and TDS will only be monitored during Assessment Monitoring. The Coalition discussed these constituents and applicable management practices with targeted growers. Through general outreach, the Coalition will continue to address these constituents and provide information on management practices effective in eliminating water quality impairments.

Next Steps

Focused outreach is completed within this site subwatershed and the Coalition will continue to conduct general outreach in 2014. In 2014, MPM is scheduled to occur during months of past exceedances for chlorpyrifos, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca*.

V. GRANT LINE CANAL NEAR CALPACK RD

Overview

Grant Line Canal near Calpack Rd is one of the Coalition's a second priority site subwatersheds. Focused outreach was initiated at Grant Line Canal near Calpack Rd in 2010 and continued through 2012. To evaluate the effectiveness of outreach, MPM during months of past exceedances occurred in 2010 through September 2013. The Coalition suggests alternatives and recommends reducing the use of chlorpyrifos in an effort to decrease chlorpyrifos related exceedances and toxicities. The Coalition's strategy has been successful; the Regional Board approved the removal of chlorpyrifos from the site's active management plan on February 27, 2013 after three years of focused outreach and no exceedances of the WQTL. Remaining high priority constituents under the site's management plan include: water column toxicity to *C. dubia*, *S. capricornutum*, and sediment toxicity to *H. azteca* (Table V-1).

During 2013 MPM, water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca* occurred once; the other remaining constituents do no require MPM since they are priority E (Table V-1). Exceedances of the WQTL for DO and SC occurred at Grant Line Canal near Calpack Rd during MPM in 2013. In 2014, MPM is scheduled to continue for water column toxicity to *C. dubia*, *S. capricornutum*, and sediment toxicity to *H. azteca*. Dissolved Oxygen and SC are field parameters and will be measured during all monitoring events.

Table V-1. Grant Line Canal near Calpack Rd management plan constituents.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
D	*C. dubia* water column toxicity	2006	Active
D	*H. azteca* sediment toxicity	2006	Active
D	*S. capricornutum* water column toxicity	2008	Active
E	Arsenic	2007	Active
E	Dissolved Oxygen	2006	Active
E	*E. coli*	2006	Active
E	Specific Conductivity	2006	Active
E	Total Dissolved Solids	2006	Active
CONSTITUENT (REMOVED)			
A/B	Chlorpyrifos	2006	2013

Description of Site Subwatershed

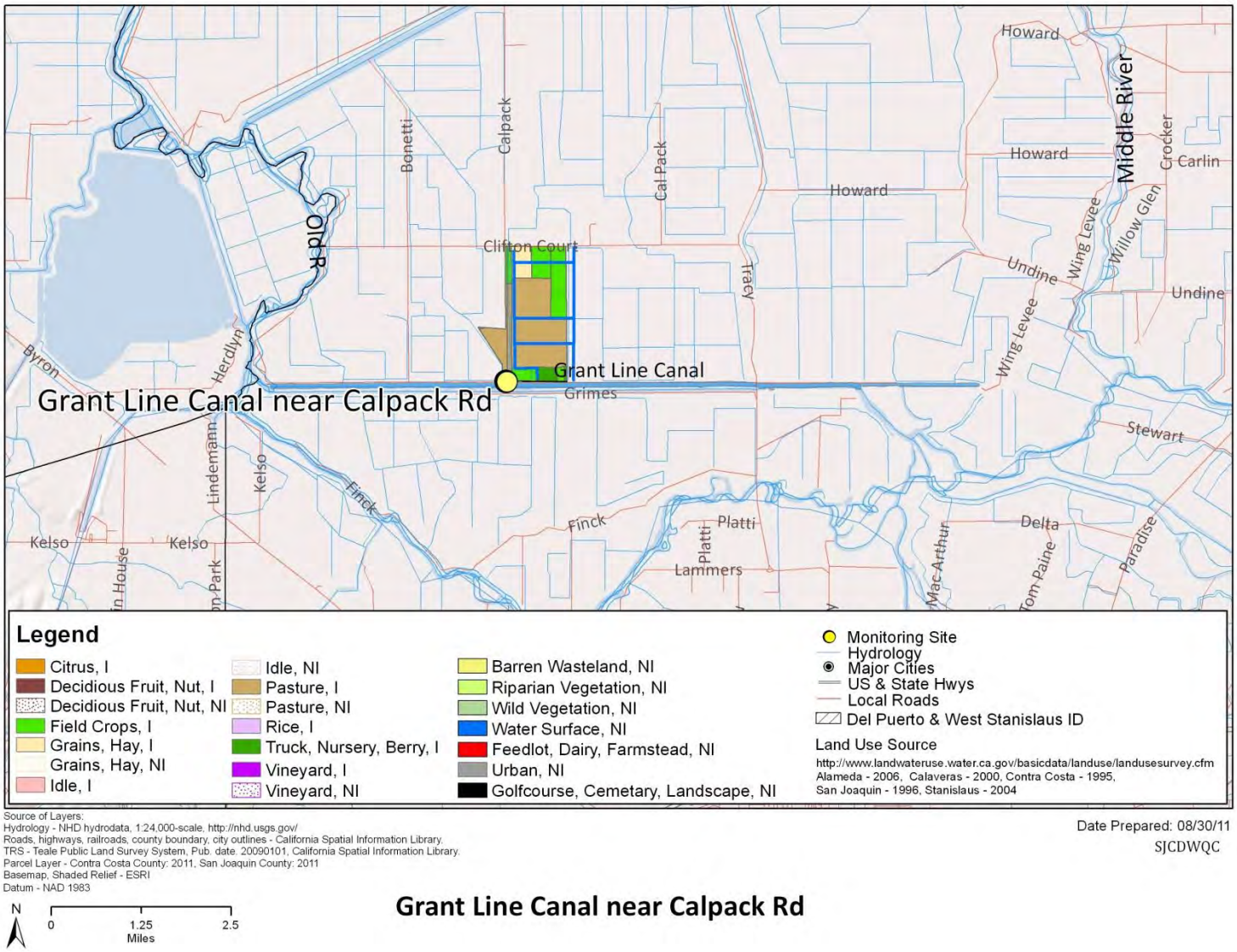
Grant Line Canal near Calpack Rd is a rotating Assessment Monitoring location within Zone 4 under the 2008 MRPP. Grant Line Canal near Calpack Rd consists of 682 irrigated acres which include alfalfa, field crops (e.g. corn and safflower), grain, and hay (Figure V-1). This site is located on the southwest section of Union Island in the Bay-Delta tidal prism and receives water from east and west inputs (Table V-2). The source of water in the Grant Line Canal depends on delta tides, natural flows of large waterbodies such as the San Joaquin River, the operation of agriculture barriers, and the operation of the pumping plants at Clifton Court Forebay.

The Grant Line Canal is not considered impaired on California's 303(d) List of Impaired Waterbodies (last updated in 2010). However, the section of Old River from the SJR to the Delta Mendota Canal that runs parallel to Grant Line Canal is listed for chlorpyrifos, low DO, electrical conductivity and TDS. All potential sources are listed as unknown except for the low DO which is attributed to hydromodification. The export waters of the Delta are listed for chlorpyrifos, DDT, diazinon, electrical conductivity, group A pesticides, invasive species, mercury, and unknown toxicity. The potential sources are listed as agriculture (chlorpyrifos, DDT, diazinon, EC and group A pesticides), unknown source (invasive species and unknown toxicity), and resource extraction (mercury). The Delta Mendota Canal and the California Aqueduct receive export waters from Grant Line Canal.

Table V-2. Grant Line Canal near Calpack Rd site subwatershed sampling location coordinates.

Site Name	Station Code	Target Latitude	Target Longitude
Grant Line Canal near Calpack Rd	544XGLCCR	37.82084	-121.50009

Figure V-1. Grant Line Canal near Calpack Rd site subwatershed land use map.



Subwatershed Monitoring History

Normal monitoring at Grant Line Canal near Calpack Rd began in 2005 and continued through 2008. Table V-3 contains the number of events monitored per year and the constituents (by group) from 2008 to 2013 (see 2013 MPUR Appendix I, Table V-3 for analytes sampled prior to 2008). The most recent Assessment Monitoring for Grant Line Canal near Calpack Rd occurred in 2008.

In an effort to source the chemicals that caused exceedances, additional MPM for chlorpyrifos and *C. dubia* occurred at Grant Line Canal near Calpack Rd in 2007. Management Plan Monitoring during months of past exceedances has occurred since 2010 to evaluate the effectiveness of the Coalition's outreach strategy and the newly implemented management practices on water quality in the site subwatershed (Table V-4).

Table V-3. Grant Line Canal near Calpack Rd sampling events and analyses per year.

Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	12	0	5	9	8	8
	Dry Sites	0	0	0	0	0	0
	Events Sampled	12	0	5	9	8	8
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	12	0	5	9	8	8
	Dissolved Solids	7	0	0	0	0	0
	E. coli	7	0	0	0	0	0
	Grain size (sediment)	0	0	0	2	2	2
	Hardness as CaCO3	7	0	0	0	0	0
	pH	12	0	5	9	8	8
	Specific Conductivity	12	0	5	9	8	8
	Suspended Solids	0	0	0	0	0	0
	Total Organic Carbon	7	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	2	2	2
	Turbidity	7	0	0	0	0	0
Nutrients	Ammonia as N	7	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0
	Nitrate as N	7	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0
	Nitrogen, Total Kjeldahl	7	0	0	0	0	0
	OrthoPhosphate as P	7	0	0	0	0	0
	Phosphate as P	7	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0
	Copper	0	0	0	0	0	0
	Lead	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0
Metals (Total)	Arsenic	7	0	0	0	0	0
	Boron	7	0	0	0	0	0
	Cadmium	7	0	0	0	0	0
	Copper	7	0	0	0	0	0
	Lead	7	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0
	Nickel	7	0	0	0	0	0
	Selenium	7	0	0	0	0	0
	Zinc	7	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
Carbamates	Aldicarb	7	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0
	Diuron	7	0	0	0	0	0
	Linuron	7	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0
	Methomyl	7	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0
	Paraquat	7	0	0	0	0	0
	Simazine	7	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0
	Dicofol	7	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0
	Endrin	7	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0
	Chlorpyrifos	7	0	3	4	4	0
	Demeton-s	0	0	0	0	0	0
	Diazinon	7	0	0	0	0	0
	Dichlorvos	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0
	Malathion	7	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0
	Methidathion	7	0	0	0	0	0
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0
	Phorate	7	0	0	0	0	0
	Phosmet	7	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	0	0	1	1
	Chlorpyrifos	0	0	0	0	1	1
	Cyfluthrin	0	0	0	0	1	1
	Cyhalothrin, lambda	0	0	0	0	1	1
	Cypermethrin	0	0	0	0	1	1
	Deltamethrin: Tralomethrin	0	0	0	0	1	1

Type	Analyte	2008	2009	2010	2011	2012	2013
	Esfenvalerate/ Fenvalerate	0	0	0	0	1	1
	Fenpropathrin	0	0	0	0	1	1
	Permethrin	0	0	0	0	1	1
Toxicity	*Ceriodaphnia dubia*	7	0	0	3	3	3
	Pimephales promelas	7	0	0	0	0	0
	Selenastrum capricornutum	10	0	3	5	5	5
	Hyalella azteca	2	0	1	2	2	2

Table V-4. Grant Line Canal near Calpack Rd Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	*C. dubia*	*S. capricornutum*	*H. azteca*
Grant Line Canal near Calpack Rd	07/30/07	Add.	X	X		
Grant Line Canal near Calpack Rd	08/28/07	Add.	X			
Grant Line Canal near Calpack Rd	04/13/10	MPM			X	
Grant Line Canal near Calpack Rd	05/11/10	MPM	X		X	
Grant Line Canal near Calpack Rd	07/13/10	MPM	X		X	
Grant Line Canal near Calpack Rd	08/10/10	MPM	X			
Grant Line Canal near Calpack Rd	09/07/10	MPM				X
Grant Line Canal near Calpack Rd	01/11/11	MPM			X	
Grant Line Canal near Calpack Rd	02/08/11	MPM			X	
Grant Line Canal near Calpack Rd	03/08/11	MPM	X	X		X
Grant Line Canal near Calpack Rd	04/12/11	MPM			X	
Grant Line Canal near Calpack Rd	05/24/11	MPM	X	X	X	
Grant Line Canal near Calpack Rd	07/26/11	MPM	X		X	
Grant Line Canal near Calpack Rd	08/23/11	MPM	X	X		
Grant Line Canal near Calpack Rd	10/14/11	MPM				X
Grant Line Canal near Calpack Rd	01/17/12	MPM			X	
Grant Line Canal near Calpack Rd	02/14/12	MPM			X	
Grant Line Canal near Calpack Rd	03/15/12	MPM	X	X		X
Grant Line Canal near Calpack Rd	04/12/12	MPM			X	
Grant Line Canal near Calpack Rd	05/16/12	MPM	X	X	X	
Grant Line Canal near Calpack Rd	07/17/12	MPM	X		X	
Grant Line Canal near Calpack Rd	08/21/12	MPM	X	X		
Grant Line Canal near Calpack Rd	09/18/12	MPM				X
Grant Line Canal near Calpack Rd	01/15/13	MPM			X	
Grant Line Canal near Calpack Rd	02/21/13	MPM			X	
Grant Line Canal near Calpack Rd	03/19/13	MPM		X		X
Grant Line Canal near Calpack Rd	04/02/13	MPM			X	
Grant Line Canal near Calpack Rd	05/21/13	MPM		X	X	
Grant Line Canal near Calpack Rd	07/16/13	MPM			X	
Grant Line Canal near Calpack Rd	08/20/13	MPM		X		
Grant Line Canal near Calpack Rd	09/17/13	MPM				X

Add. – Additional sampling

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

2013 Monitoring Results

In 2013, MPM was scheduled at Grant Line Canal near Calpack Rd for chlorpyrifos, water column toxicity to *C. dubia, S. capricornutum*, and sediment toxicity to *H. azteca* (Table V-4). However, chlorpyrifos MPM did not occur in 2013 due to the approval to remove it from the management plan on February 27, 2013. There were no toxicities to *C. dubia* in 2013; however, toxicity to *S. capricornutum* occurred in and sediment toxicity to *H. azteca* occurred in 2013 (Table V-5). The last toxicity to *S. capricornutum* and *H. azteca* occurred in January 2011 and in September 2012, respectively (Table V-6). Priority E constituents, DO and SC, were also measured during 2013 MPM as field parameters; four exceedances of the WQTL of DO and eight exceedances of SC occurred.

Table V-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Grant Line Canal near Calpack Rd site subwatershed (organized alphabetically by constituent priority). Table V-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table V-7 contains the instantaneous loads for chlorpyrifos since monitoring began in the site subwatershed. A record of all exceedances in the Grant Line Canal near Calpack Rd site subwatershed since monitoring began is provided in Appendix II, Table V-A.

Table V-5. Grant Line near Calpack Rd management plan constituent exceedance tally (2005-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table V-A.

	Active Management Plan Constituents								Removed Management Plan Constituents
Monitoring Year	*C. dubia*, (%Control)	*H. azteca*, (%Control)	*S. capricornutum*, (%Control)	Arsenic, >10 µg/L	Dissolved Oxygen,<7 mg/L	*E. coli*, >235 MPN/100 mL	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L	Chlorpyrifos, >0.015 µg/L
2005	2	3	1	NA	8	5	9	6	3
2006	1	1	0	2	7	5	7	4	1
2007	0	2	3	1	10	5	14	8	0
2008	0	0	6	1	10	4	12	7	0
2009	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010	NA	1	0	NA	3	NA	5	NA	0
2011	0	1	1	NA	2	NA	7	NA	0
2012	1	1	0	NA	6	NA	7	NA	0
2013	0	1	1	NA	4	NA	8	NA	NA
Overall Tally	**4**	**10**	**12**	**4**	**50**	**19**	**69**	**25**	**4**
Constituent Priority	**D**	**D**	**D**	**E**	**E**	**E**	**E**	**E**	**A/B[R]**

NA – Not Applicable; monitoring did not occur for constituent.
[R] – Removed from active management plan.

Table V-6. Grant Line Canal near Calpack Rd site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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
2007 NM (near Calpack Rd)	Date	NA	NA	NA	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	NA
	C. dubia toxicity (% Control)	NA	NA	NA	111	95	95	100	100	100	NA
2007 MPM Add. (near Calpack Rd)	Date	NA	NA	NA	NA	NA	NA	7/30/07	8/28/07	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	<0.003	<0.003	NA	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	100	NA	NA
2008 NM (near Calpack Rd)	Date	NA	NA	NA	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	NA
	C. dubia toxicity (% Control)	NA	NA	NA	100	88	100	100	100	100	NA
2010 MPM (near Calpack Rd)	Date	NA	NA	NA	4/13/10	5/11/10	NA	7/13/10	8/10/10	9/07/10	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	<0.003	NA	<0.003	<0.003	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	426	691	NA	620	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	NA	**91**	NA
2011 MPM (near Calpack Rd)	Date	1/11/11	2/8/11	3/8/11	4/12/11	5/24/11	NA	7/26/11	8/23/11	NA	10/14/11
	Chlorpyrifos (µg/L)	NA	NA	<0.003	NA	<0.003	NA	<0.003	<0.003	NA	NA
	C. dubia toxicity (% Control)	NA	NA	100	NA	95	NA	NA	100	NA	NA
	S. capricornutum toxicity (% Control)	**53**	126	NA	846	254	NA	311	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	98	NA	NA	NA	NA	NA	NA	**86**
2012 MPM (near Calpack 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
	Chlorpyrifos (µg/L)	NA	NA	<0.003	NA	<0.003	NA	<0.003	<0.003	NA	NA
	C. dubia toxicity (% Control)	NA	NA	105	NA	100	NA	NA	**60**	NA	NA
	S. capricornutum toxicity (% Control)	1031	160	NA	91	193	NA	98	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	102	NA	NA	NA	NA	NA	**0**	NA
2013 MPM (near Calpack Rd)	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	NA
	C. dubia toxicity (% Control)	NA	NA	100	NA	105	NA	NA	100	NA	NA
	S. capricornutum toxicity (% Control)	**37**	142	NA	213	497	NA	277	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	**41**	NA	NA	NA	NA	NA	96	NA

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
NA – Not applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring.

Table V-7. Grant Line Canal near Calpack 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
Grant Line Canal near Calpack Rd	Chlorpyrifos	03/21/05	0	0.076	µg/L	0	µg/sec
Grant Line Canal near Calpack Rd	Chlorpyrifos	07/19/05	0	0.053	µg/L	0	µg/sec
Grant Line Canal near Calpack Rd	Chlorpyrifos	08/16/05	0	0.15	µg/L	0	µg/sec
Grant Line Canal near Calpack Rd	Chlorpyrifos	06/20/06	0	0.011	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

A complete review of source identification and outreach activities in the Grant Line near Calpack Rd site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 140-148). The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the site's management plan.

Water column toxicity to *C. dubia* occurred in March and August 2005, May 2006 and August 2012. Toxic Identification Evaluations were conducted on the August 2005 and May 2006 toxic samples; both results indicated that toxicity was due to non-polar organics. Exceedances of the WQTL for chlorpyrifos were also associated with the 2005 and 2006 toxicities to *C. dubia*. Since 2006 there has only been one sample toxic to *C. dubia* which occurred in August 2012. A TIE was not conducted on the August 2012 sample; however, the PUR results indicate 232 lbs AI of malathion applied during the month of August 2012 when the sample was collected.

Toxicity to *S. capricornutum* has occurred 12 times since 2005, including four resampling events (Table V-5). The six TIEs conducted on samples collected from 2005 through 2013 indicated that the toxicities were most likely caused by non-polor organic and cationic chemical(s). The Coalition believes that management of copper and herbicides will eliminate the toxicity to algae.

Sediment toxicity to *H. azteca* occurred ten times since sediment monitoring began in this subwatershed (Table V-5). Additional sediment chemistry results from the most recent toxicity to *H. azteca* in March 2013 contained concentrations of bifenthrin.

Priority E constituents under the Grant Line Canal near Calpack Rd management plan are: arsenic, DO, SC, TDS, and *E. coli*. In 2013, there were eight exceedances of the WQTL of SC and four exceedances of the WQTL for DO. Exceedances of WQTLs for DO and salts (SC and TDS) are common within Zone 4 due to a lack of flow. In most cases flows do not occur in the drains unless they are being pumped for irrigation. While four exceedances of the arsenic WQTL occurred since 2006, available PUR data indicate no product containing arsenic was applied in this subwatershed in the past 10 years.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the 2014 MPUR.

The Coalition carried out its management practice tracking and outreach which included contacting targeted growers in 2010 and following up with the growers in 2011. The Coalition contacted two targeted growers, representing 686 acres within the Grant Line Canal near Calpack site subwatershed (2013 MPUR, pages 33-34) and documented current management practices (2011 MPUR, pages 63-66).

Both growers participated in follow-up contacts and documented implementation of the same management practices in 2010 that they had implemented in 2009 (2011 MPUR, pages 63-66).

Evaluation

The frequency of water quality impairments related to high priority constituents, especially chlorpyrifos, has decreased since focused outreach began in the site subwatershed. One of the Coalition's strategies for this site was to reduce the use of chlorpyrifos, focus on tailwater management, and minimize spray drift. The Coalition's strategy to reduce or eliminate the number of chlorpyrifos exceedances has been successful. The Coalition received approval on February 27, 2013 to remove chlorpyrifos from the Grant Line Canal near Calpack Rd active management plan. The remaining high priority constituents include toxicity to *C. dubia, S. capricornutum*, and sediment toxicity to *H. azteca*. The last toxicity to *C. dubia* occurred during 2012 MPM. A single water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca* occurred during 2013 MPM. A TIE was conducted on the S. cap toxic sample and results indicated that organics and cationic metals were the cause of toxicity.

The remaining priority E constituents, including, arsenic, DO, *E. coli*, SC, and TDS, have been discussed during focused and general outreach and will continue to be discussed at annual grower meetings.

Next Steps

Focused outreach is completed within this site subwatershed and the Coalition will continue to conduct general outreach in 2014. In 2014, MPM will continue for water column toxicity to *C. dubia* (March, May and August), *S. capricornutum* (January, February, April, May and July), and sediment toxicity to *H. azteca* (March and September). Dissolved Oxygen and SC are field parameters and will be measured during monitoring events.

VI. LITTLEJOHNS CREEK @ JACK TONE RD

Overview

Littlejohns Creek @ Jack Tone Rd is one of the Coalition's second priority site subwatersheds. The Coalition completed the focused outreach portion of its management plan strategy in the site subwatershed in 2012 and monitoring results through 2013 indicate improved water quality. After demonstrating improved water quality and three years with no exceedances, the Coalition received approval to remove diazinon and toxicity to *S. capricornutum* from the Littlejohns Creek @ Jack Tone Rd active management plan on February 27, 2013. The remaining constituents under the site's active management plan include chlorpyrifos, copper, DO, *E. coli*, and pH (Table VI-1).

Management Plan Monitoring occurred in 2013 for chlorpyrifos, copper and diazinon; the other remaining constituents do no require MPM since they are priority E (Table VI-1). Monitoring during 2013 marked the second consecutive year with no exceedances of the WQTL for chlorpyrifos or copper, and diazinon MPM in February 2013 (prior to removal) resulted in no detections. Management Plan Monitoring will continue in 2014 for the remaining high priority constituents.

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 SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2006	Active
C	Copper	2008	Active
E	Dissolved Oxygen	2006	Active
E	*E. coli*	2006	Active
E	pH	2009	Active
CONSTITUENT (REMOVED)			
A/B	Diazinon	2008	2013
D	*S. capricornutum* water column toxicity	2006	2013

Description of Site Subwatershed

Littlejohns Creek @ Jack Tone Rd is a rotating Assessment Monitoring location within Zone 2 under the 2008 MRPP. Littlejohns Creek @ Jack Tone Rd consists of 16,167 irrigated acres representing all of the major types of agriculture present in the Coalition region including, field crops, orchards, grains, vineyards, and irrigated pasture (Figure VI-1). Littlejohns Creek @ Jack Tone Rd 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).

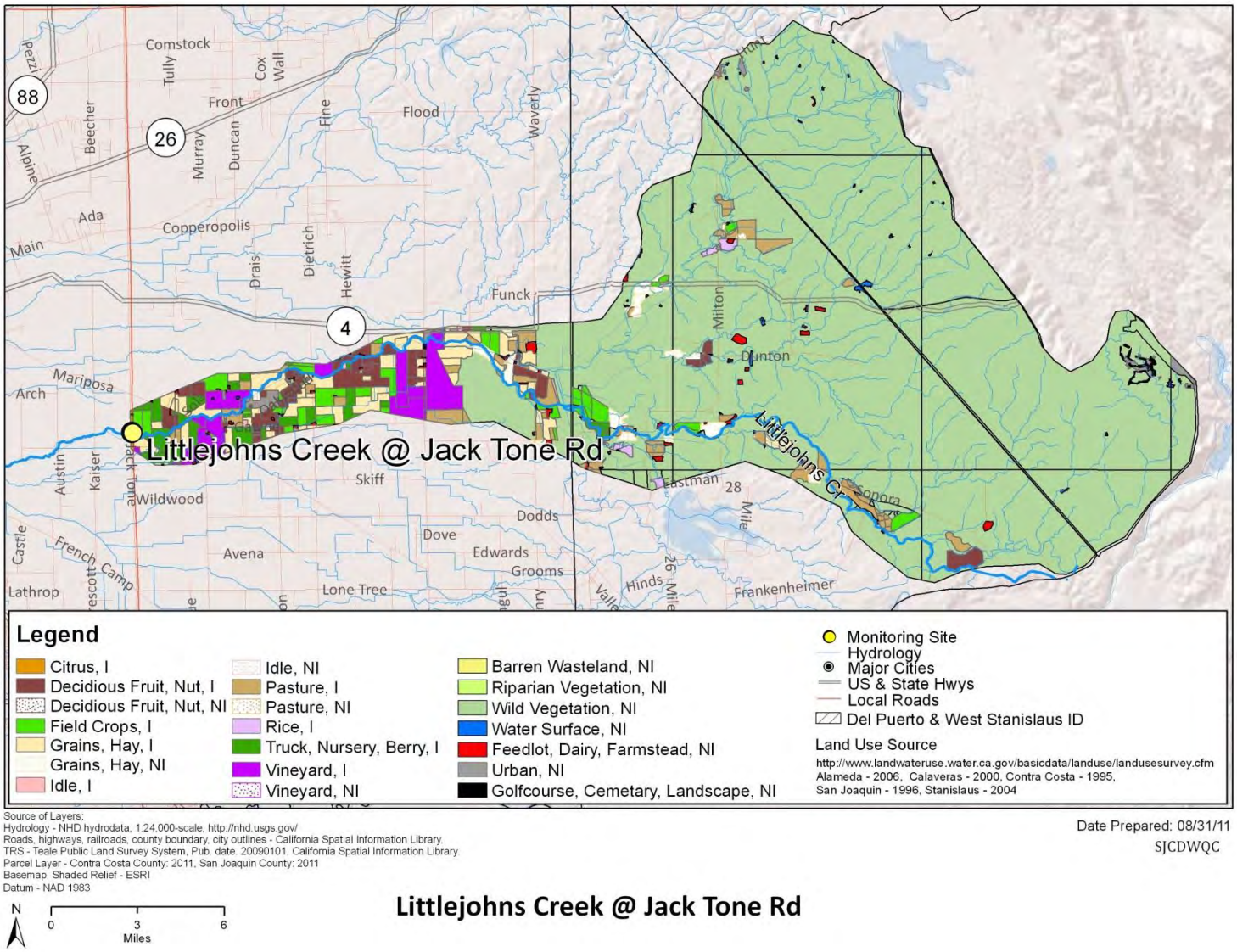
Littlejohns Creek @ Jack Tone Rd is listed on California's 303(d) List of Impaired Waterbodies for *E. coli* and unknown toxicity (last updated in 2010).

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

SITE NAME	STATION CODE	TARGET LATITUDE	TARGET LONGITUDE
Littlejohns Creek @ Escalon Bellota [US]	531XLCAER	37.9255	-120.9991
Littlejohns Creek @ 26 Mile Rd [US]	531LCATMR	37.8932	-120.8776
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

Normal 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 (by group) from 2008 to 2013 (see 2013 MPUR Appendix I, Table VI-3 for analytes sampled prior to 2008). The most recent Assessment Monitoring occurred at the site in 2008.

Management Plan Monitoring was initiated at Littlejohns Creek @ Jack Tone Rd in 2007 (Table VI-4). In 2008, MPM was conducted at two upstream locations, Littlejohn's Creek @ 26 Mile Rd and Littlejohns Creek @ Escalon Bellota Rd, in an attempt to source exceedances of chlorpyrifos, metals, and toxicity to *S. capricornutum*. Management Plan Monitoring during months of past exceedances has occurred at the site since 2010 to evaluate the effectiveness of the Coalition's outreach strategy and the newly implemented management practices on water quality (Table VI-4).

From June 2010 through February 2011, additional samples were collected for chlorpyrifos, diazinon, and sediment toxicity to *H. azteca* as part of a DPR grant to reduce the impact of agricultural discharge on water quality.

Table VI-3. Littlejohns Creek @ Jack Tone Rd sampling events and analyses per year.

Only environmental samples are counted.

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

Type	Analyte	2008	2009	2010	2011	2012	2013
	Copper	7	0	3	4	4	4
	Lead	7	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0
	Nickel	7	0	0	0	0	0
	Selenium	7	0	0	0	0	0
	Zinc	7	0	0	0	0	0
Carbamates	Aldicarb	7	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0
	Diuron	7	0	0	0	0	0
	Linuron	7	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0
	Methomyl	7	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0
	Paraquat	7	0	0	0	0	0
	Simazine	7	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0
	Dicofol	7	0	0	0	0	0
	Dieldrin	7	0	0	0	0	0
	Endrin	7	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0
	Chlorpyrifos	7	0	8	6	5	5
	Demeton-s	0	0	0	0	0	0
	Diazinon	7	0	7	2	1	1
	Dichlorvos	0	0	0	0	0	0
	Dimethoate	7	0	0	0	0	0
	Disulfoton	7	0	0	0	0	0
	Malathion	7	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0
	Methidathion	7	0	0	0	0	0
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0
	Phorate	7	0	0	0	0	0
	Phosmet	7	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0

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

Table VI-4. Littlejohns Creek Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Copper	Total Metals	Chlorpyrifos	Diazinon	*S. capricornutum*	*H. azteca*
Littlejohns Creek @ Jack Tone Rd	07/30/07	Add.			X			
Littlejohns Creek @ Jack Tone Rd	08/28/07	Add.					X	
Littlejohns Creek @ 26 Mile Rd	05/13/08	US		X				
Littlejohns Creek @ Escalon Bellota Rd	05/13/08	US		X				
Littlejohns Creek @ 26 Mile Rd	06/10/08	US		X				
Littlejohns Creek @ Escalon Bellota Rd	06/10/08	US		X				
Littlejohns Creek @ 26 Mile Rd	07/15/08	US		X				
Littlejohns Creek @ Escalon Bellota Rd	07/15/08	US			X		X	
Littlejohns Creek @ 26 Mile Rd	08/12/08	US		X				
Littlejohns Creek @ Escalon Bellota Rd	08/12/08	US			X		X	
Littlejohns Creek @ 26 Mile Rd	09/16/08	US		X				
Littlejohns Creek @ Jack Tone Rd	04/13/10	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	05/11/10	MPM	X					
Littlejohns Creek @ Jack Tone Rd	06/08/10	MPM	X		X[1]	X[2]		
Littlejohns Creek @ Jack Tone Rd	07/13/10	MPM			X[1]	X[2]	X	
Littlejohns Creek @ Jack Tone Rd	08/10/10	MPM			X[2]	X[2]	X	
Littlejohns Creek @ Jack Tone Rd	09/07/10	MPM	X		X[2]	X[2]		X[2]
Littlejohns Creek @ Jack Tone Rd	10/12/10	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	11/09/10	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	12/07/10	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	01/11/11	MPM			X[2]	X[2]		
Littlejohns Creek @ Jack Tone Rd	02/08/11	MPM	X		X[1]	X[1]		
Littlejohns Creek @ Jack Tone Rd	03/08/11	MPM					X	
Littlejohns Creek @ Jack Tone Rd	04/12/11	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	05/24/11	MPM	X					
Littlejohns Creek @ Jack Tone Rd	06/28/11	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	07/26/11	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	08/23/11	MPM					X	
Littlejohns Creek @ Jack Tone Rd	09/20/11	MPM	X					
Littlejohns Creek @ Jack Tone Rd	11/15/11	MPM			X			
Littlejohns Creek @ Jack Tone Rd	02/14/12	MPM	X		X	X		
Littlejohns Creek @ Jack Tone Rd	03/15/12	MPM					X	
Littlejohns Creek @ Jack Tone Rd	04/12/12	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	05/16/12	MPM	X					
Littlejohns Creek @ Jack Tone Rd	06/19/12	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	07/17/12	MPM			X		X	
Littlejohns Creek @ Jack Tone Rd	08/21/12	MPM					X	
Littlejohns Creek @ Jack Tone Rd	09/18/12	MPM	X					
Littlejohns Creek @ Jack Tone Rd	11/06/12	MPM			X			
Littlejohns Creek @ Jack Tone Rd	02/21/13	MPM	X		X	X		
Littlejohns Creek @ Jack Tone Rd	04/02/13	MPM			X			
Littlejohns Creek @ Jack Tone Rd	05/21/13	MPM	X					
Littlejohns Creek @ Jack Tone Rd	06/18/13	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	07/16/13	MPM			X			
Littlejohns Creek @ Jack Tone Rd	09/17/13	MPM	X					
Littlejohns Creek @ Jack Tone Rd	11/12/13	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).

2013 Monitoring Results

During 2013, MPM occurred at Littlejohns Creek @ Jack Tone Rd for chlorpyrifos, copper, and diazinon (Table VI-4). Monitoring during 2013 marked the second consecutive year with no exceedances of the WQTL for chlorpyrifos or copper (Table VI-5). On February 27, 2013, the Regional Board approved the removal of diazinon and toxicity to *S. capricornutum* from the Littlejohns Creek @ Jack Tone Rd active management plan. Dissolved Oxygen and pH were measured during 2013 MPM as field parameters and four exceedances of the WQTL for DO occurred; no exceedances of the WQTL for pH occurred.

Table VI-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Littlejohns Creek @ Jack Tone Rd site subwatershed (organized alphabetically by constituent priority). Table VI-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table VI-7 contains the instantaneous loads for chlorpyrifos, copper and diazinon since monitoring began in the site subwatershed. A record of all exceedances in the Littlejohns Creek @ Jack Tone Rd site subwatershed since monitoring began is provided in Appendix II, Table VI-A.

Table VI-5. Littlejohns Creek @ Jack Tone Rd management plan constituent exceedance tally (2006-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table VI-A.

	Active Management Plan Constituents						Removed Management Plan Constituents	
Monitoring Year	Chlorpyrifos, >0.015 µg/L	Copper (Dissolved), Variable[1]	Copper (Total), Variable[2] or >1300 µg/L	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	pH, <6.5 and >8.5 Units	Diazinon, >0.1 µg/L	*S. capricornutum*, (%Control)
2004	0	NA	NA	1	0	0	0	1
2005	1	NA	NA	2	4	1	0	1
2006	1	NA	1	3	1	0	0	0
2007	2	NA	2	4	1	0	1	1
2008	3	0	2	3	0	0	0	2
2009	NA	NA	NA	NA	NA	NA	NA	NA
2010	1	1	0	4	NA	0	0	0
2011	1	1	0	3	NA	1	0	0
2012	0	0	0	5	NA	0	0	0
2013	0	0	0	4	NA	0	0	NA
Overall Tally	**9**	**2**	**5**	**29**	**6**	**2**	**1**	**5**
Constituent Priority	**A/B**	**C**	**C**	**E**	**E**	**E**	**A/B[R]**	**D[R]**

[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.
[R] – Removed from active management plan.

Table VI-6. Littlejohns Creek site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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	8/07/07	9/04/07		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	6/08/10	7/13/10	8/10/10	9/07/10	9/14/10	10/12/10	11/09/10	12/07/10
	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

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Diazinon (µg/L)	<0.004*	<0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	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

Add. – Additional Monitoring, conducted in 2007 only.
MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
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 VI-7. Littlejohns Creek site subwatershed instantaneous load calculations for chlorpyrifos, copper, and diazinon.

Upstream sites are italicized. 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
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	02/11/07	0	0.029	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	01/23/08	2.45	0.0039	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	11/09/10	0	0.040	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	12/07/10	0	0.014	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	11/15/11	0	0.022	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	05/16/06	23.50	4.4	µg/L	2928	µg/sec
Littlejohns Creek @ Jack Tone Rd*	Copper	08/15/06	12.79	2.1	µg/L	761	µg/sec
Littlejohns Creek @ Jack Tone Rd*	Copper	08/15/06	12.79	2.2	µg/L	797	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	08/15/06	12.79	2.5	µg/L	905	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	02/11/07	0	6.8	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	09/04/07	0	2.7	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	01/23/08	2.45	3.8	µg/L	264	µg/sec
Littlejohns Creek @ 26 Mile Rd	*Copper*	*09/16/08*	*0*	*1.0*	*µg/L*	*0*	*µg/sec*
Littlejohns Creek @ Jack Tone Rd	Copper	02/08/11	0	2.8	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	02/14/12	0	3.4	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	05/16/12	0	2.5	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper	02/21/13	0	2.7	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper (D)	02/08/11	0	2.0	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper (D)	02/14/12	0	2.5	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper (D)	05/16/12	0	1.3	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Copper (D)	02/21/13	0	1.6	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Diazinon	02/27/06	10.45	0.035	µg/L	10	µg/sec
Littlejohns Creek @ Jack Tone Rd	Diazinon	02/11/07	0	0.11	µg/L	0	µg/sec
Littlejohns Creek @ Jack Tone Rd	Diazinon	01/23/08	2.45	0.017	µg/L	1	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

A complete review of source identification and outreach activities in the Littlejohns Creek @ Jack Tone Rd site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 163-178). The Coalition evaluated the PUR data and past monitoring results to determine the sources of constituents listed in the management plan.

The only high priority constituents in the Littlejohns Creek @ Jack Tone Rd subwatershed are chlorpyrifos and copper. According to the PUR data, the number of chlorpyrifos applications has decreased from 48 in 2010 to 34 applications in 2013 (preliminary PUR data up to date through July 2013). The last exceedance of the WQTL for chlorpyrifos occurred in November 2011. Continued exceedances of the WQTL for chlorpyrifos prompted the Coalition to conduct additional outreach to six growers in the Littlejohns Creek @ Jack Tone Rd site subwatershed during 2012. Additional outreach

was aimed at improving management practices, such as discontinuing the use of chlorpyrifos and recycling tailwater. Results from 2012 indicate that all six growers discontinued the use of chlorpyrifos and some growers implemented additional management practices to reduce runoff (installation of sprinkler or micro irrigation, reducing runoff volumes, and use of center grass rows or filter strips). Water quality improvements are expected to continue within this site subwatershed due to implementation of additional management practices. Copper is one of the most heavily applied constituents in the site subwatershed. In 2012, a total of 17,400 lbs AI were applied in the site subwatershed; however, applications have declined by approximately half since 2005 (32,600 lbs AI). The most recent copper WQTL exceedance occurred for dissolved copper in May 2011.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR.

The Coalition carried out its management practice tracking and outreach which included contacting targeted growers in 2010 and following up with the growers in 2011 and 2012. The Coalition contacted 16 targeted growers, representing 2,796 acres within the Littlejohns Creek @ Jack Tone Rd site subwatershed (2013 MPUR, page 33) and documented their management practices (2012 MPUR, pages 67-71). 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 (2012 MPUR, pages 67-71).

Evaluation

The Coalition's focused outreach strategy has helped to improve water quality in the Littlejohns Creek @ Jack Tone Rd site subwatershed. Following the completion of focused outreach in 2012, the Coalition received approval on February 27, 2013 to remove diazinon and toxicity to *S. capricornutum* form the Littlejohns Creek @ Jack Tone Rd management plan. The remaining high priority constituents in the site subwatershed are chlorpyrifos and copper. The last exceedance of the WQTLs for chlorpyrifos and copper occurred during 2011; therefore, the Coalition will petition to remove chlorpyrifos and copper during 2014 following three years of monitoring with no exceedances. The Priority E constituents under the Littlejohns Creek @ Jack Tone Rd management plan are: DO, *E. coli*, and pH. The Coalition believes that addressing other water quality impairments will address priority E constituents including, DO and pH.

Next Steps

During 2014, MPM will occur for chlorpyrifos and copper during months of past exceedances. General outreach will continue in the site subwatershed. Dissolved Oxygen and pH are field parameters and will be measured during all monitoring events.

HIGH PRIORITY SITE SUBWATERSHEDS (2011–2013)

VII. FRENCH CAMP SLOUGH @ AIRPORT WAY

Overview

French Camp Slough @ Airport Way is one of the Coalition's third priority site subwatersheds. The Coalition completed focused outreach portion of its management plan strategy in the site subwatershed in 2013 and monitoring results ifrom 2011 through 2013 indicate improved water quality. The Coalition received approval to remove dieldrin from the site subwatershed active management plan (approval on March 22, 2012) as well as copper, diazinon, diuron, lead, and water column toxicity to *C. dubia* and *S. capricornutum* (approval on February 27, 2013). The remaining constituents in the site's active management plan include: chlorpyrifos, sediment toxicity to *H. azteca,* DO, *E. coli,* and pH (Table VII-1).

During 2013, MPM at French Camp Slough @ Airport Way occurred for chlorpyrifos and sediment toxicity to *H. azteca*. Management Plan Monitoring also occurred for copper, diazinon, diuron, and water column toxicity to *C. dubia* and *S. capricornutum* prior to their removal on February 27, 2013. A single exceedance of the WQTL for chlorpyrifos occurred in July; the last exceedance of the chlorpyrifos WQTL occurred in 2011. No sediment toxicity to *H. azteca* occurred during 2013 monitoring; there has been no sediment toxicity in samples collected from this site for two years. Core Monitoring in 2013 resulted in two exceedances of the WQTL for DO (July, August), and one exceedance of the WQTL for *E. coli* in November.

During 2014, MPM will occur for chlorpyrifos and sediment toxicity to *H. azteca* and will enable the Coalition to further evaluate the effectiveness of implemented management practices. Assessment Monitoring is scheduled during 2014 and general outreach will continue in the site subwatershed.

Table VII-1. French Camp Slough @ Airport Way management plan constituents.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2006	Active
D	*H. azteca* sediment toxicity	2008	Active
E	Dissolved Oxygen	2006	Active
E	*E. coli*	2006	Active
E	pH	2009	Active
CONSTITUENT (REMOVED)			
A/B	Diazinon	2008	2013
C	Copper	2007	2013
C	Diuron	2009	2013
D	*C. dubia* water column toxicity	2008	2013
D	*S. capricornutum* water column toxicity	2009	2013
E	Dieldrin	2009	2012
E	Lead	2008	2013

Description of Site Subwatershed

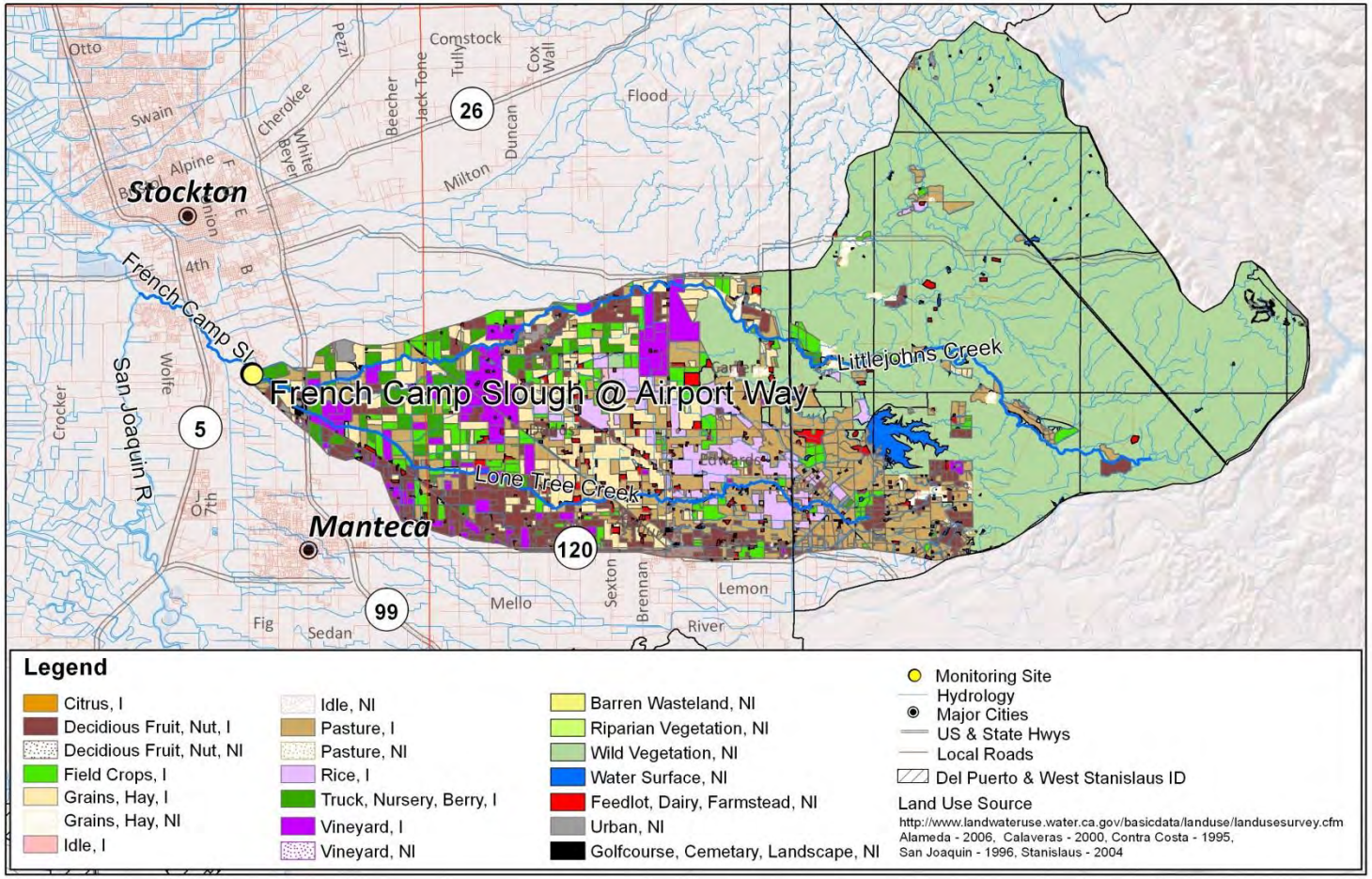
French Camp Slough @ Airport Way is the Core Monitoring site within Zone 2 under the 2008 MRPP. This site contains 83,229 irrigated acres consisting of all major types of agriculture present in the Coalition region including, field crops, orchards, grains, hay, rice, tomatoes, vineyards, and irrigated pasture (Figure VII-1). 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 VII-1). Table VII-2 lists the coordinates of the location where monitoring occurs on French Camp Slough. French Camp Slough 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 @ Airport Way (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 VII-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 VII-1. French Camp Slough @ Airport Way site subwatershed land use map.



Subwatershed Monitoring History

Normal Monitoring at French Camp Slough @ Airport Way was conducted from 2005 through 2008. Core Monitoring began in October 2008 with Assessment Monitoring occuring every third year; the last Assessment Monitoring year was 2011. Table VII-3 contains the number of events monitored per year and the constituents (by group) from 2008 to 2013 (see 2013 MPUR Appendix I, Table VII-3 for analytes sampled prior to 2008).

Management Plan Monitoring at French Camp Slough @ Airport Way began in 2007 and resumed in 2010 (Table VII-4). From 2010 through 2013, MPM occurred during months of past exceedances.

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

Type	Analyte	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	14	13	12	14	12	12
	Dry Sites	0	0	0	0	0	0
	Events Sampled	14	13	12	14	12	12
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	14	13	12	14	12	12
	Dissolved Solids	10	12	12	12	12	12
	E. coli	10	12	12	12	12	12
	Grain size (sediment)	0	0	1	2	2	2
	Hardness as CaCO3	7	0	4	12	5	1
	pH	14	13	12	14	12	12
	Specific Conductivity	14	13	12	14	12	12
	Suspended Solids	3	12	12	12	12	12
	Total Organic Carbon	10	12	12	12	12	12
	Total Organic Carbon (sediment)	0	0	1	2	2	2
	Turbidity	10	12	12	12	12	12
Nutrients	Ammonia as N	10	12	12	12	12	12
	Nitrate + Nitrite as N	3	12	12	12	12	12
	Nitrate as N	7	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0
	Nitrogen, Total Kjeldahl	10	12	12	12	0	12
	OrthoPhosphate as P	10	12	12	12	12	12
	Phosphate as P	10	12	12	12	12	12
Metals (Dissolved)	Cadmium	0	0	0	12	0	0
	Copper	0	0	4	12	5	1
	Lead	0	0	0	12	2	0
	Nickel	0	0	0	12	0	0
	Zinc	0	0	0	12	0	0
Metals (Total)	Arsenic	7	0	0	12	0	0
	Boron	7	0	0	12	0	0
	Cadmium	7	0	0	12	0	0
	Copper	7	0	4	12	5	1
	Lead	7	0	0	12	2	0
	Molybdenum	0	0	0	12	0	0
	Nickel	7	0	0	12	0	0
	Selenium	7	0	0	12	0	0
	Zinc	7	0	0	12	0	0
Carb-amates	Aldicarb	10	12	12	12	0	0
	Carbaryl	10	12	12	12	0	0
	Carbofuran	10	12	12	12	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
	Diuron	10	1	0	12	0	2
	Linuron	10	1	0	12	0	0
	Methiocarb	10	12	12	12	0	0
	Methomyl	10	12	12	12	0	0
	Oxamyl	10	12	12	12	0	0
Group A Pesticides	Aldrin	0	8	0	0	0	0
	Chlordane	0	8	0	0	0	0
	Endosulfan I	0	8	0	0	0	0
	Endosulfan II	0	8	0	0	0	0
	HCH, alpha	0	8	0	0	0	0
	HCH, beta	0	8	0	0	0	0
	HCH, delta	0	8	0	0	0	0
	HCH, gamma	0	8	0	0	0	0
	Heptachlor	0	8	0	0	0	0
	Heptachlor epoxide	0	8	0	0	0	0
	Toxaphene	0	8	0	0	0	0
Herbicides	Atrazine	7	1	0	12	0	0
	Cyanazine	7	1	0	12	0	0
	Glyphosate	7	0	0	12	0	0
	Paraquat	7	0	0	12	0	0
	Simazine	7	1	0	12	0	0
	Trifluralin	0	1	0	12	0	0
Organochlorines	DDD(p,p')	10	12	0	12	0	0
	DDE(p,p')	10	12	0	12	0	0
	DDT(p,p')	10	12	0	12	0	0
	Dicofol	10	12	0	12	0	0
	Dieldrin	10	12	1	12	0	0
	Endrin	10	12	0	12	0	0
	Methoxychlor	10	12	0	12	0	0
Organophosphates	Azinphos methyl	10	12	0	12	0	0
	Chlorpyrifos	10	12	5	12	7	7
	Demeton-s	3	12	0	12	0	0
	Diazinon	10	12	0	12	2	2
	Dichlorvos	3	12	0	12	0	0
	Dimethoate	10	12	0	12	0	0
	Disulfoton	10	12	0	12	0	0
	Malathion	10	12	0	12	0	0
	Methamidophos	10	12	0	12	0	0
	Methidathion	10	12	0	12	0	0
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	10	12	0	12	0	0
	Phorate	10	12	0	12	0	0
	Phosmet	10	12	0	12	0	0
	Thiobencarb	7	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	0	0	0
	Chlorpyrifos	0	0	1	0	0	0
	Cyfluthrin	0	0	1	0	0	0
	Cyhalothrin, lambda	0	0	1	0	0	0
	Cypermethrin	0	0	1	0	0	0
	Deltamethrin: Tralomethrin	0	0	1	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	1	0	0	0
	Fenpropathrin	0	0	1	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
	Permethrin	0	0	1	0	0	0
Toxicity	*Ceriodaphnia dubia*	7	0	0	12	2	1
	Pimephales promelas	7	0	0	12	0	0
	Selenastrum capricornutum	8	1	1	12	2	1
	Hyalella azteca	3	0	1	2	2	2

Table VII-4. French Camp Slough @ Airport Way Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Copper	Lead	Chlorpyrifos	Diazinon	Dieldrin	Diuron	*C. dubia*	*S. capricornutum*	*H. azteca*
French Camp Slough @ Airport Way	06/12/07	MPM	X								
French Camp Slough @ Airport Way	07/10/07	MPM	X		X						
French Camp Slough @ Airport Way	08/07/07	MPM	X		X						
French Camp Slough @ Airport Way	04/13/10	MPM								X	
French Camp Slough @ Airport Way	05/11/10	MPM	X		X						
French Camp Slough @ Airport Way	06/08/10	MPM	X								
French Camp Slough @ Airport Way	07/13/10	MPM	X		X		X				
French Camp Slough @ Airport Way	08/10/10	MPM	X		X						
French Camp Slough @ Airport Way	09/07/10	MPM			X						X
French Camp Slough @ Airport Way	10/12/10	MPM			X						
French Camp Slough @ Airport Way	01/11/11	MPM	X			X		X			
French Camp Slough @ Airport Way	02/08/11	MPM			X	X		X	X	X	
French Camp Slough @ Airport Way	03/08/11	MPM							X		X
French Camp Slough @ Airport Way	04/12/11	MPM								X	
French Camp Slough @ Airport Way	05/24/11	MPM	X		X						
French Camp Slough @ Airport Way	06/28/11	MPM	X								
French Camp Slough @ Airport Way	07/26/11	MPM	X		X		X				
French Camp Slough @ Airport Way	08/23/11	MPM	X		X						
French Camp Slough @ Airport Way	09/20/11	MPM			X						
French Camp Slough @ Airport Way	10/06/11	MPM			X						
French Camp Slough @ Airport Way	10/14/11	MPM									X
French Camp Slough @ Airport Way	01/17/12	MPM				X		X			
French Camp Slough @ Airport Way	02/14/12	MPM	X		X	X		X	X	X	
French Camp Slough @ Airport Way	03/15/12	MPM							X		X
French Camp Slough @ Airport Way	04/12/12	MPM			X					X	
French Camp Slough @ Airport Way	05/16/12	MPM	X	X	X						
French Camp Slough @ Airport Way	06/19/12	MPM	X	X							
French Camp Slough @ Airport Way	07/17/12	MPM	X		X						
French Camp Slough @ Airport Way	08/21/12	MPM	X		X						
French Camp Slough @ Airport Way	09/18/12	MPM			X						X
French Camp Slough @ Airport Way	10/16/12	MPM			X						
French Camp Slough @ Airport Way	01/15/13	MPM				X		X			
French Camp Slough @ Airport Way	02/21/13	MPM	X		X	X		X	X	X	
French Camp Slough @ Airport Way	03/19/13	MPM									X
French Camp Slough @ Airport Way	04/02/13	MPM			X						
French Camp Slough @ Airport Way	05/21/13	MPM			X						
French Camp Slough @ Airport Way	07/16/13	MPM			X						
French Camp Slough @ Airport Way	08/20/13	MPM			X						
French Camp Slough @ Airport Way	09/17/13	MPM			X						X
French Camp Slough @ Airport Way	10/8/2013	MPM			X						

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

2013 Monitoring Results

In 2013, MPM at French Camp Slough @ Airport Way occurred for copper, diazinon, diuron, and water column toxicity to *C. dubia* and *S. capricornutum* prior to their removal from the site subwatershed's active management plan on February 27, 2013. All of these constituents were approved for removal based on improved water quality demonstrated by a lack of exceedances in the last two years (Table VII-5). Management Plan Monitoring occurred for the remaining active constituents and there was one exceedance of the WQTL for chlorpyrifos in July; the last exceedance of the chlorpyrifos WQTL occurred in 2011 (Table VII-6). No sediment toxicity to *H. azteca* occurred during 2013 monitoring; there has been no sediment toxicity in samples collected from this site for two years (Table VII-6). Core Monitoring in 2013 resulted in two exceedances of the WQTL for DO (July, August), and one exceedance of the WQTL for *E. coli* in November.

TableVII-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the French Camp Slough @ Airport Way site subwatershed (organized alphabetically by constituent priority). Table VII-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table VII-7 contains the instantaneous loads for chlorpyrifos, copper, diazinon, dieldrin, and diuron since monitoring began in the site subwatershed. A record of all exceedances in the French Camp Slough @ Airport Way site subwatershed since monitoring began is provided in Appendix II, Table VII-A.

Table VII-5. French Camp Slough @ Airport Way management plan constituent exceedance tally (2005-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table VII-A.

	Active Management Plan Constituents					Removed Management Plan Constituents						
Monitoring Year	Chlorpyrifos, >0.015 µg/L	*H. azteca*, (%Control)	Dissolved Oxygen, <7mg/L	*E. coli*, >235 MPN/100 ml	pH, <6.5 or > 8.5 units	Diazinon, >0.1 µg/L	Copper (Total), Variable[1] or >1300 µg/L	Diuron, >2 µg/L	*C. dubia*, (%Control)	*S. capricornutum*, (%Control)	Dieldrin, >0.00014 µg/L	Lead (Total), Variable[1] or >15 µg/L
2005	2	0	3	6	1	0	NA	NA	0	1	NA	NA
2006	2	1	3	5	0	0	4	0	1	0	0	1
2007	1	1	1	5	0	1	8	1	1	0	1	1
2008	3	1	4	4	2	1	0	1	0	1	1	0
2009	1	NA	2	1	0	0	NA	0	NA	NA	0	NA
2010	1	1	2	5	0	NA	0	NA	NA	0	0	NA
2011	2	1	0	5	3	0	0	0	0	0	0	0
2012	0	0	2	5	1	0	0	0	0	0	NA	0
2013	1	0	2	1	0	0	0	0	0	0	NA	NA
Overall Tally	**13**	**5**	**19**	**37**	**7**	**2**	**12**	**2**	**2**	**2**	**2**	**2**
Constituent Priority	**A/B**	**D**	**E**	**E**	**E**	**A/B[R]**	**C[R]**	**C[R]**	**D[R]**	**D[R]**	**E[R]**	**E[R]**

[1] Metal WQTL variable based on hardness.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
[R] – Removed from active management plan.

Table VII-6. French Camp Slough @ Airport Way site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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	8/07/07		9/04/07	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		11/04/08	12/09/08
	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 (% Control)	100	NA		NA	100	100	95	100	100	NA	100	NA		NA	NA
	H. azteca (% 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	6/09/09	7/14/09	8/11/09		9/15/09	10/06/09		11/10/09	12/08/09
	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	6/08/10	7/13/10	8/10/10		9/07/10	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 (%	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 (%	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

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
	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 (%	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 (%	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

MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
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 VII-7. French Camp Slough @ Airport Way site subwatershed instantaneous load calculations for chlorpyrifos, copper, diazinon, diuron, and dieldrin.

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
French Camp Slough @ Airport Way	Chlorpyrifos	05/17/05	43.56	0.011	µg/L	14	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	07/19/05	59.40	0.033	µg/L	56	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	08/16/05	90.40	0.043	µg/L	110	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	03/15/06	2030.00	0.005	µg/L	287	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	05/16/06	54.83	0.015	µg/L	23	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	07/18/06	77.96	0.027	µg/L	60	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	09/19/06	60.56	0.013	µg/L	22	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	02/11/07	70.48	0.049	µg/L	98	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	04/10/07	32.12	0.013	µg/L	12	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	06/12/07	47.33	0.013	µg/L	17	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	07/10/07	27.64	0.014	µg/L	11	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	07/10/07	27.64	0.014	µg/L	11	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	07/30/07	66.63	0.011	µg/L	21	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	01/23/08	8.13	0.0080	µg/L	2	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	04/15/08	57.81	0.0030	µg/L	5	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	04/15/08	57.81	0.0041	µg/L	7	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	05/13/08	52.12	0.40	µg/L	590	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	08/12/08	18.46	0.022	µg/L	12	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	09/16/08	76.09	0.039	µg/L	84	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	04/14/09	56.42	0.0045	µg/L	7	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	10/06/09	68.06	0.029	µg/L	56	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	08/10/10	25.75	0.022	µg/L	16	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	09/07/10	87.76	0.009	µg/L	22	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	04/12/11	24.60	0.032	µg/L	22	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	04/12/11	24.60	0.033	µg/L	23	µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	10/06/11	118.57	0.097	µg/L	326	µg/sec
French Camp Slough @ Airport Way*	Chlorpyrifos	10/06/11	118.57	0.092	µg/L	309	µg/sec
French Camp Slough at Airport Way	Chlorpyrifos	07/16/13	35.68	0.042	µg/L	42	µg/sec
French Camp Slough @ Airport Way	Copper	05/16/06	54.83	8.4	µg/L	13042	µg/sec
French Camp Slough @ Airport Way	Copper	07/18/06	77.96	7.0	µg/L	15453	µg/sec
French Camp Slough @ Airport Way	Copper	08/15/06	90.95	8.0	µg/L	20603	µg/sec
French Camp Slough @ Airport Way	Copper	09/19/06	60.56	3.8	µg/L	6517	µg/sec
French Camp Slough @ Airport Way	Copper	02/11/07	70.48	30	µg/L	59873	µg/sec
French Camp Slough @ Airport Way	Copper	04/10/07	32.12	5.7	µg/L	5184	µg/sec
French Camp Slough @ Airport Way	Copper	05/22/07	71.95	5.9	µg/L	12021	µg/sec
French Camp Slough @ Airport Way	Copper	06/12/07	47.33	5.9	µg/L	7907	µg/sec
French Camp Slough @ Airport Way	Copper	06/20/07	27.38	6.7	µg/L	5195	µg/sec
French Camp Slough @ Airport Way*	Copper	07/10/07	27.64	5.3	µg/L	4148	µg/sec
French Camp Slough @ Airport Way	Copper	07/10/07	27.64	5.4	µg/L	4226	µg/sec
French Camp Slough @ Airport Way	Copper	07/30/07	66.63	6.9	µg/L	13019	µg/sec
French Camp Slough @ Airport Way	Copper	08/07/07	38.79	5.0	µg/L	5492	µg/sec
French Camp Slough @ Airport Way	Copper	08/28/07	58.55	5.9	µg/L	9782	µg/sec
French Camp Slough @ Airport Way	Copper	09/04/07	44.24	4.5	µg/L	5637	µg/sec
French Camp Slough @ Airport Way	Copper	01/23/08	8.13	12	µg/L	2763	µg/sec
French Camp Slough @ Airport Way*	Copper	04/15/08	57.81	4.7	µg/L	7694	µg/sec
French Camp Slough @ Airport Way	Copper	04/15/08	57.81	4.9	µg/L	8021	µg/sec

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
French Camp Slough @ Airport Way	Copper	05/13/08	52.12	5.6	µg/L	8265	µg/sec
French Camp Slough @ Airport Way	Copper	06/10/08	19.99	3.2	µg/L	1811	µg/sec
French Camp Slough @ Airport Way	Copper	07/15/08	30.20	4.8	µg/L	4105	µg/sec
French Camp Slough @ Airport Way	Copper	08/12/08	18.46	2.8	µg/L	1464	µg/sec
French Camp Slough @ Airport Way	Copper	09/16/08	76.09	3.9	µg/L	8403	µg/sec
French Camp Slough @ Airport Way	Copper	05/11/10	31.87	4.3	µg/L	3881	µg/sec
French Camp Slough @ Airport Way	Copper	06/08/10	13.89	6.2	µg/L	2439	µg/sec
French Camp Slough @ Airport Way	Copper	07/13/10	45.48	6.0	µg/L	7727	µg/sec
French Camp Slough @ Airport Way	Copper	08/10/10	25.75	4.6	µg/L	3354	µg/sec
French Camp Slough @ Airport Way*	Copper	01/11/11	204.31	6.4	µg/L	37027	µg/sec
French Camp Slough @ Airport Way	Copper	01/11/11	204.31	6.0	µg/L	34713	µg/sec
French Camp Slough @ Airport Way	Copper	02/08/11	9.18	2.9	µg/L	754	µg/sec
French Camp Slough @ Airport Way*	Copper	02/08/11	9.18	3.0	µg/L	780	µg/sec
French Camp Slough @ Airport Way	Copper	04/12/11	24.60	6.6	µg/L	4598	µg/sec
French Camp Slough @ Airport Way*	Copper	04/12/11	24.60	6.3	µg/L	4389	µg/sec
French Camp Slough @ Airport Way	Copper	05/24/11	58.85	6.4	µg/L	10665	µg/sec
French Camp Slough @ Airport Way*	Copper	05/24/11	58.85	6.2	µg/L	10332	µg/sec
French Camp Slough @ Airport Way	Copper	06/28/11	28.26	5.8	µg/L	4641	µg/sec
French Camp Slough @ Airport Way*	Copper	06/28/11	28.26	5.8	µg/L	4641	µg/sec
French Camp Slough @ Airport Way*	Copper	07/26/11	6.47	4.7	µg/L	861	µg/sec
French Camp Slough @ Airport Way	Copper	07/26/11	6.47	4.2	µg/L	769	µg/sec
French Camp Slough @ Airport Way*	Copper	08/23/11	48.03	3.3	µg/L	4488	µg/sec
French Camp Slough @ Airport Way	Copper	08/23/11	48.03	3.1	µg/L	4216	µg/sec
French Camp Slough @ Airport Way	Copper	09/20/11	67.53	3.0	µg/L	5737	µg/sec
French Camp Slough @ Airport Way*	Copper	09/20/11	67.53	2.7	µg/L	5163	µg/sec
French Camp Slough @ Airport Way*	Copper	10/06/11	118.57	4.2	µg/L	14102	µg/sec
French Camp Slough @ Airport Way	Copper	10/06/11	118.57	4.1	µg/L	13766	µg/sec
French Camp Slough @ Airport Way	Copper	11/15/11	0	3.0	µg/L	0	µg/sec
French Camp Slough @ Airport Way*	Copper	11/15/11	0	3.1	µg/L	0	µg/sec
French Camp Slough @ Airport Way	Copper	12/13/11	2.76	3.2	µg/L	250	µg/sec
French Camp Slough @ Airport Way	Copper	02/14/12	0.64	5.7	µg/L	103	µg/sec
French Camp Slough @ Airport Way	Copper	05/16/12	27.83	4.2	µg/L	3310	µg/sec
French Camp Slough @ Airport Way	Copper	06/19/12	48.48	3.8	µg/L	5217	µg/sec
French Camp Slough @ Airport Way	Copper	07/17/12	58.98	117.6	µg/L	196408	µg/sec
French Camp Slough @ Airport Way	Copper	08/21/12	21.51	2.9	µg/L	1766	µg/sec
French Camp Slough @ Airport Way	Copper (D)	05/11/10	31.87	2.7	µg/L	2437	µg/sec
French Camp Slough @ Airport Way	Copper (D)	06/08/10	13.89	3.5	µg/L	1377	µg/sec
French Camp Slough @ Airport Way	Copper (D)	07/13/10	45.48	3.5	µg/L	4508	µg/sec
French Camp Slough @ Airport Way	Copper (D)	08/10/10	25.75	2.9	µg/L	2115	µg/sec
French Camp Slough @ Airport Way	Copper (D)	01/11/11	204.31	3.4	µg/L	19671	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	01/11/11	204.31	3.4	µg/L	19671	µg/sec
French Camp Slough @ Airport Way	Copper (D)	02/08/11	9.18	2.3	µg/L	598	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	02/08/11	9.18	2.3	µg/L	598	µg/sec
French Camp Slough @ Airport Way	Copper (D)	04/12/11	24.60	3.5	µg/L	2438	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	04/12/11	24.60	3.4	µg/L	2368	µg/sec
French Camp Slough @ Airport Way	Copper (D)	05/24/11	58.85	3.5	µg/L	5833	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	05/24/11	58.85	3.6	µg/L	5999	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	06/28/11	28.26	3.6	µg/L	2881	µg/sec
French Camp Slough @ Airport Way	Copper (D)	06/28/11	28.26	3.5	µg/L	2801	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	07/26/11	6.47	1.8	µg/L	330	µg/sec

Site Name	Analyte Name	Sample Date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
French Camp Slough @ Airport Way	Copper (D)	07/26/11	6.47	1.9	µg/L	348	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	08/23/11	48.03	1.6	µg/L	2176	µg/sec
French Camp Slough @ Airport Way	Copper (D)	08/23/11	48.03	1.8	µg/L	2448	µg/sec
French Camp Slough @ Airport Way	Copper (D)	09/20/11	67.53	1.8	µg/L	3442	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	09/20/11	67.53	1.7	µg/L	3251	µg/sec
French Camp Slough @ Airport Way	Copper (D)	10/06/11	118.57	2.7	µg/L	9065	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	10/06/11	118.57	2.8	µg/L	9401	µg/sec
French Camp Slough @ Airport Way*	Copper (D)	11/15/11	0	2.1	µg/L	0	µg/sec
French Camp Slough @ Airport Way	Copper (D)	11/15/11	0	2.1	µg/L	0	µg/sec
French Camp Slough @ Airport Way	Copper (D)	12/13/11	2.76	2.1	µg/L	164	µg/sec
French Camp Slough @ Airport Way	Copper (D)	02/14/12	0.64	4.5	µg/L	82	µg/sec
French Camp Slough @ Airport Way	Copper (D)	05/16/12	27.83	1.8	µg/L	1419	µg/sec
French Camp Slough @ Airport Way	Copper (D)	06/19/12	48.48	1.6	µg/L	2196	µg/sec
French Camp Slough @ Airport Way	Copper (D)	07/17/12	58.98	1.6	µg/L	2672	µg/sec
French Camp Slough @ Airport Way	Copper (D)	08/21/12	21.51	1.4	µg/L	853	µg/sec
French Camp Slough @ Airport Way	Diazinon	02/16/05	706.00	0.052	µg/L	1040	µg/sec
French Camp Slough @ Airport Way	Diazinon	07/19/05	59.40	0.013	µg/L	22	µg/sec
French Camp Slough @ Airport Way	Diazinon	03/15/06	2030.00	0.087	µg/L	5001	µg/sec
French Camp Slough @ Airport Way	Diazinon	02/11/07	70.48	0.11	µg/L	220	µg/sec
French Camp Slough @ Airport Way	Diazinon	01/23/08	8.13	0.12	µg/L	28	µg/sec
French Camp Slough @ Airport Way	Dieldrin	07/10/07	27.64	0.0053	µg/L	4	µg/sec
French Camp Slough @ Airport Way	Dieldrin	07/15/08	30.20	0.0083	µg/L	7	µg/sec
French Camp Slough @ Airport Way	Diuron	05/16/06	54.83	0.21	µg/L	326	µg/sec
French Camp Slough @ Airport Way	Diuron	02/11/07	70.48	3.2	µg/L	6387	µg/sec
French Camp Slough @ Airport Way	Diuron	04/10/07	32.12	0.36	µg/L	327	µg/sec
French Camp Slough @ Airport Way	Diuron	05/22/07	71.95	0.30	µg/L	611	µg/sec
French Camp Slough @ Airport Way	Diuron	07/10/07	27.64	0.38	µg/L	297	µg/sec
French Camp Slough @ Airport Way*	Diuron	07/10/07	27.64	0.40	µg/L	313	µg/sec
French Camp Slough @ Airport Way	Diuron	01/23/08	8.13	3.3	µg/L	760	µg/sec
French Camp Slough @ Airport Way*	Diuron	04/15/08	57.81	0.79	µg/L	1293	µg/sec
French Camp Slough @ Airport Way	Diuron	04/15/08	57.81	0.84	µg/L	1375	µg/sec
French Camp Slough @ Airport Way	Diuron	06/10/08	19.99	0.23	µg/L	130	µg/sec
French Camp Slough @ Airport Way	Diuron	01/17/12	6.81	0.52	µg/L	100	µg/sec
French Camp Slough @ Airport Way	Diuron	02/14/12	0.64	0.27	µg/L	5	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

A complete review of source identification and outreach activities in the site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 201-227).

The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the French Camp Slough @ Airport Way management plan. Remaining high priority constituents in the French Camp Slough @ Airport Way management plan include chlorpyrifos and sediment toxicity to *H. azteca*. Nine exceedances of the WQTL for chlorpyrifos occurred in the site

subwatershed from 2005 to 2009 (19.5% of samples); comparatively, only four exceedances occurred from 2010 through 2013 as focused outreach was implemented (12% of samples). The PUR data indicate chlorpyrifos use has declined in recent years. For example, in the site subwatershed there were 7,000 pounds of chlorpyrifos applied in 2013 (preliminary PUR data through July 2013) versus 18,000 pounds applied in 2005 (2013 MPUR, Appendix I, Table VII-8). Growers are provided information on chlorpyrifos and are encouraged to review their operations to determine if storm water runoff/irrigation return flows are managed properly, specifically if parcels have the potential to drain to the creek.

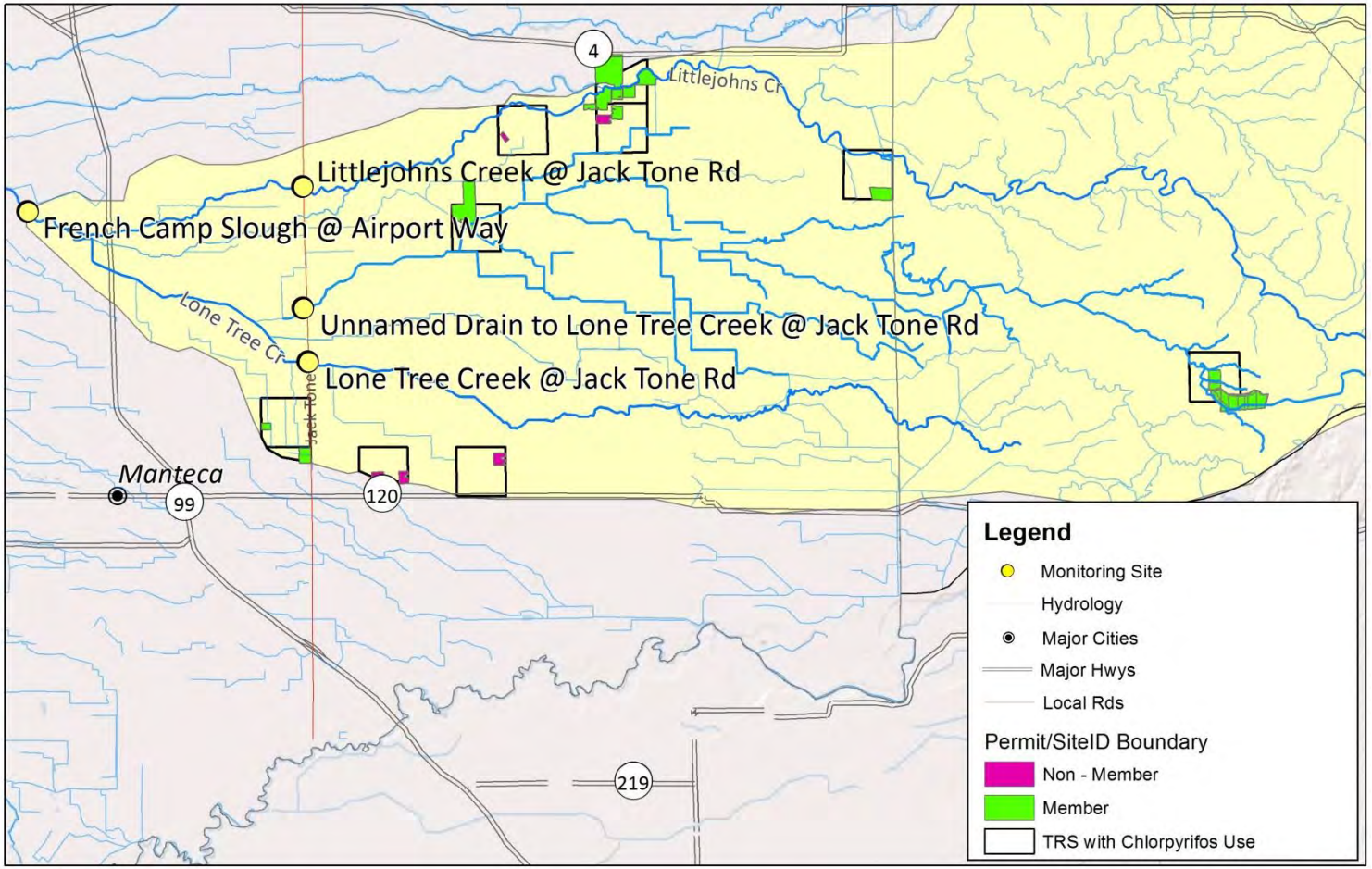
One exceedance in 2013 occurred for chlorpyrifos (Table VII-5). The chlorpyrifos concentration was above the WQTL in samples collected in July at French Camp Slough @ Airport Way (0.042 ug/L). Samples collected the same day from two upstream locations (Lone Tree Creek @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) had exceedance level detections of chlorpyrifos (0.026 ug/L and 0.041 ug/L, respectively). There are still several growers in the upstream subwatersheds that are not members of the Coalition and actively apply chlorpyrifos (Figure VII-2). The single exceedance of the WQTL for chlorpyrofis in July 2013 could have been due to upstream applications of chlorpyrifos in Littlejohns Creek @ Jack Tone Rd, Lone Tree Creek @ Jack Tone Rd, and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Applications of chlorpyrifos in the entire French Camp Slough subwatershed four weeks prior to the exceedance included 57 applications to walnuts and almonds.

French Camp Slough @ Airport Way sediment samples collected for September 2010 MPM were toxic to *H. azteca* and additional chemistry analysis resulted in detections of pyrethroids and chlorpyrifos. The Coalition believes that by addressing storm water and irrigation tailwater management during outreach, movement of pesticides to waterways, including chlorpyrifos and pyrethroids, will also be addressed. The most recent sediment toxicity to *H. azteca* occurred in October 2011; survival was greater than 80 % compared to the control and therefore additional sediment chemistry was not required.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR.

The Coalition carried out management practice tracking and outreach, including contacting targeted growers in 2011 and following up in 2012. The Coalition contacted 13 targeted growers, representing 3,767 irrigated acres within the French Camp Slough @ Airport Way site subwatershed (2013 MPUR, page 45) and documented current management practices (2012 MPUR, pages 50-55). Thirteen growers participated in follow-up contacts and documented newly implemented management practices in 2012 (2013 MPUR, pages 56-59). Additionally, focused outreach in the high priority site subwatersheds upstream of French Camp Slough (Lone Tree Creek @ Jack Tone Rd, Unnamed Drain to Lone Tree Creek @ Jack Tone Rd, and Littlejohns Creek @ Jack Tone Rd) was complete in 2012 which is expected to result in further water quality improvements in the French Camp Slough @ Airport Way site subwatershed.

Figure VII-2. French Camp Slough @ Airport Way and Direct Drainage Subwatershed member and non member parcels with applications associated with July 2013 exceedances of the WQTL for chlorpryifos.



Source of Layers:
Hydrology - NHD hydrodata, 1:24,000-scale, http://nhd.usgs.gov/
Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library.
TRS - Teale Public Land Survey System, Pub. date. 20090101, California Spatial Information Library.
CalAg Permit Layer - 2014 from each County
Basemap, Shaded Relief - ESRI
Datum - NAD 1983

N
0 1.5 3
Miles

Date Prepared: 03/12/14
ESJWQC

French Camp Slough @ Airport Way & Drainage Subwatersheds - irrig 3 MPM, NM 07/16/13 Chlorpyrifos Applications Associated with Permit/SiteID & TRS

Evaluation

Overall, substantial water quality improvements are apparent in the French Camp Slough @ Airport Way site subwatershed. The Coalition received approval on February 27, 2013 to remove six constituents from the site's management plan: copper, diazinon, diuron, lead, and toxicity to *C. dubia* and *S. capricornutum*. Dieldrin was also approved for removal from the management plan on March 22, 2012. The remaining constituents in the active management plan are chlorpyrifos, sediment toxicity to *H. azteca*, DO, E. coli, and pH. According to the PUR data, chlorpyrifos use has decreased in recent years and water quality improvements relative to this constituent are expected to continue. Since outreach began in 2011, the frequency of exceedances of the WQTL for chlorpyrifos has continued to decrease; two exceedances occurred in 2010, compared to none in 2011 and 2012 and one in 2013 (Table II-5). Management Plan Monitoring for chlorpyrifos d in 2013 resulted in one exceedance of the WQTL in July (0.042 ug/L). Samples collected on the same day from two upstream locations (Lone Tree Creek @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) also had concentrations of chlorpyrifos above the WQTL (0.026 ug/L and 0.041 ug/L, respectively). There are still several growers in those upstream site subwatersheds that are not members of the Coalition and actively apply chlorpyrifos. The single exceedance of the WQTL for chlorpyrofis in July 2013 could have been due to the upstream applications of chlorpyrifos in Littlejohns Creek @ Jack Tone Rd, Lone Tree Creek @ Jack Tone Rd, and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Management Plan Monitoring for sediment toxicity to *H. azteca* occurred in 2013 and resulted in no toxicity. The last sediment toxicity to *H. azteca* occurred during 2011.

Next Steps

The Coalition concluded focused outreach in the French Camp Slough @ Airport Way site subwatershed during 2013 and general outreach will continue in 2014. In 2014, the site subwatershed will be monitored for nutrients, metals, pesticides, and toxicity monthly during Assessment Monitoring. In addition, MPM for chlorpyrifos and sediment toxicity to *H. azteca* during months of past exceedances will continue.

VIII. MOKELUMNE RIVER @ BRUELLA RD

Overview

Mokelumne River @ Bruella Rd is one of the Coalition's third priority site subwatersheds. The Coalition completed the focused outreach portion of its management plan strategy in 2013, and monitoring results from 2011 through 2013 indicate improved water quality. The Coalition received approval on May 30, 2012 to remove copper and DO from the site's active management plan and toxicity to *C. dubia* and *S. capricornutum* on February 27, 2013. The only constituents remaining in the Mokelumne River @ Bruella Rd active management plan are priority E constituents: *E. coli* and pH.

Prior to the removal of *C. dubia* from the active management plan, toxicity to *C. dubia* was monitored in 2013 during February MPM and no toxicity occurred; the last toxicity occurred in February 2006.

Priority E constituents, *E. coli* and pH, will continue to be monitored during Core Monitoring in 2014. No MPM is scheduled for 2014 because all high priority constituents were approved for removal based on improved water quality demonstrated by a lack of exceedances in the last two years.

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 SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
E	*E. coli*	2010	Active
E	pH	2007	Active
CONSTITUENT (REMOVED)			
C	Copper	2008	2012
D	*S. capricornutum* water column toxicity	2006	2013
E	*C. dubia* water column toxicity	2006	2013
E	Dissolved Oxygen	2006	2012

Description of Site Subwatershed

Mokelumne River @ Bruella Rd is the Core Monitoring location within Zone 1 under the 2008 MRPP. The site subwatershed consists of 9,966 irrigated acres, and the upstream agriculture consists of vineyards that primarily are drip irrigated, orchards irrigated by microspray as well as field crops (Figure VIII-1). Flow in the Mokelumne River is controlled by the amount of water released from the 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).

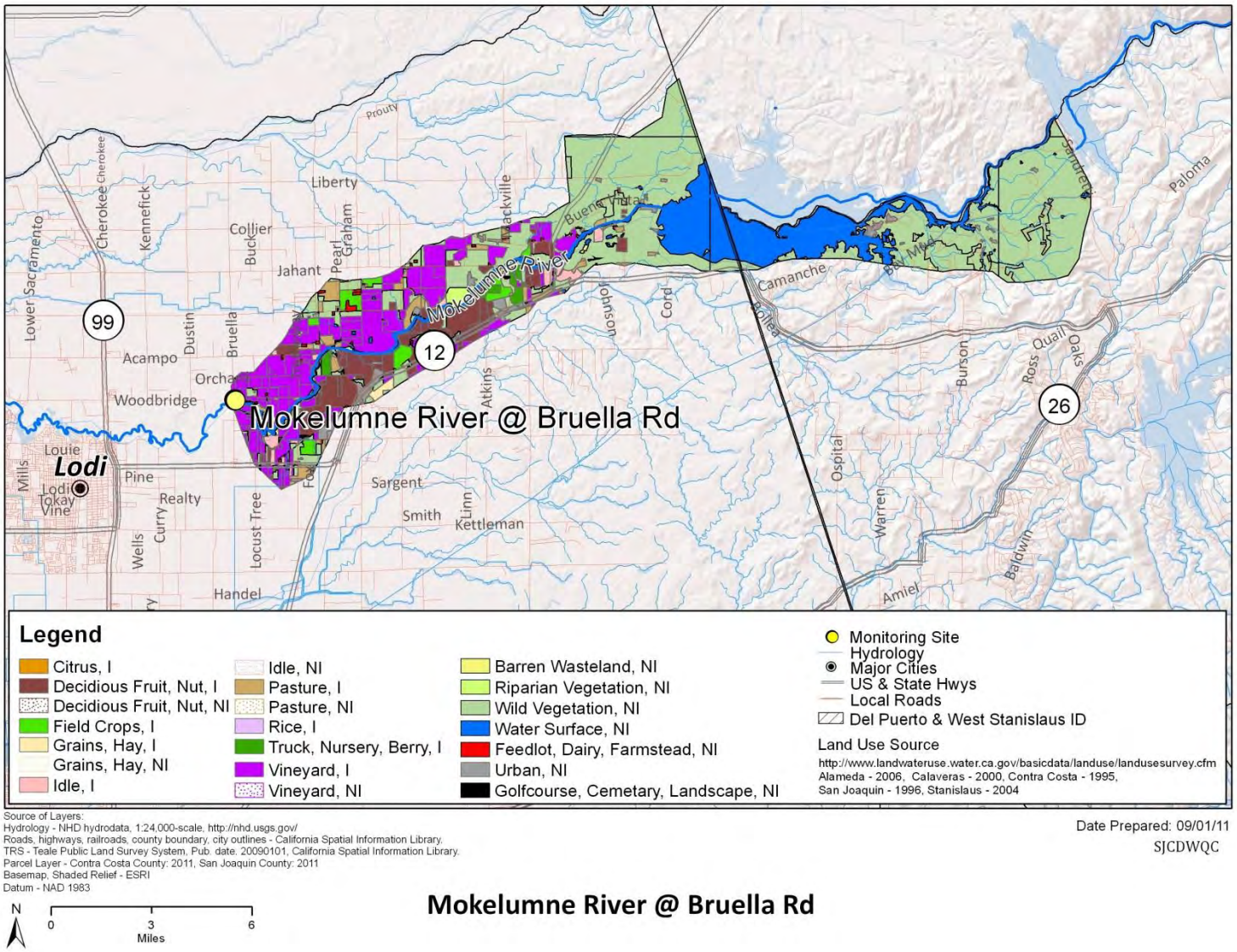
Mokelumne River, Lower (in Delta Waterways, eastern portion) is listed on California's 303(d) List of Impaired Waterbodies for chlorpyrifos, copper, mercury, zinc, unknown toxicity and DO.

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	38.2264	-121.0264

[US] Upstream site
*Original SJCDWQC sampling site

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



Subwatershed Monitoring History

Normal Monitoring at Mokelumne River @ Bruella Rd began in August 2004 and continued through 2008. Core Monitoring began in October 2008 with Assessment Monitoring occuring every third year; the last Assessment Monitoring year was 2011. Table VIII-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table III-3 for analytes sampled prior to 2008).

Management Plan Monitoring was initiated at the site subwatershed in 2007 (Table VIII-4). In an effort to source the chemicals that caused exceedances, additional sampling occurred at Mokelumne River @ Bruella Rd in 2007 and 2008, and upstream monitoring occurred at Mokelumne River @ Fish Hatchery in 2005. Management Plan Monitoring during months of past exceedances occurred at Mokelumne River @ Bruella Rd in 2010 through 2013 to evaluate water quality in the site subwatershed.

Table VIII-3. Mokelumne River @ Bruella Rd sampling events and analyses per year.

Only environmental samples are counted.

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

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

Type	Analyte	2008	2009	2010	2011	2012	2013
	Cypermethrin	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	9	0	0	12	4	1
	Pimephales promelas	0	0	0	12	0	0
	Selenastrum capricornutum	12	0	4	12	5	0
	Hyalella azteca	2	0	0	2	0	0

Table VIII-4. Mokelumne River @ Bruella Rd Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Copper	*C. dubia*	*S. capricornutum*
Mokelumne River @ Bruella Rd	06/20/07	Add.		X	
Mokelumne River @ Bruella Rd	08/28/07	Add.			X
Mokelumne River @ Bruella Rd	09/25/07	Add.		X	
Mokelumne River @ Bruella Rd	05/07/08	Add.			X
Mokelumne River @ Bruella Rd	06/03/08	Add.	X	X	
Mokelumne River @ Bruella Rd	07/08/08	Add.	X		X
Mokelumne River @ Bruella Rd	08/05/08	Add.	X		X
Mokelumne River @ Bruella Rd	09/09/08	Add.		X	
Mokelumne River @ Bruella Rd	04/13/10	MPM			X
Mokelumne River @ Bruella Rd	05/11/10	MPM			X
Mokelumne River @ Bruella Rd	06/08/10	MPM	X		
Mokelumne River @ Bruella Rd	07/13/10	MPM	X		X
Mokelumne River @ Bruella Rd	08/10/10	MPM	X		X
Mokelumne River @ Bruella Rd	02/08/11	MPM		X	
Mokelumne River @ Bruella Rd	03/08/11	MPM		X	X
Mokelumne River @ Bruella Rd	04/12/11	MPM			X
Mokelumne River @ Bruella Rd	05/24/11	MPM			X
Mokelumne River @ Bruella Rd	06/28/11	MPM	X	X	
Mokelumne River @ Bruella Rd	07/26/11	MPM	X		X
Mokelumne River @ Bruella Rd	08/23/11	MPM	X		X
Mokelumne River @ Bruella Rd	09/20/11	MPM		X	
Mokelumne River @ Bruella Rd	02/14/12	MPM		X	
Mokelumne River @ Bruella Rd	03/15/12	MPM		X	X
Mokelumne River @ Bruella Rd	04/12/12	MPM			X
Mokelumne River @ Bruella Rd	05/16/12	MPM			X
Mokelumne River @ Bruella Rd	06/19/12	MPM		X	
Mokelumne River @ Bruella Rd	07/17/12	MPM			X
Mokelumne River @ Bruella Rd	08/21/12	MPM			X
Mokelumne River @ Bruella Rd	09/18/12	MPM		X	
Mokelumne River @ Bruella Rd	02/21/13	MPM		X	

Add. – Additional sampling

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

2013 Monitoring Results

In February 2013, prior to the Coalition's approval to remove it from the site's active management plan, MPM occurred at Mokelumne River @ Bruella Rd for water column toxicity to *C. dubia* (Table VIII-4) and no toxicity occurred. No further MPM was scheduled after February 2013; all high priority constituents were approved for removal based on improved water quality demonstrated by a lack of exceedances in the last two years (Table VIII-5). Core Monitoring continued throughout 2013 and resulted in one exceedance of the WQTL for pH and one exceedance of the WQTL for *E. coli* (Table VIII-5).

Table VIII-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Mokelumne River @ Bruella Rd site subwatershed (organized alphabetically by constituent priority). Table VIII-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table XIII-7 contains the instantaneous loads for copper since monitoring began in the site subwatershed. A record of all exceedances in the Mokelumne River @ Bruella Rd site subwatershed since monitoring began is provided in Appendix II, Table VIII-A.

Table VIII-5. Mokelumne River @ Bruella Rd management plan constituent exceedance tally (2004-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table VIII-A.

	Active Management Plan Constituents		Removed Management Plan Constituents			
Monitoring Year	*E. coli*, >235 MPN/100 mL	pH <6.5 and >8.5 units	Copper (total) variable[1] or >1300 µg/L	*S. capricornutum*, (%Control)	*C. dubia*, (%Control)	Dissolved oxygen, <7 mg/L
2004	0	0	NA	1	1	0
2005	0	0	NA	2	2	2
2006	0	2	0	0	2	2
2007	0	1	3	1	0	0
2008	1	0	0	6	0	0
2009	1	2	NA	NA	NA	1
2010	0	1	0	0	NA	0
2011	2	3	0	0	0	0
2012	1	1	NA	0	0	0
2013	1	1	NA	NA	0	0
Overall Tally	**6**	**11**	**3**	**10**	**5**	**5**
Constituent	**E**	**E**	**C[R]**	**D[R]**	**E[R]**	**E[R]**

[1] Metal WQTL variable based on hardness.
NA – Not Applicable; monitoring did not occur for this constituent during the year.
[R] – Removed from active management plan

Table VIII-6. Mokelumne River site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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 (@ 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	5/07/08	6/03/08	7/08/08	8/05/08	9/09/08	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	6/08/10	7/13/10	8/10/10	9/07/10	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

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

MPM – Management Plan Monitoring (see Table 4 for MPM schedule).

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.

Table VIII-7. Mokelumne River site subwatershed instantaneous load calculations for copper.

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
Mokelumne River @ Bruella Rd	Copper	09/16/08	206.25	1.1	µg/L	6424	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 evaluated PUR data and past monitoring results to determine the sources of constituents listed in the Mokelumne River @ Bruella Rd management plan. Between 2012 and 2013, three high priority constituents were removed from the active management plan: copper and toxicity to *C. dubia* and *S. capricornutum*. A complete review of source identification and outreach activities in the site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (2013 MPUR Appendix I, pages 241-246).

Dissolved oxygen, *E. coli*, and pH are Core constituents and are monitored monthly at the site. Although theses constituents will remain low priority, the Coalition will continue to collect monitoring data on priority E constituents as a part of Core and Assessment Monitoring. All priority E constituents are discussed during targeted outreach and will continue to be discussed at annual grower meetings. The Coalition plans to participate in the focus group along with other Coalitions and Regional Board staff to develop a joint Work Plan to address *E. coli* exceedances by characterizing the potential agricultural sources of *E. coli* and identifying management practices to prevent discharges to surface waters.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR.

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 representing 937 acres within the site subwatershed (2013 MPUR, pages 35-37) and documented current management practices (2013 MPUR, pages 60-62). Eleven growers participated in follow-up contacts and documented newly implemented management practices in 2012 (2013 MPUR, pages 60-62).

Evaluation

Water quality has improved since focused outreach began in the Mokelumne River @ Bruella Rd site subwatershed. The Coalition completed focused outreach in the site subwatershed in 2013. The Coalition's strategy for the site subwatershed was to provide information to growers and review their

operation to determine if irrigation tailwater return flows were managed properly, specifically growers with parcels with the potential to drain to the waterway. Water quality has improved in the site subwatershed as indicated by the approval on May 30, 2012, to remove copper and DO from active management plan, and on February 27, 2013 all remaining high priority constituents were approved for removal: toxicity to *C. dubia* and *S. capricornutum*. The only constituents remaining in the site subwatershed management plan are low priority constituents: *E. coli* and pH.

Next Steps

Focused outreach is completed within this site subwatershed; however, general outreach will continue to occur. Assessment Monitoring at Mokelumne River @ Bruella Rd is scheduled during 2014. All high priority constituents requiring MPM have been removed from the active management plan; therefore, no MPM is scheduled for 2014. *E. coli* and pH will continue to be monitored as part of Core Monitoring.

IX. TERMINOUS TRACT DRAIN @ HWY 12

Overview

Terminous Tract Drain @ Hwy 12 is one of the Coalition's third priority site subwatersheds. The Coalition completed focused outreach in the site subwatershed in 2013. To evaluate the effectiveness of outreach, MPM during months of past exceedances occurred from 2010 through 2013 and monitoring results indicate improved water quality. Based on two or more years of no toxicity, the Coalition received approval to remove *P. promelas* and *S. capricornutum* from the Terminous Tract @ Hwy 12 active management plan on April 17, 2012 (Table IX-1). The remaining constituents in the site's management plan include: chlorpyrifos, sediment toxicity to *H. azteca* arsenic, DO, *E. coli*, SC, and TDS.

The Coalition's management plan strategy includes addressing irrigation and storm water management to improve water quality relative to exceedances of the WQTL for chlorpyrifos and sediment toxicity to *H. azteca.* The Coalition's strategy has been successful at eliminating the number of chlorpyrifos exceedances; the last exceedance of the chlorpyrifos WQTL occurred once during 2011.

Assessment Monitoring occurred at Terminous Tract @ Hwy 12 in 2013 in addition to MPM for chlorpyrifos and sediment toxicity to *H. azteca*; sediment toxicity to *H. azteca* and exceedances of the WQTLs for arsenic, DO, *E. coli*, SC, and TDS occurred. The Coalition's management plan strategy includes addressing irrigation and storm water management to improve water quality relative to exceedances of the WQTL for chlorpyrifos. The Coalition's strategy has been successful at eliminating the number of chlorpyrifos exceedances; the last exceedance of the WQTL occurred once during 2011.

During 2014, Core Monitoring and MPM for chlorpyrifos and sediment toxicity to *H. azteca* are scheduled.

Table IX-1. Terminous Tract Drain @ Hwy 12 management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2009	Active
D	*H. azteca* sediment toxicity	2007	Active
E	Arsenic	2008	Active
E	Dissolved Oxygen	2006	Active
E	*E. coli*	2006	Active
E	Specific Conductivity	2006	Active
E	Total Dissolved Solids	2006	Active
CONSTITUENT (REMOVED)			
E	*P. promelas* water column toxicity	2006	2012
E	*S. capricornutum* water column toxicity	2007	2012

Description of Site Subwatershed

Terminous Tract Drain @ Highway 12 is the Core Monitoring site in Zone 3 under the 2008 MRPP. This site subwatershed consists of 9,728 acres which include field crops, turf, truck/nursery/berry crops, grains, and hay (Figure IX-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. The Terminous Tract Drain @ Highway 12 site subwatershed includes two upstream locations, Delta Drain-Terminous Tract off Glasscock Rd and Delta Drain-Terminous Tract off Guard Rd (Table IX-2).

Caltrans road construction occurred upstream of Terminous Tract @ Hwy 12 from July 2012 through August 2013 and resulted in a large amount of suspended sediment in the waterway. As a result, elevated levels of TSS, TDS and turbidity were detected during 2013 monitoring.

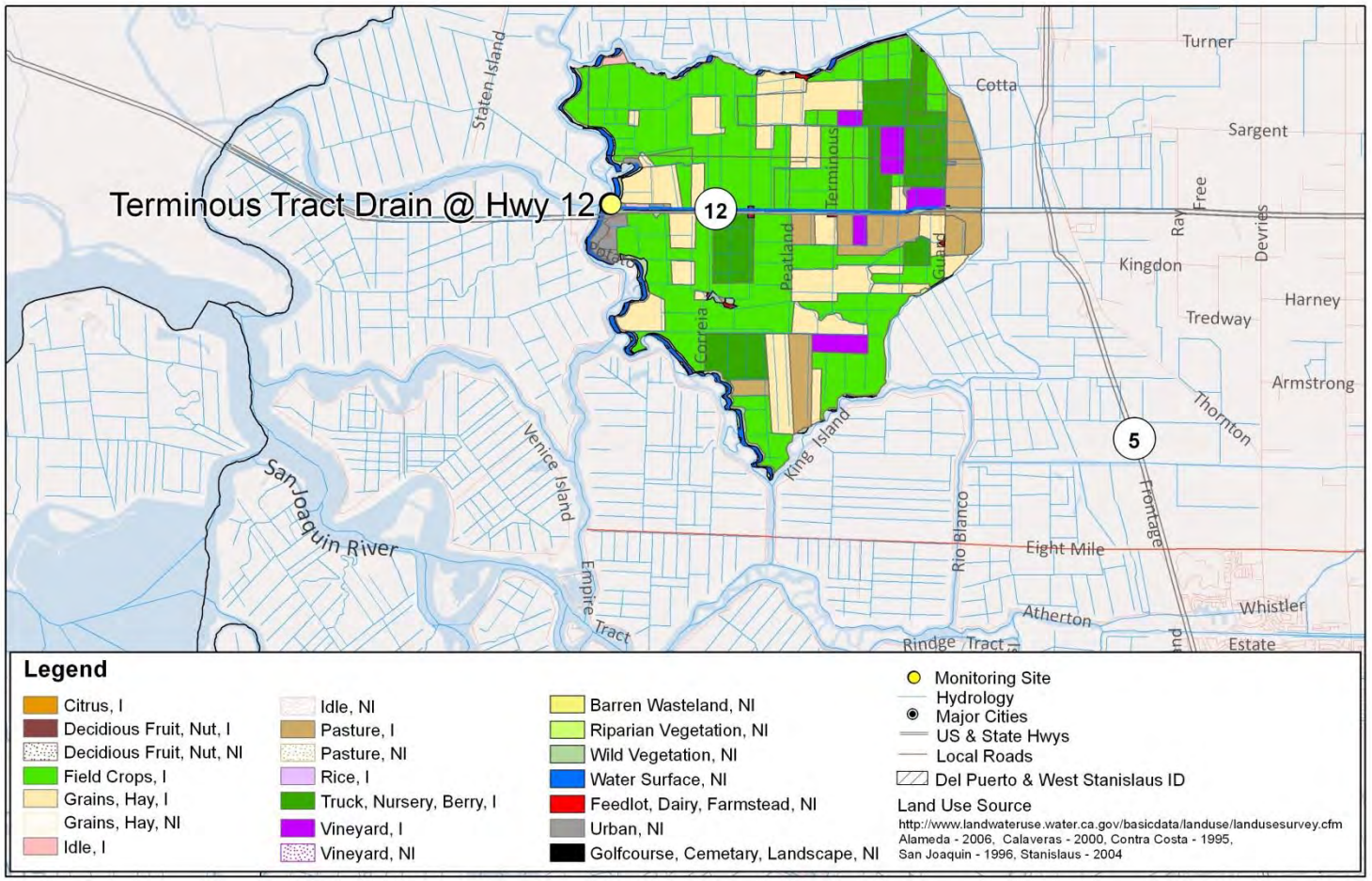
Terminous Tract Drain is not considered an impaired waterway on California's 303(d) List of Impaired Waterbodies (last updated in 2010). However, the represented TMDL subareas in the Delta Waterways (central and eastern portions) where Terminous Tract Drain eventually drains are listed for: chlorpyrifos,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

Table IX-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	38.1255	-121.4894
Terminous Tract off Guard Rd [US]	544XTTGUR	38.1167	-121.4211

[US] Upstream site

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



Subwatershed Monitoring History

Normal Monitoring was initiated at Terminous Tract Drain @ Hwy 12 in 2005 and continued through 2008. Core Monitoring began in October 2008 with Assessment Monitoring occuring every third year; the last Assessment Monitoring year was 2013. Table IX-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table IX-3 for analytes sampled prior to 2008).

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.

Management Plan Monitoring during months of past exceedances occurred at Terminous Tract Drain @ Hwy 12 from 2010 through 2013 to evaluate the effectiveness of the Coalition's outreach strategy and newly implemented management practices (Table IX-4).

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

Only environmental samples are counted.

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	13	12	12	14	12	13
	Dry Sites	0	0	0	0	0	0
	Events Sampled	13	12	12	14	12	13
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	13	12	12	14	12	13
	Dissolved Solids	10	12	12	12	12	12
	E. coli	10	12	12	12	12	12
	Grain size (sediment)	0	0	2	1	2	2
	Hardness as CaCO3	7	0	12	0	0	12
	pH	13	12	12	14	12	13
	Specific Conductivity	13	12	12	14	12	13
	Suspended Solids	3	12	12	12	12	12
	Total Organic Carbon	10	12	12	12	12	12
	Total Organic Carbon (sediment)	0	0	2	1	0	2
	Turbidity	10	12	12	12	12	12
Nutrients	Ammonia as N	10	12	12	12	12	12
	Nitrate + Nitrite as N	3	12	12	12	12	12
	Nitrate as N	7	0	0	0	0	0
	Nitrite as N	7	0	0	0	0	0
	Nitrogen, Total Kjeldahl	10	12	12	12	12	12
	OrthoPhosphate as P	10	12	12	12	12	12
	Phosphate as P	10	12	12	12	12	12
Metals (Dissolved)	Cadmium	0	0	12	0	0	12
	Copper	0	0	12	0	0	12
	Lead	0	0	12	0	0	12
	Nickel	0	0	12	0	0	12

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013
	Zinc	0	0	12	0	0	12
Metals (Total)	Arsenic	7	0	12	0	0	12
	Boron	7	0	12	0	0	12
	Cadmium	7	0	12	0	0	12
	Copper	7	0	12	0	0	12
	Lead	7	0	12	0	0	12
	Molybdenum	0	0	12	0	0	12
	Nickel	7	0	12	0	0	12
	Selenium	7	0	12	0	0	12
	Zinc	7	0	12	0	0	12
Carbamates	Aldicarb	7	0	12	0	0	12
	Carbaryl	7	0	12	0	0	12
	Carbofuran	7	0	12	0	0	12
	Diuron	7	0	12	0	0	12
	Linuron	7	0	12	0	0	12
	Methiocarb	7	0	12	0	0	12
	Methomyl	7	0	12	0	0	12
	Oxamyl	7	0	12	0	0	12
Group A Pesticides	Aldrin	0	8	0	0	0	0
	Chlordane	0	8	0	0	0	0
	Endosulfan I	0	8	0	0	0	0
	Endosulfan II	0	8	0	0	0	0
	HCH, alpha	0	8	0	0	0	0
	HCH, beta	0	8	0	0	0	0
	HCH, delta	0	8	0	0	0	0
	HCH, gamma	0	8	0	0	0	0
	Heptachlor	0	8	0	0	0	0
	Heptachlor epoxide	0	8	0	0	0	0
	Toxaphene	0	8	0	0	0	0
Herbicides	Atrazine	7	0	12	0	0	12
	Cyanazine	7	0	12	0	0	12
	Glyphosate	7	0	12	0	0	12
	Paraquat	7	0	12	0	0	12
	Simazine	7	0	12	0	0	12
	Trifluralin	0	0	12	0	0	12
Organochlorines	DDD(p,p')	7	8	12	0	0	12
	DDE(p,p')	7	8	12	0	0	12
	DDT(p,p')	7	8	12	0	0	12
	Dicofol	7	8	12	0	0	12
	Dieldrin	7	8	12	0	0	12
	Endrin	7	8	12	0	0	12
	Methoxychlor	7	8	12	0	0	12
Organophosphates	Azinphos methyl	7	0	12	0	0	12
	Chlorpyrifos	7	0	12	2	2	12
	Demeton-s	0	0	0	12	0	12
	Diazinon	7	0	12	0	0	12
	Dichlorvos	0	0	0	12	0	12
	Dimethoate	7	0	12	0	0	12
	Disulfoton	7	0	12	0	0	12
	Malathion	7	0	12	0	0	12
	Methamidophos	7	0	12	0	0	12
	Methidathion	7	0	12	0	0	12
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	7	0	12	0	0	12
	Phorate	7	0	12	0	0	12
	Phosmet	7	0	12	0	0	12
	Thiobencarb	7	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
Pyrethroids	Bifenthrin	0	0	0	0	0	0
	Cyfluthrin, total	0	0	0	0	0	0
	Cyhalothrin, lambda, total	0	0	0	0	0	0
	Cypermethrin, total	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	0	0	0	0	0	0
	Permethrin, total	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	1	0	0	1
	Chlorpyrifos	0	0	1	0	0	1
	Cyfluthrin	0	0	1	0	0	1
	Cyhalothrin, lambda	0	0	1	0	0	1
	Cypermethrin	0	0	1	0	0	1
	Deltamethrin: Tralomethrin	0	0	1	0	0	1
	Esfenvalerate/ Fenvalerate	0	0	1	0	0	1
	Fenpropathrin	0	0	1	0	0	1
	Permethrin	0	0	1	0	0	1
Toxicity	*Ceriodaphnia dubia*	7	0	12	0	0	12
	Pimephales promelas	7	0	12	0	0	12
	Selenastrum capricornutum	10	0	12	4	3	12
	Hyalella azteca	0	0	2	1	2	2

Table IX-4. Terminous Tract Drain @ Hwy 12 Management Plan Monitoring schedule (2010-2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	*S. capricornutum*	*H. azteca*
Terminous Tract Drain @ Hwy 12	04/13/10	MPM		X	
Terminous Tract Drain @ Hwy 12	05/11/10	MPM		X	
Terminous Tract Drain @ Hwy 12	08/10/10	MPM	X		
Terminous Tract Drain @ Hwy 12	09/07/10	MPM	X		
Terminous Tract Drain @ Hwy 12	01/11/11	MPM		X	
Terminous Tract Drain @ Hwy 12	02/08/11	MPM		X	
Terminous Tract Drain @ Hwy 12	04/12/11	MPM		X	
Terminous Tract Drain @ Hwy 12	05/24/11	MPM		X	
Terminous Tract Drain @ Hwy 12	08/23/11	MPM	X		
Terminous Tract Drain @ Hwy 12	09/20/11	MPM	X		
Terminous Tract Drain @ Hwy 12	10/14/11	MPM			X
Terminous Tract Drain @ Hwy 12	01/17/12	MPM		X	
Terminous Tract Drain @ Hwy 12	02/14/12	MPM		X	
Terminous Tract Drain @ Hwy 12	03/15/12	MPM			X
Terminous Tract Drain @ Hwy 12	04/12/12	MPM		X	
Terminous Tract Drain @ Hwy 12	08/21/12	MPM	X		
Terminous Tract Drain @ Hwy 12	09/18/12	MPM	X		X
Terminous Tract Drain @ Hwy 12	03/19/13	MPM			X
Terminous Tract Drain @ Hwy 12	08/20/13	MPM	X		
Terminous Tract Drain @ Hwy 12	09/17/13	MPM	X		X

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

2013 Monitoring Results

In 2013, Assessment Monitoring occurred at Terminous Tract Drain @ Hwy 12 in addition to MPM for chlorpyrifos and sediment toxicity to *H. azteca* (Table IX-4). No exceedances of the WQTL for chlorpyrifos occurred; however, sediment toxicity to *H. azteca* occurred in 2013 (Table IX-5). Since monitoring was initiated in 2005, there have been three exceedances of the chlorpyrifos WQTL with the most recent exceedance occurring in September 2011. Prior to the September 2013 toxicity, the most recent sediment toxicity to *H. azteca* occurred during September 2010. Exceedances of priority E constituents occurred during 2013 Assessment Monitoring including arsenic (1), DO (7), *E. coli* (1), SC (4), and TDS (4).

Table IX-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Terminous Tract Drain @ Hwy 12 site subwatershed (organized alphabetically by constituent priority). Table IX-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table IX-7 contains the instantaneous loads for chlorpyrifos, since monitoring began in the site subwatershed. A record of all exceedances in the Terminous Tract Drain @ Hwy 12 site subwatershed since monitoring began is provided in Appendix II, Table IX-A.

Table IX-5. Terminous Tract Drain @ Hwy 12 management plan constituent exceedance tally (2005-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table IX-A.

	Active Management Pla n Constituents							Removed Management Plan Constituents	
Monitoring Year	Chlorpyrifos, >0.015 µg/L	*H. azteca*, (%Control)	Arsenic, >10 µg/L	Dissolved Oxygen,<7 mg/L	*E. coli*, >235 MPN/100 mL	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L	*P. promelas*, (%Control)	*S. capricornutum*, (%Control)
2005	0	0	NA	4	2	4	2	1	1
2006	0	0	1	6	3	3	3	0	0
2007	0	0	2	8	3	3	2	0	0
2008	2	0	2	5	0	10	6	0	3
2009	NA	NA	NA	6	1	6	5	NA	NA
2010	0	1	2	7	1	6	6	0	0
2011	1	0	NA	9	2	8	7	NA	0
2012	0	0	NA	9	2	6	6	NA	0
2013	0	1	1	7	1	4	4	0	0
Overall Tally	**3**	**2**	**8**	**61**	**15**	**50**	**41**	**1**	**4**
Constituent	**A/B**	**D**	**E**	**E**	**E**	**E**	**E**	**E[R]**	**E[R]**

NA – Not Applicable; monitoring did not occur for this constituent during the year.
[R] – Removed from active management plan.

Table IX-6. Terminous Tract Drain @ Hwy 12 site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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	8/07/07	8/9/07	9/04/07	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	2/09/10		3/16/10	4/13/10	5/11/10	6/08/10	7/13/10	8/10/10		9/07/10	10/12/10	11/09/10	12/07/10
	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		9/07/10	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	2/08/11		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

MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
NA – Not Applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring.

Table IX-7. Terminous Tract Drain 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
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	03/21/05	9.06	0.012	µg/L	3	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	01/23/08	33.93	0.0047	µg/L	5	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	09/16/08	18.58	0.020	µg/L	11	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	09/07/10	4.07	0.011	µg/L	1	µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	09/20/11	22.89	0.082	µg/L	53	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

A complete review of source identification and outreach activities in the Terminous Tract @ Hwy 12 subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 267-273). The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the site subwatershed's management plan.

Chlorpyrifos is the only priority A/B constituent listed under the active management plan at the site. The PUR data indicate 2010 had the greatest amount of chlorpyrifos use (823 lbs AI); however, no exceedances coincide with 2010 applications (2013 MPUR, Appendix I, Table IX-8). The last exceedance of the chlorpyrifos WQTL occurred during September 2011. The PUR data indicate only a few growers are responsible for movement of chlorpyrifos to the waterway. The Coalition's strategy is to focus on growers with the potential to directly drain (including spray drift) to Terminous Tract Drain.

Five sediment toxicities to *H. azteca* have occurred at Terminous Tract Drain, including three toxicities at the upstream sites (Terminous Tract off Glasscock Rd and Terminous Tract off Guard Rd during 2005 through 2006), and one toxicity at Terminous Tract @ Hwy 12 during September 2010 and September 2013. Additional sediment chemistry on the 2010 and 2013 toxic samples resulted in detections of chlorpyrifos and pyrethroids. The Coalition believes that sediment toxicity, similar to chlorpyrifos, will be eliminated by addressing irrigation and storm water management.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR.

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, representing 1,778 acres within the Terminous Tract Drain @ Hwy 12 site subwatershed (2013 MPUR, pages 35-37) and documented current management practices (2012 MPUR,

pages 61-66). All four growers participated in follow-up contacts and documented newly implemented management practices during 2012 (2013 MPUR, pages 63-65).

Evaluation

Water quality has improved within the Terminous Tract Drain @ Hwy 12 site subwatershed. After two or more years with no toxicity, *P. promelas* and *S. capricornutum* were approved for removal from the Terminous Tract Drain @ Hwy 12 active management plan on April 17, 2012. The remaining high priority constituents under the management plan include chlorpyrifos and sediment toxicity to *H. azteca*. The Coalition's plan for addressing chlorpyrifos and sediment toxicity to *H. azteca* includes management of irrigation tailwater and storm water runoff. Since 2008, exceedances of the chlorpyrifos WQTL have been declining; the last exceedance of the chlorpyrifos WQTL occurred in 2011. Sediment toxicity to *H. azteca* occurred once during 2013 MPM and additional chemistry resulted in detections of pyrethroids and chlorpyrifos. Prior to the 2013 toxicity, the most recent sediment toxicity to *H. azteca* occurred during 2010. The remaining priority E constituents, arsenic, DO, *E. coli,* SC, and TDS have been discussed during focused and general outreach, and will continue to be discussed at annual grower meetings.

Next Steps

Focused outreach concluded in the Terminous Tract Drain @ Hwy 12 site subwatershed in 2013; however, general outreach will continue. In 2014, MPM for chlorpyrifos and sediment toxicity to *H. azteca* will continue to occur and field parameters, such as DO and SC, will be measured during all MPM events. In addition, Core Site Monitoring will occur at Terminous @ Hwy 12 and therefore monthly monitoring for the priority E constituents, *E. coli* and TDS will occur.

HIGH PRIORITY SITE SUBWATERSHEDS (2012–2014)

X. KELLOGG CREEK ALONG HOFFMAN LN

Overview

Kellogg Creek along Hoffman Ln is one of the Coalition's fourth priority site subwatersheds. The Coalition has completed two of the three years of its focused management plan strategy in the site subwatershed. The Coalition has evaluated the effectiveness of implemented management practices and results indicate water quality is improving. The Coalition received approval to remove chlorpyrifos, copper, water column toxicity to *C. dubia,* and DO from the active management plan on February 27, 2013. The remaining constituents in the stie's active management plan include: water column toxicity to *P. promelas* and *S. capricornutum*, sediment toxicity to *H. azteca,* DDE, DDT, *E. coli*, pH, SC, and TDS (Table X-1).

During 2013, MPM occurred for chlorpyrifos, copper, water column toxicity to *C. dubia* and *S. capricornutum*, and sediment toxicity to *H. azteca*; no exceedances or toxicity occurred. The field parameter, pH, was measured during all MPM events and three exceedances of the upper WQTL occurred. In 2014, MPM is scheduled to occur for sediment toxicity to *H. azteca* and water column toxicity to *S. capricornutum*. In 2014, the Coalition will complete its focused outreach and a complete evaluation of the effectiveness of management practices will be reported in the 2014 MPUR.

Table X-1. Kellogg Creek along Hoffman Ln management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
D	*H. azteca* sediment toxicity	2006	Active
D	*S. capricornutum* water column toxicity	2009	Active
E	DDE	2008	Active
E	DDT	2008	Active
E	*E. coli*	2006	Active
E	pH	2006	Active
E	*P. promelas* water column toxicity	2006	Active
E	Specific Conductivity	2006	Active
E	Total Dissolved Solids	2006	Active
CONSTITUENT (REMOVED)			
A/B	Chlorpyrifos	2006	2013
C	Copper	2008	2013
D	*C. dubia* water column toxicity	2007	2013
E	Dissolved Oxygen	2006	2013

Description of Site Subwatershed

Kellogg Creek along Hoffman Ln is a rotating Assessment Monitoring location in Zone 4 under the 2008 MRPP. The site subwatershed consists of 1,831 irrigated acres, of which is primarily includes deciduous orchards, truck crops and field crops (Figure X-1). This site is located north of Livermore, CA and is surrounded by a mixture of agricultural, preserved and urban landscapes. Kellogg Creek along Hoffman Ln drains the Los Vasqueros 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 X-2); this site was discontinued due to the large urban inputs. The next Assessment Monitoring at Kellogg Creek along Hoffman Ln is scheduled for 2035.

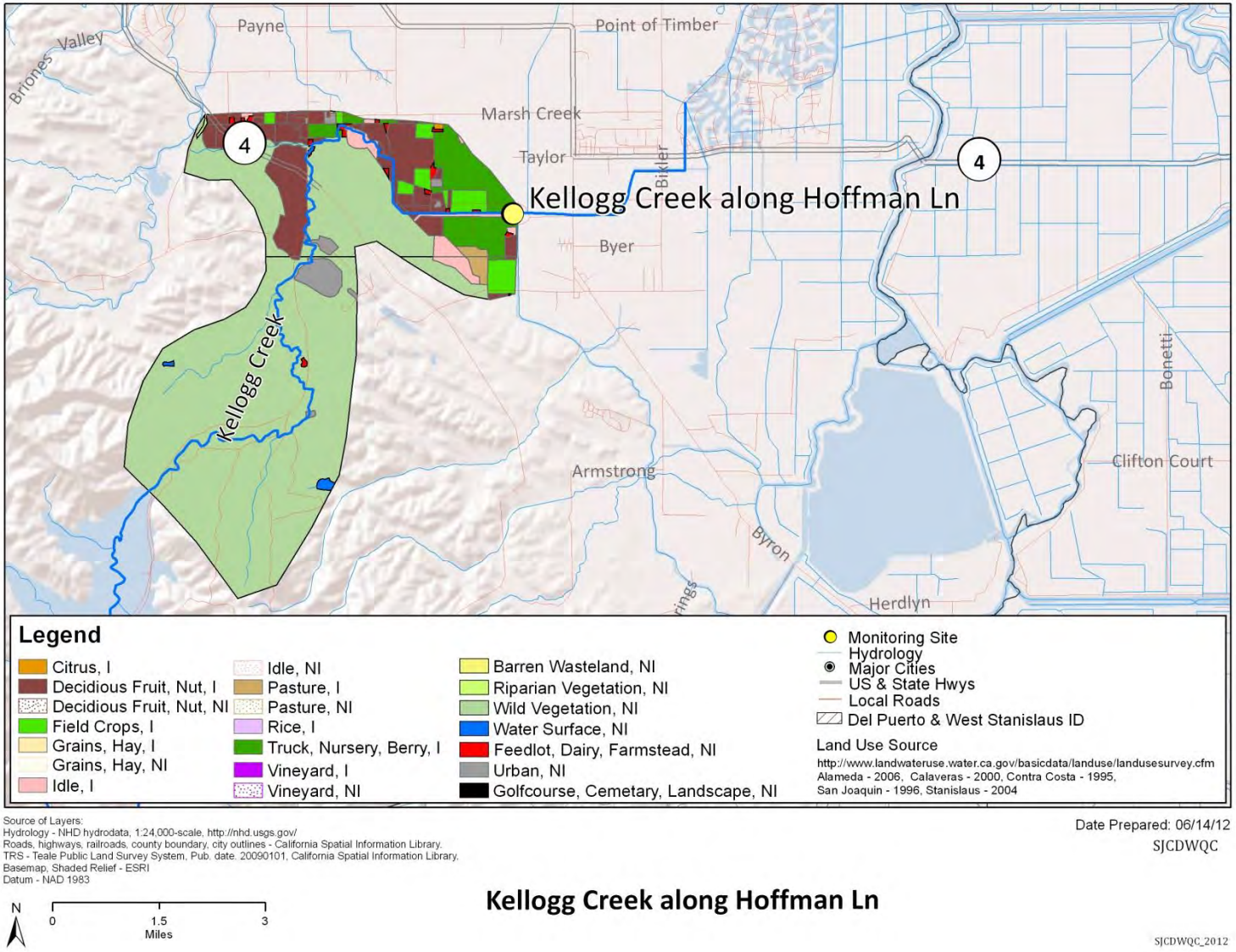
Kellogg Creek along Hoffman Ln is on California's 303 (d) list as an impaired waterbody for *E. coli*, DO, salinity, sediment toxicity, and unknown toxicity.

Table X-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 X-1. Kellogg Creek along Hoffman Ln site subwatershed land use map.



Subwatershed Monitoring History

Normal 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 due to large urban inputs in the Kellogg Creek @ Hwy 4 site subwatershed. No monitoring occurred from 2009 through 2010 at Kellogg Creek along Hoffman Ln; monitoring resumed from 2011 through 2013. Table X-3 contains the number of events monitored at Kellogg Creek along Hoffman Ln per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table X-3 for analytes sampled at the Kellogg Creek site subwatershed prior to 2008).

In an effort to source exceedances, additional MPM occurred for copper and water column toxicity to *C. dubia* in 2007, and for toxicity to *P. promelas* in 2008 at Kellogg Creek along Hoffman Ln (Table X-4). Chlorpyrifos was placed in the Kellogg Creek along Hoffman Ln management plan due to a single exceedance of the WQTL that occurred at Kellogg Creek @ Hwy 4 in 2005.

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

Only environmental samples are counted.

Type	Analyte	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	14	0	0	8	7	6
	Dry Sites	1	0	0	1	0	0
	Events Sampled	13	0	0	7	7	6
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	6	0	0	0	0	0
	Dissolved Oxygen	14	0	0	7	7	6
	Dissolved Solids	6	0	0	0	0	0
	E. coli	6	0	0	0	0	0
	Grain size (sediment)	0	0	0	2	2	2
	Hardness as CaCO3	7	1	0	0	2	1
	pH	14	0	0	7	7	6
	Specific Conductivity	14	0	0	7	7	6
	Suspended Solids	0	0	0	0	0	0
	Total Organic Carbon	6	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	2	2	2
	Turbidity	6	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0
	OrthoPhosphate as P	6	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0
	Copper	0	0	0	1	2	1
	Lead	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0
Metals (Total)	Arsenic	6	0	0	0	0	0
	Boron	6	0	0	0	0	0
	Cadmium	6	0	0	0	0	0
	Copper	7	0	0	1	2	1
	Lead	6	0	0	0	0	0
	Molybdenum	0	0	0	0	0	0
	Nickel	6	0	0	0	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
	Selenium	6	0	0	0	0	0
	Zinc	6	0	0	0	0	0
Carbamates	Aldicarb	6	0	0	0	0	0
	Carbaryl	6	0	0	0	0	0
	Carbofuran	6	0	0	0	0	0
	Diuron	6	0	0	0	0	0
	Linuron	6	0	0	0	0	0
	Methiocarb	6	0	0	0	0	0
	Methomyl	6	0	0	0	0	0
	Oxamyl	6	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0
Herbicides	Atrazine	6	0	0	0	0	0
	Cyanazine	6	0	0	0	0	0
	Glyphosate	6	0	0	0	0	0
	Paraquat	6	0	0	0	0	0
	Simazine	6	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0
Organochlorines	DDD(p,p')	6	0	0	0	0	0
	DDE(p,p')	6	0	0	0	0	0
	DDT(p,p')	6	0	0	0	0	0
	Dicofol	6	0	0	0	0	0
	Dieldrin	6	0	0	0	0	0
	Endrin	6	0	0	0	0	0
	Methoxychlor	6	0	0	0	0	0
Organophosphates	Azinphos methyl	6	0	0	0	0	0
	Chlorpyrifos	6	0	0	0	1	1
	Demeton-s	0	0	0	0	0	0
	Diazinon	6	0	0	0	0	0
	Dichlorvos	0	0	0	0	0	0
	Dimethoate	6	0	0	0	0	0
	Disulfoton	6	0	0	0	0	0
	Malathion	6	0	0	0	0	0
	Methamidophos	6	0	0	0	0	0
	Methidathion	6	0	0	0	0	0
	Molinate	6	0	0	0	0	0
	Parathion, Methyl	6	0	0	0	0	0
	Phorate	6	0	0	0	0	0
	Phosmet	6	0	0	0	0	0
	Thiobencarb	6	0	0	0	0	0
Pyrethroids	Bifenthrin	6	0	0	0	0	0
	Cyfluthrin, total	6	0	0	0	0	0
	Cyhalothrin, lambda, total	6	0	0	0	0	0
	Cypermethrin, total	6	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	6	0	0	0	0	0
	Permethrin, total	6	0	0	0	0	0
Sediment Pesticide	Bifenthrin	0	0	0	2	0	0
	Chlorpyrifos	0	0	0	2	0	0
	Cyfluthrin	0	0	0	2	0	0

Type	Analyte	2008	2009	2010	2011	2012	2013
	Cyhalothrin, lambda	0	0	0	2	0	0
	Cypermethrin	0	0	0	2	0	0
	Deltamethrin: Tralomethrin	0	0	0	2	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	2	0	0
	Fenpropathrin	0	0	0	2	0	0
	Permethrin	0	0	0	2	0	0
Toxicity	*Ceriodaphnia dubia*	7	0	0	2	3	1
	Pimephales promelas	6	0	0	0	0	0
	Selenastrum capricornutum	8	0	0	3	3	3
	Hyalella azteca	3	0	0	2	2	2

Table X-4. Kellogg Creek along Hoffman Ln Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Copper	Chlorpyrifos	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Kellogg Creek along Hoffman Ln	06/20/07	Add.				X		
Kellogg Creek along Hoffman Ln	09/25/07	Add.				X		
Kellogg Creek along Hoffman Ln	04/30/08	Add.			X			
Kellogg Creek along Hoffman Ln	07/08/08	Add.	X					
Kellogg Creek along Hoffman Ln	02/08/11	MPM	X	X	X			
Kellogg Creek along Hoffman Ln	03/08/11	MPM			X			X
Kellogg Creek along Hoffman Ln	04/12/11	MPM			X		X	
Kellogg Creek along Hoffman Ln	05/24/11	MPM					X	
Kellogg Creek along Hoffman Ln	07/26/11	MPM	X					
Kellogg Creek along Hoffman Ln	08/23/11	MPM					X	
Kellogg Creek along Hoffman Ln	10/14/11	MPM						X
Kellogg Creek along Hoffman Ln	02/14/12	MPM	X	X	X			
Kellogg Creek along Hoffman Ln	03/15/12	MPM			X			X
Kellogg Creek along Hoffman Ln	04/12/12	MPM			X		X	
Kellogg Creek along Hoffman Ln	05/16/12	MPM					X	
Kellogg Creek along Hoffman Ln	07/17/12	MPM	X					
Kellogg Creek along Hoffman Ln	08/21/12	MPM					X	
Kellogg Creek along Hoffman Ln	09/21/12	MPM						X
Kellogg Creek along Hoffman Ln	02/21/13	MPM	X	X	X			
Kellogg Creek along Hoffman Ln	03/19/13	MPM						X
Kellogg Creek along Hoffman Ln	04/02/13	MPM					X	
Kellogg Creek along Hoffman Ln	05/21/13	MPM					X	
Kellogg Creek along Hoffman Ln	08/20/13	MPM					X	
Kellogg Creek along Hoffman Ln	09/17/13	MPM						X

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

2013 Monitoring Results

In 2013, MPM for water column toxicity to *S. capricornutm* and sediment toxicity to *H. azteca* occur and resulted in no toxicity. The Coalition collected samples in February to monitor for chlorpyrifos, copper, and water column toxicity to *C. dubia* prior to receiving approval to remove from the active management plan on February 27, 2013. No exceedances of the WQTLs occurred for chlorpyrifos or dissolved copper and no toxicity to *C. dubia* occurred. Exceedances of the WQTL for chlorpyrifos have not occurred at Kellogg Creek along Hoffman Ln, but the constituent was placed on the active management plan and monitored due to an exceedance of the WQTL for chlorpyrifos at Kellogg Creek @ Hwy 4 in 2005. The last exceedances of the hardness based WQTL for copper was in 2008 (Table X-5). The last toxicity to *C. dubia* and *S. capricornutum* occurred in April 2007 and May 2008; respectively. The last time sediment toxicity occurred was September 2011.

The field parameter, pH, was measured during all MPM events in 2013; three exceedances of the upper WQTL limit occurred. The DO measurements at Kellogg Creek along Hoffman Ln (6.99 mg/L) on August 21, 2012 were reported as exceedances after these constituents were approved for removal from the site subwatershed's management plans. However, based on the Fourth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins, the lower DO trigger limit of 5 mg/L should be utilized for Delta waterways that have a 'warm' beneficial use designation, and/or not considered a resource for fisheries. Therefore, the Coalition reevaluated the DO measurements at the site and determined it was not considered an exceedance.

Table X-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Kellogg Creek @ Hwy 4 site subwatershed (organized alphabetically by constituent priority). Table X-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table X-7 contains the instantaneous loads for chlorpyrifos and copper since monitoring began in the site subwatershed. A record of all exceedances in the Kellogg Creek site subwatershed since monitoring began is provided in Appendix II, Table X-A.

Table X-5. Kellogg Creek management plan constituent exceedance tally (2005-2013).

Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table IX-A.

Monitoring Year	Active Management Plan Constituents									Removed Management Plan Constituents			
	H. azteca, (%Control)	*S. capricornutum*, (%Control)	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L	*E. coli*, >235 MPN/100 mL	pH, <6.5 and >8.5 units	*P. promelas*, (%Control)	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L	Chlorpyrifos, >0.015 µg/L	Copper (Total), Variable[1] or >1300 µg/L	*C. dubia*, (%Control)	Dissolved Oxygen, <7 mg/L
2005	3	1	NA	NA	4	2	2	5	3	1	NA	1	2
2006	0	0	1	1	4	0	0	6	4	0	NA	1	4
2007	2	0	2	1	1	2	0	0	1	0	2	1	2
2008	2	4	0	0	0	1	0	0	0	0	1	0	3
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	2	0	NA	NA	NA	4	NA	1	NA	NA	0	0	0
2012	0	0	NA	NA	NA	4	NA	0	NA	NA	0	0	0
2013	0	0	NA	NA	NA	3	NA	0	NA	0	0	0	0
Overall Tally	**9**	**5**	**3**	**2**	**9**	**16**	**2**	**12**	**8**	**1**	**3**	**3**	**11**
Constituent Priority	**D**	**D**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**A/B[R]**	**C[R]**	**D[R]**	**E[R]**

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

[R] – Removed from active management plan.

Table X-6. Kellogg Creek site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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
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

Add. – Additional monitoring conducted in 2007 and 2008 only.
MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
NA – No monitoring occurred on this date for this constituent.
NM – Normal Monitoring

Table X-7. Kellogg Creek along Hoffman Ln site subwatershed instantaneous load calculations for copper.
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
Kellogg Creek along Hoffman Ln	Copper	08/15/06	16.22	2.1	µg/L	965	µg/sec
Kellogg Creek along Hoffman Ln	Copper	09/19/06	0	4.5	µg/L	0	µg/sec
Kellogg Creek along Hoffman Ln	Copper	02/11/07	0.04	4.0	µg/L	5	µg/sec
Kellogg Creek along Hoffman Ln	Copper	02/28/07	0	17	µg/L	0	µg/sec
Kellogg Creek along Hoffman Ln	Copper	04/15/08	29.54	3.1	µg/L	2593	µg/sec
Kellogg Creek along Hoffman Ln	Copper	05/13/08	31.98	4.3	µg/L	3894	µg/sec
Kellogg Creek along Hoffman Ln	Copper	06/10/08	34.15	4.4	µg/L	4255	µg/sec
Kellogg Creek along Hoffman Ln	Copper	07/08/08	18.41	98	µg/L	51089	µg/sec
Kellogg Creek along Hoffman Ln	Copper	07/15/08	28.77	2.5	µg/L	2037	µg/sec
Kellogg Creek along Hoffman Ln	Copper	08/12/08	21.44	2.1	µg/L	1275	µg/sec
Kellogg Creek along Hoffman Ln	Copper	09/16/08	14.91	2.6	µg/L	1098	µg/sec
Kellogg Creek along Hoffman Ln	Copper	07/26/11	13.89	7.2	µg/L	2832	µg/sec
Kellogg Creek along Hoffman Ln	Copper	02/14/12	0	1.9	µg/L	0	µg/sec
Kellogg Creek along Hoffman Ln	Copper	07/17/12	19.68	2.5	µg/L	1393	µg/sec
Kellogg Creek along Hoffman Ln	Copper	02/21/13	2.72	3.3	µg/L	254	µg/sec
Kellogg Creek along Hoffman Ln	Copper (D)	07/26/11	13.89	1.1	µg/L	433	µg/sec
Kellogg Creek along Hoffman Ln	Copper (D)	02/14/12	0	1.3	µg/L	0	µg/sec
Kellogg Creek along Hoffman Ln	Copper (D)	07/17/12	19.68	1.4	µg/L	780	µg/sec
Kellogg Creek along Hoffman Ln	Copper (D)	02/21/13	2.72	2.0	µg/L	154	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.
Copper (D)-Dissolved Copper

Source Identification and Outreach

A complete review of source identification and outreach is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 288-300). The Coalition evaluated PUR data and past monitoring results to determine sources of constituents listed in the Kellogg Creek along Hoffman Ln management plan.

Toxicity to *S. capricornutum* occurred in April (17% survival compared to the control) and May (5% survival compared to the control) 2008. Phase III TIEs were conducted on both samples and results indicated diuron, copper, and zinc were linked to the toxicity to *S. capricornutum* in April 2008. The toxicity to *S. capricornutum* in May 2008 was likely caused by copper and zinc (2009 SAMR, pages 111-112).

The PUR data indicate 20 combined applications of herbicides and pesticides, in particular pyrethroids, were associated with the persistent sediment toxicity to *H. azteca* in March and April 2008, resulting in 78% and 62% survival compared to the control, respectively. In September 2010, the Coalition began performing chemical analyses on toxic samples that resulted in 80% or less survival compared to the control. Additional chemistry analyses conducted on toxic sediment samples in March and October 2011 indicated that the sediment contained chlorpyrifos and pyrethroids.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority site subwatersheds in the Management Practice Tracking Strategy section of the main body of the 2014 MPUR.

Focused outreach to document management practices and track implementation of additional management practices began in 2012 and will be compete in 2014. The Coalition contacted 10 targeted growers, representing 402 acres within the Kellogg Creek site subwatershed in 2012 (2013 MPUR, page 66). Targeted growers already implemented management practices to reducing runoff water volumes, installation of sprinkler or micro irrigation and center grass rows/grass waterways/grass filter strips. The follow-up survey responses provided in the 2014 MPUR indicate targeted growers implemented new management practices that include: reducing pesticide use and irrigation tailwater runoff and installing sprinkler and microirrigation systems.

Evaluation

Overall, water quality is improving since focused outreach began in the site subwatershed. Due to continued improvements, chlorpyrifos, copper, water column toxicity to *C. dubia,* and DO were removed from the Kellogg Creek along Hoffman Ln site subwatershed active management plan on February 27, 2013. The Coalition's focused outreach is aimed at working with growers identified as potential sources of agricultural discharge within site subwatersheds that could result in water quality impairments, particularly parcels with the potential to drain to the waterway. The remaining constituents in the active management plan are sediment toxicity to *H. azteca*, water column toxicity to *S. capricornutum* and *P. promelas*, DDE, DDT, *E. coli*, pH, SC, and TDS. The Coalition will continue MPM in 2014 to evaluate the effectiveness of focused outreach on water quality.

Next Steps

Focused outreach will be completed in 2014 within the Kellogg Creek along Hoffman Ln site subwatershed. In 2014, MPM will occur for water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca,* which will allow the Coalition to evaluate the effectiveness of its focused management plan strategy. The field parameters, SC and pH, are measured during every monitoring event. General outreach will continue to keep growers informed of water quality concerns and applicable management practices designed to improve water quality.

XI. MORMON SLOUGH @ JACK TONE RD

Overview

Mormon Slough @ Jack Tone Rd is one of the Coalition's fourth priority site subwatersheds. The Coalition has completed two of the three years of its focused management plan strategy in the site subwatershed. The Coalition contacted targeted growers to document current and newly implemented practices and address water quality impairments. To evaluate the effectiveness of management practices on improving water quality, MPM occurred during months of past exceedances from 2011 through 2013 and results indicate water quality is improving. The constituents listed in the active management plan are chlorpyrifos, water column toxicity to *C. dubia* and *S. capricornutum*, DO, and pH (Table XI-1).

During 2013, MPM occurred for chlorpyrifos and water column toxicity to *C. dubia* and *S. capricornutum* and no exceedances or toxicity occurred. Priority E constituents, DO and pH, were monitored during every MPM event in 2013; a single exceedance of the WQTL for DO and two exceedances of the WQTL for the upper limit of pH occurred.

Management Plan Monitoring is scheduled to continue for chlorpyrifos and water column toxicity to *C. dubia* and *S. capricornutum* in 2014.

Table XI-1. Mormon Slough @ Jack Tone Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2007	Active
D	*C. dubia* water column toxicity	2009	Active
D	*S. capricornutum* water column toxicity	2009	Active
E	Dissolved Oxygen	2007	Active
E	pH	2009	Active

Description of Site Subwatershed

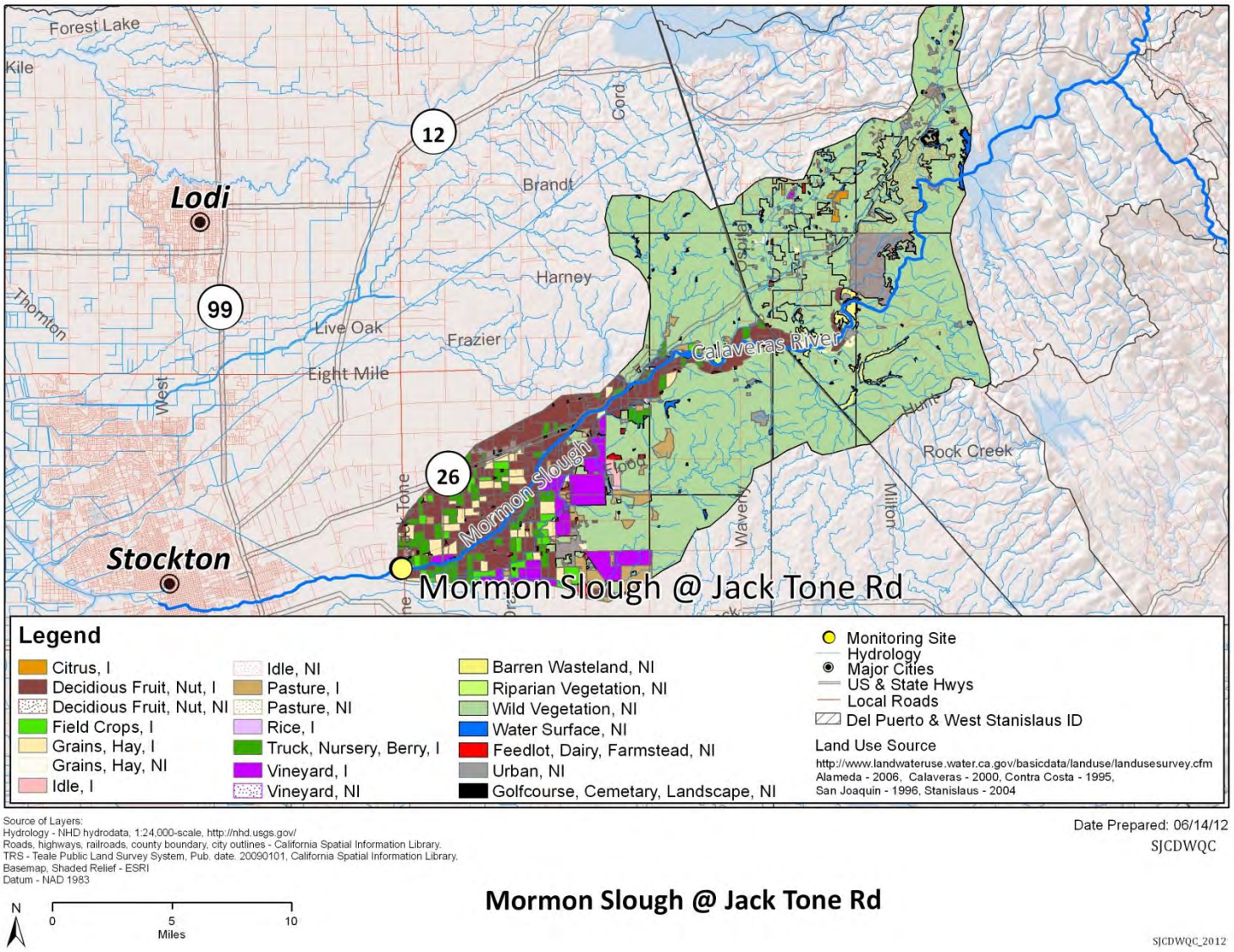
Mormon Slough @ Jack Tone Rd is a rotating Assessment Monitoring location within the French Camp Slough Zone (Zone 2) under the 2008 MRPP. This site is located on the eastern portion of San Joaquin County and extends upstream into Calaveras County (Table XI-2). This site subwatershed consists of 24,615 irrigated acres which primarily consist of deciduous trees with smaller amounts of vineyard, truck farm/nursery and berry crops (Figure XI-1).

Mormon Slough is currently 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 XI-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 XI-1. Mormon Slough @ Jack Tone Rd site subwatershed land use map.



Subwatershed Monitoring History

Normal Monitoring began at Mormon Slough @ Jack Tone Rd during the irrigation season of 2006 and continued through September 2008 at which time the site became an Assessment Monitoring location. Assessment Monitoring last occurred in 2008 for this site subwatershed. No monitoring occurred from 2009 through 2010. Table XI-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table XI-3 for analytes sampled prior to 2008).

Management Plan Monitoring was initiated at Mormon Slough @ Jack Tone Rd in 2008. In an effort to source the chemicals that caused exceedances, additional MPM occurred for chlorpyrifos in 2008 at Mormon Slough @ Jack Tone Rd. Management Plan Monitoring occurred for chlorpyrifos, toxicity to *C. dubia* and *S. capricornutum* from 2011 through 2013 to evaluate the effectiveness of the Coalition's outreach strategy and the newly implemented management practices on water quality (Table XI-4). In 2014, MPM for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum* is scheduled during months of past exceedances.

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

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

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

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

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

Table XI-4. Mormon Slough @ Jack Tone Rd Management Plan Monitoring schedule (2008-2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	*C. dubia*	*S. capricornutum*
Mormon Slough @ Jack Tone Rd	05/07/08	Add.	X		
Mormon Slough @ Jack Tone Rd	09/09/08	Add.	X		
Mormon Slough @ Jack Tone Rd	04/12/11	MPM			X
Mormon Slough @ Jack Tone Rd	05/24/11	MPM	X	X	X
Mormon Slough @ Jack Tone Rd	07/26/11	MPM	X		X
Mormon Slough @ Jack Tone Rd	08/23/11	MPM	X		
Mormon Slough @ Jack Tone Rd	09/20/11	MPM	X	X	
Mormon Slough @ Jack Tone Rd	04/12/12	MPM			X
Mormon Slough @ Jack Tone Rd	05/16/12	MPM	X	X	X
Mormon Slough @ Jack Tone Rd	07/17/12	MPM	X		X
Mormon Slough @ Jack Tone Rd	08/21/12	MPM	X		
Mormon Slough @ Jack Tone Rd	09/18/12	MPM	X	X	
Mormon Slough @ Jack Tone Rd	04/02/13	MPM			X
Mormon Slough @ Jack Tone Rd	05/21/13	MPM	X	X	X
Mormon Slough @ Jack Tone Rd	07/16/13	MPM	X		X
Mormon Slough @ Jack Tone Rd	08/20/13	MPM	X		
Mormon Slough @ Jack Tone Rd	09/17/13	MPM	X	X	

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

2013 Monitoring Results

During 2013, MPM occurred for chlorpyrifos and water column toxicity to *C. dubia* and *S. capricornutum;* no exceedances of the WQTL or toxicity occurred (Table XI-5). The last exceedance of the WQTL for chlorpyrifos occurred in September 2011. The last time water column toxicity to *C. dubia* and *S. capricornutum* occurred was in May 2008. The Priority E constituents, DO and pH, were measured during all MPM events in 2013. A single exceedance of the WQTL for DO occurred in May 2013 and two exceedances of the upper WQTL for pH occurred in July and August 2013.

In September 2013, the site could not be sampled due to construction. The site was dammed off by San Joaquin County maintenance crews who were repairing the bridge columns and adding rip-rap at the site to reduce scour. Therefore samples could not be collected for chlorpyrifos or toxicity to *C. dubia* MPM.

Table XI-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Mormon Slough @ Jack Tone Rd site subwatershed (organized alphabetically by constituent priority). Table XI-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table XI-7 contains the instantaneous loads for chlorpyrifos since monitoring began in the site subwatershed. A record of all exceedances in the Mormon Slough @ Jack Tone Rd site subwatershed since monitoring began is provided in Appendix II, Table XI-A.

Table XI-5. Mormon Slough @ Jack Tone Rd management plan constituent exceedance tally (2006-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table XI-A.

Monitoring Year	Chlorpyrifos, >0.015 µg/L	*C. dubia*, (%Control)	*S. capricornutum*, (%Control)	Dissolved Oxygen, <7 mg/L	pH, <6.5 and >8.5 units
2006	1	0	0	3	0
2007	1	1	1	3	0
2008	5	1	3	5	4
2011	1	0	0	0	2
2012	0	0	0	2	1
2013	0	0	0	1	2
Overall Tally	**8**	**2**	**4**	**14**	**9**
Constituent Priority	**A/B**	**D**	**D**	**E**	**E**

Table XI-6. Mormon Slough @ Jack Tone Rd site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

Exceedance values are in bold. Resampling (RS) due to toxicity not included in table.

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

MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
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 XI-6. 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	07/10/07	0	0.015	µg/L	0	µg/sec
Mormon Slough @ Jack Tone Rd	Chlorpyrifos	09/04/07	0	0.21	µg/L	0	µg/sec
Mormon Slough @ Jack Tone Rd	Chlorpyrifos	09/16/08	0	0.036	µg/L	0	µg/sec
Mormon Slough @ Jack Tone Rd	Chlorpyrifos	09/20/11	0	0.11	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

A complete review of the source identification and outreach activities in the Mormon Slough @ Jack Tone Rd site subwatershed is provided in the 2013 MPUR Appendix I (pages 310-316). The Coalition evaluated PUR data and past monitoring results to determine the sources of the site's high priority management plan constituents.

Chlorpyrifos is the only priority A/B constituent listed in the site's active management plan. Overall, most chlorpyrifos applications occur during July and August. High chlorpyrifos use occurred in both 2006 and 2010. Exceedances of the WQTL for chlorpyrifos occurred eight times in the Mormon Slough @ Jack Tone Rd site subwatershed from 2006 through 2013; all exceedances of the WQTL for chlorpyrifos occurred during the irrigation season. Despite similar chlorpyrifos use during 2008 and 2011, five exceedances of the WQTL for chlorpyrifos occurred in 2008, whereas only one occurred in 2011 (Figure XI-2). September 2011 was the last time an exceedance of the WQTL for chlorpyrifos occurred.

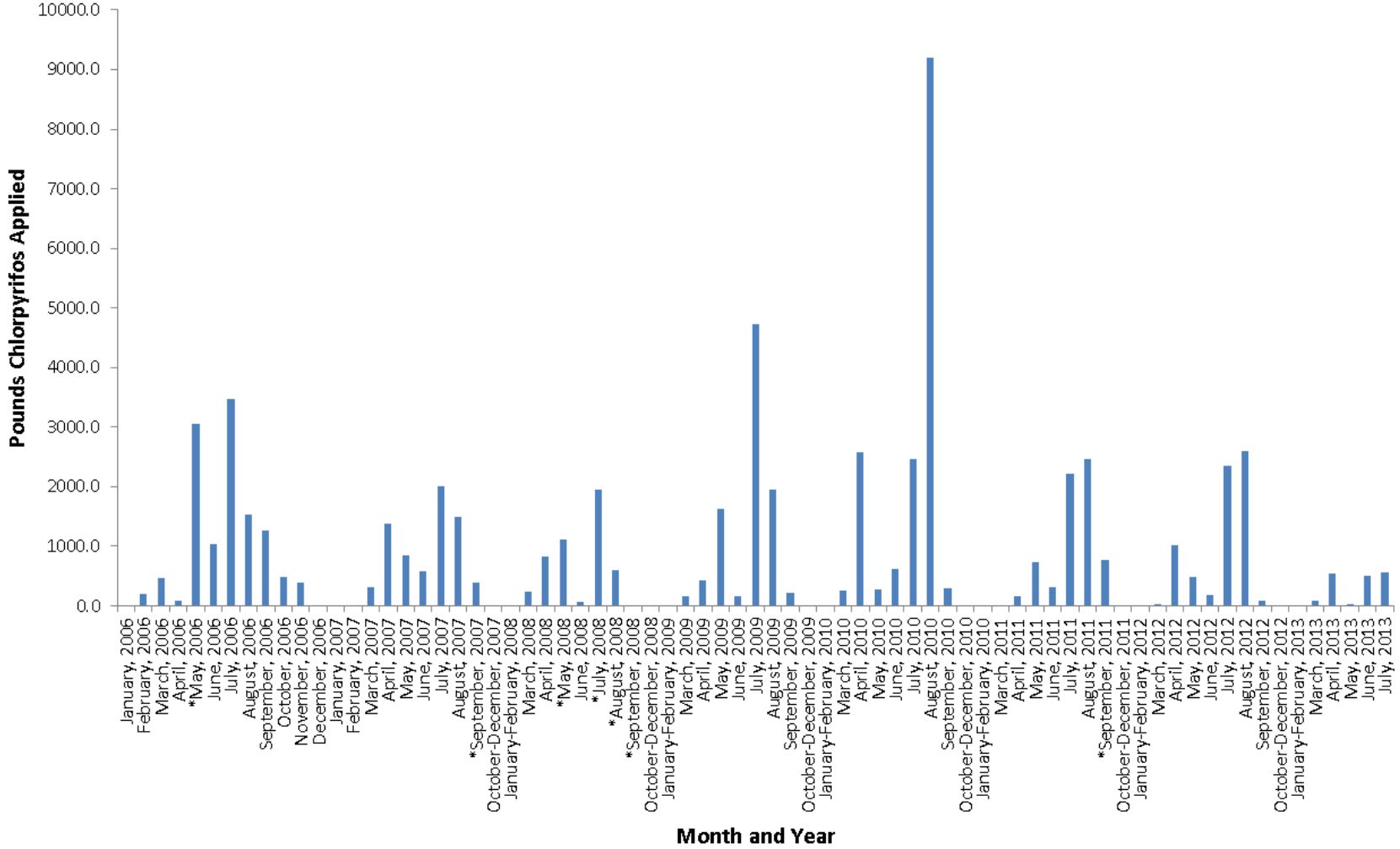
Toxicity to *C. dubia* occurred in September 2007 and May 2008, both samples resulted in 0% survival compared to the control. The TIE results indicated non-polar organics were the cause. Although the toxicity was not persistent when samples were recollected two days after the initial sample date, the samples from the resampling event contained exceedance level detections of chlorpyrifos. The May 2008 toxicity could not be sourced because the sample lost all toxicity prior to initiation of the TIE. Toxicity to *S. capricornutum* occurred in July 2007 and April and May 2008. Toxicity was lost prior to conducting the TIE on the July 2007 sample and therefore the source of toxicity could not be identified. The TIE results for the 2008 toxic samples indicated non-polar organics and metals were the source of toxicity. The priority E constituents, DO and pH, were measured during all 2013 MPM events, and two exceedances of the WQTLs occurred for each constituent. However, all management plan constituents are discussed during Coalition focused outreach.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR.

The Coalition contacted 29 targeted growers, representing 1,789 acres within the site subwatershed (2013 MPUR, page 71) and current management practices were documented in 2011. Targeted growers already implement management practices including reducing the use of the pesticide types found in exceedance and installing sprinkler or micro irrigation systems to reduce the volume of runoff. The follow-up survey responses provided in the 2014 MPUR indicate targeted growers implemented management practices including reducing pesticide use and irrigation runoff, and installing sprinkler or micro irrigation systems.

Figure XI-2. Mormon Slough @ Jack Tone Rd site subwatershed lbs chlorpyrifos applied by month (2006-2013).

Pesticide Use Report data are complete through July 2013 for San Joaquin County. Asterisk (*) denotes months with exceedances.



Evaluation

The Coalition aims to identify sources of agricultural discharge that could result in water quality impairments. The Coalition targeted growers with crops located adjacent to the waterway and whose parcel may directly drain to the waterway. Outreach efforts included grower notification, management practice outreach and education, and tracking management practice implementation. Monitoring results indicate water quality is improving. Despite similar trends in applications of chlorpyrifos, the frequency of exceedances of the WQTL for chlorpyrifos have declined since the Coalition began focused outreach. Samples for analysis of chlorpyrifos and water column toxicity to *C. dubia* could not be sampled as scheduled in September 2013 due to construction activities. Since September MPM could not be conducted due to construction at the site, the Coalition will not be eligible to petition to remove chlorpyrifos and *C. dubia* toxicity from the Mormon Slough @ Jack Tone Rd active management plan until MPM has occurred for two or more consecutive years with no exceedances. In 2014, MPM is scheduled to continue during months of past exceedances to evaluate the effectiveness of focused outreach and management practice implementation on water quality.

Next Steps

Focused outreach will be complete in 2014 within the Mormon Slough @ Jack Tone Rd site subwatershed. MPM will continue for chlorpyrifos and water column toxicity to *C. dubia* and *S. capricornutum*. Dissolved Oxygen and pH are field parameters and are measured during every monitoring event. General outreach will continue to keep growers informed of water quality concerns and applicable management practices designed to improve water quality.

XII. SAND CREEK @ HWY 4 BYPASS

Overview

Sand Creek @ Hwy 4 Bypass is one of the Coalition's fourth priority site subwatersheds. The Coalition has completed two of the three years of its focused management plan strategy in Sand Creek @ Hwy 4 Bypass site subwatershed. To evaluate the effectiveness of outreach on water quality, MPM for diazinon, dieldrin, disulfoton, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* occurred during months of past exceedances from 2011 through 2013. After demonstrating improved water quality and no exceedances, chlorpyrifos, diazinon, and water toxicity to *C. dubia* were removed from the Sand Creek @ Hwy 4 Bypass active management plan on February 27, 2013. The remaining constituents in the subwatersheds management plan are disulfoton, water column toxicity to *S. capricornutum*, sediment toxicity to *H. azteca*, DDE, DDT, dieldrin, DO, *E. coli*, SC, and TDS (Table XII-1).

During 2013, MPM for diazinon (prior to removal), dieldrin, disulfoton, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* occurred. Field parameters, including DO and SC, were measured during all MPM events. For high priority constituents, only sediment toxicity to *H. azteca* occurred 2013. Exceedances of the WQTL for DO and SC are common at Sand Creek @ Hwy 4 Bypass. During 2013, exceedances for DO occurred six times and for SC five times. In 2014, MPM is scheduled to continue for dieldrin, disulfoton, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca*. Field parameters, including DO and SC, will be monitoring during all MPM events.

Table XII-1. Sand Creek @ Hwy 4 Bypass management plan constituents.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
C	Disulfoton	2009	Active
D	*H. azteca* sediment toxicity	2007	Active
D	*S. capricornutum* water column toxicity	2009	Active
E	DDE	2007	Active
E	DDT	2007	Active
E	Dieldrin	2007	Active
E	Dissolved Oxygen	2007	Active
E	*E. coli*	2007	Active
E	Specific Conductivity	2007	Active
E	Total Dissolved Solids	2007	Active
CONSTITUENT (REMOVED)			
A/B	Chlorpyrifos	2007	2013
A/B	Diazinon	2007	2013
D	*C. dubia* water column toxicity	2007	2013

Description of Site Subwatershed

Sand Creek @ Hwy 4 Bypass is the only monitoring location within Zone 6; therefore, there is no rotating Assessment Monitoring location. Likewise, Zone 6 does not have a Core Monitoring location due to

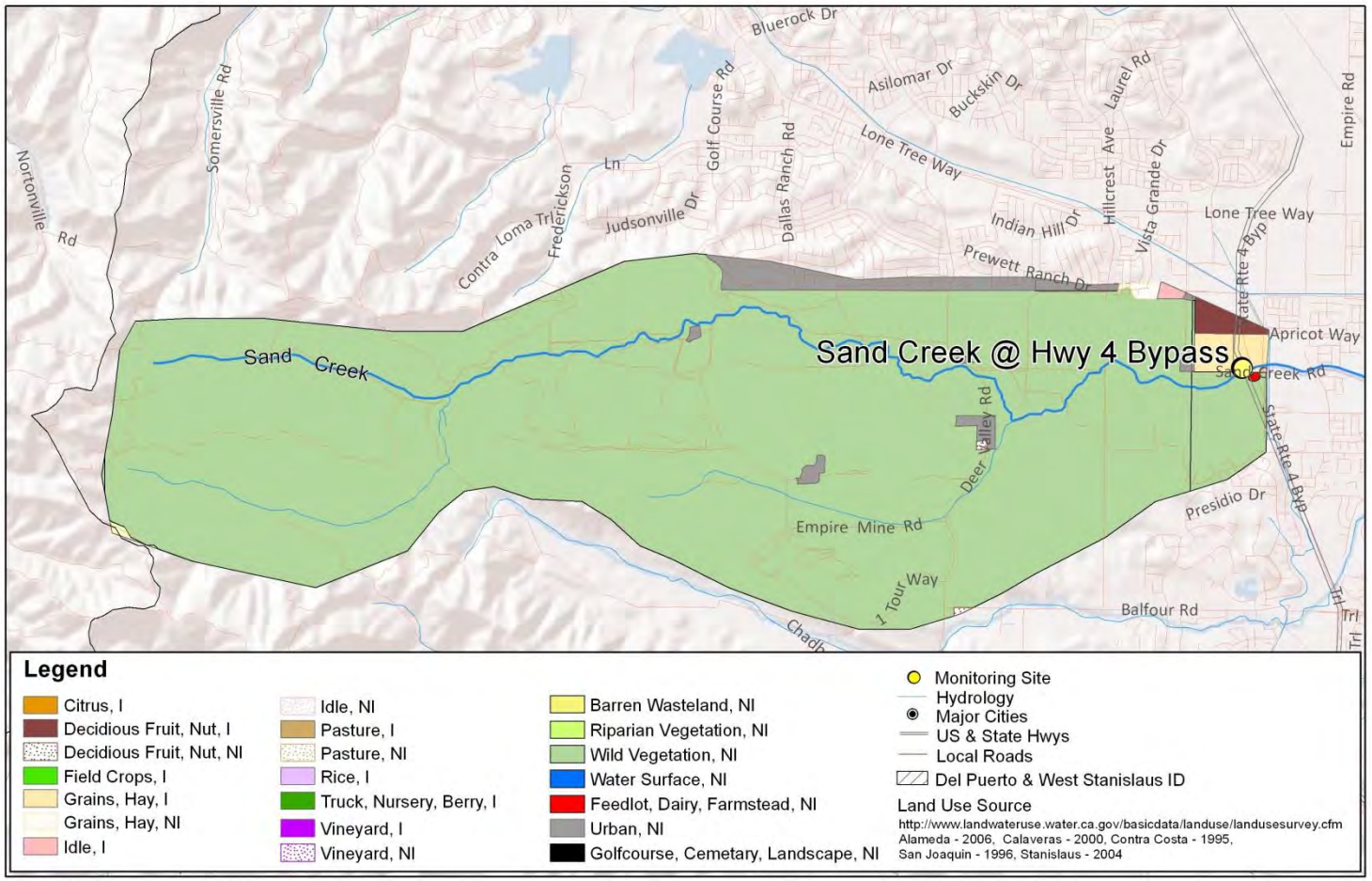
increased urbanization in Contra Costa County and lack of agriculture in the southern portion of the site subwatershed. The site is located west of Brentwood where the creek crosses Hwy 4 Bypass. The creek drains approximately 14.4 square miles of combined seasonal flow of the natural lands upstream and tailwater return flow from lowland agriculture (Table XII-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 XII-2).

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



Subwatershed Monitoring History

Normal Monitoring was initiated at Sand Creek @ Hwy 4 Bypass during the irrigation season of 2006 and continued through the irrigation season of 2008. Sand Creek @ Hwy 4 is the only site in Zone 6 and, therefore, Assessment Monitoring does not occur at the site. Table XII-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table XII-3 for analytes sampled prior to 2008).

In an effort to source the chemicals that caused exceedances, additional MPM for chlorpyrifos, dieldrin, and water column toxicity to *C. dubia* occurred from 2007 through 2008 (Table XII-4). Management Plan Monitoring during months of past exceedances has occurred since 2011 to evaluate the effectiveness of implemented practices on water quality. 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 XII-3. Sand Creek @ Hwy 4 Bypass sampling events and analyses per year.

Only environmental samples are counted.

Type	Analyte	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	16	0	0	9	8	7
	Dry Sites	0	0	0	0	0	0
	Events Sampled	16	0	0	9	8	7
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	7	0	0	0	0	0
	Dissolved Oxygen	16	0	0	9	8	7
	Dissolved Solids	7	0	0	0	0	0
	E. coli	7	0	0	0	0	0
	Grain size (sediment)	0	0	0	2	2	2
	Hardness as CaCO3	6	0	0	0	0	0
	pH	16	0	0	9	8	7
	Specific Conductivity	16	0	0	9	8	7
	Suspended Solids	0	0	0	0	0	0
	Total Organic Carbon	7	0	0	0	0	0
	Total Organic Carbon (sediment)	0	0	0	2	2	2
	Turbidity	7	0	0	0	0	0
Nutrients	Ammonia as N	6	0	0	0	0	0
	Nitrate + Nitrite as N	0	0	0	0	0	0
	Nitrate as N	6	0	0	0	0	0
	Nitrite as N	6	0	0	0	0	0
	Nitrogen, Total Kjeldahl	6	0	0	0	0	0
	OrthoPhosphate as P	6	0	0	0	0	0
	Phosphate as P	6	0	0	0	0	0
Metals (Dissolved)	Cadmium	0	0	0	0	0	0
	Copper	0	0	0	0	0	0
	Lead	0	0	0	0	0	0
	Nickel	0	0	0	0	0	0
	Zinc	0	0	0	0	0	0
Metals (Total)	Arsenic	6	0	0	0	6	0
	Boron	6	0	0	0	6	0
	Cadmium	6	0	0	0	6	0
	Copper	6	0	0	0	6	0
	Lead	6	0	0	0	6	0
	Molybdenum	6	0	0	0	0	0
	Nickel	6	0	0	0	6	0

Type	Analyte	2008	2009	2010	2011	2012	2013
	Selenium	6	0	0	0	6	0
	Zinc	6	0	0	0	6	0
Carbamates	Aldicarb	7	0	0	0	0	0
	Carbaryl	7	0	0	0	0	0
	Carbofuran	7	0	0	0	0	0
	Diuron	7	0	0	0	0	0
	Linuron	7	0	0	0	0	0
	Methiocarb	7	0	0	0	0	0
	Methomyl	7	0	0	0	0	0
	Oxamyl	7	0	0	0	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	0
	Chlordane	0	0	0	0	0	0
	Endosulfan I	0	0	0	0	0	0
	Endosulfan II	0	0	0	0	0	0
	HCH, alpha	0	0	0	0	0	0
	HCH, beta	0	0	0	0	0	0
	HCH, delta	0	0	0	0	0	0
	HCH, gamma	0	0	0	0	0	0
	Heptachlor	0	0	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	0
	Toxaphene	0	0	0	0	0	0
Herbicides	Atrazine	7	0	0	0	0	0
	Cyanazine	7	0	0	0	0	0
	Glyphosate	7	0	0	0	0	0
	Paraquat	7	0	0	0	0	0
	Simazine	7	0	0	0	0	0
	Trifluralin	0	0	0	0	0	0
Organochlorines	DDD(p,p')	7	0	0	0	0	0
	DDE(p,p')	7	0	0	0	0	0
	DDT(p,p')	7	0	0	0	0	0
	Dicofol	7	0	0	0	0	0
	Dieldrin	9	0	0	0	3	3
	Endrin	7	0	0	0	0	0
	Methoxychlor	7	0	0	0	0	0
Organophosphates	Azinphos methyl	7	0	0	0	0	0
	Chlorpyrifos	9	0	0	2	2	0
	Demeton-s	0	0	0	0	0	0
	Diazinon	7	0	0	2	2	1
	Dichlorvos	0	0	0	0	0	0
	Dimethoate	7	0	0	2	2	0
	Disulfoton	7	0	0	3	3	3
	Malathion	7	0	0	0	0	0
	Methamidophos	7	0	0	0	0	0
	Methidathion	7	0	0	0	0	0
	Molinate	7	0	0	0	0	0
	Parathion, Methyl	7	0	0	0	0	0
	Phorate	7	0	0	0	0	0
	Phosmet	7	0	0	0	0	0
	Thiobencarb	7	0	0	0	0	0
Pyrethroids	Bifenthrin	7	0	0	0	0	0
	Cyfluthrin, total	7	0	0	0	0	0
	Cyhalothrin, lambda, total	7	0	0	0	0	0
	Cypermethrin, total	7	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	7	0	0	0	0	0
	Permethrin, total	7	0	0	0	0	0
Sediment Pesticide	Bifenthrin	0	0	0	2	1	0
	Chlorpyrifos	0	0	0	2	1	0
	Cyfluthrin	0	0	0	2	1	0

Type	Analyte	2008	2009	2010	2011	2012	2013
	Cyhalothrin, lambda	0	0	0	2	1	0
	Cypermethrin	0	0	0	2	1	0
	Deltamethrin: Tralomethrin	0	0	0	2	1	0
	Esfenvalerate/ Fenvalerate	0	0	0	2	1	0
	Fenpropathrin	0	0	0	2	1	0
	Permethrin	0	0	0	2	1	0
Toxicity	*Ceriodaphnia dubia*	10	0	0	3	3	0
	Pimephales promelas	7	0	0	0	0	0
	Selenastrum capricornutum	9	0	0	2	3	2
	Hyalella azteca	4	0	0	0	2	2

Table XII-4. Sand Creek @ Hwy 4 Bypass site subwatershed Management Plan Monitoring schedule (2007-2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	*C. dubia*	*S. capricornutum*	*H. azteca*
Sand Creek @ Hwy 4 Bypass	06/20/07	Add.	X		X				
Sand Creek @ Hwy 4 Bypass	07/30/07	Add.					X		
Sand Creek @ Hwy 4 Bypass	05/07/08	Add.	X		X		X		
Sand Creek @ Hwy 4 Bypass	06/03/08	Add.	X		X		X		
Sand Creek @ Hwy 4 Bypass	07/8/08	Add.					X		
Sand Creek @ Hwy 4 Bypass	01/11/11	MPM		X					
Sand Creek @ Hwy 4 Bypass	03/08/11	MPM							X
Sand Creek @ Hwy 4 Bypass	04/12/11	MPM						X	
Sand Creek @ Hwy 4 Bypass	05/24/11	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	06/28/11	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	07/26/11	MPM		X			X		
Sand Creek @ Hwy 4 Bypass	08/23/11	MPM			X	X		X	
Sand Creek @ Hwy 4 Bypass	10/14/11	MPM							X
Sand Creek @ Hwy 4 Bypass	01/17/12	MPM		X					
Sand Creek @ Hwy 4 Bypass	03/15/12	MPM							X
Sand Creek @ Hwy 4 Bypass	04/12/12	MPM						X	
Sand Creek @ Hwy 4 Bypass	05/16/12	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	06/19/12	MPM	X		X	X	X		
Sand Creek @ Hwy 4 Bypass	07/17/12	MPM		X			X		
Sand Creek @ Hwy 4 Bypass	08/21/12	MPM			X	X		X	
Sand Creek @ Hwy 4 Bypass	09/18/12	MPM							X
Sand Creek @ Hwy 4 Bypass	01/15/13	MPM		X					
Sand Creek @ Hwy 4 Bypass	03/19/13	MPM							X
Sand Creek @ Hwy 4 Bypass	04/02/13	MPM						X	
Sand Creek @ Hwy 4 Bypass	05/21/13	MPM			X	X			
Sand Creek @ Hwy 4 Bypass	06/18/13	MPM			X	X			
Sand Creek @ Hwy 4 Bypass	08/20/13	MPM			X	X		X	
Sand Creek @ Hwy 4 Bypass	09/17/13	MPM							X

Add. – Additional sampling.

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

2013 Monitoring Results

During 2013, MPM for diazinon, dieldrin, disulfoton, water column toxicity to *S. capricornutum*, and sediment toxicity to *H. azteca* was scheduled to occur at Sand Creek @ Hwy 4 Bypass. No exceedances occurred for any constituent except sediment toxicity (Table XII-5). The Coalition received approval to remove chlorpyrifos, diazinon, and toxicity to *C. dubia* from the site's active management plan on February 27, 2013. Management Plan Monitoring occurred once in January 2013 for diazinon prior to its removal from the active management plan and did not result in an exceedance of the WQTL. Sediment samples collected suring March 2013 MPM were toxic to *H. azteca,* resulting in 90% survival compared to the control (Table XII-6). The field parameters, DO and SC, were measured during all MPM events in 2013. Exceedances of the WQTL for DO and SC occurred six and seven times; respectively.

Table XII-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Sand Creek @ Hwy 4 Bypass site subwatershed (organized alphabetically by constituent priority). Table XII-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Table XII-7 contains the instantaneous loads for chlorpyrifos, diazinon, and disulfoton since monitoring began in the site subwatershed. A record of all exceedances in the Sand Creek @ Hwy 4 Bypass site subwatershed since monitoring began is provided in Appendix II, Table XII-A.

Table XII-5. Sand Creek @ Hwy 4 Bypass management plan constituent exceedance tally (2006-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table XII-A.

	Active Mangement Plan Constituents										Removed Management Plan Constituents		
Monitoring Year	Disulfoton, >0.05 µg/L	*H. azteca*, (%Control)	*S. capricornutum*, (%Control)	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L	Dieldrin, >0.00014 µg/L	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	*C. dubia*, (%Control)
2006	0	2	0	2	2	2	7	5	6	4	2	1	3
2007	0	4	0	1	0	0	6	5	14	8	0	0	0
2008	3	4	3	2	1	2	12	7	16	7	0	1	0
2011	0	2	0	NA	NA	1	6	NA	9	NA	0	0	0
2012	0	1	0	NA	NA	1	5	NA	7	NA	0	0	0
2013	0	1	0	NA	NA	0	6	NA	7	NA	NA	0	NA
Overall Tally	**3**	**14**	**3**	**5**	**3**	**6**	**42**	**17**	**59**	**19**	**2**	**2**	**3**
Constituent Priority	**C**	**D**	**D**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**A/B[R]**	**A/B[R]**	**D[R]**

NA – Not Applicable; monitoring did not occur for this constituent during the year.
[R] – Removed from active management plan.

Table XII-6. Sand Creek @ Hwy 4 Bypass site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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
	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

Add. – Additional monitoring conducted in 2007 and 2008 only.
MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
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.

Table XII-7. Sand Creek @ Hwy 4 Bypass site subwatershed instantaneous load calculations for chlorpyrifos, diazinon, disulfoton, and dieldrin.

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
Sand Creek @ Hwy 4 Bypass	Chlorpyrifos	05/16/06	2.96	0.089	µg/L	7	µg/sec
Sand Creek @ Hwy 4 Bypass	Diazinon	07/18/06	0.47	0.45	µg/L	6	µg/sec
Sand Creek @ Hwy 4 Bypass	Diazinon	01/23/08	11.48	0.11	µg/L	36	µg/sec
Sand Creek @ Hwy 4 Bypass	Dieldrin	05/24/11	0	0.027	µg/L	0	µg/sec
Sand Creek @ Hwy 4 Bypass	Dieldrin	06/19/12	0	0.096	µg/L	0	µg/sec
Sand Creek @ Hwy 4 Bypass	Disulfoton	05/13/08	0.29	0.11	µg/L	1	µg/sec
Sand Creek @ Hwy 4 Bypass	Disulfoton	06/10/08	0.41	0.20	µg/L	2	µg/sec
Sand Creek @ Hwy 4 Bypass	Disulfoton	08/12/08	0	0.18	µg/L	0	µg/sec
Sand Creek @ Hwy 4 Bypass	Disulfoton	09/16/08	0.53	0.036	µg/L	1	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

A complete review of source identification and outreach activities in the Sand Creek @ Hwy 4 Bypass site subwatershed is provided in the 2013 MPUR Appendix I including an analysis of the management plan constituents that have since been removed due to improved water quality (pages 330-334). The Coalition evaluated PUR data and past monitoring results to determine the sources of constituents listed in the Sand Creek @ Hwy 4 Bypass management plan. In the case of the Sand Creek @ Hwy 4 Bypass site subwatershed, only a single grower was targeted for outreach. While the grower indicated that storm water leaves the field, as well as a small amount of non-turbid tailwater, the grower did not apply any of the pesticides that exceeded the WQTLs in 2011, and no PUR data for the constituents of concern were reported from 2006 through 2013 in the subwatershed. The exception was a verbal discussion with a grower who said he applied chlorpyrifos to corn, as reported in the 2008 Management Plan. Furthermore, extensive urban development has occurred in the region within the last five years. It is possible that many of the water quality impairments in the Sand Creek @ Hwy 4 Bypass site subwatershed are the result of multiple sources including urban discharges of pyrethroids that are common in new urban developments. There were no applications of any high priority constituents in the Sand Creek @ Hwy 4 Bypass site subwatershed and therefore PUR data are not available to assess for the purposes of the following sections.

The only exceedances of the WQTL for disulfoton occurred during 2008 in the Sand Creek @ Hwy 4 Bypass site subwatershed; none of the three exceedances were associated with toxicity to *C. dubia* (May, June, and August 2008).

Water column toxicity to *S. capricornutum* occurred twice (including a resample) in April 2008, indicating persistent toxicity. The TIE results from the initial sampling event indicated non-polar organics as the cause; however no exceedances of the WQTLs for any of the pesticides occurred. Water column toxicity to *S. capricornutum* in August 2008 resulted in 38% growth compared to the control but the TIE results were inconclusive. Sediment toxicity to *H. azteca* occurred 5 times at Sand Creek @ Hwy 4 Bypass between 2006 and 2008 during scheduled monitoring events. The Coalition recollected samples from

the site after all initial toxicities and in all cases, toxicity persisted. The Coalition did not begin performing sediment chemistry analyses on toxic samples (80% or less survival compared to the control) until September 2010. Therefore, sediment toxicity prior to September 2010 had no additional chemistry data and therefore the cause of toxicity cannot be determined.

Sediment toxicity to *H. azteca* resulted in 29% and 79% survival compared to the control in March and October 2011; respectively. The sediment from both sampling events contained pyrethroids (2012 AMR, page 132-133). The March 2011 toxicity PUR data indicate that no pesticides associated with toxicity to *H. azteca* have been applied in the site subwatershed since 2009; therefore the cause of the sediment toxicity is unknown. Aerial applications of pyrethroids were linked to the sediment toxicity in October 2011 via spray drift (2013 MPUR Appendix IV, Table 25). Spray drift of aerial pyrethroid applications were also linked to toxicity to *H. azteca* in March 2012, resulting in 63% survival compared to the control; pyrethroids were detected in the toxic sample (2013 AMR, pages 129-130). In March 2013, sediment toxicity to *H. azteca* occurred, resulting in 90% survival compared to the control. Although, the survival was statistically significant, the results were not considered ecologically relevant and additional sediment chemistry analysis was not required.

The Coalition monitored DDE, DDT, and dieldrin from 2006 through the irrigation season of 2008. The Coalition continued MPM for dieldrin from 2011 through 2013 to demonstrate that this legacy pesticide is no longer contributing to water quality impairments (2013 MPUR Appendix I, page 333). One exceedance of the WQTL for dieldrin occurred in June 2012 and was likely related to construction activities causing movement of sediment into the creek. Extensive urban development has occurred within the site subwatershed within the last six years. It is possible that water quality impairments in the Sand Creek @ Hwy 4 Bypass site subwatershed are the result of urban influences that are common in newly developed areas.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting outreach in high priority sites in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR.

The Coalition contacted the single targeted grower representing 116 acres in the site subwatershed and documented current 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. The follow-up response indicated the grower implemented new management practices including: sprinkler or micro irrigation system installation and irrigation management to reduce runoff of pesticides of concern and runoff water volume.

Evaluation

The Coalition organized meetings and mailings to educate the grower about management practices and the importance of improving water quality. The removal of chlorpyrifos, diazinon, and water column toxicity to *C. dubia* from the active management plan on February 27, 2013 demonstrates that water quality is improving. In 2013, MPM for diazinon (January only), dieldrin, disulfoton, water column toxicity to *S. capricornutum,* and sediment toxicity to *H. azteca* occurred during months of past exceedances occurred. Management Plan Monitoring during 2013 resulted in a single toxic sediment sample in March with 90% survival compared to the control (not considered ecologically relevant). Extensive urban development near the site could be contributing to water quality impairments. Additionally, construction activities suspending sediment in the creek could potentially be contributing detections of legacy pesticides; during MPM in 2013, dieldrin was the only legacy pesticide monitored. Concentrations of dieldrin were not detected in water samples collected.

Next Steps

The Coalition will complete focused outreach in the Sand Creek @ Hwy 4 Bypass site subwatershed in 2014. Management Plan Monitoring in 2014 is scheduled to continue for disulfoton, dieldrin, water column toxicity to *S. capricornutum,* and sediment toxicity to *H. azteca*. The Coalition will evaluate MPM results to determine the effectiveness of management practices on water quality in the site subwatershed. General outreach will continue to keep growers informed of water quality concerns and applicable management practices designed to improve water quality.

HIGH PRIORITY SITE SUBWATERSHEDS (2013 – 2015)

XIII. BEAR CREEK @ NORTH ALPINE RD

Overview

Bear Creek @ North Alpine Rd is one of the Coalition's fifth priority site subwatersheds. The Coalition has completed the first year of its focused management plan strategy in the site subwatershed. Water quality concerns have been 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. Constituents listed in the active management plan are chlorpyrifos, malathion, DO, *E. coli*, and pH (Table XIII-1).

During 2013, MPM occurred for chlorpyrifos and malathion and no exceedances of the WQTLs occurred. The last time exceedances of the WQTLs for chlorpyrifos and malathion occurred was in October and September 2011; respectively. Priority E constituents, DO and pH, were monitored during all MPM events in 2013 and three exceedances of DO occurred. A single exceedance of *E. coli* occurred during Assessment Monitoring in 2011.

During 2014, MPM is scheduled to occur for chlorpyrifos and malathion; field parameters will be measured during every monitoring event. The Coalition will analyze these results to evaluate the overall water quality in the site subwatershed.

Table XIII-1. Bear Creek @ North Alpine Rd management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2012	Active
C	Malathion	2012	Active
E	Dissolved Oxygen	2009	Active
E	pH	2012	Active
E	*E. coli*	2012	Active

Description of Site Subwatershed

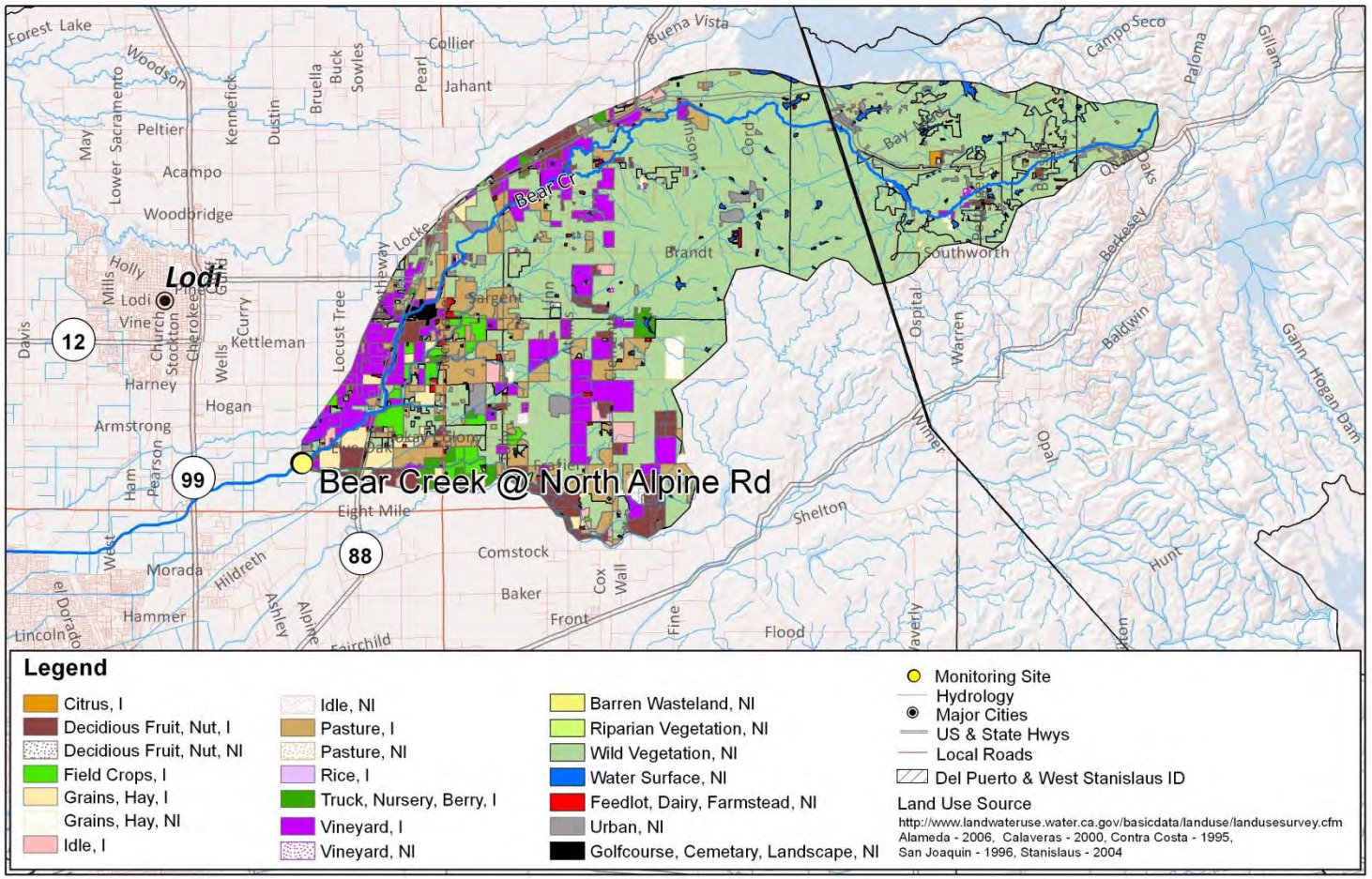
Bear Creek @ North Alpine Rd is a rotating Assessment Site in Zone 1 under the 2008 MRPP. The site is located on the northern edge of the Coalition region. Its boundary starts in the north eastern region of San Joaquin County and it contains portions of Calaveras County in its upstream region (Table XIII-2). The site consists of 19,642 irrigated acres that are primarily includes pasture, vineyards and deciduous orchards with some field crops, grains and hay (Figure XIII-1).

Bear Creek @ North Alpine Rd is listed as a 303 (d) Impaired Waterbody for diazinon (updated in 2010).

Table XIII-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 XIII-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 2009; Assessment Monitoring last occurred in 2011. Table XIII-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013.

In 2012, MPM for chlorpyrifos and malathion occurred in the Bear Creek @ North Alpine Rd site subwatershed. In 2013, MPM for chlorpyrifos and malathion occurred during months of past exceedances (Table XIII-4). Management Plan Monitoring is scheduled to continue in 2014 for chlorpyrifos and malathion during months of past exceedances and field parameters will be measured during every monitoring event.

Table XIII-3. Bear Creek @ North Alpine Rd sampling events and analyses per year.

Only environmental samples are counted.

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

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

Type	Analyte	2008	2009	2010	2011	2012	2013
	Deltamethrin: Tralomethrin	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	3	3	0	12	0	0
	Pimephales promelas	3	3	0	12	0	0
	Selenastrum capricornutum	3	3	0	12	0	0
	Hyalella azteca	0	0	0	2	0	0

Table XIII-4. Bear Creek @ North Alpine Rd Management Plan Monitoring schedule (2012 - 2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Malathion
Bear Creek @ North Alpine Rd	05/16/12	MPM		X
Bear Creek @ North Alpine Rd	09/18/12	MPM	X	X
Bear Creek @ North Alpine Rd	10/16/12	MPM	X	
Bear Creek @ North Alpine Rd	01/15/13	MPM	X	X
Bear Creek @ North Alpine Rd	05/21/13	MPM		X
Bear Creek @ North Alpine Rd	09/17/13	MPM	X	X
Bear Creek @ North Alpine Rd	10/15/13	MPM	X	

2013 Monitoring Results

In 2013, MPM for chlorpyrifos and malathion occurred at Bear Creek @ North Alpine Rd and resulted in no exceedances (Table XIII-5). The last exceedances of the WQTLs for chlorpyrifos and malathion occurred in October and September 2011; respectively (Table XIII-6). DO and pH were measured during all MPM events for high priority constituents; exceedances of the WQTL for DO occurred in May, September and October 2013.

Table XIII-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Bear Creek @ North Alpine Rd site subwatershed (organized alphabetically by constituent priority). Table XIII-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. TableXIII-7 contains the instantaneous loads for chlorpyrifos and malathion since monitoring began in the site subwatershed. A record of all exceedances in the at Bear Creek @ North Alpine Rd site subwatershed since monitoring began is provided in Appendix II, Table XIII-A.

Table XIII-5. Bear Creek @ North Alpine Rd management plan constituent exceedance tally (2008-2013).

Exceedances that occurred during resampling for field parameters and toxicity are included in the tally Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table XIII-A.

Monitoring Year	Chlorpyrifos, > 0.015 µg/L	Malathion, > 0 µg/L	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	pH, <6.5 and >8.5 units
2008	0	0	3	1	0
2009	0	0	1	0	0
2011	3	3	4	1	2
2012	0	0	3	NA	0
2013	0	0	3	NA	0
Overall Tally	**3**	**3**	**14**	**2**	**2**
Constituent Priority	**A/B**	**C**	**E**	**E**	**E**

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

Table XIII-6. Bear Creek @ North Alpine Rd site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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

MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
NA – Not Applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring

Table XIII-7. Bear Creek @ North Alpine Rd site subwatershed instantaneous load calculations for chlorpyrifos and malathion.

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
Bear Creek @ North Alpine Rd	Chlorpyrifos	02/10/09	0.56	0.0084	µg/L	0	µg/sec
Bear Creek @ North Alpine Rd	Chlorpyrifos	01/11/11	10.79	0.11	µg/L	34	µg/sec
Bear Creek @ North Alpine Rd	Chlorpyrifos	09/20/11	12.43	0.089	µg/L	31	µg/sec
Bear Creek @ North Alpine Rd	Chlorpyrifos	10/06/11	20.52	0.067	µg/L	39	µg/sec
Bear Creek @ North Alpine Rd	Malathion	01/11/11	10.79	0.10	µg/L	31	µg/sec
Bear Creek @ North Alpine Rd	Malathion	05/24/11	1.47	0.064	µg/L	3	µg/sec
Bear Creek @ North Alpine Rd	Malathion	09/20/11	12.43	0.089	µg/L	31	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 evaluated PUR data and past monitoring results to determine sources of constituents in the Bear Creek @ North Alpine Rd management plan (2013 MPUR Appendix I, pages 343-350). Chlorpyrifos is the only priority A/B constituent listed in the active management plan.

From 2008 through 2013, the largest number of applications of chlorpyrifos occurred in July. Overall, applications of chlorpyrifos are declining, with the exceptions of October 2009 and August 2012 (Figure XIII-2). Three exceedances of the WQTL for chlorpyrifos occurred in January, September, and October 2011. In January 2011, no applications of chlorpyrifos were made. The exceedances of the WQTL for chlorpyrifos in September and October 2011 were most likely linked to storm water runoff and offsite movement of irrigation tailwater from orchards (2013 MPUR Appendix I, page 344). Applications of malathion are highest during the month of May. During May 2011, the first exceedance of the WQTL for malathion coincided with one of the largest quantities of malathion applied in the site subwatershed (2,577 lbs AI; Figure XIII-3). The May exceedance of the WQTL for malathion was most likely due to the offsite movement of irrigation tailwater or spray drift from orchards in the site subwatershed. The exceedance of the WQTL for malathion in January 2011 was likely caused by storm water runoff, whereas in September 2011 it was associated with high applications of AI and offsite movement of tailwater water runoff.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting focused outreach in high priority site subwatersheds in the Management Practice Tracking strategy sections of the main body of the 2014 MPUR.

Focused outreach to document current management practices and track implemented management practices began in 2013 and will be complete in 2015. The Coalition contacted seven targeted growers, representing 655 irrigated acres in the site subwatershed (2014 MPUR Performance Goals and Schedules section). Management practices are being documented and will be summarized in the main body of the 2014 MPUR. Follow-up surveys were mailed to targeted growers on February 14, 2014 and a final analysis of newly implemented practices will be provided in the 2015 MPUR. The Coalition believes the implementation of certain management practices and increased grower awareness will help improve water quality within the Bear Creek @ North Alpine Rd site subwatershed.

Figure XIII-2. Bear Creek @ North Alpine Rd site subwatershed lbs chlorpyrifos applied by month (2008-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County. Asterisk (*) denotes months with exceedances.

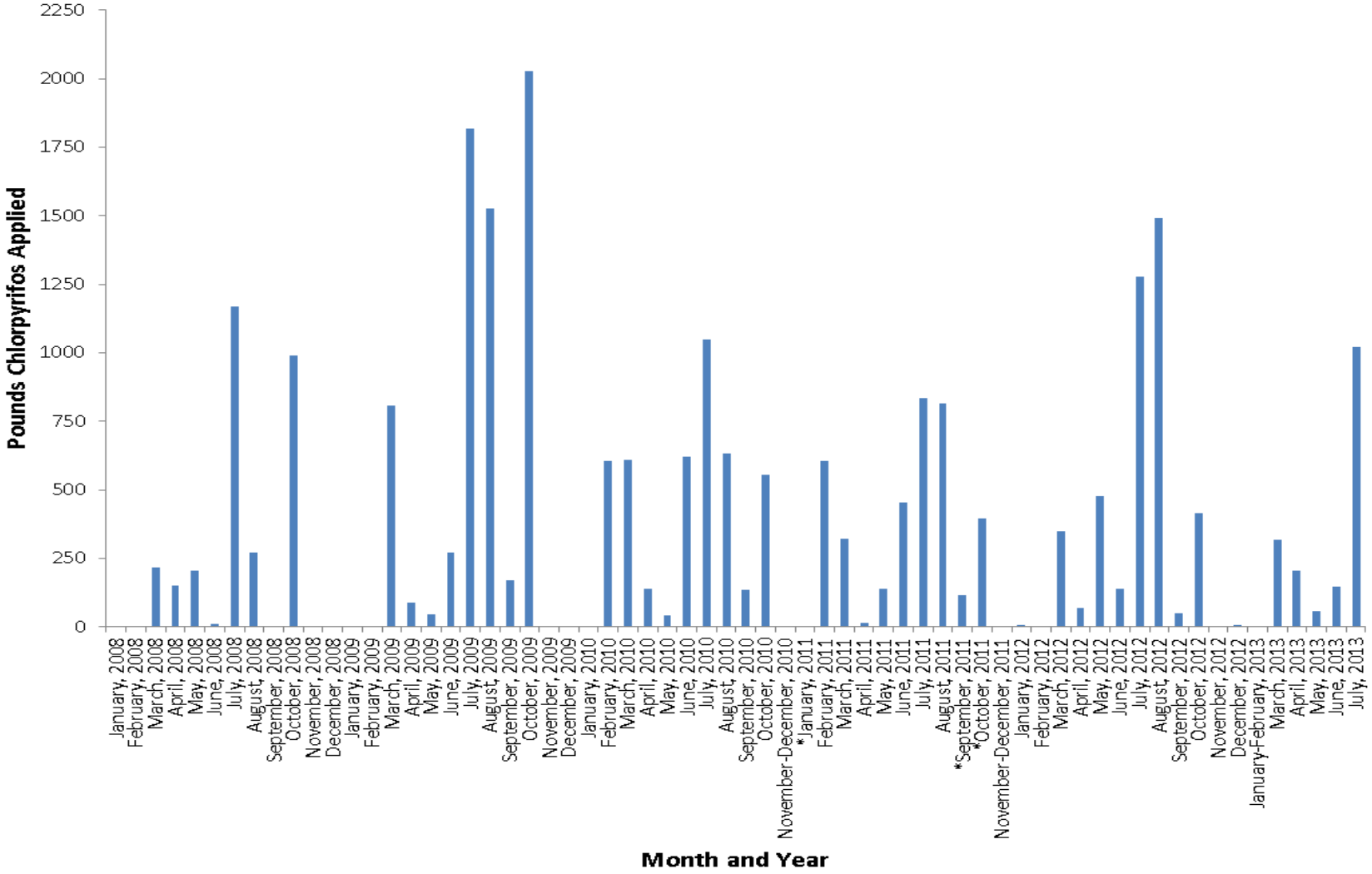
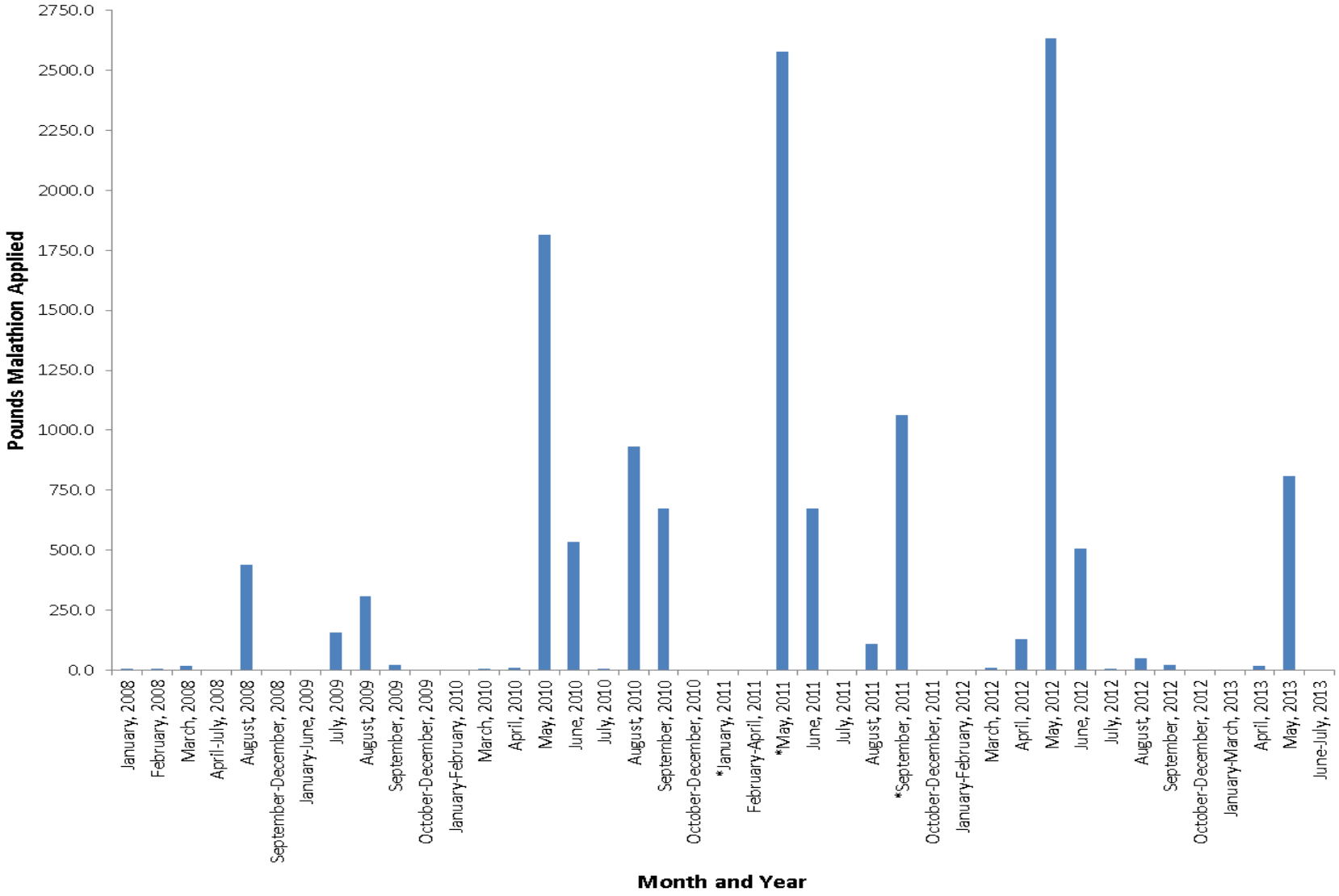


Figure XIII-3. Bear Creek @ North Alpine Rd site subwatershed lbs malathion applied by month (2008-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County. Asterisk (*) denotes months with exceedances.



Evaluation

The Coalition contacted seven targeted growers with property that has the potential to directly drain to the creek in an effort to document current management practices and discuss water quality concerns. Overall, improvements in water quality are evident at Bear Creek @ North Alpine Rd with respect to several management plan constituents. The last exceedances of the WQTLs for chlorpyrifos and malathion occurred during Assessment Monitoring in 2011. During Normal Monitoring in 2008, 2009, and 2011, exceedances of the WQTL for DO (8), *E. coli* (2) and pH (2) occurred. The field parameters, DO and pH, were measured during all MPM events in 2012 and 2013; during these two MPM years, exceedances of the WQTL for DO occurred eleven times and no exceedances of the WQTL for pH occurred. The Coalition believes addressing other water quality concerns will also address priority E constituents. The Coalition will continue to conduct MPM for chlorpyrifos in 2014 to evaluate the effectiveness of its focused management plan strategy in the site subwatershed and field parameters will be measured during every monitoring event.

Next Steps

The Coalition will continue focused outreach to educate growers and promote awareness of water quality concerns within the site subwatershed. The Coalition will document follow-up survey responses from targeted growers during 2014. Management Plan Monitoring is scheduled to continue for chlorpyrifos and malathion in 2014 to evaluate the effectiveness of implemented management practices on water quality.

XIV. ROBERTS ISLAND @ WHISKEY SLOUGH PUMP

Overview

Roberts Island @ Whiskey Slough Pump is one of the Coalition's fifth priority site subwatersheds. The Coalition has completed the first year of its focused management plan strategy in the site subwatershed. Water quality concerns have been 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. Roberts Island @ Whiskey Slough Pump 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. The 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. The constituents listed in the site's active management plan includes: chlorpyrifos, diuron, water column toxicity to *C. dubia* and *S. capricornutum*, sediment toxicity to *H. azteca*, DDE, DO, *E. coli*, pH, SC, and TDS (Table XIV-1).

During 2013, MPM occurred for chlorpyrifos, diuron, water column toxicity to *C. dubia* and *S. capricornutum,* and sediment toxicity to *H. azteca*; no exceedances or toxicities occurred. In addition to MPM, Core Monitoring occurred and samples were collected monthly for chlorpyrifos and diazinon. There were no exceedances of the WQTLs for chlorpyrifos or diazinon. In addition, Core Monitoring occurred in 2013 and resulted in exceedances of the WQTLs for DO (5) and SC (12) and TDS (12).

During MPM in 2014, chlorpyrifos, diuron, and water column toxicity to *C. dubia* and *S. capricornutum,* and sediment toxicity to *H. azteca* will be monitorined during months of past exceedances. In addition, Assessment Monitoring will occur at Roberts Island @ Whiskey Slough Pump during 2014. The 2014 monitoring results will provide the Coalition with information to evaluate the effectiveness of its outreach strategy and to further evaluate the sources of exceedances.

Table XIV-1. Roberts Island @ Whiskey Slough Pump management plan constituents.
Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2007	Active
C	Diuron	2009	Active
D	*C. dubia* water column toxicity	2011	Active
D	*H. azteca* sediment toxicity	2009	Active
D	*S. capricornutum* water column toxicity	2009	Active
E	DDE	2007	Active
E	Dissolved Oxygen	2007	Active
E	*E. coli*	2007	Active
E	pH	2007	Active
E	Specific Conductivity	2007	Active
E	Total Dissolved Solids	2007	Active

Description of Site Subwatershed

Roberts Island @ Whiskey Slough Pump is the Core site in Zone 4 under the 2008 MRPP. Roberts Island @ Whiskey Slough Pump 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 XIV-2). The site subwatershed consists of 11,716 irrigated acres and land use primarily includes asparagus, field crops, grains, alfalfa and pasture (Figure XIV-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.

Roberts Island Drain along House Rd consists of 1,229 irrigated acres and is located on the northeastern edge of Roberts Island (Table XIV-2). From the sample site the water in the drain flows north. The primary agriculture in the site subwatershed is asparagus followed by field crops and pasture.

Roberts Island Drain @ Holt Rd consists of 1,134 irrigated acres and is a portion of Roberts Island that is drained by the pump along McDonald Road west of the sample site and is located south of Roberts Island Drain along House Rd (Table XIV-2). The primary agriculture upstream of the sample site includes asparagus, field crops, grains, hay (alfalfa), and pasture.

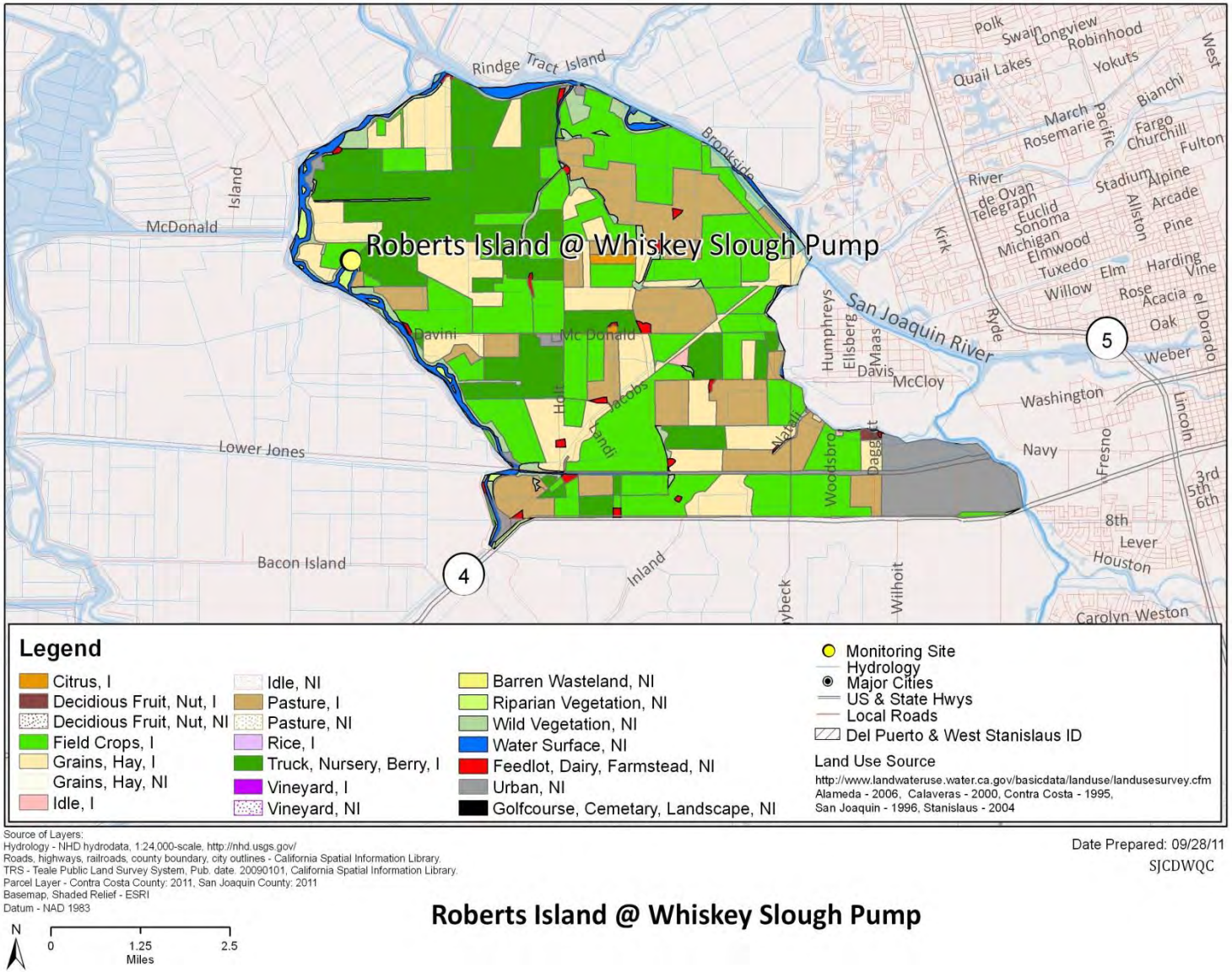
Roberts Island is not considered impaired according to California's 303(d) List of Impaired Waterbodies. However, the represented TMDL subareas are listed as impaired (export area, central, southern and western portions) for chlorpyrifos, DDT, diazinon, electrical conductivity, group A pesticides, invasive 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 XIV-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 XIV-1. Roberts Island @ Whiskey Slough Pump site subwatershed land use map.



Subwatershed Monitoring History

Normal Monitoring was initiated at Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd, 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 replaced these two sites as the Core site in Zone 4 in 2012. Details are included in the 2013 MPUR Appendix I (page 354). Table XIV-3 contains the number of events and constituents monitored at all three sites (organized by group). Core Monitoring occurred at Roberts Island @ Whiskey Slough Pump and samples were collected monthly for the analysis of chlorpyrifos and diazinon.

Management Plan Monitoring for high priority constituents at Roberts Island @ Whiskey Slough Pump began in 2012 and continued through 2013 during months of past exceedances (Table XIV- 4). All active management plan constituents from Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd are addressed in the Roberts Island @ Whiskey Slough Pump management plan. In 2014, Roberts Island @ Whiskey Slough Pump will be monitored for Assessment Monitoring constituents and therefore all MPM constituents will be collected monthly.

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

Only environmental samples are counted.

Type	Analyte	544RIDAHR			544RIDAHT						544RIAWSP	
		2006	2007	2008	2006	2007	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	5	12	13	5	13	15	12	12	14	12	12
	Dry Sites	0	0	0	0	0	0	0	0	0	0	0
	Events Sampled	5	12	13	5	13	15	12	12	14	12	12
Field and Physical Parameters	BOD	1	4	0	1	4	0	0	0	0	0	0
	Color	5	8	7	5	8	7	0	0	0	0	0
	Dissolved Oxygen	5	12	13	5	13	15	12	12	14	12	12
	Dissolved Solids	5	8	7	5	8	10	12	12	12	12	12
	E. coli	5	8	7	5	8	10	12	12	12	12	12
	Grain size (sediment)	0	0	0	0	0	0	0	0	2	2	2
	Hardness as CaCO3	0	0	6	0	0	6	0	0	12	0	0
	pH	5	12	13	5	13	15	12	12	14	12	12
	Specific Conductivity	5	12	13	5	13	15	12	12	14	12	12
	Suspended Solids	0	0	0	0	0	3	12	12	12	12	12
	Total Organic Carbon	5	8	7	5	8	10	12	12	12	12	12
	Total Organic Carbon (sediment)	0	0	0	0	0	0	0	0	2	2	2
	Turbidity	5	8	7	5	8	10	12	12	12	12	12
Nutrients	Ammonia as N	0	0	6	0	0	9	12	12	12	12	12
	Nitrate + Nitrite as N	0	0	0	0	0	3	12	12	12	12	12
	Nitrate as N	0	1	6	0	1	6	0	0	0	0	0
	Nitrite as N	0	1	6	0	1	6	0	0	0	0	0
	Nitrogen, Total Kjeldahl	0	0	6	0	0	9	12	12	12	12	12
	OrthoPhosphate as P	0	1	6	0	1	9	12	12	12	12	12
	Phosphate as P	0	0	6	0	0	9	12	12	12	12	12
Metals (Dissolved)	Cadmium	0	0	0	0	0	0	0	0	12	0	0
	Copper	0	0	0	0	0	0	0	0	12	0	0
	Lead	0	0	0	0	0	0	0	0	12	0	0
	Nickel	0	0	0	0	0	0	0	0	12	0	0

Type	Analyte	544RIDAHR			544RIDAHT						544RIAWSP	
		2006	2007	2008	2006	2007	2008	2009	2010	2011	2012	2013
	Zinc	0	0	0	0	0	0	0	0	12	0	0
Metals (Total)	Arsenic	0	0	6	0	0	6	0	0	12	0	0
	Boron	0	0	6	0	0	6	0	0	12	0	0
	Cadmium	0	0	6	0	0	6	0	0	12	0	0
	Copper	0	0	6	0	0	6	0	0	12	0	0
	Lead	0	0	6	0	0	6	0	0	12	0	0
	Molybdenum	0	0	0	0	0	0	0	0	12	0	0
	Nickel	0	0	6	0	0	6	0	0	12	0	0
	Selenium	0	0	6	0	0	6	0	0	12	0	0
	Zinc	0	0	6	0	0	6	0	0	12	0	0
Carbamates	Aldicarb	5	8	7	5	8	7	0	0	12	0	0
	Carbaryl	5	8	7	5	8	7	0	0	12	0	0
	Carbofuran	5	8	7	5	8	7	0	0	12	0	0
	Diuron	5	8	7	5	8	7	0	0	12	2	2
	Linuron	5	8	7	5	8	7	0	0	12	0	0
	Methiocarb	5	8	7	5	8	7	0	0	12	0	0
	Methomyl	5	8	7	5	8	7	0	0	12	0	0
	Oxamyl	5	8	7	5	8	7	0	0	12	0	0
Group A Pesticides	Aldrin	0	0	0	0	0	3	12	0	0	0	0
	Chlordane	0	0	0	0	0	3	12	0	0	0	0
	Endosulfan I	0	0	0	0	0	3	12	0	0	0	0
	Endosulfan II	0	0	0	0	0	3	12	0	0	0	0
	HCH, alpha	0	0	0	0	0	3	12	0	0	0	0
	HCH, beta	0	0	0	0	0	3	12	0	0	0	0
	HCH, delta	0	0	0	0	0	3	12	0	0	0	0
	HCH, gamma	0	0	0	0	0	3	12	0	0	0	0
	Heptachlor	0	0	0	0	0	3	12	0	0	0	0
	Heptachlor epoxide	0	0	0	0	0	3	12	0	0	0	0
	Toxaphene	0	0	0	0	0	3	12	0	0	0	0
Herbicides	Atrazine	5	8	7	5	8	7	0	0	12	0	0
	Cyanazine	5	8	7	5	8	7	0	0	12	0	0
	Glyphosate	5	8	7	5	8	7	0	0	12	0	0
	Paraquat	5	8	7	5	8	7	0	0	12	0	0
	Simazine	5	8	7	5	8	7	0	0	12	0	0
	Trifluralin	0	0	0	0	0	0	0	0	12	0	0
Organochlorines	DDD(p,p')	5	8	7	5	8	10	12	0	12	0	0
	DDE(p,p')	5	8	7	5	8	10	12	0	12	0	0
	DDT(p,p')	5	8	7	5	8	10	12	0	12	0	0
	Dicofol	5	8	7	5	8	10	12	0	12	0	0
	Dieldrin	5	8	7	5	8	10	12	0	12	0	0
	Endrin	5	8	7	5	8	10	12	0	12	0	0
	Methoxychlor	5	8	7	5	8	10	12	0	12	0	0
Organophosphates	Azinphos methyl	5	8	7	5	8	10	4	12	12	0	0
	Chlorpyrifos	5	8	7	5	8	10	4	12	12	12	12
	Demeton-s	0	0	0	0	0	3	4	12	12	0	0
	Diazinon	5	8	7	5	8	10	4	12	12	12	12
	Dichlorvos	0	0	0	0	0	3	4	12	12	0	0
	Dimethoate	5	8	7	5	8	10	4	12	12	0	0
	Disulfoton	5	8	7	5	8	10	4	12	12	0	0
	Malathion	5	8	7	5	8	10	4	12	12	0	0
	Methamidophos	5	8	7	5	8	10	4	0	12	0	0
	Methidathion	5	8	7	5	8	10	4	12	12	0	0
	Molinate	5	8	7	5	8	7	0	0	0	0	0
	Parathion, Methyl	5	8	7	5	8	10	4	12	12	0	0
	Phorate	5	8	7	5	8	10	4	12	12	0	0
	Phosmet	5	8	7	5	8	10	4	12	12	0	0
	Thiobencarb	5	8	7	5	8	7	0	0	0	0	0

Type	Analyte	544RIDAHR			544RIDAHT						544RIAWSP	
		2006	2007	2008	2006	2007	2008	2009	2010	2011	2012	2013
Pyrethroids	Bifenthrin	5	8	7	5	8	7	0	0	0	0	0
	Cyfluthrin, total	5	8	7	5	8	7	0	0	0	0	0
	Cyhalothrin, lambda, total	5	9	7	5	10	7	0	0	0	0	0
	Cypermethrin, total	5	8	7	5	10	7	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	5	8	7	5	8	7	0	0	0	0	0
	Permethrin, total	5	8	7	5	8	7	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	0	0	0	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0	0	0	0	0	0
	Permethrin	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
	Pimephales promelas	5	8	7	5	8	10	3	0	12	0	0
	Selenastrum capricornutum	5	8	9	5	9	10	0	0	12	4	4
	Hyalella azteca	1	3	3	2	2	2	0	0	2	2	2

Table XIV-4. Roberts Island @ Whiskey Slough Pump Management Plan Monitoring schedule (2012-2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	Diuron	*C. dubia*	*S. capricornutum*	*H. azteca*
Roberts Island @ Whiskey Slough Pump	01/17/12	MPM	X	X		X	
Roberts Island @ Whiskey Slough Pump	02/14/12	MPM	X				
Roberts Island @ Whiskey Slough Pump	03/15/12	MPM			X		X
Roberts Island @ Whiskey Slough Pump	04/12/12	MPM				X	
Roberts Island @ Whiskey Slough Pump	05/16/12	MPM				X	
Roberts Island @ Whiskey Slough Pump	07/17/12	MPM		X	X	X	
Roberts Island @ Whiskey Slough Pump	08/21/12	MPM	X				
Roberts Island @ Whiskey Slough Pump	09/18/12	MPM	X				X
Roberts Island @ Whiskey Slough Pump	01/15/13	MPM	X	X		X	
Roberts Island @ Whiskey Slough Pump	02/21/13	MPM	X				
Roberts Island @ Whiskey Slough Pump	03/19/13	MPM			X		X
Roberts Island @ Whiskey Slough Pump	04/02/13	MPM				X	
Roberts Island @ Whiskey Slough Pump	05/21/13	MPM				X	
Roberts Island @ Whiskey Slough Pump	07/16/13	MPM		X	X	X	
Roberts Island @ Whiskey Slough Pump	08/20/13	MPM	X				
Roberts Island @ Whiskey Slough Pump	09/17/13	MPM	X				X

2013 Monitoring Results

During 2013, MPM for chlorpyrifos, diuron, water column toxicity to *C. dubia* and *S. capricornutum,* and sediment toxicity to *H. azteca* occurred at Roberts Island @ Whiskey Slough Pump; no exceedances or toxicities occurred (Table XIV-5). Exceedances of the WQTLs for chlorpyrifos (February 2011) and diuron (January 2008) occurred during monitoring at Roberts Island Drain @ Holt Rd. The last water column toxicity to *C. dubia* occurred at Roberts Island Drain @ Holt Rd (March 2010), and toxicity to *S. capricornutum* occurred at Roberts Island Drain along House Rd (May 2008). Sediment toxicity to *H. azteca* last occurred in September 2008 at Roberts Island Drain along House Rd. The Priority E constituents, DO, SC, and TDS were monitored during all MPM events in 2013. Exceedances of the WQTL for SC occurred during every monitoring event in 2013 and exceedances of the WQTL for TDS occurred during every month in 2013 except December. Exceedances of the WQTL for DO occurred in May, June, August, September, and October.

Table XIV-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Roberts Island @ Whiskey Slough Pump site subwatershed (organized alphabetically by constituent priority). 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 chlorpyrifos, copper, diazinon, and diuron since monitoring began in the site subwatershed. A record of all exceedances in the Roberts Island site subwatershed since monitoring began is provided in Appendix II, Table XIV-A.

Table XIV-5. Roberts Island management plan constituent exceedance tally (2006-2013).

Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table XIV-A.

Monitoring Year	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	*C. dubia*, (%Control)	*H. azteca*, (%Control)	*S. capricornutum*, (%Control)	DDE (p,p'), >0.00059 µg/L	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	pH, <6.5 and >8.5 units	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L
2006	1	0	0	2	0	1	5	4	3	3	4
2007	0	1	1	2	1	2	12	3	0	14	9
2008	2	1	2	2	8	1	13	4	0	16	9
2009	0	NA	0	NA	NA	0	4	1	0	10	10
2010	0	NA	1	NA	NA	NA	4	3	0	12	11
2011	2	0	0	0	0	0	4	3	1	10	8
2012	0	0	0	0	0	NA	9	4	0	12	11
2013	0	0	0	0	0	NA	5	0	0	12	12
Overall Tally	**5**	**2**	**4**	**6**	**9**	**4**	**56**	**22**	**4**	**89**	**74**
Constituent Priority	**A/B**	**C**	**D**	**D**	**D**	**E**	**E**	**E**	**E**	**E**	**E**

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

Table XIV-6. Roberts Island site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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 Sough 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 (@ Whisky 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

[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 (see Table 4 for MPM schedule).

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

NM – Normal Monitoring.

Table XIV-6. Roberts Island site subwatershed instantaneous load calculations for chlorpyrifos and diuron.

Upstream site is italicized. 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
Roberts Island Drain @ Holt Rd	*Chlorpyrifos*	*09/19/06*	*0.54*	*0.018*	*ug/L*	*0*	*µg/sec*
Roberts Island Drain @ Holt Rd	*Chlorpyrifos*	*08/12/08*	*10.11*	*0.034*	*ug/L*	*10*	*µg/sec*
Roberts Island Drain along House Rd	*Chlorpyrifos*	*08/12/08*	*3.38*	*0.044*	*ug/L*	*4*	*µg/sec*
Roberts Island Drain along House Rd	*Chlorpyrifos*	*09/16/08*	*4.24*	*1.7*	*ug/L*	*204*	*µg/sec*
Roberts Island Drain @ Holt Rd	*Chlorpyrifos*	*02/10/09*	*1.36*	*0.0057*	*ug/L*	*0*	*µg/sec*
Roberts Island Drain @ Holt Rd	*Chlorpyrifos*	*09/07/10*	*6.67*	*0.0074*	*ug/L*	*1*	*µg/sec*
Roberts Island Drain @ Holt Rd	*Chlorpyrifos*	*01/11/11*	*5.28*	*0.016*	*ug/L*	*2*	*µg/sec*
Roberts Island Drain @ Holt Rd	*Chlorpyrifos*	*02/08/11*	*6.39*	*0.016*	*ug/L*	*3*	*µg/sec*
Roberts Island Drain along House Rd	*Diuron*	*05/22/07*	*5.47*	*0.23*	*ug/L*	*36*	*µg/sec*
Roberts Island Drain @ Holt Rd	*Diuron*	*07/10/07*	*0.22*	*4.8*	*ug/L*	*30*	*µg/sec*
Roberts Island Drain @ Holt Rd	*Diuron*	*01/23/08*	*1.35*	*17*	*ug/L*	*650*	*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

A complete review of source identification and outreach activities in the Roberts Island @ Whiskey Slough Pump site subwatershed is provided in the 2013 MPUR Appendix I (pages 366-375). 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.

Chlorpyrifos is the only A/B constituent in the Roberts Island @ Whiskey Slough Pump active management plan. Applications of chlorpyrifos typically occur during the irrigation season; chlorpyrifos use in the site subwatershed has declined in recent years. The single exceedance of the WQTL for chlorpyrifos occurred in September 2006 at Roberts Island Drain @ Holt Rd and coincided with the highest reported application (Figure XIV-2). Three exceedances of the WQTL for chlorpyrifos occurred in 2008 at Roberts Island Drain @ Holt Rd (1) and Roberts Island Drain along House Rd (2) and were linked to irrigation tailwater and storm water runoff (2013 MPUR Appendix I, page 367). The winter exceedances of the WQTL for chlorpyrifos in January and February 2011 at Roberts Island Drain @ Holt Rd were associated with storm water runoff (2012 AMR, page 126). The PUR data indicate applications of diuron are also declining in the Roberts Island @ Whiskey Slough Pump site subwatershed (Figure XIV-3). The exceedances of the WQTL for diuron occurred in July 2007 and January 2008 at Roberts Island Drain @ Holt Rd. The exceedance in July 2007 did not coincided with applications made during the irrigation season; however, the exceedance could be related to irrigation tailwater mobilizing diuron from dormant season applications remaining in or near the waterway. The January 2008 exceedance of the WQTL for diuron was associated with storm water runoff.

In July 2007, toxicity to *C. dubia* at Roberts Island Drain @ Holt Rd resulted in 0% survival compared to the control; TIE results indicated non-polar organic chemicals were the cause of toxicity. However, no exceedances of the WQTL for chlorpyrifos occurred during the same sampling event. In September 2008, toxicity to *C. dubia* at Roberts Island Drain along House Rd occurred and resulted in 0% survival

compared to the control; TIE results indicated an organophosphate insecticide was the cause of the toxicity. During this instance, an exceedance of the WQTL for chlorpyrifos coincided with the September 2008 toxicity. The last toxicity to *C. dubia* occurred in March 2010 at Roberts Island Drain @ Holt Rd and resulted in 75% compared to the control; because survival was greater than 50% compared to the control a TIE was not required.

Between 2007 and 2008, toxicity to *S. capricornutum* occurred nine times total in the Roberts Island Drain subwatershed; five to *S. capricornutum* occurred at Roberts Island Drain @ Holt Rd and four to *S. capricornutum* occurred at times Roberts Island Drain along House Rd. One toxicity to *S. capricornutum* occurred in 2007 at Roberts Island Drain @ Holt Rd, resulting in 40% growth compared to the control. A TIE was not conducted and therefore the cause of toxicity cannot be sourced. The January 2008 toxicity to *S. capricornutum* at Roberts Island Drain @ Holt Rd resulted in 1% growth compared to the control and TIE results indicate non-polar organics were the source. The TIE results for the toxicity to *S. capricornutum* at Roberts Island Drain @ Holt Rd in April 2008 indicate non-polar organics and metals were the source; toxicity was not persistent in samples collected within 7 days. Toxicity to *S. capricornumutm* also occurred at Roberts Island Drain along House Rd in April 2008 and TIE results indicate metals were the cause of toxicity; samples were recollected at Roberts Island Drain along House Rd and toxicity was persistent. Of the eight MPM events for toxicity to *S. capricornutm* at Roberts Island @ Whiskey Slough Pump, no toxicity occurred. Of the last 19 monitoring events for sediment toxicity to *H. azteca* at Roberts Island @ Whiskey Slough Pump there have been no instances of toxicity to *H. azteca*. The last time sediment toxicity to *H. azteca* occurred at Roberts Island Drain along House Rd during August 2008.

Priority A/B, C, and D constituents can be associated with pesticide applications to assist with narrowing down potential sources of water quality impairements and focusing outreach efforts. However, all management plan constituents are discussed during Coalition focused outreach including management practices that can be implemented to reduce agricultural discharge of constituents of concern. The Coalition describes its strategy for conducting focused outreach for high priority sites in the Management Practice Tracking strategy sections of the main body of the 2014 MPUR.

Focused outreach to document current management practices and track implementation of new management practices began in 2013 and will be complete in 2015. The Coalition contacted seven targeted growers, representing 1,618 irrigated acres in the site subwatershed (2013 MPUR, page 43). Management practices are being documented and are summarized in the main body of this report. Follow-up surveys were mailed to targeted growers on February 14, 2014 and a final analysis of newly implemented practices will be provided in the 2015 MPUR. The Coalition believes the implementation of certain management practices and increased grower awareness will help improve water quality within the Roberts Island @ Whiskey Slough Pump site subwatershed.

Figure XIV-2. Roberts Island @ Whiskey Slough Pump site subwatershed lbs chlorpyrifos applied by month (2006-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County. .Asterisk (*) denotes months with exceedances.

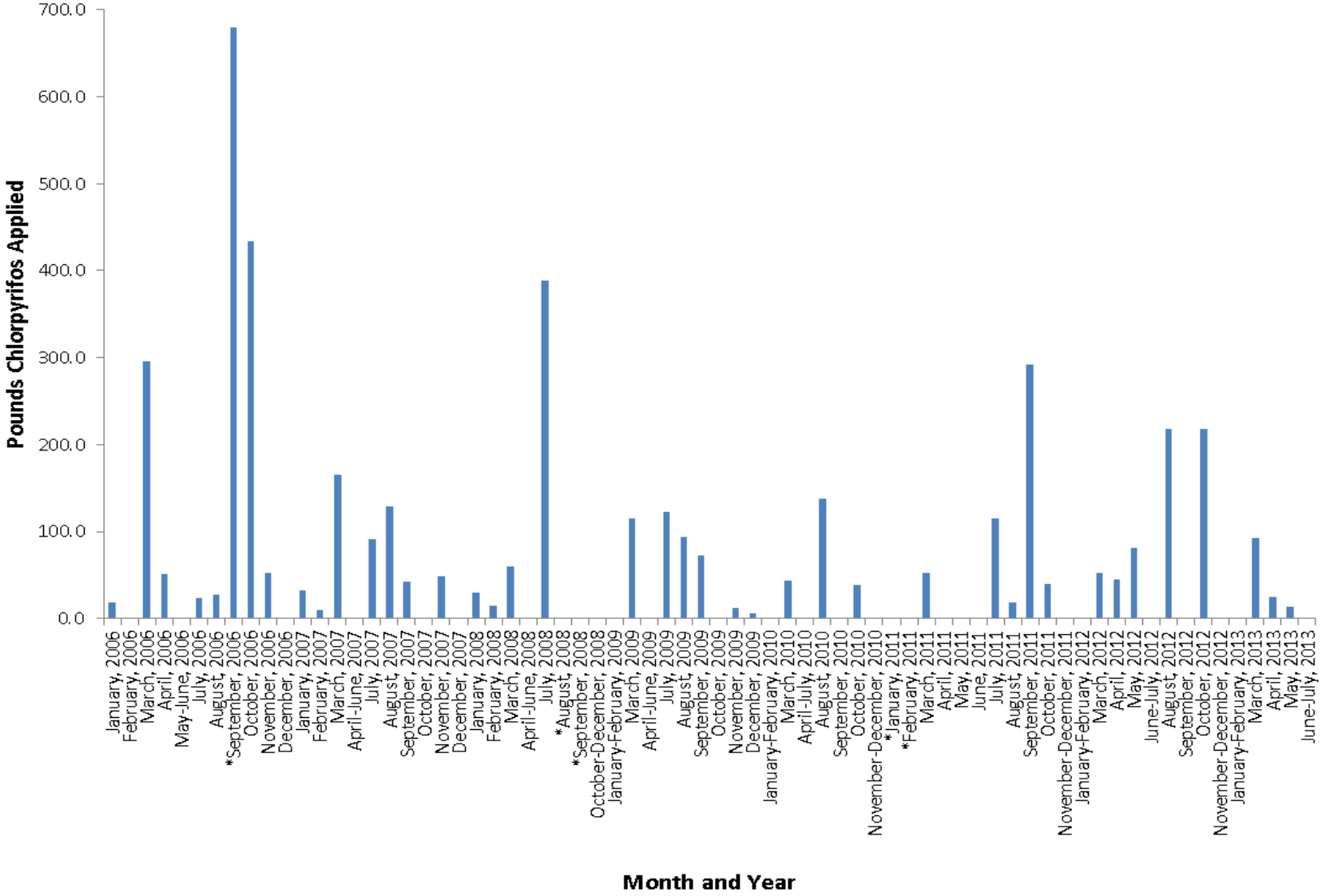
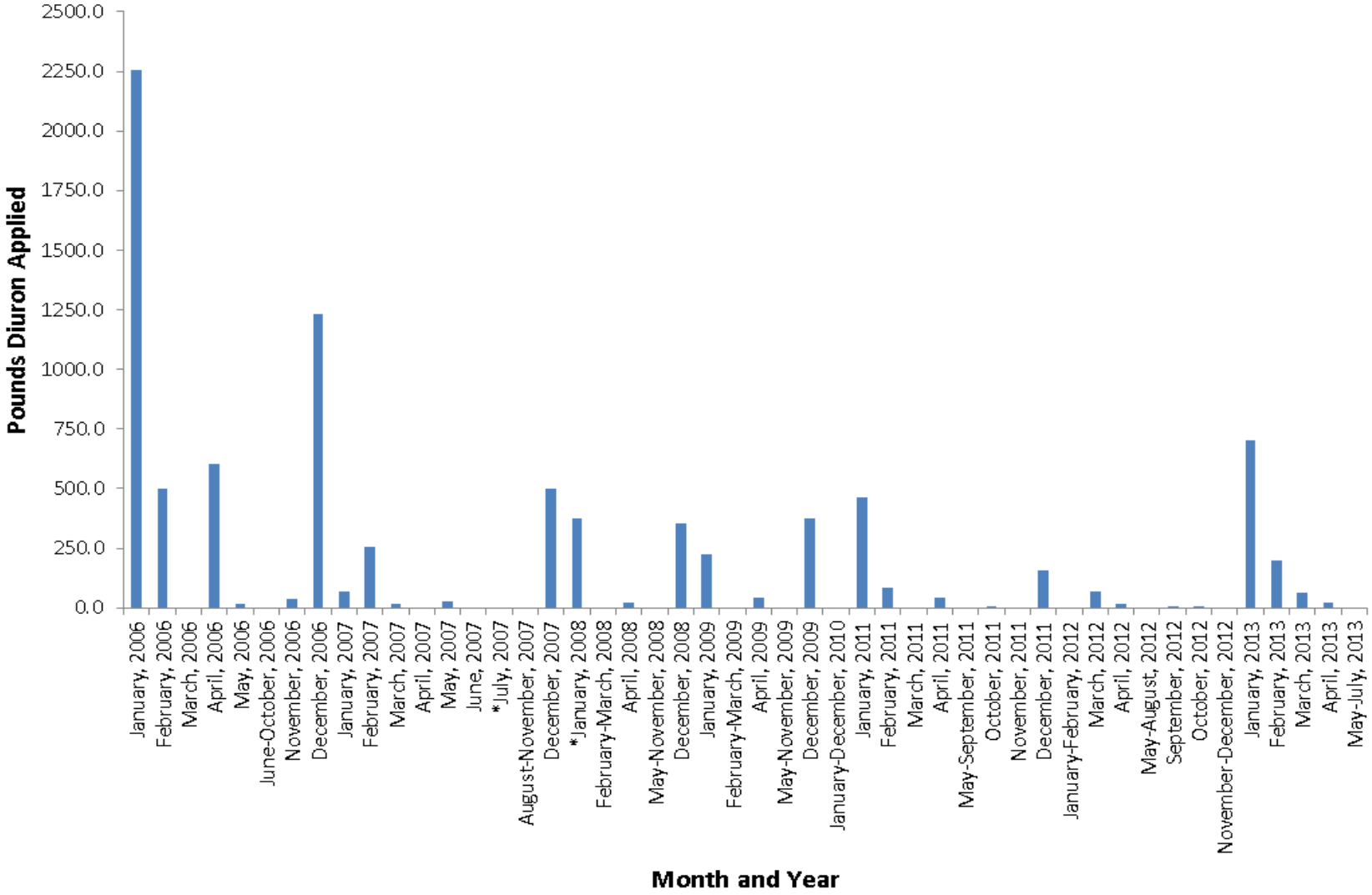


Figure XIV-3. Roberts Island @ Whiskey Slough Pump site subwatershed lbs diuron applied by month (2006-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County. Asterisk (*) denotes months with exceedances.



Evaluation

The Coalition contacted seven targeted growers with property that has the potential to directly drain to the waterway, documented current management practices, and discussed water quality concerns. Beginning in 2012, MPM at Roberts Island @ Whiskey Slough Pump occurred to address sources of exceedances that historically occurred at the sites it replaced, Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd.

The sampling location at Roberts Island @ Whiskey Slough Pump better represents overall water quality of Roberts Island. Management Plan Monitoring for chlorpyrifos, diuron, water column toxicity to *C. dubia* and *S. capricornutum,* and sediment toxicity to *H. azteca* occurred from 2012 through 2013 and 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. The MPM results from 2014 and 2015 will allow the Coalition to evaluate the effectiveness of its focused management plan strategy in the site subwatershed.

Next Steps

The Coalition will continue focused outreach to educate growers and promote awareness of water quality impairments within the site subwatershed. The Coalition is scheduled to complete follow-up contacts with targeted growers to assess newly implemented practices in 2014 and general outreach will continue. During 2014, Roberts Island @ Whiskey Slough Pump will be monitored for Assessment Monitoring constituents and MPM is scheduled for chlorpyrifos, diuron, and water column toxicity to *C. dubia*, *S. capricornutum,* and sediment toxicity to *H. azteca*. Results from 2014 MPM will provide the Coalition with information to evaluate the effectiveness of its outreach strategy and to further evaluate the sources of exceedances.

XV. WALTHALL SLOUGH @ WOODWARD AVE

Overview

Walthall Slough @ Woodward Ave is one of the Coalition's fifth priority site subwatersheds. The Coalition has completed the first year of its focused management plan strategy in the site subwatershed. Water quality concerns have been 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. The high priority constituents in the Walthall Slough @ Woodward Ave site subwatershed management plan are chlorpyrifos, nitrate, and sediment toxicity to *H. azteca* (Table XV-1).

During 2013, Assessment Monitoring occurred monthly and MPM for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* occurred during months of past exceedances. Additionally, this site is a TMDL compliance monitoring location and monitoring for chlorpyrifos and diazinon occurred during April storm sampling and from May through August 2013. No exceedances of the WQTL for chlorpyrifos or sediment toxicity to *H. azteca* have occurred at the site since 2011. Nitrate was the only high priority constituent to result in an exceedance during Assessment Monitoring in 2013.

Core Monitoring and MPM for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* will continue at the site during 2014.

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 SJCWQC MPUR.

PRIORITY	CONSTITUENT	MANAGEMENT PLAN INITIATION YEAR	MANAGEMENT PLAN REMOVAL YEAR
A/B	Chlorpyrifos	2012	Active
C	Nitrate + Nitrite as N	2012	Active
D	*H. azteca* sediment toxicity	2011	Active
E	Dissolved Oxygen	2010	Active
E	*E. coli*	2010	Active
E	HCH-delta	2010	Active
E	Specific Conductivity	2010	Active
E	Total Dissolved Solids	2010	Active

Description of Site Subwatershed

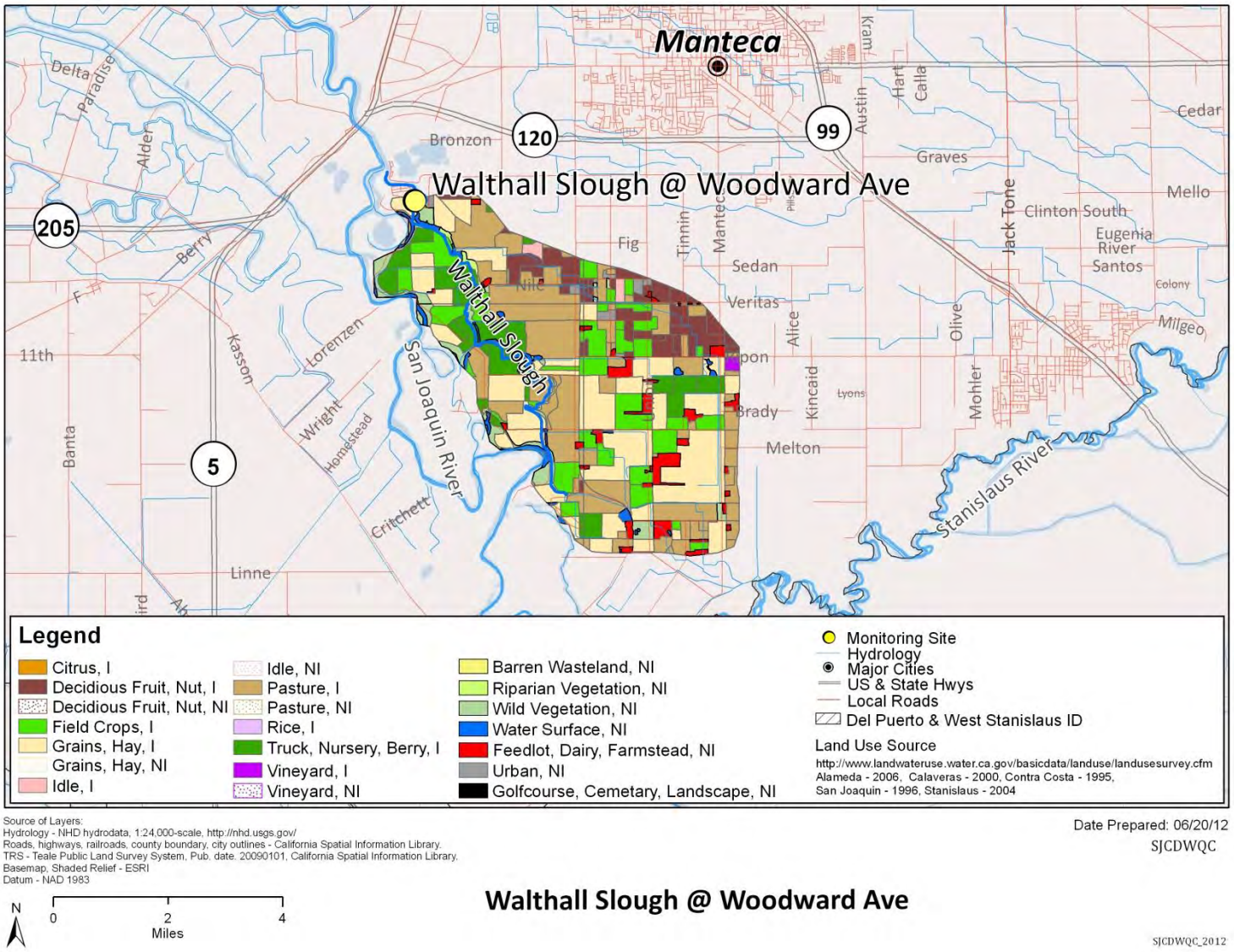
Walthall Slough @ Woodward Ave is the Core Monitoring location within Zone 5 under the 2008 MRPP. Walthall Slough @ Woodward Ave consists of 8,426 irrigated acres which include pasture, field crops, truck/nursery/berry crops, fruits and nuts, grains/hay, and dairy (Figure XV-1). This site is located 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).

Walthall Slough @ Woodward Ave 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

Normal Monitoring began at Walthall Slough @ Woodward Ave in 2009 and continued through 2008. Core Monitoring began in October 2008 with Assessment Monitoring occuring every third year; the last Assessment Monitoring year was 2013. Table XV-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013 (see 2013 MPUR Appendix I, Table XV-3 for analytes sampled prior to 2008).

Management Plan Monitoring was initiated in the site subwatershed during 2012 and monitoring occurred during months of past exceedances for chlorpyrifos and sediment toxicity to *H. azteca.* Management Plan Monitoring occurred in 2013 for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca* (Table XV-4). Additionally, Walthall Slough @ Woodward Ave is a TMDL compliance location for the Sacramento-San Joaquin Delta TMDL monitoring program; since 2009, monitoring for chlorpyrifos and diazinon occurred monthly.

Table XV-3. Walthall Slough @ Woodward Ave sampling events and analyses per year.

Only environmental samples are counted.

Type	Analyte	2008	2009	2010	2011	2012	2013
Sampling Events	Events Scheduled	0	13	12	12	12	13
	Dry Sites	0	0	0	0	0	0
	Events Sampled	0	13	12	12	12	13
Field and Physical Parameters	BOD	0	0	0	0	0	0
	Color	0	0	0	0	0	0
	Dissolved Oxygen	0	13	12	12	12	13
	Dissolved Solids	0	12	12	12	12	12
	E. coli	0	12	12	12	12	12
	Grain size (sediment)	0	2	2	0	2	2
	Hardness as CaCO3	0	12	12	0	0	12
	pH	0	13	12	12	12	13
	Specific Conductivity	0	13	12	12	12	13
	Suspended Solids	0	12	12	12	12	12
	Total Organic Carbon	0	12	12	12	12	12
	Total Organic Carbon (sediment)	0	2	2	0	2	2
	Turbidity	0	12	12	12	12	12
Nutrients	Ammonia as N	0	12	12	12	12	12
	Nitrate + Nitrite as N	0	12	12	12	12	12
	Nitrate as N	0	0	0	0	0	0
	Nitrite as N	0	0	0	0	0	0
	Nitrogen, Total Kjeldahl	0	12	12	12	12	12
	OrthoPhosphate as P	0	12	12	12	12	12
	Phosphate as P	0	12	12	12	12	12
Metals (Dissolved)	Cadmium	0	12	12	0	0	12
	Copper	0	12	12	0	0	12
	Lead	0	12	12	0	0	12
	Nickel	0	12	12	0	0	12
	Zinc	0	12	12	0	0	12
Metals (Total)	Arsenic	0	12	12	0	0	12
	Boron	0	12	12	0	0	12
	Cadmium	0	12	12	0	0	12
	Copper	0	12	12	0	0	12
	Lead	0	12	12	0	0	12
	Molybdenum	0	12	12	0	0	12
	Nickel	0	12	12	0	0	12

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

Type	Analyte	2008	2009	2010	2011	2012	2013
	Cyhalothrin, lambda	0	0	1	0	0	0
	Cypermethrin	0	0	1	0	0	0
	Deltamethrin: Tralomethrin	0	0	1	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	1	0	0	0
	Fenpropathrin	0	0	1	0	0	0
	Permethrin	0	0	1	0	0	0
Toxicity	*Ceriodaphnia dubia*	0	0	12	0	0	12
	Pimephales promelas	0	0	12	0	0	12
	Selenastrum capricornutum	0	0	12	0	0	12
	Hyalella azteca	0	0	2	0	2	2

Table XV-4. Walthall Slough @ Woodward Ave Management Plan Monitoring schedule (2012-2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	HCH	*H. azteca*
Walthall Slough @ Woodward Ave	03/15/12	MPM			X
Walthall Slough @ Woodward Ave	09/18/12	MPM	X		X
Walthall Slough @ Woodward Ave	10/16/12	MPM	X		
Walthall Slough @ Woodward Ave	01/15/13	MPM		X	
Walthall Slough @ Woodward Ave	03/19/13	MPM			X
Walthall Slough @ Woodward Ave	09/17/13	MPM	X		X
Walthall Slough @ Woodward Ave	10/15/13	MPM	X		
Walthall Slough @ Woodward Ave	11/19/13	MPM		X	
Walthall Slough @ Woodward Ave	12/17/13	MPM		X	

2013 Monitoring Results

During 2013, MPM for chlorpyrifos, HCH-delta and sediment toxicity to *H. azteca* were monitored under Assessment Monitoring. The last exceedance of the WQTL for chlorpyrifos occurred during TMDL compliance monitoring in 2011, the last exceedance of HCH-delta occurred in 2009, and there have been no instances of sediment toxicity since sediment toxicity to *H. azteca* was added to the site's management plan in 2011. Mangement Plan Monitoring is not conducted for nitrate; however, nitrate was monitored monthly during 2013 under Assessment Monitoring and resulted in exceedance level detections during February, November and December 2013 (Appendix II, Table XV-A). In addition, exceedances of priority E constituents, including DO (9), SC (3), and TDS (4), occurred during Assessment Monitoring (Table XV-5).

Table XV-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Walthall Slough @ Woodward Ave site subwatershed (organized alphabetically by constituent priority). 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 at Walthall Slough @ Woodward Ave site subwatershed since monitoring began is provided in Appendix II, Table XV-A.

Table XV-5. Walthall Slough @ Woodward Ave management plan constituent exceedance tally (2009-2013).
Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table XV-A.

Monitoring Year	Chlorpyrifos, >0.015 µg/L	Nitrate + Nitrite as N, >10 mg/L	*H. azteca*, (%Control)	Dissolved Oxygen, <7 mg/L	*E. coli*, >235 MPN/100 mL	HCH, delta, >0.0039 µg/L	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L
2009	0	0	1	11	2	3	3	3
2010	0	1	1	6	2	0	3	1
2011	2	2	NA	8	1	NA	4	3
2012	0	1	0	11	0	NA	3	4
2013	0	3	0	9	0	0	3	4
Overall Tally	**2**	**7**	**2**	**45**	**5**	**3**	**17**	**15**
Constituent Priority	**A/B**	**C**	**D**	**E**	**E**	**E**	**E**	**E**

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

Table XV-6. Walthall Slough @ Woodward Ave site subwatershed monitoring results for priority A/B - D constituents and HCH –delta since management plan initiation.

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

[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 (see Table 4 for MPM schedule).

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 chlorpyrifos and nitrate + nitrite as N.

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
Walthall Slough @ Woodward Ave	Chlorpyrifos	03/16/10	3.95	0.0060	µg/L	1	µg/sec
Walthall Slough @ Woodward Ave*	Chlorpyrifos	03/16/10	3.95	0.0080	µg/L	1	µg/sec
Walthall Slough @ Woodward Ave	Chlorpyrifos	09/20/11	42.40	0.083	µg/L	100	µg/sec
Walthall Slough @ Woodward Ave	Chlorpyrifos	10/06/11	36.13	0.078	µg/L	80	µg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	01/13/09	2.42	6.7	mg/L	459	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	02/10/09	0	0.70	mg/L	0	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	03/10/09	0	0.02	mg/L	0	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	04/14/09	35.37	0.28	mg/L	280	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	04/14/09	35.37	0.33	mg/L	331	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	05/12/09	15.87	0.24	mg/L	108	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	05/12/09	15.87	0.25	mg/L	112	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	06/09/09	2.11	0.16	mg/L	10	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	06/09/09	2.11	0.11	mg/L	7	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	07/14/09	16.90	1.0	mg/L	479	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	07/14/09	16.90	0.89	mg/L	426	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	08/11/09	17.23	0.26	mg/L	127	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	08/11/09	17.23	0.21	mg/L	102	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	09/15/09	20.09	2.1	mg/L	1195	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	09/15/09	20.09	2.2	mg/L	1252	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	10/06/09	27.16	0.74	mg/L	569	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	10/06/09	27.16	0.78	mg/L	600	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	11/10/09	1.03	2.5	mg/L	73	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	11/10/09	1.03	2.5	mg/L	73	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	12/08/09	2.37	4.0	mg/L	268	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	12/08/09	2.37	4.0	mg/L	268	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	01/13/10	1.09	0.37	mg/L	11	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	01/13/10	1.09	0.29	mg/L	9	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	02/09/10	3.48	4.1	mg/L	404	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	02/09/10	3.48	4.3	mg/L	424	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	03/16/10	3.95	5.7	mg/L	638	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	03/16/10	3.95	6.2	mg/L	693	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	04/13/10	5.15	1.2	mg/L	175	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	04/13/10	5.15	1.2	mg/L	175	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	05/11/10	8.42	0.82	mg/L	196	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	05/11/10	8.42	0.87	mg/L	208	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	06/08/10	16.27	0.78	mg/L	359	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	06/08/10	16.27	0.83	mg/L	383	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	07/13/10	19.92	0.78	mg/L	440	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	07/13/10	19.92	0.76	mg/L	429	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	08/10/10	12.83	0.67	mg/L	243	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	08/10/10	12.83	0.72	mg/L	262	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	09/07/10	17.91	0.70	mg/L	355	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	09/07/10	17.91	0.69	mg/L	350	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	10/12/10	8.18	3.7	mg/L	857	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	10/12/10	8.18	5.2	mg/L	1204	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	11/09/10	2.01	8.6	mg/L	489	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	11/09/10	2.01	8.8	mg/L	501	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	12/07/10	3.06	10	mg/L	867	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	12/07/10	3.06	11	mg/L	953	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	01/11/11	0	9.5	mg/L	0	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	02/08/11	0	4.7	mg/L	0	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	03/08/11	0	6.9	mg/L	0	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	07/26/11	15.11	0.74	mg/L	317	mg/sec

Site Name	Analyte Name	Sample date	Discharge, CFS	Concentration	Concentration Unit	Loading Rate[1]	Loading Rate Unit
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	08/23/11	36.75	1.7	mg/L	1769	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	09/20/11	42.40	0.88	mg/L	1057	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	10/06/11	36.13	1.5	mg/L	1535	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	11/15/11	2.41	11	mg/L	751	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	12/13/11	1.39	14	mg/L	551	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	01/17/12	6.86	2.4	mg/L	466	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	02/14/12	1.61	4.2	mg/L	191	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	03/15/12	2.66	0.91	mg/L	69	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	03/15/12	2.66	0.92	mg/L	69	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	04/12/12	16.56	0.5	mg/L	234	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	05/16/12	10.71	0.31	mg/L	94	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	06/19/12	17.25	1.2	mg/L	586	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	07/17/12	15.00	0.52	mg/L	221	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	08/21/12	4.74	0.086	mg/L	12	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	09/18/12	15.99	1.4	mg/L	634	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	10/16/12	14.27	1.5	mg/L	606	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	11/06/12	1.80	5.4	mg/L	275	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	12/03/12	4.45	12	mg/L	1512	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	01/15/13	14.84	5.9	mg/L	2479	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	01/15/13	14.84	5.8	mg/L	2437	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	02/21/13	1.79	15	mg/L	760	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	02/21/13	1.79	14	mg/L	710	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	03/19/13	23.39	2.8	mg/L	1855	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	03/19/13	23.39	2.8	mg/L	1855	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	04/02/13	27.58	2.8	mg/L	2187	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	04/02/13	27.58	2.8	mg/L	2187	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	05/21/13	17.86	4.1	mg/L	2074	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	05/21/13	17.86	3.7	mg/L	1871	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	06/18/13	11.58	1.4	mg/L	459	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	06/18/13	11.58	1.4	mg/L	459	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	07/16/13	18.27	0.98	mg/L	507	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	07/16/13	18.27	0.97	mg/L	502	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	08/20/13	15.54	1.7	mg/L	748	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	08/20/13	15.54	1.7	mg/L	748	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	09/17/13	9.75	3.6	mg/L	994	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	09/17/13	9.75	3.5	mg/L	966	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	10/08/13	16.61	0.57	mg/L	268	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	10/08/13	16.61	1.7	mg/L	800	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	11/19/13	0	12	mg/L	0	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	11/19/13	0	13	mg/L	0	mg/sec
Walthall Slough @ Woodward Ave	Nitrate + Nitrite as N	12/17/13	0.90	16	mg/L	408	mg/sec
Walthall Slough @ Woodward Ave*	Nitrate + Nitrite as N	12/17/13	0.90	15	mg/L	382	mg/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

To address source identification and determine an outreach strategy, the Coalition considers past monitoring results and associated PUR data and focuses its efforts on applied pesticides (2013 MPUR Appendix I, pages 240-246).

Chlorpyrifos is the only A/B constituent under the Walthall Slough @ Woodward Ave site subwatershed management plan. Since monitoring began at the site subwatershed in 2009, two exceedances of the WQTL for chlorpyrifos have occurred, one in September 2011 and one in October 2011. The exceedances of the WQTL for chlorpyrifos that occurred during September, October 2011 were most likely associated with storm water runoff and/or offsite movement of irrigation tailwater from hay fields. Toxicity was not associated with either one of the 2011 exceedances of the WQTL for chlorpyrifos. The Coalition received preliminary PUR data from San Joaquin County for applications made through July 2013 and reviewed PUR data for the number of chlorpyrifos applications, pound applied, and acres treated. The number of pounds of chlorpyrifos applied in the Walthall Slough site subwatershed has decreased over time; in 2009 approximately 1,100 pounds were applied compared to approximately 600 pounds of chlorpyrifos applied in 2013 (Figure XV-2). Based on PUR data, alfalfa was determined to be the crop type with the highest pounds of chlorpyrifos applied in the Walthall Slough @ Woodward Ave site subwatershed.

Nitrate is the only priority C constituent for the Walthall Slough @ Woodward Ave site subwatershed. Exceedances of the WQTL for nitrate occurred every year except for 2009 (Table XV-5). There have been no toxicities associated with any exceedance of the WQTL for nitrate at this site. During 2013, three exceedances of the WQTL for nitrate occurred, once during winter monitoring and twice during fall monitoring. Increased rainfall in February and March increased flows in Walthall Slough; rainfall may have carried nitrates from pastures, dairies or urban areas into the waterway. 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. It is possible for TKN and ammonium in animal waste that enter surface waters to be converted to nitrate by nitrifying bacteria resulting in elevated levels of nitrates in the water column. Furthermore, TKN and ammonium were both detected in water column samples collected from Walthall Slough @ Woodward Ave during the 2010 and 2011 fall seasons. Possible sources of animal waste in a waterbody include dairies, poultry operations, pastureland and/or wildlife.

Sediment samples have been toxic to *H. azteca* twice since monitoring began, once in April 2009 and once in September 2010. Additional sediment chemistry analysis was not conducted until 2010; sediment chemistry results for the September 2010 toxicity indicated the presence of chlorpyrifos and pyrethroids. The Coalition believes eliminating irrigation tailwater and storm water runoff will address many of the potential causes of sediment toxicity in the subwatershed, such as pesticides. During

outreach, the Coalition discussed the importance of preventing erosion and offsite movement of sediment to waterways.

The priority E constituents listed under the Walthall Slough @ Woodward Ave site subwatershed management plan are: DO, *E. coli*, HCH-delta, SC and TDS. HCH-delta is actively monitored under the management plan; MPM occurred in 2013 and resulted in no exceedances of the WQTL for this constituent. The last and only year in which exceedances of the WQTL for HCH-delta occurred was 2009. HCH-delta (OCH) is a break down product of other legacy organochlorine products that are no longer applied. Due to exceedances of HCH-delta during 2009, the Coalition is required to monitor for HCH-delta even though all Group A pesticides have been removed from the monitoring program in SJCWQDC.

Exceedances of physical parameters (DO, SC, and TDS) are difficult to source. DO is a non-conserved parameter, meaning that it can increase or decrease as water moves downstream and can vary diurnally and seasonally. Exceedances of SC and TDS can be associated with groundwater intrusion from the Delta and/or recirculation of irrigation water. To characterize the potential agricultural sources of *E. coli*, the Coalition plans to participate in a focus group with other Coalitions and Regional Board staff to develop a joint work plan to source and identify management practices to prevent discharges to surface waters. Although DO, *E. coli*, SC, and TDS will remain low priority, the Coalition will continue to collect monitoring data for these constituents during Core Monitoring. Priority E constituents are discussed during targeted outreach and will continue to be discussed at annual grower meetings.

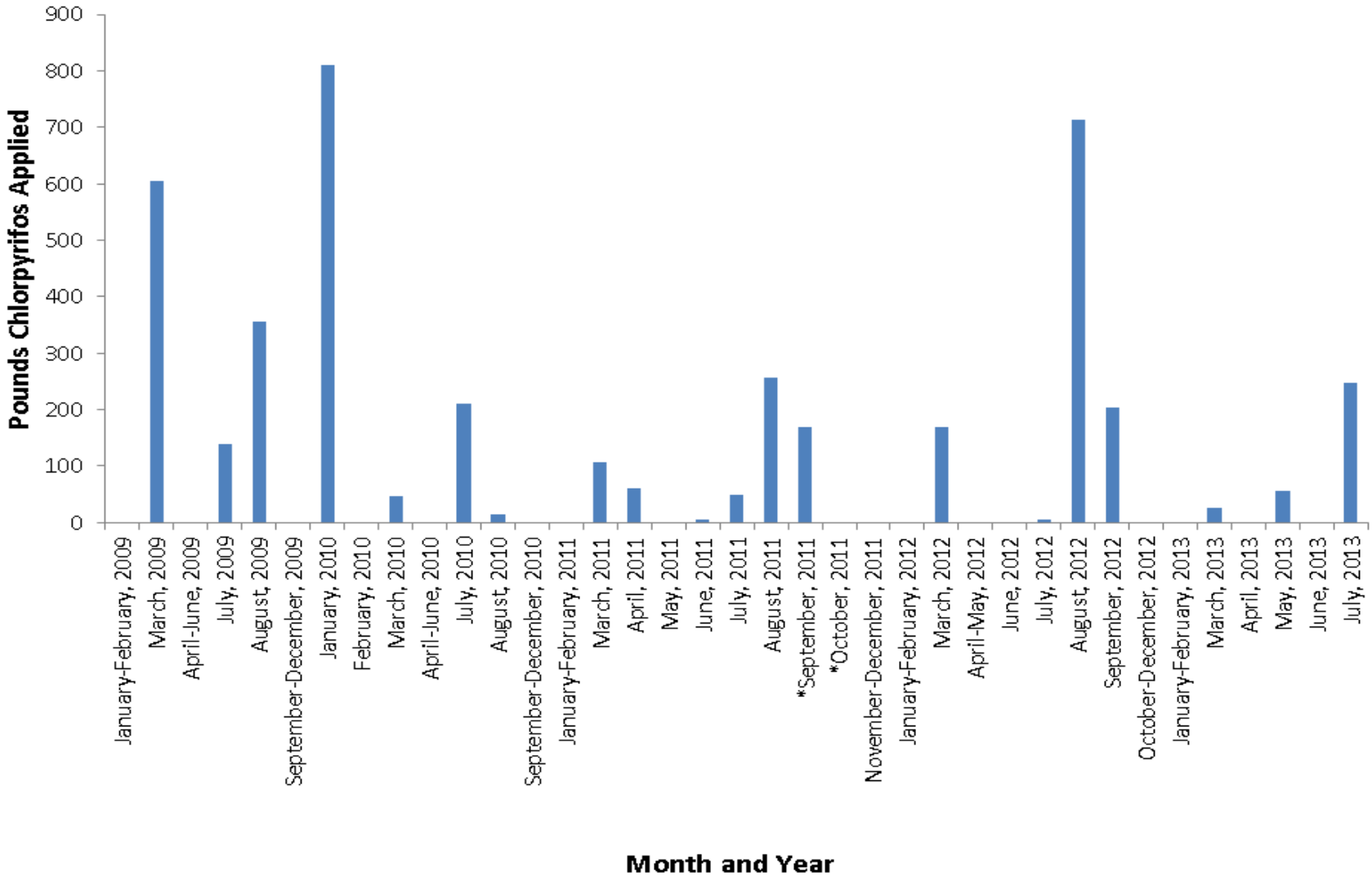
Walthall Slough @ Woodward Ave is a high priority site subwatershed and focused outreach occurred during 2013 and will continue in 2014 and 2015. The Coalition's strategy for conducting outreach in high priority site subwatersheds is described in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR. The Coalition created a list of targeted growers that operate farms adjacent to the waterway, have the potential to discharge directly to the waterway, and have recorded past uses of management plan constituents. During focused outreach the Coalition will discuss priority A/B and C constituents; however, all constituents in the active management plan will be reviewed and discussed.

In 2013, eight growers representing 1,490 acres within the site subwatershed were contacted to schedule individual meetings (2014 MPUR, Performance Goals and Schedules section). The Coalition held individual grower meetings with targeted members in January 2013 to inform growers about management practices as well as assess current and expected future implementation of additional management practices (2014 MPUR, Fifth Priority Subwatersheds Summary of Management Practices section). Surveys documenting current and planned management practices were returned by October 2013 and a preliminary analysis of management practices is provided in the Management Practices section of the 2014 MPUR. On February 14, 2014 follow-up surveys were sent to targeted growers to document implemented management practices. A complete analysis of implemented management practices will be discussed in the 2015 MPUR.

In 2012, the South San Joaquin Irrigation District completed the installation of a new closed irrigation delivery system over approximately 3,800 acres (Division 9 Irrigation Enhancement Project) upstream of the Walthall Slough subwatershed. The previous irrigation system was running at a maximum capacity due to the overuse and over-pressurization of sprinkler and drip irrigation systems. This caused several leaks and water loss because excess water in the system had to be discharged. The new irrigation system implemented in 2012 is designed to capture agricultural runoff and divert runoff into reservoirs for irrigation re-use. The irrigation system contains automated and metering technology which provides precise measurement and accounting of water use. Furthermore, the new irrigation system eliminates the waste of water from evaporation from flood irrigation or sprinklers. The new system delivers water directly to the roots of crops providing a much higher level of efficiency. Decreased excess water means less runoff from parcels upstream of Walthall Slough which could help improve overall water quality in the site subwatershed.

Figure XV-2. Walthall Slough @ Woodward Ave site subwatershed lbs chlorpyrifos applied by month (2009-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County. Asterisk (*) denotes months with exceedances.



Evaluation

Walthall Slough @ Woodward Ave is a fifth priority site subwatershed. The Coalition will conduct focused outreach and MPM for high priority constituents as part of the management plan strategy during 2013 through 2015. Grower surveys documenting current management practices and assessing future planned implementations are complete. On February 14, 2014 the Coalition initiated follow-up outreach with growers to identify newly implemented practices. The high priority constituents for the site subwatershed management plan are chlorpyrifos, HCH-delta, nitrate, and sediment toxicity to *H. azteca*. Water quality has improved in the site subwatershed and exceedances have decreased; no exceedances of the WQTL for chlorpyrifos or HCH-delta, and no sediment toxicity occurred during 2012 or 2013 MPM. Nitrate was the only high priority constituent to result in exceedance level detections in 2012 and 2013. Exceedances of the WQTL for chlorpyrifos last occurred in 2011 and the last time sediment toxicity occurred was in October 2010 (Appendix II, Table XV-A).

Management Plan Monitoring and focused outreach for high priority constituents will occur in 2014. In addition, chlorpyrifos and diazinon will be monitored for TMDL compliance. The Coalition anticipates the number of chlorpyrifos exceedances to continue to decline as chlorpyrifos use decreases in the Walthall Slough @ Woodward Ave site subwatershed and focused outreach continues.

Next Steps

During 2014, Walthall Slough @ Woodward Ave is scheduled for Core Monitoring and MPM will occur for chlorpyrifos, HCH-delta, and sediment toxicity to *H. azteca*. Total Maximum Daily Load compliance monitoring for chlorpyrifos and diazinon is also scheduled during one storm event and from April through August. The Coalition will continue to actively engage in grower outreach and education to address all the management plan constituents in the site subwatershed. On February 14, 2014 the Coalition sent out follow-up surveys to targeted growers to assess the implementation of new practices; a final analysis of management practices will be included in the 2015 MPUR.

HIGH PRIORITY SITE SUBWATERSHEDS (2014 – 2016)

XVI. DRAIN @ WOODBRIDGE RD

Overview

Drain @ Woodbridge Rd is a sixth priority site subwatershed. Monitoring at Drain @ Woodbridge Rd was initiated in October 2008 and continued through 2010; Assessment Monitoring last occurred in 2010. The Coalition will conduct focused outreach and MPM for high priority constituents as part of the management plan strategy from 2014 through 2016.

The active management plan constituents for Drain @ Woodbridge Rd are chlorpyrifos, arsenic, DO, *E. coli*, SC, and TDS (Table XVI-1). Management Plan Monitoring for chlorpyrifos began in 2013; chlorpyrifos was monitored in April and no exceedance ocurred. Management Plan Monitoring for chlorpyrifos will continue in 2014.

Table XVI-1. Drain @ Woodbridge Rd management plan constituents.

Management plan initiation year refers to when the site and constituent are addressed in the SJCWQC MPUR.

Priority	Constituent	Management Plan Initiation Year	Management Plan Removal Year
A/B	Chlorpyrifos	2011	Active
E	Arsenic	2009	Active
E	Dissolved Oxygen	2009	Active
E	*E. coli*	2011	Active
E	Specific Conductivity	2009	Active
E	Total Dissolved Solids	2009	Active

Description of Site Subwatershed

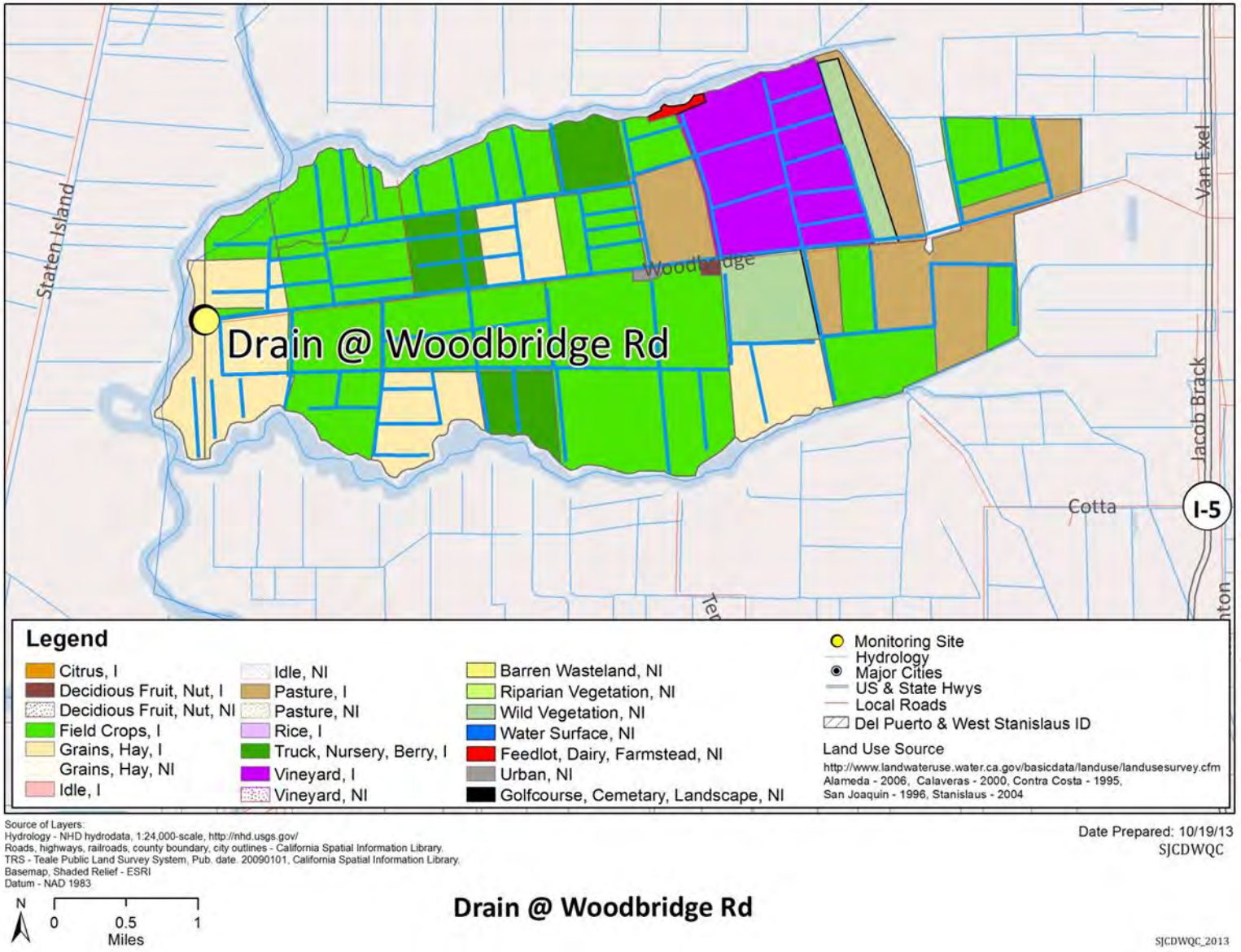
Drain @ Woodbridge Rd is rotating Assessment Site in Zone 3 under the 2008 MRPP. This site is located on the northern side of the Coalition region. Water from the drain is pumped to the Mokelumne River close to the sample location. The site drains an area of land to the east between Hog Slough and Sycamore Slough (Table XVI-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 XVI-1).

Drain @ Woodbridge Rd 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. The potential sources for the constituents are agriculture (chlorpyrifos, DDT, diazinon and group A pesticides), unknown source (invasive species and unknown water column toxicity) and resource extraction (mercury).

Table XVI-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 XVI-1. Drain @ Woodbridge Rd site subwatershed land use map.



Subwatershed Monitoring History

Monitoring began at Drain @ Woodbridge Rd in October 2008 and continued through 2010. Assessment Monitoring last occurred at the site in 2010; Table XVI-3 contains the number of events monitored per year and the constituents (by group) from 2008 through 2013. To better characterize water quality in the Drain @ Woodbridge Rd site subwatershed, MPM occurred for chlorpyrifos in 2013 prior to the Coalition's focused outreach (Table XVI-4).

Table XVI-3. Drain @ Woodbridge Rd sampling events and analyses per year.

Only environmental samples are counted.

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

TYPE	ANALYTE	2008	2009	2010	2011	2012	2013
Group A Pesticides	Aldrin	2	3	0	0	0	0
	Chlordane	2	3	0	0	0	0
	Endosulfan I	2	3	0	0	0	0
	Endosulfan II	2	3	0	0	0	0
	HCH, alpha	2	3	0	0	0	0
	HCH, beta	2	3	0	0	0	0
	HCH, delta	2	3	0	0	0	0
	HCH, gamma	2	3	0	0	0	0
	Heptachlor	2	3	0	0	0	0
	Heptachlor epoxide	2	3	0	0	0	0
	Toxaphene	2	3	0	0	0	0
Herbicides	Atrazine	2	3	12	0	0	0
	Cyanazine	2	3	12	0	0	0
	Glyphosate	2	3	12	0	0	0
	Paraquat	2	3	12	0	0	0
	Simazine	2	3	12	0	0	0
	Trifluralin	2	3	12	0	0	0
Organochlorines	DDD(p,p')	2	3	12	0	0	0
	DDE(p,p')	2	3	12	0	0	0
	DDT(p,p')	2	3	12	0	0	0
	Dicofol	2	3	12	0	0	0
	Dieldrin	2	3	12	0	0	0
	Endrin	2	3	12	0	0	0
	Methoxychlor	2	3	12	0	0	0
Organophosphates	Azinphos methyl	2	3	12	0	0	0
	Chlorpyrifos	2	3	12	0	0	1
	Demeton-s	2	3	12	0	0	0
	Diazinon	2	3	12	0	0	0
	Dichlorvos	2	3	12	0	0	0
	Dimethoate	2	3	12	0	0	0
	Disulfoton	2	3	12	0	0	0
	Malathion	2	3	12	0	0	0
	Methamidophos	2	3	12	0	0	0
	Methidathion	2	3	12	0	0	0
	Parathion, Methyl	2	3	12	0	0	0
	Phorate	2	3	12	0	0	0
	Phosmet	2	3	12	0	0	0
	Thiobencarb	0	0	0	0	0	0
Pyrethroids	Bifenthrin	0	0	0	0	0	0
	Cyfluthrin, total	0	0	0	0	0	0
	Cyhalothrin, lambda, total	0	0	0	0	0	0
	Cypermethrin, total	0	0	0	0	0	0
	Esfenvalerate/Fenvalerate, total	0	0	0	0	0	0
	Permethrin, total	0	0	0	0	0	0
Sediment Pesticides	Bifenthrin	0	0	0	0	0	0
	Chlorpyrifos	0	0	0	0	0	0
	Cyfluthrin	0	0	0	0	0	0
	Cyhalothrin, lambda	0	0	0	0	0	0
	Cypermethrin	0	0	0	0	0	0
	Deltamethrin: Tralomethrin	0	0	0	0	0	0
	Esfenvalerate/ Fenvalerate	0	0	0	0	0	0
	Fenpropathrin	0	0	0	0	0	0
	Permethrin	0	0	0	0	0	0
Toxicity	*Ceriodaphnia dubia*	2	3	12	0	0	0
	Pimephales promelas	2	3	12	0	0	0
	Selenastrum capricornutum	2	3	12	0	0	0
	Hyalella azteca	0	0	2	0	0	0

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

Table XVI-4. Drain @ Woodbridge Rd site subwatershed Management Plan Monitoring schedule (2013).

Site Name	Sample Date	Monitoring Type	Chlorpyrifos
Drain @ Woodbridge Rd	4/9/2013	MPM	X

Monitoring Results

Drain @ Woodbridge Rd was monitored for chlorpyrifos twice in 2008, three times in 2009 and every month in 2010 during Assessment Monitoring; one exceedances of the WQTL occurred in 2010 (Table XVI-5). Chlorpyrifos was added to the Drain @ Woodbridge Rd site subwatershed management plan in 2011 after the single exceedance of the WQTL occurred in April 2010. Management Plan Monitoring was initiated at the site in 2013; chlorpyrifos was monitored April 2013 and there was no exceedance.

Arsenic, DO, *E. coli*, SC, and TDS are priority E constituents monitored at Drain @ Woodbridge Rd; arsenic, *E. coli,* and TDS were monitored 17 times from 2008 through 2010, and field parameters were monitored during every monitoring event. Arsenic was added to the Drain @ Woodbridge Rd management plan in 2009 after two exceedances occurred in 2008. Exceedances of the WQTL for DO occurred during every month of monitoring from 2008 through 2010 and again during MPM in April 2013. Dissolved Oxygen and was added to the Drain @ Woodbridge management plan in 2009. An exceedance of the WQTL for *E. coli* occurred once in 2008 and once in 2010; and therefore it was added to the site's management plan in 2011. Specific Conductivity and TDS were added to the site's management plan in 2009; sixteen exceedances of the WQTL for SC and 15 exceedances of the WQTL for TDS occurred from 2008 through 2010 (Table XVI-5).

Table XVI-5 is a yearly tally of exceedances of WQTLs from 2006 through 2013 for management plan constituents in the Drain @ Woodbridge Rd site subwatershed (organized alphabetically by constituent priority). Table XVI-6 contains detections and WQTL exceedance results of all sampling events since the constituent became part of the site subwatershed management plan. Drain @ Woodbridge Rd is too deep to measure discharge and therefore no instantaneous loads are calculated for chlorpyrifos. A record of all exceedances in the Drain @ Woodbridge Rd site subwatershed since monitoring began is provided in Appendix II, Table XVI-A.

Table XVI-5. Drain @ Woodbridge Rd management plan constituent exceedance tally (2008-2013).

Exceedances that occurred during resampling for field parameters and toxicity are included in the tally. Exceedancex are organized alphabetically by constituent priority. A complete list of exceedances can be found in Appendix II, Table XVI-A.

Monitoring Year	Chlorpyrifos, > 0.015 µg/L	Arsenic, >10 µg/L	Dissolved Oxygen, >7 mg/L	*E. coli*, >235 MPN/100 mL	Specific Conductivity, >700 µS/cm	Total Dissolved Solids, >450 mg/L
2008	0	2	2	1	2	2
2009	0	3	2	0	3	3
2010	1	9	12	1	11	10
2013	0	NA	1	NA	0	NA
Overall Tally	**1**	**14**	**17**	**2**	**16**	**15**
Constituent Priority	**A/B**	**E**	**E**	**E**	**E**	**E**

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

Table XVI-6. Drain @ Woodbridge Rd site subwatershed monitoring results for priority A/B - D constituents since management plan initiation.

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	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	<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	<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	NA	NA	NA	<0.003	NA	NA	NA	NA	NA	NA	NA	NA

MPM – Management Plan Monitoring (see Table 4 for MPM schedule).
NA – Not Applicable. No monitoring occurred on this date for this constituent.
NM – Normal Monitoring

Source Identification

The Coalition evaluates past monitoring results and associated PUR data to identify sources of management plan constituents and develop an outreach strategy. The only high priority constituent in the Drain @ Woodbridge Rd site subwatershed management plan is chlorpyrifos. The Coalition reviews PUR data to determine the most frequent crop type and timing associated with chlorpyrifos applications. The Coalition is able to more easily source A/B, C, and D constituents through PUR data and outreach efforts are designed to target the sources of water quality impairments associated with these constituents.

Priority A/B Constituents

Chlorpyrifos is the only A/B constituent for the Drain @ Woodbridge Rd site subwatershed.

Chlorpyrifos

Exceedances of the WQTL for chlorpyrifos occurred once at Drain @ Woodbridge Rd in April 2010. The only other detection of chlorpyrifos (0.0067 µg/L) occurred in September 2010 and was below the reporting limit (Table XVI-6). To develop an outreach strategy, the Coalition reviews PUR data for the number of monthly chlorpyrifos applications, pounds of active ingredient applied, and acres treated (Table XVI-7, 8 and Figure XVI-2). Chlorpyrifos applications have been decreasing in the Drain @ Woodbridge Rd site subwatershed from 2008 through 2013 and, overall, pounds of chlorpyrifos applied and the number of acres treated have been decreasing since 2010; March 2010 had nine applications reported (765 total lbs AI) compared to six in March 2012 (122 total lbs AI) and three in March 2013 (60 total lbs AI, Table XVI-7). The single exceedance of the WQTL for chlorpyrifos occurred during the irrigation season, and therefore was most likely due to offsite movement of irrigation tailwater from row crops (Table XVI-8).

Table XVI-7. Drain @ Woodbridge Rd site subwatershed chlorpyrifos applications, lbs AI applied, and acres treated by month (2008-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
July, 2008	2	321.6	315
March, 2009	1	25	100
March, 2010	9	765.3	326
March, 2011	7	119.2	295
May, 2011	4	31.6	73
August, 2011	2	64.2	128.3
March, 2012	6	122.1	260
September, 2012	1	50.4	50
March, 2013	3	60.9	120
April, 2013	2	40.1	81
May, 2013	1	65	65
Summaries by Year			
2008 Total	2	321.6	315.4
2009 Total	1	25	100
2010 Total	9	765.3	326
2011 Total	13	215	496.3
2012 Total	7	172.6	310
2013 Total	6	166	266
Total	**38**	**1665.4**	**1813.7**

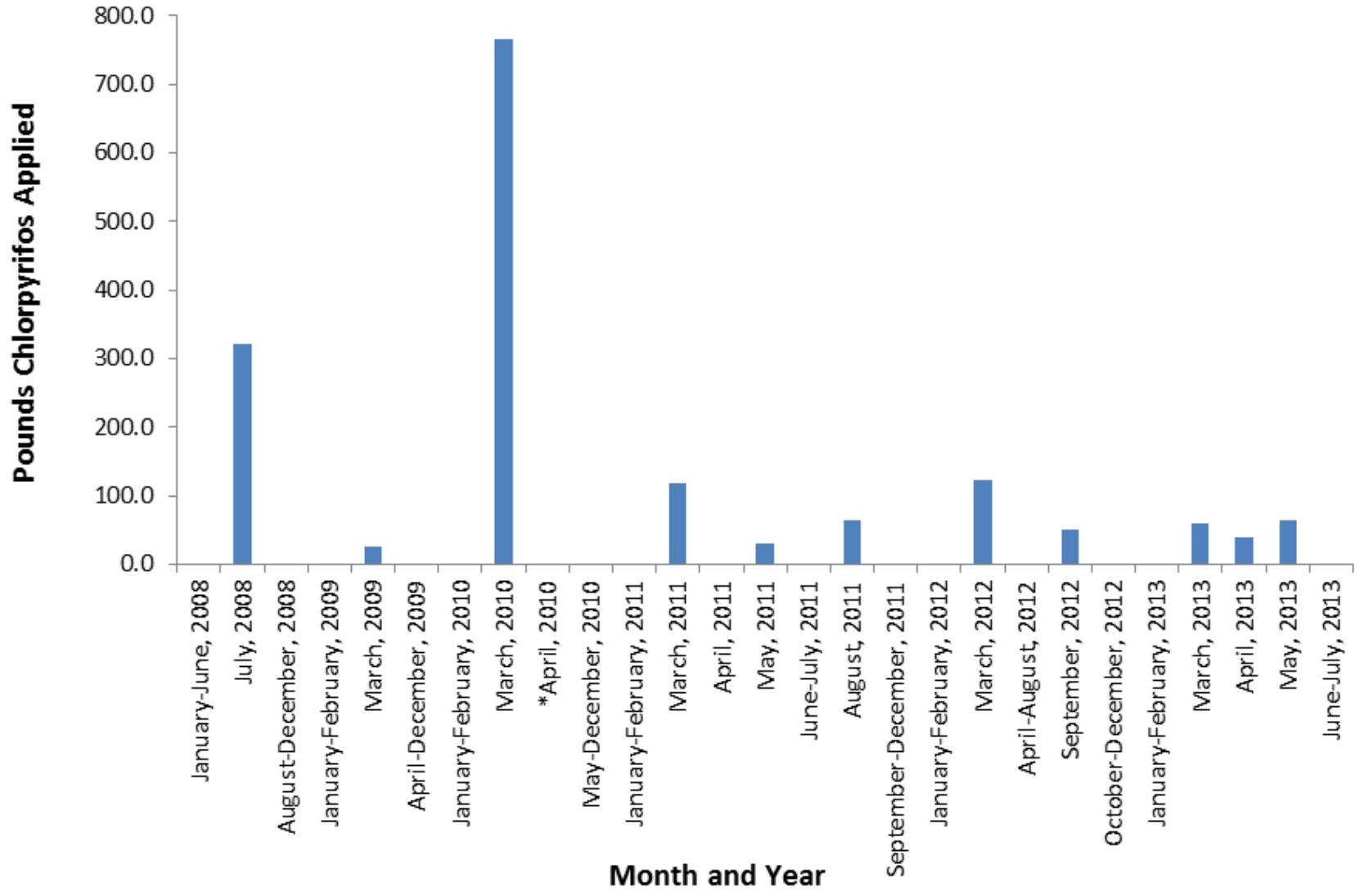
Table XVI-8. Drain @ Woodbridge Rd site subwatershed chlorpyrifos PUR data (2008-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County.

Year	Commodity	Pounds of AI Applied
2008	CORN (FORAGE - FODDER)	321.6
2009	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	25.0
2010	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	765.3
2011	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	183.4
	WHEAT (FORAGE - FODDER)	31.6
2012	ALFALFA	122.1
	ASPARAGUS	50.4
2013	ALFALFA	101.0
	CORN (FORAGE - FODDER)	65.0

Figure XVI-2. Drain @ Woodbridge Rd subwatershed lbs chlorpyrifos applied by month (2008-2013).

Pesticide Use Report data complete through July 2013 for San Joaquin County. Asterisk (*) denotes months with exceedances.



Priority E Constituents

The priority E constituents listed under the Drain @ Woodbridge Rd site subwatershed active management plan are arsenic, DO, *E. coli*, SC, and TDS. Priority E constituents are difficult to source; however, exceedances of the WQTL for DO can be caused by low flow in the waterway and *E. coli* can be the result of mismanaged manure applications to croplands and/or runoff from dairy farms. There are currently no products containing arsenic that are registered for use by agriculture. Any detections of arsenic may be from 1) legacy product use on agriculture, 2) naturally occurring concentrations of arsenic in the soils of the Coalition region, 3), non-agricultural use of products containing arsenic for purposes such as wood protection, household ant killer, weed control, etc. and 4) high concentrations of arsenic moving through the groundwater supply. Potential sources of TDS and SC are minerals leached from soils by upstream surface water and groundwater, or drain water from irrigated agriculture. The Coalition is not required to conduct MPM for priority E constituents; however, all constituents are discussed with growers during focused outreach and the Coalition believes informing growers of other water quality impairments will also address priority E constituents.

Outreach

The Coalition has conducted general outreach and education in the Drain @ Woodbridge Rd site subwatershed, which includes general management practices surveys to establish a baseline of current management practices, mailings, quarterly updates and annual meetings. Drain @ Woodbridge Rd is a high priority site subwatershed in 2014 through 2015 and during 2014 focused outreach will begin as a part of the Coalition's management plan strategy. The Coalition's strategy for conducting outreach in high priority site subwatersheds is described in the Management Practice Tracking Strategy sections of the main body of the 2014 MPUR. The Coalition created a list of targeted growers in 2013 that operate farms adjacent to the waterway, have the potential to discharge directly to the waterway, and have recorded past uses of management plan constituents (2014 MPUR Performance Goals and Schedules section). During outreach the Coalition will focus discussions on chlorpyrifos; however, all constituents in the active management plan will be reviewed and discussed.

Evaluation

It is evident that growers became aware of water quality concerns during general outreach and took certain actions to address these impairments. Chlorpyrifos applications have decreased in the Drain @ Woodbridge Rd site subwatershed and no exceedances of the WQTL have occurred since 2010. Arsenic, DO, *E. coli*, SC, and TDS are priority E constituents monitored at Drain @ Woodbridge Rd; arsenic, *E. coli* and TDS were monitored 17 times from 2008 through 2010, and field parameters were monitored during every monitoring event. Management Plan Monitoring is not required for priority E constituents; however, all constituents are discussed with growers during focused outreach and the Coalition believes addressing other water quality impairments will also address priority E constituents. The Coalition will continue to conduct MPM for chlorpyrifos in 2014 to evaluate the effectiveness of its focused management plan strategy in the site subwatershed.

Next Steps

Drain @ Woodbridge Rd site subwatershed is a high priority site subwatershed 2014 through 2016. The Coalition will document current management plan practices in 2014 and growers should begin implementing new management practices in the irrigation season of 2014 in an effort to further improve water quality. Management Plan Monitoring for high priority constituents will continue in 2014 and results will allow the Coalition to evaluate the effectiveness of its focused management plan strategy in the Drain @ Woodbridge Rd site subwatershed; the Coalition will present these conclusions in the 2015 MPUR.