Appendix I

High Priority Site Subwatershed Analysis

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HIGH PRIORITY SITE SUBWATERSHEDS (2008 – 2010)

I. DUCK CREEK @ HWY 4

Management Plan Constituents

Priority A/B

- Chlorpyrifos
- Diazinon

Priority D

- *Ceriodaphnia dubia* water column toxicity

Priority E

- Dissolved Oxygen
- pH
- *E. coli*
- *Selenastrum capricornutum* water column toxicity

Description of Duck Creek Site Subwatershed

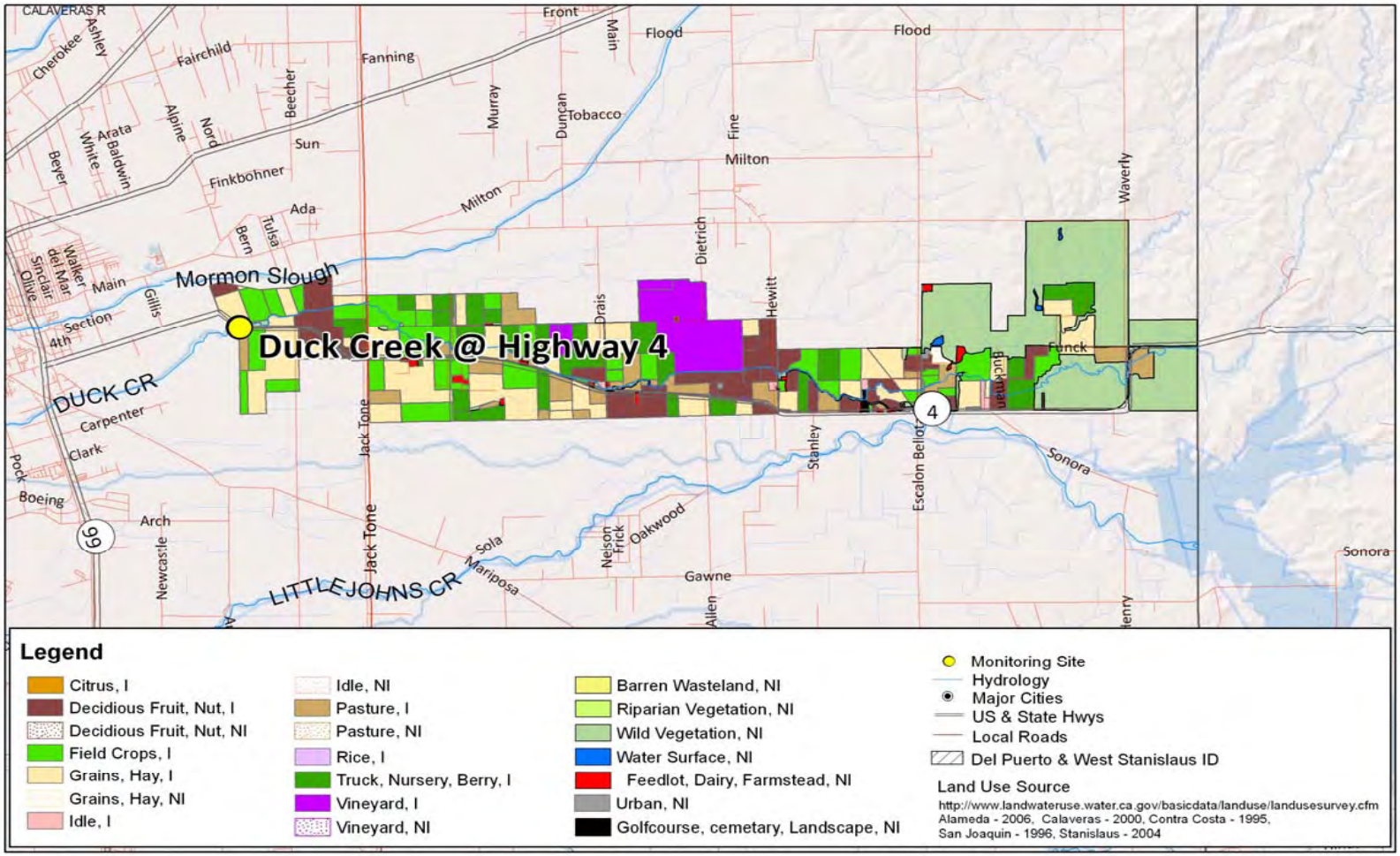
Duck Creek @ Highway 4 (15,046 irrigated acres) – This site is located just to the east of the city of Stockton. Duck Creek drains a section of southern San Joaquin County between Stockton and the Lone Tree Creek site subwatershed. During the summer, flow is typically low in the creek. The creek channel was dredged over several months early in the 2007 irrigation season. The predominant land uses for irrigated agriculture are field crops and irrigated pasture. There are also a relatively large amount of deciduous nuts in the site subwatershed and truck farm/nursery and berries are also grown. Figure I-1 illustrates the land use within this site subwatershed area. This site subwatershed includes an upstream location (Duck Creek @ Drais Rd) which was sampled in 2008. Table I-1 includes the station name (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table I-1. Coordinates of the Duck Creek site subwatershed sampling locations.

Sample Site	Station Code	Target Latitude	Target Longitude
Duck Creek @ Highway 4*	531XDCAHF	37.9491	-121.1810
Duck Creek @ Drais Rd [U]	531XDCADR	37.9348	-121.0841

*Original SJCDWQC sampling site
[U] Upstream sites

Figure I-1. Site subwatershed map of land use for the sample site at Duck Creek @ Hwy 4.



Source of Layers:
Hydrology - NHD hydrodata, http://nhd.usgs.gov/
Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library.
World Shaded Relief, ESRI 2009
NAD 1927

Date Prepared: 1/14/11
SJCDWQC

N
0 1.25 2.5
Miles

Duck Creek @ Hwy 4

Subwatershed Monitoring History

Monitoring at Duck Creek @ Hwy 4 began during the irrigation season of 2004 (Table I-2). This location was removed from the monitoring program in 2005 and the Coalition resumed sampling at Duck Creek @ Hwy 4 during the irrigation season of 2006 and continued through the irrigation season of 2010. Specific information on the analyses conducted across each of the monitoring seasons is provided below (Table I-3).

The Duck Creek @ Hwy 4 site subwatershed is one of the rotating Assessment Monitoring locations within the SJCDWQC French Camp Slough @ Airport Way Zone. Duck Creek @ Hwy 4 is scheduled to be monitored in 2012 as an Assessment Monitoring location under the current Monitoring Reporting Program Plan MRPP.

Management Plan Monitoring (MPM) for the Coalition was initiated at Duck Creek @ Hwy 4 in June of 2007. Duck Creek was monitored under the Duck Creek Management Plan for chlorpyrifos during the 2007 and 2008 irrigation seasons (Table I-4 and Table I-5) and for chlorpyrifos and toxicity to *Ceriodaphnia dubia* and *Selenastrum capricornutum* during the 2009 irrigation season (Table I-6). In 2010, MPM was conducted for chlorpyrifos (all months of the irrigation season), diazinon (February), toxicity to *C. dubia* (April, July and September), and toxicity to *S. capricornutum* (February, April and May), see Table I-7. A summary and discussion of all exceedances throughout the years are provided in the next section (Table I-8). Management Plan Monitoring will be conducted during 2011 at this site.

During 2010, additional samples were collected for chlorpyrifos, diazinon, and sediment toxicity to *Hyalella azteca* as part of a Department of Pesticide Regulation (DPR) grant to reduce the impact of agricultural discharge on water quality (Table I-7). The DPR grant monitoring began in June 2010 and continued through February 2011.

Walker Slough, the most immediate downstream waterbody, is listed as impaired for pathogens due to urban runoff/storm sewers and recreational and tourism activities. Duck Creek is currently listed under the 2008 Central Valley Basin Plan 303d list of impaired waterbodies for chlorpyrifos, *E. coli* and mercury. Agriculture is listed as the potential source for the impairment caused by chlorpyrifos.

Table I-2. Duck Creek @ Hwy 4 sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	2	NA	NA	NA	5	2	6	2	6	2	3	NA	6	NA	1	NA	6	3
Events Not Sampled	0	NA	NA	NA	0	0	0	0	0	0	0	NA	0	NA	0	NA	0	0
Total	**2**	**NA**	**NA**	**NA**	**5**	**2**	**6**	**2**	**6**	**2**	**3**	**NA**	**6**	**NA**	**1**	**NA**	**6**	**3**

NA - Not applicable. This site was not sampled during this season/year.

Table I-3. Number of analyses performed per analyte in each sampling season and year for the Duck Creek @ Hwy 4 sample site.
Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2004	2006	2007		2008			2009				2010			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*	Winter	Storm*	Irrigation	Fall
Field and Physical Parameters																
NA	pH	2	5	3	8	3	9	2	3		6		1		7	3
NA	Specific Conductivity	2	5	3	8	3	9	2	3		6		1		7	3
NA	Dissolved Oxygen	2	4	3	8	3	9	2	3		6		1		7	3
EPA 160.1	Dissolved Solids	2	5	2	6	2	6	2	3							
EPA 160.2	Suspended Solids					1		2	3							
EPA 180.1	Turbidity	2	5	2	6	2	6	2	3							
SM 9223 B	*E. coli*	2	5	2	6	2	6	2	3							
EPA 110.2	Color	2	5	2	6	1	6									
EPA 415.1	TOC	2	5	2	6	2	6	2	3							
Walkley-Black	TOC (sediment)														1	
ASTM D422	Grain size (sediment)														1	
EPA 405.1	BOD		1	2	2											
Carbamates																
EPA 8321A	Aldicarb		5	2	6	2	6	2	3							
EPA 8321A	Carbaryl		5	2	6	2	6	2	3							
EPA 8321A	Carbofuran		5	2	6	2	6	2	3							
EPA 8321A	Methiocarb		5	2	6	2	6	2	3							
EPA 8321A	Methomyl		5	2	6	2	6	2	3							
EPA 8321A	Oxamyl		5	2	6	2	6	2	3							
Organochlorines																
EPA 8081A	DDD		5	2	6	2	6	2	3							
EPA 8081A	DDE		5	2	6	2	6	2	3							
EPA 8081A	DDT		5	2	6	2	6	2	3							
EPA 8081A	Dicofol		5	2	6	2	6	2	3							
EPA 8081A	Dieldrin		5	2	6	2	6	2	3							
EPA 8081A	Endrin		5	2	6	2	6	2	3							
EPA 8081A	Methoxychlor		5	2	6	2	6	2	3							
Organophosphates																
EPA 8141A	Azinphos methyl		5	2	6	2	6	2	3							

Method	Analyte	2004	2006	2007		2008			2009				2010			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*	Winter	Storm*	Irrigation	Fall
EPA 8141A	Chlorpyrifos	2	5	2	7	2	6	2	3		6					3
EPA 8141A	Diazinon	2	5	2	6	2	6	2	3							3
EPA 8141A	Dichlorvos					1		2	3							
EPA 8141A	Dimethoate		5	2	6	2	6	2	3							
EPA 8141A	Disulfoton		5	2	6	2	6	2	3							
EPA 8141A	Demeton-s					1		2	3							
EPA 8141A	Malathion		5	2	6	2	6	2	3							
EPA 8141A	Methamidophos		5	2	6	2	6	2	3							
EPA 8141A	Methidathion		5	2	6	2	6	2	3							
EPA 8141A	Parathion, Methyl		5	2	6	2	6	2	3							
EPA 8141A	Phorate		5	2	6	2	6	2	3							
EPA 8141A	Phosmet		5	2	6	2	6	2	3							
Group A Pesticides																
EPA 8081A	Aldrin					1		2	3							
EPA 8081A	Chlordane					1		2	3							
EPA 8081A	Endosulfan I					1		2	3							
EPA 8081A	Endosulfan II					1		2	3							
EPA 8081A	HCH, alpha					1		2	3							
EPA 8081A	HCH, beta					1		2	3							
EPA 8081A	HCH, delta					1		2	3							
EPA 8081A	HCH, gamma					1		2	3							
EPA 8081A	Heptachlor					1		2	3							
EPA 8081A	Heptachlor epoxide					1		2	3							
EPA 8081A	Toxaphene					1		2	3							
Pyrethroids																
EPA 8081A	Bifenthrin		5	2	6	1	6									
EPA 8081A	Cypermethrin	2	5	2	6	1	6									
EPA 8081A	Cyhalothrin, lambda	2	5	2	6	1	6									
EPA 8081A	Permethrin	2	5	2	6	1	6									
EPA 8081A	Cyfluthrin		5	2	6	1	6									
EPA 8081A	Esfenvalerate/ Fenvalerate	2	5	2	6	1	6									
Triazines																
EPA 619	Atrazine		5	2	6	2	6	2	3							

Method	Analyte	2004	2006	2007		2008			2009				2010			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*	Winter	Storm*	Irrigation	Fall
EPA 619	Cyanazine		5	2	6	2	6	2	3							
EPA 8321A	Diuron		5	2	6	2	6	2	3							
EPA 547M	Glyphosate		5	2	6	2	6	2	3							
EPA 8321A	Linuron		5	2	6	2	6	2	3							
EPA 8141A	Molinate		5	2	6	1	6									
EPA 549.2M	Paraquat dichloride		5	2	6	2	6	2	3							
EPA 619	Simazine		5	2	6	2	6	2	3							
EPA 8141A	Thiobencarb		5	2	6	1	6									
EPA 8141A	Trifluralin					1		2	3							
Metals (Total)																
EPA 200.8	Arsenic					1	6	2	3							
EPA 200.8	Boron					1	6	2	3							
EPA 200.8	Cadmium					1	6	2	3							
EPA 200.8	Copper					1	6	2	3							
EPA 200.8	Lead					1	6	2	3							
EPA 200.8	Molybdenum					1		2	3							
EPA 200.8	Nickel					1	6	2	3							
EPA 200.8	Selenium					1	6	2	3							
EPA 200.8	Zinc					1	6	2	3							
Metals (Dissolved)																
EPA 200.8	Cadmium					1		2	3							
EPA 200.8	Copper					1		2	3							
EPA 200.8	Lead					1		2	3							
EPA 200.8	Nickel					1		2	3							
EPA 200.8	Zinc					1		2	3							
Nutrients																
EPA 350.2	Ammonia as N					1	6	2	3							
SM 2340 C	Hardness as CaCO3					1	6	2	3							
EPA 300.0	Nitrate as N						6									
EPA 354.1	Nitrite as N						6									
EPA 353.2	Nitrate + Nitrite as N					1		2	3							
EPA 351.3	Nitrogen, Total Kjeldahl					1	6	2	3							
EPA 365.2	Orthophosphate as P					1	6	2	3							

Method	Analyte	2004	2006	2007		2008			2009				2010			
		Irrigation	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm*	Irrigation	Fall*	Winter	Storm*	Irrigation	Fall
EPA 365.2	Phosphate as P					1	6	2	3							
Sediment Pesticides																
EPA 8270M_NCI_SIM	Bifenthrin														1	
EPA 8270M_NCI_SIM	Chlorpyrifos														1	
EPA 8270M_NCI_SIM	Cyfluthrin														1	
EPA 8270M_NCI_SIM	Cyhalothrin, lambda														1	
EPA 8270M_NCI_SIM	Cypermethrin														1	
EPA 8270M_NCI_SIM	Deltamethrin: Tralomethrin														1	
EPA 8270M_NCI_SIM	Esfenvalerate/ Fenvalerate														1	
EPA 8270M_NCI_SIM	Fenpropathrin														1	
EPA 8270M_NCI_SIM	Permethrin														1	
Toxicity																
EPA 821-02-012	*Ceriodaphnia dubia*	2	6	2	6	2	8	2	5		3				3	
EPA 821-02-012	*Pimephales promelas*	2	5	2	6	2	6	2	5							
EPA 821-02-013	*Selenastrum capricornutum*	2	5	3	6	2	8	2	5		2		1		2	
EPA 600/R-99-064	*Hyalella azteca*	2	1	1	1		1								2	

*Site not sampled in 2005, 2009 storm and fall seasons, and 2010 storm season.

Table I-4. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos for the Duck Creek site subwatershed. "X" indicates constituent sampled.

Sample Site	Date	Type	Chlorpyrifos
Duck Creek @ Hwy 4	25-Sep-07	A	X

Table I-5. 2008 Management Plan upstream (U) sampling schedule for the Duck Creek site subwatershed. "X" indicates constituent sampled.

Sample Site	Date	Type	Chlorpyrifos
Duck Creek @ Drais Rd	5-May-08	U	X
Duck Creek @ Drais Rd	15-Jul-08	U	X
Duck Creek @ Drais Rd	16-Sep-08	U	X

Table I-6. 2009 Management Plan sampling schedule for chlorpyrifos and *Ceriodaphnia dubia,* and *Selenastrum Capricornutum* toxicities for the Duck Creek site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	*C. dubia* Toxicity	*S. capricornutum* Toxicity	Chlorpyrifos
Duck Creek @ Hwy 4	14-Apr-09	MPM	X	X	X
Duck Creek @ Hwy 4	12-May-09	MPM		X	X
Duck Creek @ Hwy 4	9-Jun-09	MPM			X
Duck Creek @ Hwy 4	14-Jul-09	MPM	X		X
Duck Creek @ Hwy 4	11-Aug-09	MPM			X
Duck Creek @ Hwy 4	15-Sep-09	MPM	X		X

Table I-7. 2010 Management Plan sampling schedule for chlorpyrifos, diazinon and *Ceriodaphnia dubia, Selenastrum capricornutum,* and *Hyalela azteca* toxicities for the Duck Creek site subwatershed.
"X" indicates constituents sampled. Shaded indicates DPR grant monitoring schedule.

Site Name	Sample Date	Monitoring Type	*C. dubia*	*S. capricornutum*	Chlorpyrifos	Diazinon	Chlorpyrifos for DPR	Diazinon for DPR	*H. azteca* for DPR
Duck Creek @ Hwy 4	9-Feb-10	MPM		X		X			
Duck Creek @ Hwy 4	13-Apr-10	MPM	X	X	X				
Duck Creek @ Hwy 4	11-May-10	MPM		X	X				
Duck Creek @ Hwy 4	8-Jun-10	MPM			X		X	X	
Duck Creek @ Hwy 4	13-Jul-10	MPM	X		X		X	X	
Duck Creek @ Hwy 4	10-Aug-10	MPM			X		X	X	
Duck Creek @ Hwy 4	7-Sept-10	MPM	X		X		X	X	X
Duck Creek @ Hwy 4	12-Oct-10	MPM					X	X	
Duck Creek @ Hwy 4	9-Nov-10	MPM					X	X	
Duck Creek @ Hwy 4	7-Dec-10	MPM					X	X	

Exceedance History

Ambient water monitoring within the Duck Creek subwatershed was initiated in the 2004 irrigation sampling season at the site at Hwy 4. Water quality results from sampling the Duck Creek site subwatershed from 2006 through 2010 have resulted in exceedances of the Water Quality Trigger Limits (WQTL) for DO (33), pH (4), *E. coli* (6), chlorpyrifos (18), diazinon (1), malathion (1), and eight instances of toxicity, four to *C. dubia* and three to *S. capricornutum,* and one sediment toxicity to *H. azteca* (Table I-8).

Samples from 2010 included exceedances of the WQTL for DO (8), chlorpyrifos (4), and one instance of toxicity to *H. azteca.*

All exceedances are listed in Table I-8 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table I-8 and is determined using the SJCDWQC Management Plan prioritization process flow chart (MPUR 2011 Figure 3, page 21). The highest priority constituents for Duck Creek subwatershed are chlorpyrifos and diazinon (A/B) and *C. dubia* toxicity (D).

Table I-8. All exceedances experienced in samples collected from locations within the Duck Creek site subwatershed between August 2006 and December 2010 (sorted by season and date).
If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream site is italicized.

Sample Site	Season	Sample Date	Oxygen, Dissolved, < 7 mg/L	pH, < 6.5 and > 8.5 units	*E. coli*, > 235 MPN/100 mL	Chlorpyrifos, > 0.015 µg/L	Diazinon, > 0.1 µg/L	Malathion, > 0 µg/L	*C. dubia*, (% Control)	*S. capricornutum*, (% Control)	*H. azteca*, (% Control)
Duck Creek @ Hwy 4	Irrigation	5/16/2006	5.6		2400	0.029					
Duck Creek @ Hwy 4	Irrigation	6/20/2006	4.5		330						
Duck Creek @ Hwy 4	Irrigation	7/18/2006	5.5								
Duck Creek @ Hwy 4	Irrigation	8/15/2006		6.43							
Duck Creek @ Hwy 4	Irrigation	9/19/2006				0.15			0		
Duck Creek @ Hwy 4	Storm	2/11/2007			820						
Duck Creek @ Hwy 4	Storm	2/28/2007			2400		0.11			77	
Duck Creek @ Hwy 4	Storm	3/6/2007	5.8								
Duck Creek @ Hwy 4	Irrigation	4/10/2007			290						
Duck Creek @ Hwy 4	Irrigation	6/12/2007		8.66							
Duck Creek @ Hwy 4	Irrigation	7/10/2007	6.67			0.024					
Duck Creek @ Hwy 4	Irrigation	8/9/2007	6.54								
Duck Creek @ Hwy 4	Irrigation	9/4/2007	6.99			0.025					
Duck Creek @ Hwy 4	Irrigation	9/25/2007	5.83			0.029					
Duck Creek @ Hwy 4	Storm	1/23/2008			240						
Duck Creek @ Hwy 4	Irrigation	4/15/2008				0.057			0	42	
Duck Creek @ Hwy 4	Irrigation	4/23/2008							0		
Duck Creek @ Drais Rd	*Irrigation*	*5/13/2008*	*6*	*6.05*		*0.42*					
Duck Creek @ Hwy 4	Irrigation	5/13/2008	6.95	6.31						6	
Duck Creek @ Hwy 4	Irrigation	6/10/2008	6.89			0.11		0.22			
Duck Creek @ Drais Rd	*Irrigation*	*7/15/2008*	*2.66*								
Duck Creek @ Hwy 4	Irrigation	7/15/2008	5.87			0.066			0		
Duck Creek @ Hwy 4	Irrigation	7/22/2008	4.92						0		
Duck Creek @ Hwy 4	Irrigation	8/12/2008	6			0.017					
Duck Creek @ Hwy 4	Irrigation	8/13/2008	5.34								
Duck Creek @ Drais Rd	*Irrigation*	*9/16/2008*	*3.99*								

Sample Site	Season	Sample Date	Oxygen, Dissolved, < 7 mg/L	pH, < 6.5 and > 8.5 units	*E. coli*, > 235 MPN/100 mL	Chlorpyrifos, > 0.015 µg/L	Diazinon, > 0.1 µg/L	Malathion, > 0 µg/L	*C. dubia*, (% Control)	*S. capricornutum*, (% Control)	*H. azteca*, (% Control)
Duck Creek @ Hwy 4	Irrigation	9/16/2008	5.92			0.027					
Duck Creek @ Hwy 4	Fall	11/4/2008	5.38								
Duck Creek @ Hwy 4	Winter	3/10/2009	5.4								
Duck Creek @ Hwy 4	Irrigation	5/12/2009	6.43								
Duck Creek @ Hwy 4	Irrigation	6/9/2009	6.74			0.07					
Duck Creek @ Hwy 4	Irrigation	7/14/2009	4.5			0.15			0		
Duck Creek @ Hwy 4	Irrigation	8/11/2009	4.6			0.031					
Duck Creek @ Hwy 4	Irrigation	9/15/2009	5.62								
Duck Creek @ Hwy 4	Irrigation	4/13/2010	6.60								
Duck Creek @ Hwy 4	Irrigation	5/11/2010				0.055					
Duck Creek @ Hwy 4	Irrigation	6/8/2010	0.44								
Duck Creek @ Hwy 4	Irrigation	7/13/2010	6.48			0.02					
Duck Creek @ Hwy 4	Irrigation	8/10/2010	5.07			0.30					
Duck Creek @ Hwy 4	Irrigation	9/7/2010	6.11			0.023					
Duck Creek @ Hwy 4	Irrigation	9/14/2010	4.51								17
Duck Creek @ Hwy 4	Fall	10/12/2010	5.60								
Duck Creek @ Hwy 4	Fall	11/9/2010	6.01								
		Constituent Priority	**E**	**E**	**E**	**A/B**	**A/B**	**NP**	**D**	**E**	**NP**

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

2007 - 2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table I-9 for the following constituents: chlorpyrifos, diazinon and water column toxicities for *C. dubia* and *S. capricornutum.*

2007

Normal monitoring (April-September) and additional MPM (September) for chlorpyrifos occurred at Duck Creek @ Highway 4 in 2007 (Table I-9). An exceedance occurred during normal monitoring at Duck Creek @ Hwy 4 in July (0.024 µg/L) and two exceedances of chlorpyrifos were detected in September for both normal monitoring (0.025 µg/L) and MPM (0.029 µg/L).

2008

Normal monitoring (April-September) at Duck Creek @ Hwy 4 and upstream monitoring at Duck Creek @ Drais Rd for chlorpyrifos (May, July, and September) occurred in 2008. There were exceedances in every month except May during normal monitoring. Management Plan Monitoring resulted in one exceedance in May of 0.420µg/L (Table I-9).

2009

Normal monitoring was conducted at Duck Creek during January, February, and March of 2009 and resulted in no exceedances of the chlorpyrifos WQTL.

Management Plan Monitoring was conducted during the 2009 irrigation season for chlorpyrifos (April – September), *C. dubia* toxicity (April, July, and September) and *S. capricornutum* toxicity (April and May). Exceedances of the chlorpyrifos WQTL were experienced in June (0.070 µg/L), July (0.150 µg/L) and August (0.031 µg/L), see Table I-9. Toxicity to *C. dubia* occurred in samples collected in July.

2010

Management Plan Monitoring for diazinon and *S. capricornutum* toxicity took place in February of 2010. In September 2010, MPM for *H. azteca* occurred and resulted in an exceedance of 17 % survival compared to the control. During the 2010 irrigation season, MPM for chlorpyrifos, diazinon, and toxicity to *C. dubia* and *S. capricornutum* occurred (Table I-9).

Beginning in June 2010 and continuing through December 2010 additional samples were collected for chlorpyrifos and diazinon as part of the DPR grant to reduce the impact of agricultural discharge on water quality (Table I-7). Exceedances of the chlorpyrifos WQTL were experienced in May (0.055 µg/L), July (0.020 µg/L), August (0.30 µg/L) and September (0.023 µg/L; Table I-9).

2011

The DPR grant monitoring for chlorpyrifos and diazinon continued through February 2011. Management Plan Monitoring is scheduled for *S. capricornutum* toxicity (February, April and May), *C. dubia* toxicity (April, July and September), and chlorpyrifos (April through September) in 2011.

Table I-9. Normal monitoring (NM), Management Plan Monitoring (MPM), and additional DPR grant monitoring (*) results for Duck Creek site subwatershed between 2007 and 2010. Exceedance values are in bold.

	MONTH:	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	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 A (@ 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	NA	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)	NA	NA	NA	**0.057**	<0.003	**0.110**	**0.066**	**0.017**	**0.027**	NA	NA	NA
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)	Date	1/13/09	2/10/09	3/10/09	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
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	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**	<0.003*	<0.003*	<0.003*
	Diazinon (µg/L)	NA	<0.004	NA	NA	NA	<0.004*	<0.004*	<0.004*	<0.004*	<0.004*	<0.004*	<0.004*
	C. dubia toxicity (% Control)	NA	NA	NA	100	NA	NA	100	NA	100	NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	660	NA	992	1136	NA	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	NA	**17**	NA	NA	NA

NA - Not applicable. This site was not sampled during this month.
*Additional-Department of Pesticide Regulation (DPR) grant monitoring.
NM- Normal Monitoring
MPM- Management Plan Monitoring
A- Additional Monitoring conducted in 2007.
US- Upstream Monitoring conducted in 2008.

Load Calculations

Loads have been calculated for the chlorpyrifos detections (Table I-10) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (mg/L X 1000 or µg/L).

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table I-10. Instantaneous load calculations for chlorpyrifos and diazinon where discharge was measured in the Duck Creek site subwatershed (sorted by analyte, site and date).

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Duck Creek @ Hwy 4	Chlorpyrifos	05/16/06	12.68	0.029	10.41
Duck Creek @ Hwy 4	Chlorpyrifos	09/19/06	6.02	0.15	25.57
Duck Creek @ Hwy 4	Chlorpyrifos	07/10/07	14.43	0.024	9.81
Duck Creek @ Hwy 4	Chlorpyrifos	09/04/07	0	0.025	0
Duck Creek @ Hwy 4	Chlorpyrifos	09/25/07	2.16	0.029	1.77
Duck Creek @ Hwy 4	Chlorpyrifos	01/23/08	2.11	0.0081	0.48
Duck Creek @ Hwy 4	Chlorpyrifos	04/15/08	13.07	0.057	21.10
Duck Creek @ Hwy 4	Chlorpyrifos	06/10/08	15.51	0.11	48.31
Duck Creek @ Hwy 4	Chlorpyrifos	07/15/08	13.67	0.066	25.55
Duck Creek @ Hwy 4	Chlorpyrifos	08/12/08	4.97	0.017	2.39
Duck Creek @ Hwy 4	Chlorpyrifos	09/16/08	20.8	0.027	15.90
Duck Creek @ Hwy 4*	Chlorpyrifos	01/13/09	0	0.0048	0
Duck Creek @ Hwy 4	Chlorpyrifos	01/13/09	0	0.005	0
Duck Creek @ Hwy 4	Chlorpyrifos	02/10/09	0	0.0037	0
Duck Creek @ Hwy 4	Chlorpyrifos	05/12/09	5.57	0.011	1.73
Duck Creek @ Hwy 4	Chlorpyrifos	06/09/09	11.54	0.07	22.87
Duck Creek @ Hwy 4	Chlorpyrifos	07/14/09	23.44	0.15	99.56
Duck Creek @ Hwy 4	Chlorpyrifos	05/11/10	18.49	0.055	28.80
Duck Creek @ Hwy 4	Chlorpyrifos	07/13/10	20.73	0.02	11.74
Duck Creek @ Hwy 4	Chlorpyrifos	09/07/10	14.56	0.023	9.48
Duck Creek @ Hwy 4	Diazinon	02/11/07	0	0.055	0
Duck Creek @ Hwy 4	Diazinon	02/28/07	45.83	0.11	142.75
Duck Creek @ Hwy 4	Diazinon	01/23/08	2.11	0.018	1.08
Duck Creek @ Hwy 4	Diazinon	01/13/09	0	0.012	0

*Field Duplicate

Source Identification and Outreach

The Coalition addressed source identification in the 2010 Management Plan Update Report (MPUR) and, in the following sections, considers 2010 monitoring results and Pesticide Use Report (PUR) data as they expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In the past years (2007 and 2008), the Coalition conducted additional and upstream MPM during the months when exceedances historically occurred to better characterize water quality the subwatershed. During 2009 and 2010, MPM continued at the Duck Creek @ Hwy 4 site during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Duck Creek subwatershed became high priority in 2008, the Coalition has actively engaged in grower outreach and education to address the Duck Creek Management Plan's priority constituents. The Coalition has organized meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings and follow up meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos and diazinon are the priority A/B constituents included in a management plan for the Duck Creek @ Hwy 4 site subwatershed.

Chlorpyrifos

Eighteen exceedances of the chlorpyrifos WQTL (0.015 µg/L) have occurred during the irrigation season in samples collected from 2006 through 2010 during normal and MPM, including one exceedance at the upstream sampling location in 2008 (Tables I-8 and I-9). The Coalition evaluated monitoring and PUR data to identify possible sources.

Pesticide Use Report data for chlorpyrifos, from 2005 -2010, were reviewed for the number of applications and amount of the active ingredient (AI) applied (pounds applied), and acres treated (Table I-11, Figure I-2). The greatest chlorpyrifos use occurred in 2006 (72,187 lbs AI) while the lowest use occurred in 2010 (835 lbs AI). The amount of chlorpyrifos applied in this subwatershed in 2010 (835 lbs AI) decreased drastically compared to the applications in 2009 (5592 lbs AI. Peak use of chlorpyrifos consistently occurs in March, April, May and July in this subwatershed (Table I-11, Figure I-2). Exceedances do not always occur during months of the greatest amount of use (Figure I-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos (Table I-12). The highest amounts applied in the past were associated with walnuts (18,691 lbs AI) followed by alfalfa (2,043 lbs AI) and corn (1,571 lbs AI). These trends continued in 2010 with the highest amount applied to walnuts. The Coalition has focused its outreach to target growers farming these crops.

Table I-11. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for 2005 - 2010 in the Duck Creek @ Hwy 4 site subwatershed.
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
March, 2005	8	170.8	258.0
April, 2005	8	300.4	548.0
May, 2005	12	1441.9	921.0
June, 2005	13	1053.6	526.5
July, 2005	24	2346.0	1771.0
August, 2005	14	749.8	614.5
September, 2005	4	75.1	140.0
October, 2005	1	80.4	80.0
March, 2006	1	18.6	40.0
April, 2006	2	38.5	50.0
May, 2006	28	2462.3	1696.0
June, 2006	12	1342.1	876.5
July, 2006	18	1942.9	1534.0
August, 2006	20	1170.7	1015.0
September, 2006	3	127.2	268.0
October, 2006	1	114.1	57.0
March, 2007	11	603.4	537.0
April, 2007	9	362.3	548.0
May, 2007	12	1211.3	803.0
June, 2007	2	156.8	78.0
July, 2007	7	429.5	572.0
August, 2007	3	70.2	80.0
October, 2007	1	42.5	42.5
March, 2008	13	756.5	642.0
April, 2008	4	263.5	231.0
May, 2008	1	22.0	22.0
June, 2008	1	24.0	24.0
July, 2008	7	174.3	348.0
February, 2009	1	1.6	46.8
March, 2009	14	492.4	618.0
April, 2009	2	23.0	23.0
May, 2009	19	1387.4	1151.5
June, 2009	9	807.5	402.8
July, 2009	21	2051.5	1217.0
August, 2009	5	176.7	215.0
September, 2009	1	46.0	23.0
October, 2009	1	80.8	43.0
November, 2009	4	525.8	280.0
March, 2010	1	28.2	15.0
April, 2010	9	740.9	907.0
July, 2010	3	66.1	132.0

Month/Year*	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
Summaries by Year			
2005 Total	84	6218.0	4859.0
2006 Total	85	7216.5	5536.5
2007 Total	45	2876.1	2660.5
2008 Total	26	1240.3	1267.0
2009 Total	77	5592.6	4020.1
2010 Total	13	835.2	1054.0
Total	**330**	**23978.7**	**19397.1**

*No PUR data is available for 2004.

Figure I-2. Pounds of chlorpyrifos applied within the Duck Creek @ Hwy 4 site subwatershed by month for 2005 - 2010. Asterisk (*) denotes months with exceedances. No PUR data is available for 2004.

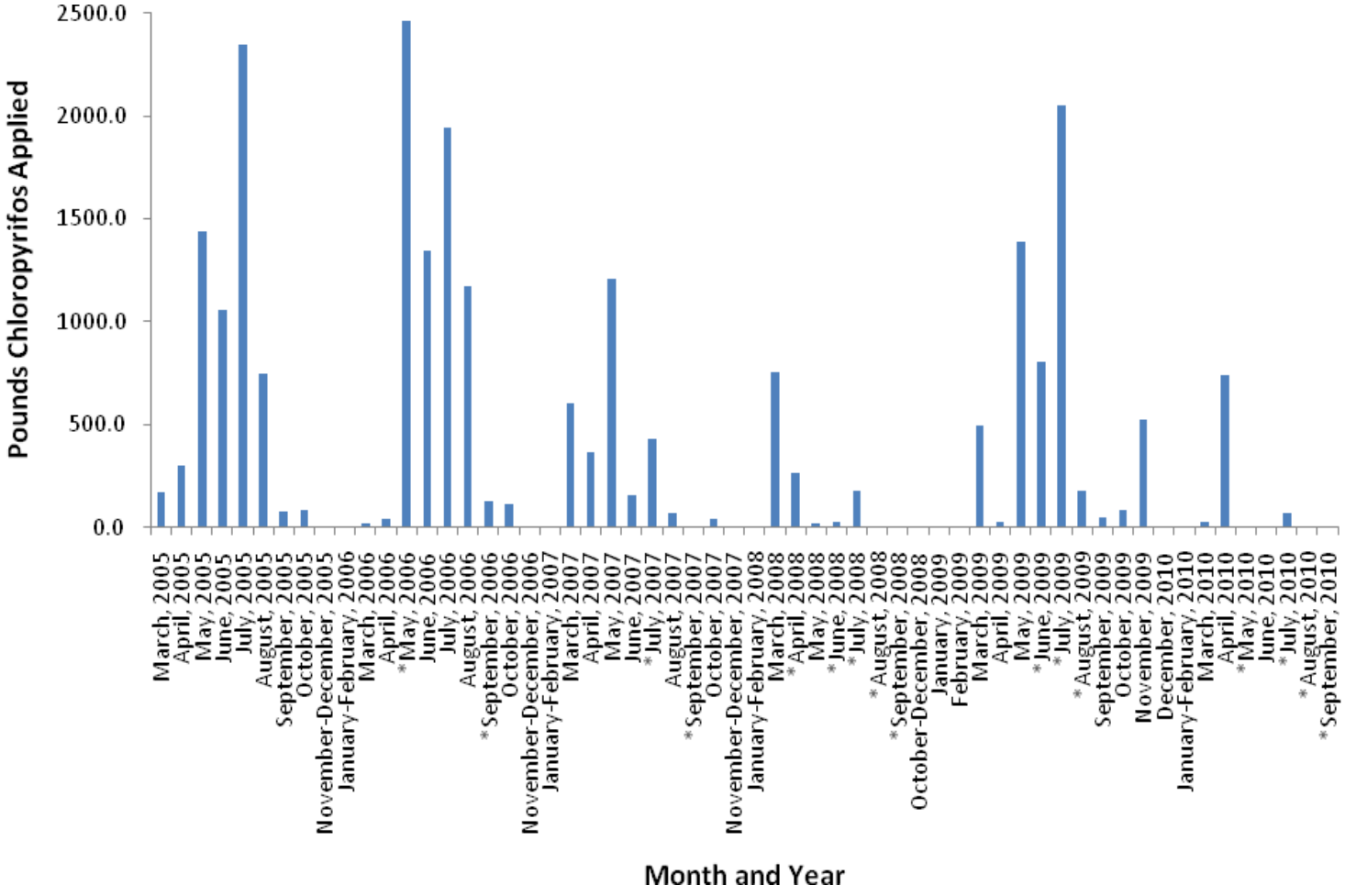


Table I-12. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2005-2010 within the Duck Creek @ Hwy 4 subwatershed. No PUR data is available for 2004.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	GOVERN 4E INSECTICIDE	20.2
		LOCK-ON INSECTICIDE	1526.5
		LORSBAN 4E-HF	250.2
		LORSBAN-4E	246.5
	APPLE	LORSBAN 4E-HF	51.5
		LORSBAN ADVANCED	165.3
		LORSBAN-4E	581.7
	CORN (FORAGE - FODDER)	GOVERN 4E INSECTICIDE	72.7
		LORSBAN 15G GRANULAR INSECTICIDE	1281.6
		NUFOS 15G	85.1
		NUFOS 4E	132.2
	GRAPE (WINE)	LORSBAN ADVANCED	606.6
		NUFOS 4E	61.8
	N-OUTDR CONTAINER/FLD GRWN PLANTS	DURSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	104.5
		ESTATE INSECTICIDE	18.6
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	LORSBAN 15G GRANULAR INSECTICIDE	82.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DURSBAN 4E-N	114.1
		GOVERN 4E INSECTICIDE	3427.5
		LORSBAN 4E INSECTICIDE	1330.0
		LORSBAN 4E-HF	589.0
		LORSBAN ADVANCED	301.4
		LORSBAN-4E	12178.5
		NUFOS 4E	751.2

ALFALFA - Total Pounds Chlorpyrifos Applied	**2043.5**
APPLE - Total Pounds Chlorpyrifos Applied	**798.4**
CORN - Total Pounds Chlorpyrifos Applied	**1571.6**
GRAPES - Total Pounds Chlorpyrifos Applied	**668.4**
OUTDOOR CONTAINER - Total Pounds Chlorpyrifos Applied	**123.1**
ONION - Total Pounds Chlorpyrifos Applied	**82.0**
WALNUT - Total Pounds Chlorpyrifos Applied	**18691.7**
Total Pounds Chlorpyrifos Applied (2005 - 2010)	**23978.7**

Previous analyses conducted by the Coalition and reported in the 2010 Management Plan Updates suggest that the chlorpyrifos concentration in the Duck Creek waterway increases as both the application rate and the total pounds applied increase. These results indicate that management of chlorpyrifos in this watershed should focus on providing information to growers to determine if irrigation return flows are managed properly, specifically to growers whose parcels have the potential to drain to the creek. Alfalfa and walnut growers should be targeted for outreach especially prior to the irrigation season. Previous investigations revealed that TRS' with exceedances were typically located adjacent to the creek suggesting that drift from aerial applications could have played a major role in generating the exceedances and should be focused on during Coalition outreach.

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition focused on outreach to growers who had used chlorpyrifos within the last two years and contacted grower permittees associated with the targeted growers. Beginning in the fall of 2008, the Coalition made several individual contacts with permittees and/or growers to discuss the Duck Creek Management Plan strategy and relevant management practices. The Coalition also hosted a subwatershed grower meeting in November 2008 and invited members to a "Mid Valley Agricultural Services" hosted grower meeting in March 2009 and a "Spray Safe" hosted grower meeting in February 2010 to further expand their grower audience as well as highlight chlorpyrifos management practices. Although meetings focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including diazinon exceedances, *C. dubia* and *S. capricornutum* toxicities, and exceedances of *E. coli*, pH, and DO. Grower surveys completed at the meetings, documenting members' current practices and indicating which recommended practices growers anticipate implementing in the upcoming years, have been compiled and assessed by the Coalition.

To date, the Coalition has contacted all 35 targeted growers accounting for 4,978 targeted acres within the subwatershed. The Coalition has received surveys back from all the 35 targeted members and thus has achieved 100% of targeted grower contact/response.

The Coalition contacted members in the fall of 2010 through the winter of 2011 to determine what additional management practices were implemented in 2010 and if additional practices are planned for 2011. Of the initial 35 targeted growers 19 members were required to participate in filling out a follow up survey. To date, 100% of the follow up meetings with the first priority subwatersheds have been completed all members who were recommended management practices have implemented. Of the 19 growers who implemented management practices (% acres), 48% reduced use of pesticides found in exceedances, 26% are using center grass rows, grass waterways/grass filter strips, 15% reduced runoff water volumes using irrigation management and 11% installed sprinkler or micro irrigation. The grower's acreages with implemented new management practices represent 49% or 2,425 acres of the 4,978 targeted acres. The Coalition assessed results in the Summary of Implemented Management Practices section of this report. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year.

During 2010, Coalition irrigation MPM at Duck Creek @ Hwy 4 revealed four more exceedances of the chlorpyrifos WQTL, in May, July, August, and September. Due to the recent exceedances to the chlorpyrifos WQTL experienced during 2010 MPM at Duck Creek @ Hwy 4, the Coalition will continue to assess water quality in the subwatershed. Duck Creek @ Hwy 4 is scheduled for MPM of chlorpyrifos during the irrigation season of 2011.

If any additional exceedances of priority A-D constituents occur, the Coalition will discuss with the Regional Board necessary actions for outreach that may include contacting other potential sources such as dairy operations and/or new members to the Coalition. The Coalition will work to complete target grower outreach and continue to conduct outreach on a grower group level as well in 2011.

Diazinon

The concentration of diazinon in a sample collected during storm monitoring in February 2007 exceeded the WQTL (0.1 µg/L). This is the only exceedance of diazinon that has occurred in this subwatershed since Coalition monitoring was initiated in 2004 and sources of this exceedance were discussed in the June 30, 2008 SAMR. During 2010, MPM for diazinon (February) and DPR grant monitoring for diazinon (June through December) resulted in no detections.

All PURs from the Duck Creek @ Hwy 4 subwatershed area were reviewed for diazinon use. The largest amount of diazinon was applied in 2007 (566 lbs AI) while the lowest amount was applied in 2009 (24 lbs AI), see Table I-13, Figure I-3. The amount of diazinon applied in this subwatershed in 2009 decreased by more than 50% compared to 2006 and applications in 2010 continued to be low (39 lbs AI), see Table I-13, Figure I-3.

The Coalition also reviewed PUR data for diazinon applications in the Duck Creek @ Hwy 4 subwatershed to determine which crops received the greatest amount of applied diazinon. Cherry orchards received the greatest number of pounds of applied diazinon from 2005 to 2010; 1,560 lbs or 87% of the reported use of diazinon in the subwatershed (Table I-14). The Coalition has focused its outreach to target growers farming orchards, specifically prior to winter dormant sprays. Conversations with growers in 2009 indicated that many growers are moving away from the practice of dormant sprays; PUR data for 2009 supported this statement since diazinon use was only reported in June of 2009, however diazinon was applied in February and August of 2010 (Figure I-3).

Table I-13. Number of diazinon applications, total pounds applied, and total acres treated by month for 2005 - 2010 in the Duck Creek @ Hwy 4 site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year*	Number of Diazinon Applications	Pounds of AI Applied	Acres Treated
February, 2005	1	20.8	41.3
March, 2005	2	144.0	158.0
August, 2005	1	3.5	7.0
October, 2005	1	5.0	10.0
December, 2005	1	260.0	130.0
February, 2006	4	38.5	48.0
April, 2006	1	130.0	130.0
October, 2006	1	5.0	10.0
January, 2007	2	263.0	136.0
February, 2007	2	60.5	121.0
March, 2007	2	146.0	138.0
July, 2007	1	73.5	49.0
November, 2007	1	23.0	46.0
February, 2008	2	273.0	156.0
March, 2008	2	22.5	45.0
April, 2008	2	260.0	260.0
August, 2008	1	2.1	231.0
June, 2009	1	24.3	48.5
February, 2010	1	16.0	8.0
April, 2010	2	1.2	6.0
August, 2010	1	22.5	15.0
Summaries by Year			
2005 Total	6	433.3	346.3
2006 Total	6	173.5	188.0
2007 Total	8	566.0	490.0
2008 Total	7	557.6	692.0
2009 Total	1	24.3	48.5
2010 Total	4	39.7	29.0
Total	**32**	**1794.4**	**1793.8**

*No PUR data available for 2004.

Figure I-3. Pounds of diazinon applied within the Duck Creek @ Hwy 4 site subwatershed by month for 2005 - 2010. Asterisk (*) denotes months with exceedances. No PUR data available for 2004.

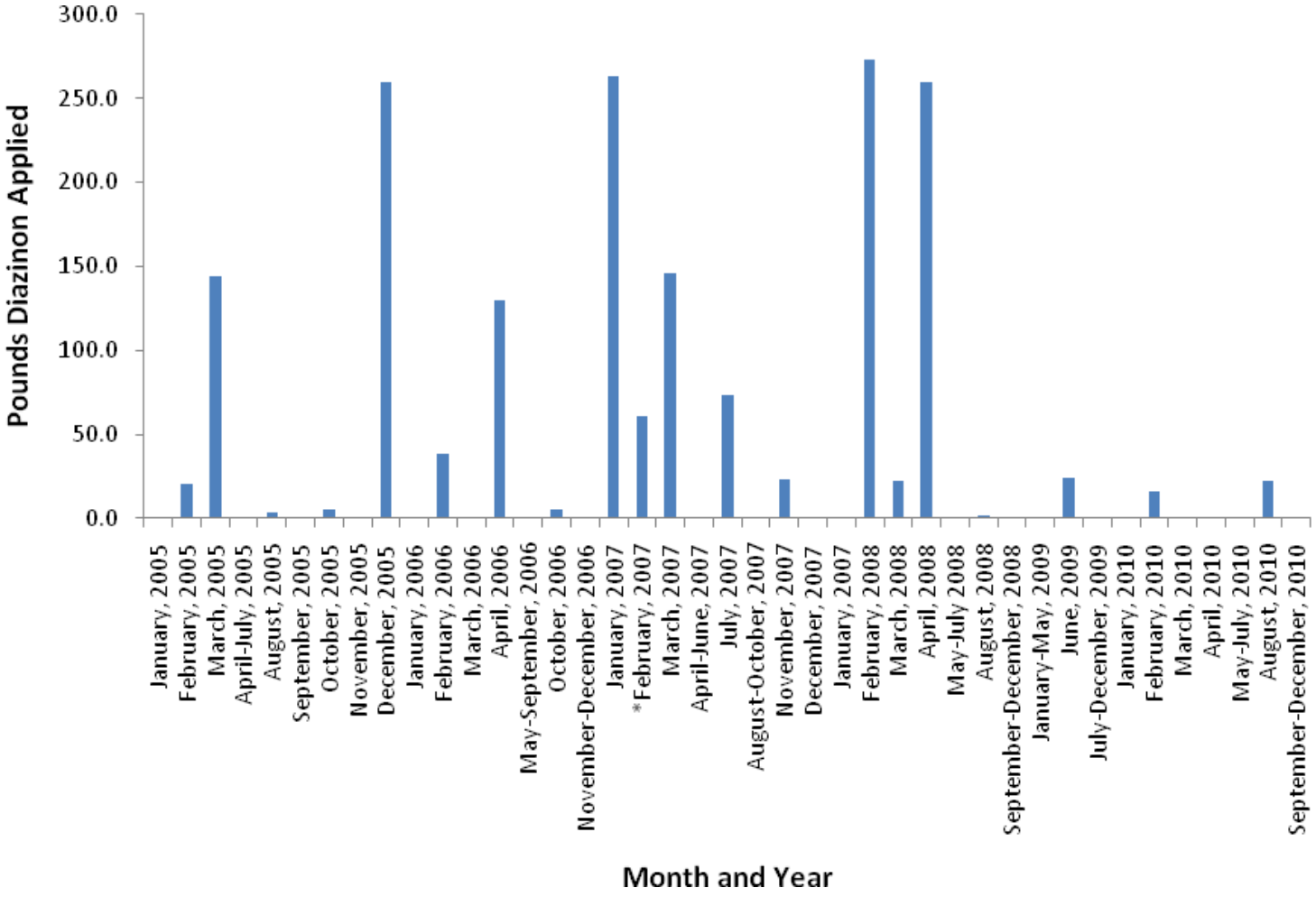


Table I-14. Total pounds active ingredient (AI) applied for diazinon based on PUR data from 2005-2010 within the Duck Creek @ Hwy 4 subwatershed. No PUR data available for 2004.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	APPLE	DIAZINON 50W	22.5
	CHERRY	DIAZINON 50W	1559.8
	N-OUTDR CONTAINER/FLD GRWN PLANTS	DIAZINON 4E	20.8
		DIAZOL 50 W	71.0
		DIAZOL AG 500	3.3
		DREXEL D-264 EC500 INSECTICIDE	56.0
		GOWAN DIAZINON 4E	45.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIAZINON 50 WP	16.0

ALFALFA - Total Pounds Diazinon Applied	**22.5**
CHERRY - Total Pounds Diazinon Applied	**1559.8**
OUTDOOR CONTAINER - Total Pounds Diazinon Applied	**196.1**
WALNUT - Total Pounds Diazinon Applied	**16.0**
Total Pounds Diazinon Applied (2005 - 2010)	**1794.4**

The Coalition's strategy for addressing diazinon exceedances in the Duck Creek subwatershed involved contacting specific growers whose parcels have the potential to drain to the creek. Individual contacts that occurred within this subwatershed are described under the chlorpyrifos outreach section and included discussions of management practices relevant to storm water retention.

Priority D Constituents

Water column toxicity to *C. dubia* is the only priority D constituent listed under the Duck Creek @ Hwy 4 management plan.

***Ceriodaphnia dubia* toxicity**

Water column toxicity to *C. dubia* occurred most recently in July of 2009. Prior to 2009, toxicity to *C. dubia* occurred twice during normal monitoring and in the corresponding resample in both April and July 2008 and once during normal monitoring in September 2006. All toxicity has coincided with chlorpyrifos exceedances. However, 2010 MPM for *C. dubia* toxicity in April, July, and September resulted in no toxic samples, despite exceedances of the chlorpyrifos WQTL in July and September.

The Coalition believes that outreach targeted toward eliminating chlorpyrifos in the waterway will continue to reduce toxicity to *C. dubia.* Therefore, the Coalition will continue with outreach as explained above under the chlorpyrifos section to address the toxicity.

Priority E Constituents

Priority E constituents include DO, pH, *E. coli* and *S. capricornutum* toxicity. Although these constituents will remain low priority, the Coalition will continue to collect priority E constituent monitoring data. The priority E constituents have been discussed during individual contacts and will continue to be discussed at annual grower meetings.

Water column toxicity to *S. capricornutum* did not occur during 2010 MPM (February, April, and May). Previously, algae toxicity occurred in February 2007 and April and May of 2008, although none was accompanied by exceedances of WQTLs for herbicides or copper. Outreach for this constituent is included as a part of general outreach that encourages management practices to improve overall watershed quality.

Evaluation

This subwatershed is one of the first three high priority site subwatersheds within the SJCDWQC and therefore the Coalition has focused its resources on identifying the sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals.

The Coalition's strategy for the Duck Creek subwatershed has been to target growers applying products containing or related to the highest level priority constituents (chlorpyrifos, diazinon, and *C. dubia* toxicity). Outreach includes grower notification, management practice education, tracking of management practice implementation, and providing information to growers on special studies of management practice efficacy.

Individual surveys to document current management practices and follow up contacts to assess future planned implementations have been completed by 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. Outreach in the Duck Creek subwatershed will continue and any additional water quality issues arise.

Acres treated and pounds of chlorpyrifos applied decreased significantly in 2010. Additionally, usage has decreased in July and August, when the most exceedances occurred in previous years. Despite this, chlorpyrifos concentrations in samples exceeded the WQTL in May, July, August, and September 2010 suggesting that one or a few applications are consistently responsible for the exceedances.

II. LONE TREE CREEK @ JACK TONE RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos
- Diazinon

Priority C

- Copper
- Diuron

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Selenastrum capricornutum* water column toxicity
- *Hyalella azteca* sediment toxicity
- *Pimephales promelas* water column toxicity

Priority E

- Ammonia
- Dissolved Oxygen
- *E. coli*
- pH
- Specific Conductivity
- Total Dissolved Solids

Description of Lone Tree Creek Site Subwatershed

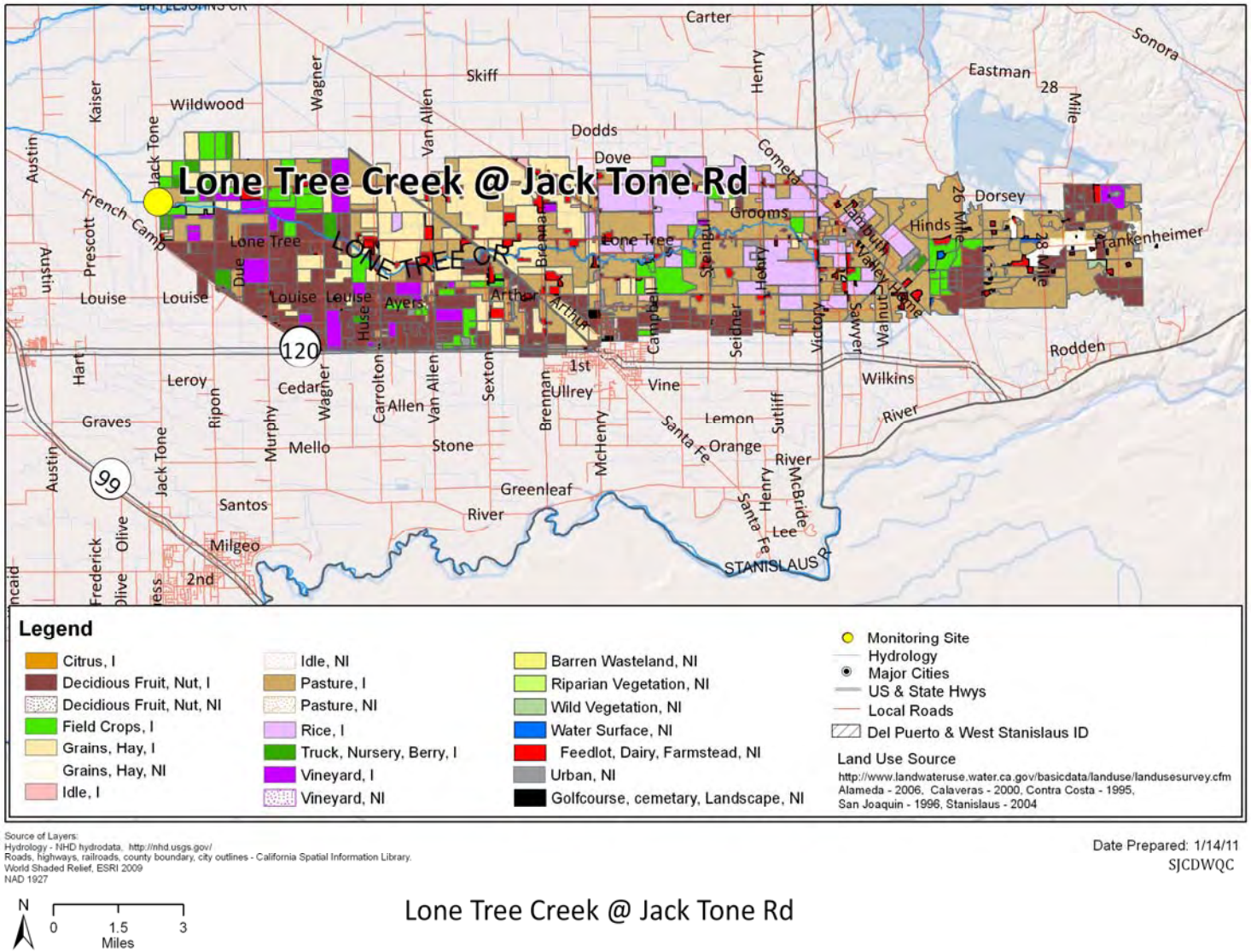
Lone Tree Creek @ Jack Tone Rd (29,232 irrigated acres) – This site is upstream from the French Camp Slough @ Airport Way site. Lone Tree Creek drains a large portion of the southern SJCDWQC region and confluences downstream with Littlejohns Creek and eventually French Camp Slough, flowing through urban areas before emptying into the Delta. The main agricultural land use upstream consists of deciduous nut orchard, field crops, irrigated pasture and several dairies. Figure II-1 illustrates the land use within this site subwatershed area. Lone Tree Creek is a 20-mile-long modified natural channel. This ephemeral stream carries natural runoff, agricultural supply and return flows to Littlejohns Creek during periods of high flow and irrigation. This site subwatershed includes upstream monitoring locations (Lone Tree Creek @ Brennan Rd and Lone Tree Creek @ Valley Home Rd) which were sampled in 2008 (Table II-5). Table II-1 contains the station name (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table II-1. Coordinates of the Lone Tree Creek site subwatershed sampling locations.

Sample Site	Station Code	Target Lat	Target Long
Lone Tree Creek @ Jack Tone Rd*	531XLTCJR	37.8376	-121.144
Lone Tree Creek @ Brennan Rd*[u]	535XLTABR	37.82552	-121.016
Lone Tree Creek @ Valley Home Rd[u]	535LTCVHR	37.82023	-120.902

*Original SJCDWQC sampling site
[u]Upstream sites

Figure II-1. Site subwatershed map of land use for the Lone Tree Creek @ Jack Tone Rd sample site.



Subwatershed Monitoring History

Monitoring at Lone Tree Creek @ Jack Tone Rd began during the irrigation season of 2004 and continued through 2010 (Table II-2). Specific information on the analyses conducted across each of the monitoring seasons is provided below (Table II-3).

The Lone Tree Creek site subwatershed is one of the rotating Assessment Monitoring locations within the SJCDWQC French Camp Slough @ Airport Way Zone. Lone Tree Creek @ Jack Tone Rd is scheduled to be monitored as an Assessment Monitoring location under the current MRPP in 2026. However, the Coalition will continue to monitor for management plan constituents as outlined in this document.

Management Plan Monitoring for the Coalition was initiated during June of 2007 and included additional sampling at Lone Tree Creek @ Jack Tone Rd in July and August for chlorpyrifos (Table II-4). In 2008 Lone Tree Creek @ Brennan Rd and Lone Tree Creek @ Valley Home Rd were sampled as upstream monitoring locations (Table II-5). During irrigation seasons of 2009, MPM for *S. capricornutum* toxicity (April-May), chlorpyrifos (July-August) and copper (July-September) took place (Table II-6). During 2010 MPM for *S. capricornutum* toxicity (January-May), copper (January-February and July-September), chlorpyrifos (January-February and July-August), diazinon and diuron (January-February) took place (Table II-7). A summary and discussion of exceedances at this site subwatershed are provided in the next section (Table II-8).

During 2010, additional samples were collected for chlorpyrifos and 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-7). The DPR grant monitoring began in June 2010 and continued through February 2011.

Lone Tree Creek is currently on the 2008 Central Valley Basin Plan 303d list of impaired waterbodies for ammonia, biochemical (biological) oxygen demand, chlorpyrifos, diuron, *E. coli,* sediment toxicity and unknown toxicity. The potential source of the stressors/pollutants is indicated as dairies for ammonia and biochemical oxygen demand, and the potential source for chlorpyrifos, diuron and toxicity is agriculture.

Table II-2. Lone Tree Creek @ Jack Tone Rd sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	2	2	5	2	5	2	6	2	6	NA	NA	NA	5	NA	2	1	6	3
Events Not Sampled	0	0	0	0	0	0	0	0	0	NA	NA	NA	0	NA	0	0	0	0
Total	**2**	**2**	**5**	**2**	**5**	**2**	**6**	**2**	**6**	**NA**	**NA**	**NA**	**5**	**NA**	**2**	**1**	**6**	**3**

NA - Not applicable. This site was not sampled during this season/year.

Table II-3. Number of analyses performed per analyte in each sampling season and year for the Lone Tree Creek @ Jack Tone Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2004	2005		2006		2007		2008*			2009*				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Field and Physical Parameters																			
NA	pH	2	3	5	4	5	3	9	3	9				5		2	1	7	3
NA	Specific Conductivity	2	3	5	4	5	3	9	3	9				5		2	1	7	3
NA	Dissolved Oxygen	2	3	4	3	4	3	9	3	9				5		2	1	7	3
EPA 160.1	Dissolved Solids	2	2	5	2	5	2	6	1	6									
EPA 160.2	Suspended Solids																		
EPA 180.1	Turbidity	2	2	5	2	5	2	7	1	6									
SM 9223 B	*E. coli*	2	2	5	2	6	2	7	1	6									
EPA 110.2	Color	2	2	5	2	5	2	7	1	6									
EPA 415.1	Total Organic Carbon	2	2	5	2	7	2	6	1	6									
EPA 405.1	BOD					2	2	2											
Carbamates																			
EPA 8321A	Aldicarb					5	2	6	1	6									
EPA 8321A	Carbaryl					5	2	6	1	6									
EPA 8321A	Carbofuran					5	2	6	1	6									
EPA 8321A	Methiocarb					5	2	6	1	6									
EPA 8321A	Methomyl					5	2	6	1	6									
EPA 8321A	Oxamyl					5	2	6	1	6									
Organochlorines																			
EPA 8081A	DDD					5	2	6	1	6									
EPA 8081A	DDE					5	2	6	1	6									
EPA 8081A	DDT					5	2	6	1	6									
EPA 8081A	Dicofol					5	2	6	1	6									
EPA 8081A	Dieldrin					5	2	6	1	6									
EPA 8081A	Endrin					5	2	6	1	6									
EPA 8081A	Methoxychlor					5	2	6	1	6									
Organophosphates																			
EPA 8141A	Azinphos methyl					5	2	6	1	6									
EPA 8141A	Chlorpyrifos	2	2	5	2	5	2	8	1	6				2		1	1	4	3
EPA 8141A	Diazinon	2	2	5	2	5	2	6	1	6						1	1	4	3
EPA 8141A	Dimethoate					5	2	6	1	6									

Method	Analyte	2004	2005		2006		2007		2008*			2009*				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8141A	Disulfoton					5	2	6	1	6									
EPA 8141A	Malathion					5	2	6	1	6									
EPA 8141A	Methamidophos					5	2	6	1	6									
EPA 8141A	Methidathion					5	2	6	1	6									
EPA 8141A	Parathion,Methyl					5	2	6	1	6									
EPA 8141A	Phorate					5	2	6	1	6									
EPA 8141A	Phosmet					5	2	6	1	6									
Pyrethroids																			
EPA 8081A	Bifenthrin			1	2	5	2	6	1	6									
EPA 8081A	Cypermethrin	2	2	5	2	5	2	6	1	6									
EPA 8081A	Cyhalothrin, lambda	2	2	5	2	5	2	6	1	6									
EPA 8081A	Permethrin	2	2	5	2	5	2	6	1	6									
EPA 8081A	Cyfluthrin			1	2	5	2	6	1	6									
EPA 8081A	Esfenvalerate/ Fenvalerate	2	2	5	2	5	2	6	1	6									
Triazines																			
EPA 619	Atrazine					5	2	6	1	6									
EPA 619	Cyanazine					5	2	6	1	6									
EPA 8321A	Diuron					5	2	6	1	6						1	1		
EPA 547M	Glyphosate					5	2	6	1	6									
EPA 8321A	Linuron					5	2	6	1	6									
EPA 8141A	Molinate					5	2	6	1	6									
EPA 549.2M	Paraquat dichloride					5	2	6	1	6									
EPA 619	Simazine					5	2	6	1	6									
EPA 8141A	Thiobencarb					5	2	6	1	6									
Metals (Total)																			
EPA 200.8	Arsenic					6	2	6	1	6									
EPA 200.8	Boron					6	2	6	1	6									
EPA 200.8	Cadmium					6	2	6	1	6									
EPA 200.8	Copper					6	2	6	1	6				3		1	1	3	
EPA 200.8	Lead					6	2	6	1	6									
EPA 200.8	Molybdenum																		
EPA 200.8	Nickel					6	2	6	1	6									
EPA 200.8	Selenium					6	2	2	1	6									
EPA 200.8	Zinc					6	2	6	1	6									

Method	Analyte	2004	2005		2006		2007		2008*			2009*				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Metals (Dissolved)																			
EPA 200.8	Cadmium																		
EPA 200.8	Copper													3		1	1	3	
EPA 200.8	Lead																		
EPA 200.8	Nickel																		
EPA 200.8	Zinc																		
Nutrients																			
EPA 300.0	Nitrate as NO3					6	2	6	1	6									
EPA 353.2	Nitrate + Nitrite as N																		
EPA 354.1	Nitrite as N					6	2	6	1	6									
EPA 350.2	Ammonia as N					6	2	6	1	6									
SM 2340 C	Hardness as CaC03					6	2	6	1	6				3		1	1	3	
EPA 365.2	Phosphate as P					6	2	6	1	6									
EPA 365.2	Orthophosphate as P					6	2	6	1	6									
EPA 351.3	Nitrogen, Total Kjeldahl					6	2	6	1	6									
Toxicity																			
EPA 821-02-012	*Ceriodaphnia dubia*	2	2	5	2	5	3	7	2	6									
EPA 821-02-012	*Pimephales promelas*	2	3	5	2	5	3	7	2	6									
EPA 821-02-013	*Selenastrum capricornutum*	2	3	5	3	5	4	7	2	8				2		2	1	2	
EPA 600/ R-99-064	*Hyalella azteca*	2		3	1	1	1	1	1	1								1	

*Site not sampled during the 2008 fall and 2009 winter, storm and fall seasons.

Table II-4. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos for the Lone Tree Creek site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	Chlorpyrifos
Lone Tree Creek @ Jack Tone Rd	30-Jul-07	A	**X**
Lone Tree Creek @ Jack Tone Rd	28-Aug-07	A	**X**

Table II-5. 2008 Management Plan upstream (U) sampling schedule for the Lone Tree Creek site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	Chlorpyrifos	Total Metals
Lone Tree Creek @ Valley Home Rd	13-May-08	U		**X**
Lone Tree Creek @ Valley Home Rd	10-Jun-08	U		**X**
Lone Tree Creek @ Valley Home Rd	15-Jul-08	U		**X**
Lone Tree Creek @ Brennan Rd	15-Jul-08	U	**X**	**X**
Lone Tree Creek @ Valley Home Rd	12-Aug-08	U		**X**
Lone Tree Creek @ Brennan Rd	12-Aug-08	U	**X**	**X**
Lone Tree Creek @ Valley Home Rd	16-Sep-08	U		**X**
Lone Tree Creek @ Brennan Rd	16-Sep-08	U		**X**

Table II-6. 2009 Management Plan sampling schedule for chlorpyrifos, copper and *Selenastrum capricornutum* toxicity for the Lone Tree Creek site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	*S. capricornutum* Toxicity	Copper	Chlorpyrifos
Lone Tree Creek @ Jack Tone Rd	14-Apr-09	MPM	X		
Lone Tree Creek @ Jack Tone Rd	12-May-09	MPM	X		
Lone Tree Creek @ Jack Tone Rd	14-Jul-09	MPM		X	X
Lone Tree Creek @ Jack Tone Rd	11-Aug-09	MPM		X	X
Lone Tree Creek @ Jack Tone Rd	15-Sep-09	MPM		X	

Table II-7. 2010 Management Plan sampling schedule for chlorpyrifos, diazinon, diuron, copper, *Selenastrum capricornutum* and *Hyalella azteca* toxicities for the Lone Tree Creek site subwatershed. "X" indicates constituents sampled. Grey columns indicate DPR grant monitoring.

Site Name	Sample Date	Monitoring Type	*S. capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Chlorpyrifos for DPR	Diazinon for DPR	*H. azteca* for DPR
Lone Tree Creek @ Jack Tone Rd	13-Jan-10	MPM	X	X	X	X	X			
Lone Tree Creek @ Jack Tone Rd	9-Feb-10	MPM	X	X	X	X	X			
Lone Tree Creek @ Jack Tone Rd	16-Mar-10	MPM	X							
Lone Tree Creek @ Jack Tone Rd	13-Apr-10	MPM	X							
Lone Tree Creek @ Jack Tone Rd	11-May-10	MPM	X							
Lone Tree Creek @ Jack Tone Rd	8-Jun-10	MPM						X	X	
Lone Tree Creek @ Jack Tone Rd	13-Jul-10	MPM		X	X			X	X	
Lone Tree Creek @ Jack Tone Rd	10-Aug-10	MPM		X	X			X	X	
Lone Tree Creek @ Jack Tone Rd	7-Sept-10	MPM		X				X	X	X
Lone Tree Creek @ Jack Tone Rd	12-Oct-10	MPM						X	X	
Lone Tree Creek @ Jack Tone Rd	9-Nov-10	MPM						X	X	
Lone Tree Creek @ Jack Tone Rd	7-Dec-10	MPM						X	X	

Exceedance History

Ambient water monitoring within the Lone Tree Creek subwatershed was initiated in the 2004 irrigation sampling season at the site at Jack Tone Road. Water quality results from sampling the Lone Tree Creek subwatershed have resulted in exceedances of WQTLs for DO (26), pH (4), TDS (2), SC (1), ammonia (4), *E. coli* (29), chlorpyrifos (10), cypermethrin (1), DDT (1), DDE (1), simazine (1), thiobencarb (2), diazinon (2), diuron (3), lead (1), and copper (8) (Tables II-8 and II-9). Water column toxicity occurred to *C. dubia* twice, *P. promelas* three times, and to *S. capricornutum* ten times. Sediment samples were toxic to *H. azteca* twice (Table II-9).

Samples from 2010 included one exceedance of the WQTL for DO and one for chlorpyrifos.

All exceedances are listed in Tables II-8 and II-9 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. Using the SJCDWQC Management Plan prioritization process flow chart (MPUR 2011 Figure 3, page 21), priorities were assigned to management plan constituents. The priority level (A-E) assigned to each constituent is listed in the bottom row of Tables II-8 and II-9. The highest priority constituents for Lone Tree Creek subwatershed are chlorpyrifos and diazinon (A/B), copper and diuron (C) and *C. dubia, S. capricornutum, P. promelas* and *H. azteca* toxicities (D).

Table II-8. Field parameters, bacteria, inorganic and legacy pesticide exceedances (low priority) experienced in samples collected from locations within the Lone Tree Creek site subwatershed between August 2004 and December 2010 (sorted by season and date).
If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream site is italicized.

Sample Site	Season	Sample Date	Oxygen, Dissolved, <7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	*E. coli*, > 235 MPN/100 mL	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/24/2004	6.3					500		
Lone Tree Creek @ Jack Tone Rd	Storm	2/16/2005	6					1600		
Lone Tree Creek @ Jack Tone Rd	Storm	3/21/2005		8.58				900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/17/2005						900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/21/2005						500		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/19/2005	6.1					900		
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/16/2005	6.9					500		
Lone Tree Creek @ Brennan Rd	*Irrigation*	*9/20/2005*	*5.1*					*1600*		
Lone Tree Creek @ Jack Tone Rd	Irrigation	9/20/2005	4.5					1600		
Lone Tree Creek @ Brennan Rd	*Storm*	*2/27/2006*			*1370*	*730*		*1600*		
Lone Tree Creek @ Jack Tone Rd	Storm	2/27/2006		9				900		
Lone Tree Creek @ Brennan Rd	*Storm*	*3/15/2006*						*1600*		

Sample Site	Season	Sample Date	Oxygen, Dissolved, <7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	*E. coli*,> 235 MPN/100 mL	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L
Lone Tree Creek @ Jack Tone Rd	Storm	3/15/2006	6.3					1600		
Lone Tree Creek @ Brennan Rd	*Storm*	*3/24/2006*	*3.3*							
Lone Tree Creek @ Jack Tone Rd	Storm	3/24/2006	6.7							
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/16/2006	6.7					2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/20/2006	4.7					2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006	5.6					770		
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/15/2006	6.62					920		
Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007	5.54				2.8	2400		
Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007					2.1	2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/22/2007						730		
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/12/2007						580		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007					2.5	2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/7/2007						1400	0.058	0.031
Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008	3.79			580	10	>2400		
Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008	5.85					650		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*5/13/2008*	*5.29*	*5.91*						
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008	4.65	6.1				1300		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*6/10/2008*	*6.62*							
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/10/2008						690		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*7/15/2008*	*6.07*							
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/15/2008						460		
Lone Tree Creek @ Brennan Rd	*Irrigation*	*8/12/2008*	*6.66*							
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*8/12/2008*	*4.2*							
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/12/2008						310		
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*9/16/2008*	*5.93*							
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/14/2009	6.61							
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/11/2009	5.95							
Lone Tree Creek @ Jack Tone Rd	Irrigation	1/13/2010	3.61							
		Constituent Priority	**E**	**E**	**E**	**E**	**E**	**E**	**NP**	**NP**

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

Table II-9. Metals, pesticides and toxicity (high priority) exceedances experienced in samples collected from locations within the Lone Tree Creek site subwatershed between August 2004 and December 2010 (sorted by season and date).
If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream sites are in italics.

Sample Site	Season	Sample Date	Copper Total, µg/L	Lead Total, µg/L	Chlorpyrifos, >0.015 µg/L	Cypermethrin, >0.002 µg/L	Diazinon, >0.1 µg/L	Diuron[1], >2 µg/L	Thiobencarb[1], >ND µg/L	Simazine[1], > 4 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*P. promelas*, (% Control)	*S. capricornutum*, (% Control)
Lone Tree Creek @ Jack Tone Rd	Storm	2/16/2005											0	77
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/17/2005										93.8		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/19/2005			0.036	0.03								
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/16/2005			0.019									
Lone Tree Creek @ Brennan Rd	*Storm*	*2/27/2006*			*0.018*						*0*		*0*	*74*
Lone Tree Creek @ Brennan Rd	*Storm*	*3/15/2006*												*56*
Lone Tree Creek @ Jack Tone Rd	Storm	3/15/2006												57
Lone Tree Creek @ Brennan Rd	*Storm*	*3/24/2006*												*83*
Lone Tree Creek @ Jack Tone Rd	Storm	4/27/2006										80		
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006			0.019									
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/15/2006	8.9 (6.4)											
Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007	21 (12.4)	3.8 (3.6)	0.052		0.14	12						
Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007	19 (13.9)					4.3		4.1				31
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/22/2007							0.5					
Lone Tree Creek @ Jack Tone Rd	Irrigation	6/12/2007							0.12					
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007	12 (5.3)		0.035									

Sample Site	Season	Sample Date	Copper Total, µg/L	Lead Total, µg/L	Chlorpyrifos, >0.015 µg/L	Cypermethrin, >0.002 µg/L	Diazinon, >0.1 µg/L	Diuron[1], >2 µg/L	Thiobencarb[1], >ND µg/L	Simazine[1], > 4 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*P. promelas*, (% Control)	*S. capricornutum*, (% Control)
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/7/2007	4.6 (4.1)											
Lone Tree Creek @ Jack Tone Rd	Irrigation	9/4/2007	3.5 (3.1)											
Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008	40 (21.1)		1.7		0.2	4.9			0		75	61
Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008												83
Lone Tree Creek @ Jack Tone Rd	Irrigation	4/23/2008												72
Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008												7
Lone Tree Creek @ Valley Home Rd	*Irrigation*	*7/15/2008*	*7 (6.5)*											
Lone Tree Creek @ Jack Tone Rd	Irrigation	8/11/2009			0.1									
Lone Tree Creek @ Jack Tone Rd	Irrigation	1/13/2010			1.1									
Lone Tree Creek @ Jack Tone Rd	Irrigation	7/13/2010			0.27									
		Constituent Priority	**C**	**NP**	**A/B**	**NP**	**A/B**	**C**	**NP[2]**	**NP**	**D**	**D**	**D**	**D**

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.
NP[2] – Not Prioritized; thiobencarb is used only by rice and therefore all exceedances are relayed to the Rice Coalition for appropriate action.

2007 - 2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table II-10 for the following constituents: chlorpyrifos, diazinon, diuron, copper and water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca.*

2007

In 2007, MPM was implemented at Lone Tree Creek @ Jack Tone Rd for chlorpyrifos (Table II-4). During the irrigation season of 2007 the Coalition did not conduct MPM for copper since only one exceedance occurred during the irrigation season in 2006. Toxicity to *S. capricornutum* and diuron exceedances occurred during the storm season of 2007. During 2007 the chlorpyrifos WQTL was exceeded once (0.035 µg/L) during normal monitoring on July 10, 2007. Samples for copper exceeded the WQTL three times during 2007 normal monitoring.

2008

After experiencing copper exceedances during the last three months of the 2007 irrigation season, 2008 upstream MPM was scheduled for monitoring of metals and chlorpyrifos at Lone Tree Creek @ Brennan Rd and metals at Lone Tree Creek @ Valley Home (Table II-5). During the 2008 irrigation season the WQTL for chlorpyrifos was not exceeded. Samples for copper exceeded the WQTL once (7 µg/L) in 2008 (July 15, 2008) during upstream MPM at Lone Tree Creek @ Valley Home Rd.

2009

The Lone Tree Creek site subwatershed is one of the rotating Assessment Monitoring locations within the SJCDWQC French Camp Slough @ Airport Way Zone. However, this subwatershed will not be rotated in as an Assessment Monitoring site until 2026. Therefore, MPM during the 2009 irrigation season took place for the following constituents: copper (dissolved and total, July –September), chlorpyrifos (July, August), and *S. capricornutum* toxicity (April and May) (Table II-10). In addition, samples from Lone Tree Creek @ Jack Tone Rd were collected during the first and second storm monitoring events for *S. capricornutum* toxicity, copper (dissolved and total), chlorpyrifos, diazinon and diuron. Of the samples collected from Lone Tree Creek @ Jack Tone Rd, there was an exceedance of the chlorpyrifos WQTL (0.100 µg/L) in August 2009 (Table II-10).

2010

Management Plan Monitoring for copper, chlorpyrifos, diazinon, diuron, and *S. capricornutum* toxicity took place (January and February) in 2010. The Coalition also conducted MPM at Lone Tree Creek @ Jack Tone Rd during the 2010 irrigation season for copper (dissolved and total), chlorpyrifos, diazinon and *S. capricornutum* toxicity.

Additional samples were collected for chlorpyrifos and diazinon (June-December) and for sediment toxicity (September) as part of a DPR grant to reduce the impact of agricultural discharge on water quality. Of the MPM samples collected from Lone Tree Creek @ Jack Tone Rd, there were exceedances of the WQTL of chlorpyrifos in January 2010 (1.10 µg/L) and in July 2010 (0.27 µg/L) (Table II-10).

2011

The DPR grant monitoring at Lone Tree Creek @ Jack Tone Rd continued through February 2011 for chlorpyrifos and diazinon. In 2011, MPM is scheduled for copper (January-February and July-September), chlorpyrifos (January-February and July-August), diazinon and diuron (January-February), *S. capricornutum* toxicity (January-May) and *H. azteca* toxicity (March and September).

Table II-10. Normal monitoring (NM), Management Plan Monitoring (MPM), and additional DPR grant monitoring (*) results for the Lone Tree Creek site subwatershed between 2007 and 2010. Exceedance values are in bold.

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept		Oct	Nov	Dec
2007 NM (@ Jack Tone Rd)	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	0.011	**0.035**	<0.003	<0.003		NA	NA	NA
	Copper (µg/L)	NA	NA	NA	3.4	4.8	5.1	**12.0**	**4.6**	**3.5**		NA	NA	NA
2007 MPM A (@ Jack Tone Rd)	Date	NA	NA	NA	NA	NA	NA	7/30/07	8/28/07	NA		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	0.01	<0.003	NA		NA	NA	NA
	Copper (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
2008 NM (@ Jack Tone Rd)	Date	NA	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)	NA	NA	NA	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		NA	NA	NA
	Copper (µg/L)	NA	NA	NA	3.5	4.5	3	3.6	3.5	2.2		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
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Copper (µg/L)	NA	NA	NA	NA	4.6	5.7	**7.0**	3.7	3.8		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
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	<0.003	**0.100**	NA		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
	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
	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
	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
	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

NA - Not applicable. This site was not sampled during this month.
*Additional-Department of Pesticide Regulation (DPR) grant monitoring.
NM- Normal Monitoring
MPM- Management Plan Monitoring
A- Additional Monitoring conducted in 2007.
US- Upstream Monitoring conducted in 2008.

Load Calculations

Loads were calculated for the chlorpyrifos, copper, diazinon and diuron detections (Table II-11) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (mg/L X 1000 or µg/L).

The load values presented for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table II-11. Instantaneous load calculations for chlorpyrifos, copper, diazinon, and diuron where discharge was measured at the Lone Tree Creek site subwatershed (sorted by site, analyte and date).

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	02/16/05	22.26	0.014	8.82
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/16/05	25.85	0.019	13.91
Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	08/16/05	25.85	0.019	13.91
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	02/27/06	0.34	0.014	0.13
Lone Tree Creek @ Brennan Rd	*Chlorpyrifos*	*02/27/06*	*0*	*0.018*	*0*
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	03/15/06	27.84	0.013	10.25
Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	02/11/07	26.7	0.041	31.00
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	02/11/07	26.7	0.052	39.32
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	06/12/07	39.21	0.011	12.21
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/10/07	35.9	0.035	35.58
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/30/07	26.77	0.01	7.58
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	01/23/08	18.88	1.7	908.86
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	01/13/10	1.19	1.1	37.07
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/13/10	23.01	0.27	175.93
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/10/10	27.32	0.015	11.60
Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/07/10	68.19	0.0086	16.61
Lone Tree Creek @ Jack Tone Rd	Copper	05/16/06	13.95	3.6	1422.08
Lone Tree Creek @ Jack Tone Rd	Copper	08/15/06	49.49	8.9	12472.53
Lone Tree Creek @ Jack Tone Rd	Copper	02/11/07	26.7	21	15877.34
Lone Tree Creek @ Jack Tone Rd*	Copper	02/11/07	26.7	21	15877.34
Lone Tree Creek @ Jack Tone Rd	Copper	02/28/07	7.85	19	4223.48
Lone Tree Creek @ Jack Tone Rd	Copper	04/10/07	24.9	3.4	2397.32
Lone Tree Creek @ Jack Tone Rd	Copper	06/12/07	39.21	5.1	5662.58
Lone Tree Creek @ Jack Tone Rd	Copper	07/10/07	35.9	12	12198.96
Lone Tree Creek @ Jack Tone Rd	Copper	08/07/07	19.43	4.6	2530.92
Lone Tree Creek @ Jack Tone Rd	Copper	01/23/08	18.88	40	21385.00
Lone Tree Creek @ Valley Home Rd	*Copper*	*05/13/08*	*10.83*	*4.6*	*1410.70*
Lone Tree Creek @ Valley Home Rd	*Copper*	*06/10/08*	*7.94*	*5.7*	*1281.57*
Lone Tree Creek @ Jack Tone Rd	Copper	07/15/08	24.15	3.6	2461.88
Lone Tree Creek @ Brennan Rd	*Copper*	*07/15/08*	*33.05*	*3.8*	*3556.33*
Lone Tree Creek @ Valley Home Rd	*Copper*	*07/15/08*	*9.76*	*7*	*1934.62*
Lone Tree Creek @ Jack Tone Rd	Copper	08/12/08	13.94	3.5	1381.59
Lone Tree Creek @ Brennan Rd	*Copper*	*08/12/08*	*12.43*	*3.3*	*1161.54*
Lone Tree Creek @ Valley Home Rd	*Copper*	*08/12/08*	*12.89*	*3.7*	*1350.52*
Lone Tree Creek @ Brennan Rd	*Copper*	*09/16/08*	*12.07*	*2.9*	*991.18*

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Lone Tree Creek @ Valley Home Rd	*Copper*	*09/16/08*	*8.63*	*3.8*	*928.63*
Lone Tree Creek @ Jack Tone Rd	Copper	01/13/10	1.19	26	876.13
Lone Tree Creek @ Jack Tone Rd	Copper	02/09/10	3.99	17	1920.74
Lone Tree Creek @ Jack Tone Rd	Copper	07/13/10	23.01	3.4	2215.35
Lone Tree Creek @ Jack Tone Rd	Copper	08/10/10	27.32	3.7	2862.40
Lone Tree Creek @ Jack Tone Rd	Copper	09/07/10	68.19	4.1	7916.84
Lone Tree Creek @ Jack Tone Rd	Copper (D)	01/13/10	1.19	7	235.88
Lone Tree Creek @ Jack Tone Rd	Copper (D)	02/09/10	3.99	8.7	982.97
Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/13/10	23.01	2.2	1433.46
Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/10/10	27.32	2.3	1779.33
Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/07/10	68.19	2.8	5406.62
Lone Tree Creek @ Jack Tone Rd	Diazinon	02/16/05	22.26	0.089	56.10
Lone Tree Creek @ Jack Tone Rd	Diazinon	02/27/06	0.34	0.014	0.13
Lone Tree Creek @ Brennan Rd	*Diazinon*	*02/27/06*	*0*	*0.017*	*0*
Lone Tree Creek @ Jack Tone Rd	Diazinon	03/15/06	27.84	0.023	18.13
Lone Tree Creek @ Brennan Rd	*Diazinon*	*03/15/06*	*12.09*	*0.031*	*10.61*
Lone Tree Creek @ Jack Tone Rd*	Diazinon	02/11/07	26.7	0.12	90.73
Lone Tree Creek @ Jack Tone Rd	Diazinon	02/11/07	26.7	0.14	105.85
Lone Tree Creek @ Jack Tone Rd	Diazinon	01/23/08	18.88	0.2	106.92
Lone Tree Creek @ Jack Tone Rd	Diazinon	01/13/10	1.19	0.074	2.49
Lone Tree Creek @ Jack Tone Rd*	Diuron	02/11/07	26.7	5.1	3855.93
Lone Tree Creek @ Jack Tone Rd	Diuron	02/11/07	26.7	12	9072.77
Lone Tree Creek @ Jack Tone Rd	Diuron	02/28/07	7.85	4.3	955.84
Lone Tree Creek @ Jack Tone Rd	Diuron	04/10/07	24.9	0.23	162.17
Lone Tree Creek @ Jack Tone Rd	Diuron	01/23/08	18.88	4.9	2619.66
Lone Tree Creek @ Jack Tone Rd	Diuron	01/13/10	1.19	0.51	17.19
Lone Tree Creek @ Jack Tone Rd	Diuron	02/09/10	3.99	0.26	29.38

*Field Duplicate
Copper (D)-Dissolved Copper

Source Identification and Outreach

Similar to the Duck Creek subwatershed, the Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. In the past (2007 and 2008), the Coalition conducted additional and upstream MPM during the months when exceedances historically occurred to better characterize water quality the subwatershed. During 2009 and 2010, MPM continued at the Lone Tree Creek @ Jack Tone Rd site during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Lone Tree Creek subwatershed became high priority in 2008, the Coalition has actively engaged in grower outreach and education to address the Lone Tree Creek Management Plan's priority constituents. Grower meetings have been organized and mailings to educate growers about management practices and their importance in achieving acceptable water quality have been sent out. Individual grower meetings and follow up meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices

Priority A/B Constituents

Chlorpyrifos and diazinon are listed as priority A/B constituents in the management plan within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chlorpyrifos

Eight exceedances of the chlorpyrifos WQTL (0.015 µg/L) have occurred in samples collected from 2004 through 2010 during normal and MPM at the Lone Tree Creek site subwatershed (Table II-9).

PUR data were reviewed for the number of applications, the amount of the active ingredient applied (pounds applied), and acres treated with chlorpyrifos (Table II-12, Figure II-2). The greatest amount of chlorpyrifos use occurred in 2005 (45,440 lbs AI) with the lowest use occurring in 2004 (2,516 lbs AI). The pounds of chlorpyrifos applied in this subwatershed have, in general, decreased since 2005. In 2010, there was significantly less use compared to previous years; only 3,165 lbs AI was applied to 1,475 acres (average of 2.1 lbs AI/acre) versus 45,440 lbs AI applied to 13,787 acres in 2005 (average of 3.3 lbs AI/acre) (Table II-12, Figure II-2). Also important, the peak use of chlorpyrifos in the month of July decreased in 2009 and 2010 compared to 2008 (Figure II-2). Despite this, the concentration of chlorpyrifos still exceeded the WQTL in January and July 2010 MPM samples.

The Coalition also used PUR data to assess which crops receive the most applications of the constituent of concern. The highest application rate (total lbs applied from August 2004 to December 2010) was associated with corn (11,103 lbs AI applied from August 2004 to December 2010) followed by almonds (7,953 lbs AI applied from August 2004 to December 2010) (Table II-13). The most common product used within this subwatershed containing chlorpyrifos was Lorsban (Table II-13). The Coalition has focused its outreach to target growers farming these crops.

Table II-12. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for August 2004 through December 2010 in the Lone Tree Creek @ Jack Tone Rd site subwatershed.
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
August, 2004	9	574.2	530.0
September, 2004	1	24.6	16.0
October, 2004	1	39.3	16.0
November, 2004	2	24.4	39.1
December, 2004	29	1853.8	658.8
January, 2005	85	15231.1	3616.3
February, 2005	56	3561.7	1503.0
March, 2005	28	1239.3	845.0
April, 2005	41	5230.9	1368.6
May, 2005	47	9676.7	1559.0
June, 2005	35	3849.4	1659.6
July, 2005	51	2256.3	1717.0
August, 2005	10	536.4	298.0
September, 2005	3	74.4	248.0
December, 2005	31	3784.0	973.4
January, 2006	112	15847.3	4064.0
February, 2006	36	1048.7	744.0
March, 2006	35	1229.1	1202.8
April, 2006	35	3295.5	1376.6

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
May, 2006	37	9291.7	1902.9
June, 2006	43	4663.7	2146.6
July, 2006	36	1916.1	1398.7
August, 2006	8	289.0	147.0
September, 2006	5	310.4	288.0
October, 2006	5	397.7	217.4
November, 2006	5	369.9	258.0
December, 2006	37	1939.3	721.0
January, 2007	63	9676.6	2492.0
February, 2007	27	1226.8	684.0
March, 2007	16	1693.4	541.0
April, 2007	40	3970.7	1168.0
May, 2007	42	9704.9	1815.0
June, 2007	23	1893.1	1242.0
July, 2007	2	56.0	62.0
September, 2007	1	39.9	40.0
October, 2007	1	199.4	100.0
November, 2007	4	128.0	197.0
December, 2007	20	452.3	150.2
January, 2008	54	8552.6	2367.8
February, 2008	23	1796.1	651.2
March, 2008	10	466.7	207.3
April, 2008	13	986.8	332.4
May, 2008	22	8652.1	1148.7
June, 2008	10	547.2	446.0
July, 2008	22	2041.9	814.3
September, 2008	2	159.9	42.0
October, 2008	1	16.5	8.3
November, 2008	2	12.2	12.6
December, 2008	7	1879.3	380.0
January, 2009	31	4588.1	1061.0
February, 2009	11	795.0	538.2
March, 2009	6	816.9	283.3
April, 2009	40	2861.0	930.5
May, 2009	26	10708.7	1068.8
June, 2009	9	331.1	240.6
July, 2009	24	1307.9	675.5
August, 2009	7	294.4	214.0
September, 2009	3	51.0	45.0
October, 2009	4	351.2	186.0
December, 2009	37	3108.4	740.3
January, 2010	11	958.7	343.0
February, 2010	1	12.6	6.0
March, 2010	5	350.3	115.0
April, 2010	28	1122.3	583.7
May, 2010	3	156.4	62.8
June, 2010	2	93.2	69.0
July, 2010	4	105.2	82.0
October, 2010	4	351.2	187.0
November, 2010	1	16.0	27.0
Summaries by Year			
2004 Total	42	2516.3	1259.9

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
2005 Total	387	45440.1	13787.9
2006 Total	394	40598.4	14467.0
2007 Total	239	29041.2	8491.2
2008 Total	166	25111.2	6410.4
2009 Total	198	25213.6	5983.3
2010 Total	59	3165.8	1475.5
Total	**1485**	**171086.7**	**51875.2**

Figure II-2. Pounds of chlorpyrifos applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2010. Asterisk (*) denotes months with exceedances.

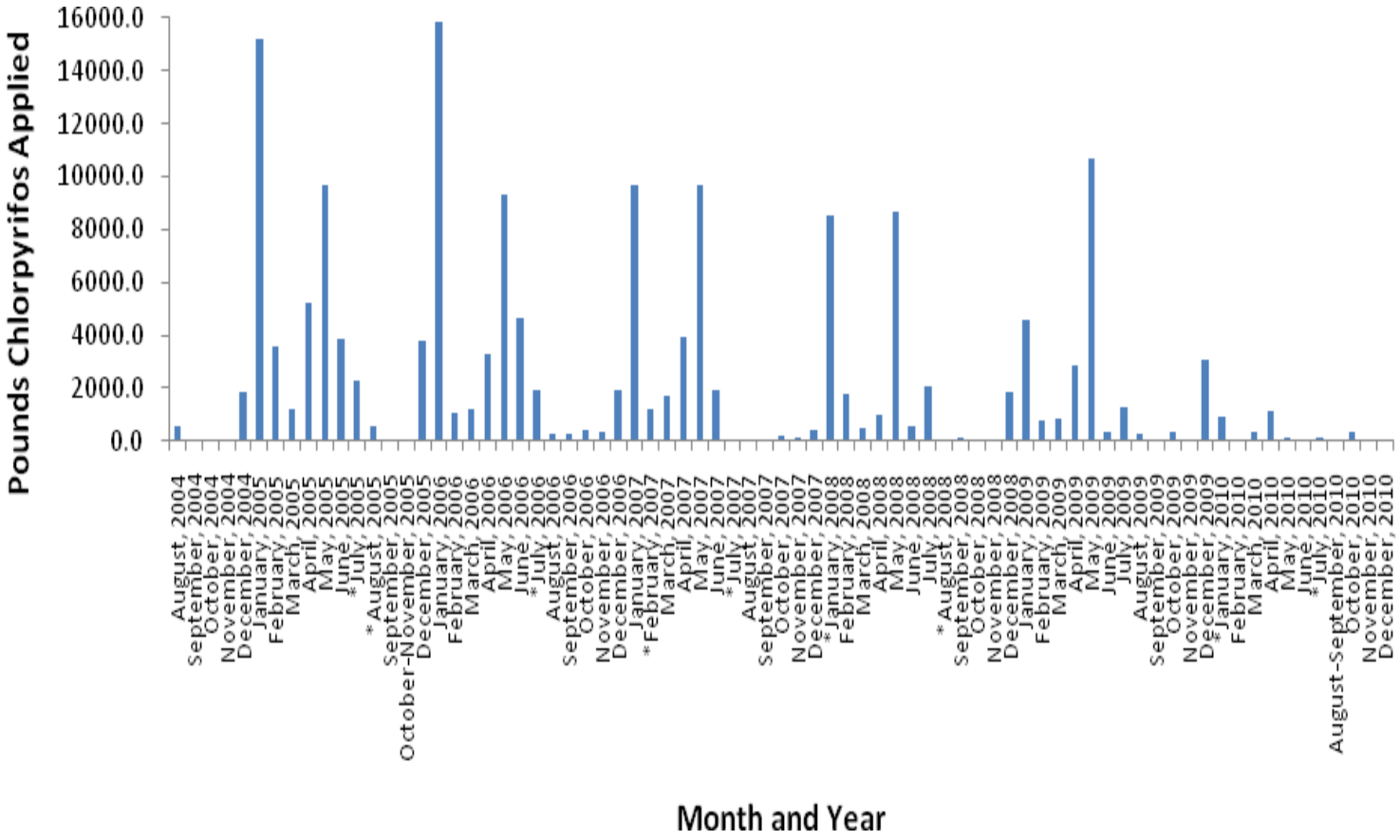


Table II-13. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2004-2010 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	45.1
		LORSBAN 4E-HF	447.7
		LORSBAN-4E	75.0
	ALMOND	CHLORPYRIFOS 4E AG	544.1
		GOVERN 4E INSECTICIDE	259.3
		LORSBAN 4E INSECTICIDE	642.4
		LORSBAN 4E-HF	1130.4
		LORSBAN ADVANCED	174.8
		LORSBAN-4E	4972.8
		WARHAWK	231.5
	CORN (FORAGE - FODDER)	GOVERN 4E INSECTICIDE	30.3
		LORSBAN 15G GRANULAR INSECTICIDE	8006.7
		LORSBAN 4E-HF	1194.2
		NUFOS 15G	1872.0
	GRAPES (RAISIN, WINE)	LORSBAN 4E-HF	860.7
		LORSBAN ADVANCED	702.4
		LORSBAN-4E	460.9
	N-OUTDR TRANSPL	WARHAWK	3.0
	NECTARINE	LORSBAN 4E INSECTICIDE	5.0
	PEACH	LORSBAN 4E INSECTICIDE	5.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	26.2
		GOVERN 4E INSECTICIDE	347.5
		LORSBAN 4E INSECTICIDE	390.5
		LORSBAN 4E-HF	2020.8
		LORSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	1.0
		LORSBAN ADVANCED	24.4
		LORSBAN-4E	1411.2
		NUFOS 4E	26.4

ALFALFA - Total Pounds Chlorpyrifos Applied	**567.8**
ALMOND - Total Pounds Chlorpyrifos Applied	**7955.3**
CORN - Total Pounds Chlorpyrifos Applied	**11103.2**
GRAPES - Total Pounds Chlorpyrifos Applied	**2024.0**
N-OUTDR TRANSPLANT - Total Pounds Chlorpyrifos Applied	**3.0**
NECTARINE - Total Pounds Chlorpyrifos Applied	**5.0**
PEACH - Total Pounds Chlorpyrifos Applied	**5.0**
WALNUT - Total Pounds Chlorpyrifos Applied	**4247.9**
Total Pounds Chlorpyrifos Applied (2004 - 2010)	**25911.3**

Previous analyses conducted by the Coalition and presented in the 2010 MPUR suggest that outreach on the management of chlorpyrifos in this watershed should be a combination of providing information to growers across the entire watershed and focusing on specific parcels on an individual basis. The single exceedance in 2008 was associated with two applications to a single section suggesting that only one or two parcels were responsible. Additionally, the elevated concentration in the sample (1.7 µg/L) suggested that surface runoff was the method of transport of chlorpyrifos to Lone Tree Creek. The same assumption can be made concerning the August 2009 and January and July 2010 chlorpyrifos

exceedances. Almond and walnut growers and alfalfa and corn growers are targeted for outreach in this subwatershed. Row crop farmers are advised of methods to better manage their irrigation tailwater and storm water runoff, whereas outreach efforts to orchard and vineyard growers focus on encouraging management practices to reduce spray drift and improve orchard and vineyard water management. The Coalition feels widespread outreach can further encourage the use of irrigation and water management practices.

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report.

The Coalition focused outreach on growers who had used chlorpyrifos within the last two years and contacted permittees associated with the targeted growers. Beginning in the fall of 2008, the Coalition made several individual contacts with permittees and/or growers to discuss the Lone Tree Creek Management Plan strategy and relevant management practices. The Coalition also hosted a subwatershed grower meeting in November 2008 and invited members to a Mid Valley Agricultural Services hosted grower meeting in March 2009 and a Spray Safe hosted grower meeting in February 2010 to further expand their grower audience as well as highlight chlorpyrifos management practices. Although meetings focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including diazinon, copper and diuron exceedances, *C. dubia*, *S. capricornutum* , *P. promelas* and *H. azteca* toxicities, and ammonia, *E. coli,* DO, SC, pH and TDS exceedances. Grower surveys completed at the meetings, documenting members' current practices and indicating which recommended practices growers anticipate implementing in the upcoming year, have been compiled and assessed by the Coalition.

To date, the Coalition had contacted all 43 growers accounting for 3742 acres within the subwatershed. The Coalition has received completed surveys from all targeted members and thus has achieved 100% of targeted grower contact.

The Coalition began following up with growers in the fall of 2010 through the winter of 2011 to determine which additional management practices were implemented in 2010 and if additional practices have been planned for 2011. Of the initial 43 targeted growers, 17 members were required to participate in filling out a follow up survey. To date, 100% of the follow up meetings with the first priority subwatersheds have been completed and all members who had recommended management practices have implemented those practices. Of the 17 growers who implemented management practices (% acres), 32% reduced the use of pesticides found in exceedances, 2% are using center grass rows, grass waterways/grass filter strips, 7% installed retention pond/holding basin/return systems, 29% reduced runoff water volumes using irrigation management, and 30% installed sprinkler or micro irrigation. The growers who implemented new management practices represent 51% or 1,923 acres of the 3,742 targeted acres. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year.

In January and July of 2010, Coalition irrigation MPM at Lone Tree Creek @ Jack Tone Rd revealed two more exceedances of the chlorpyrifos WQTL. Due to the recent exceedances of the chlorpyrifos WQTL experienced during 2010 MPM at Lone Tree Creek, the Coalition will continue to assess water quality at

Lone Tree Creek @ Jack Tone Rd. Lone Tree Creek @ Jack Tone Rd is scheduled for MPM for chlorpyrifos during the irrigation season of 2011.

Lone Tree Creek @ Jack Tone Rd will continue to be monitored for MPM constituents throughout 2011. If any additional exceedances occur, the Coalition will discuss with the Regional Board necessary actions for outreach that may include contacting other viable constituent sources such as dairy operations and/or contact new members to the Coalition. The Coalition will work to complete target grower outreach but will continue to conduct outreach on a grower group level in 2011.

Diazinon

The concentration of diazinon in samples exceeded the WQTL two times; both exceedances occurred in samples taken during storm monitoring events (February 11, 2007 and January 23, 2008). The Coalition monitored for diazinon as a part of MPM in January and February 2010 and will continue MPM for diazinon in January and February of 2011.

Applications of diazinon in this watershed typically occur as dormant sprays during December, January, and February, with January receiving the most and largest applications. Diazinon has also been applied in this subwatershed once in March 2007 and once in July 2008 (Table II-14, Figure II-3). However, 2010 PUR data indicate that diazinon use, including number of applications in a given month, and pounds applied and acres treated per month, has significantly decreased in this subwatershed, in particular during the high use month of January (Table II-14, Figure II-3). Almonds remain the primary commodity receiving applications (Table II-15).

Table II-14. Number of diazinon applications, total pounds applied, and total acres treated by month for August 2004 through December 2010 in the Lone Tree Creek @ Jack Tone Rd site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Diazinon Applications	Pounds of AI Applied	Acres Treated
December, 2004	6	37.8	22.3
January, 2005	21	1239.5	836.0
February, 2005	5	99.1	57.5
December, 2005	7	145.6	72.5
January, 2006	21	977.0	693.0
February, 2006	1	59.5	40.0
December, 2006	10	156.1	101.5
January, 2007	1	19.8	10.0
February, 2007	4	42.4	25.0
March, 2007	1	1.5	1.0
December, 2007	5	5.3	4.3
January, 2008	10	694.9	449.0
July, 2008	1	2.0	10.0
December, 2008	1	15.9	8.0
January, 2009	2	60.8	26.0
May, 2009	2	14.9	7.8
June, 2009	2	58.6	98.2
August, 2009	1	1.9	10.0

Month/Year	Number of Diazinon Applications	Pounds of AI Applied	Acres Treated
December, 2009	14	363.8	145.8
February, 2010	1	12.6	6.0
Summaries by Year			
2004 Total	6	37.8	22.3
2005 Total	33	1484.3	966.0
2006 Total	32	1192.6	834.5
2007 Total	11	69.0	40.3
2008 Total	12	712.7	467.0
2009 Total	21	499.8	287.8
2010 Total	1	12.6	6.0
Total	**116**	**4008.8**	**2623.8**

Figure II-3. Pounds of diazinon applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2010. Asterisk (*) denotes months with exceedances.

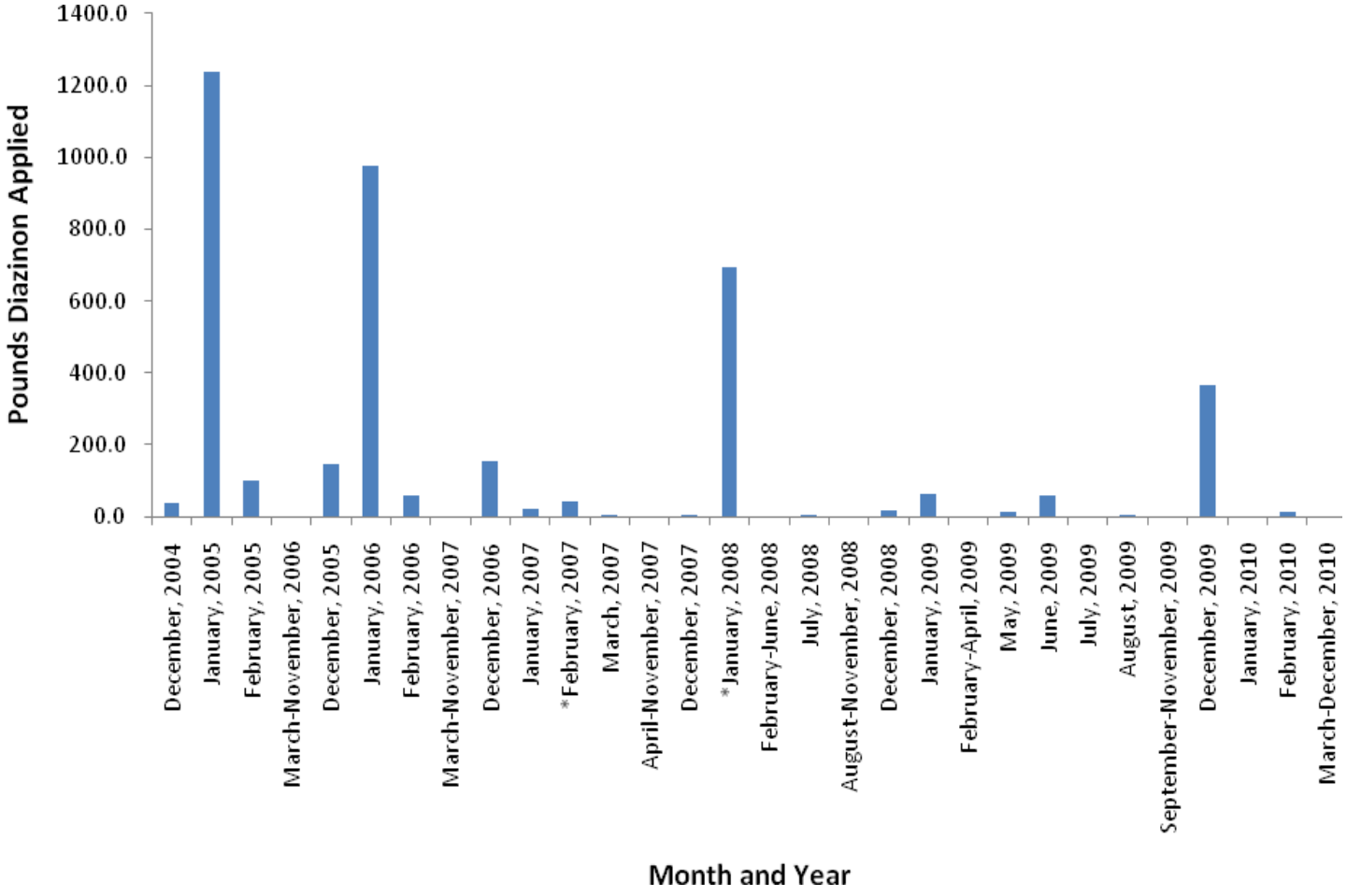


Table II-15. Total pounds active ingredient (AI) applied for diazinon based on PUR data from 2004 – 2010 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	ALMOND	CLEAN CROP DIAZINON AG600 WBC	233.3
		DIAZINON 50W	5.0
		DIAZINON AG 500	1413.7
		DIAZINON AG500	258.3
		DIAZOL 50 W	103.0
		DIAZOL AG 500	1194.1
		GOWAN DIAZINON 4E	235.9
	APPLE	D.Z.N. DIAZINON 50W (WITHDRAWN)	37.8
		DIAZOL 50 W	3.8
	APRICOT	CLEAN CROP DIAZINON AG600 WBC	2.5
		DIAZOL 50 W	8.8
	CHERRY	CLEAN CROP DIAZINON AG600 WBC	39.9
		D.Z.N. DIAZINON AG600 WBC (WITHDRAWN)	44.9
		DIAZINON 50W	46.0
		DIAZOL 50 W	7.0
	GRAPES (RAISIN, WINE)	DIAZINON AG 500	19.8
	NECTARINE	CLEAN CROP DIAZINON AG600 WBC	6.2
		D.Z.N. DIAZINON AG600 WBC (WITHDRAWN)	7.5
		DIAZOL 50 W	5.8
		DIAZOL AG 500	19.8
	PEACH	CLEAN CROP DIAZINON AG600 WBC	252.1
		DIAZINON AG 500	31.8
		DIAZOL 50 W	6.8
		DIAZOL AG 500	9.9
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	DIAZOL 50 W	8.8
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	PROKIL DIAZINON 4EC	6.4

ALMOND - Total Pounds Diazinon Applied	**3443.4**
APPLE - Total Pounds Diazinon Applied	**41.6**
APRICOT - Total Pounds Diazinon Applied	**11.2**
CHERRY - Total Pounds Diazinon Applied	**137.8**
GRAPES - Total Pounds Diazinon Applied	**19.8**
NECTARINE - Total Pounds Diazinon Applied	**39.3**
PEACH - Total Pounds Diazinon Applied	**300.5**
PLUM - Total Pounds Diazinon Applied	**8.8**
WALNUT - Total Pounds Diazinon Applied	**6.4**
Total Pounds Diazinon Applied (2004-2010)	**4008.8**

The Coalition's strategy for addressing diazinon exceedances in the Lone Tree Creek subwatershed involved contacting specific growers with parcels that have the potential to drain to the creek. Individual contacts that occurred within this subwatershed are described under the chlorpyrifos

outreach section above and included discussions of management practices relevant to storm water retention and spray management.

Priority C Constituents

Water samples from Lone Tree Creek had exceedances for copper and diuron priority C constituents.

Copper

Copper has exceeded the hardness based WQTL eight times in the Lone Tree Creek site subwatershed since monitoring began in 2004. The Coalition began monitoring for both the total and dissolved copper fractions in October 2008 to better characterize copper contamination in the subwatershed.

PUR data were reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table II-16, Figure II-4). Copper is one of the most heavily applied constituents in the site subwatershed. Normally, there are fewer applications from the summer through the fall, with the bulk of the applications occurring in the winter and spring. Since 2005, in general, the number of copper applications, amount of copper applied (35,884 lbs AI), and the number of acres treated has decreased annually. Pounds of copper applied in 2010 were 2,361 lbs. Not all exceedances occur in months with the greatest use (Figure II-4).

The PUR data are also used to assess which crops receive the most applications. Almonds (65, 617 lbs AI) received the greatest pounds of copper followed by rice (42, 833 lbs AI), see Table II-17.

Table II-16. Number of copper applications, total pounds applied, and total acres treated by month for August 2004 through December 2010 in the Lone Tree Creek @ Jack Tone Rd site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
September, 2004	1	24.6	16.0
October, 2004	1	39.3	16.0
December, 2004	14	1541.2	350.3
January, 2005	58	13853.5	2612.3
February, 2005	47	3403.9	1352.5
March, 2005	22	1067.6	563.0
April, 2005	40	5211.3	1361.6
May, 2005	29	8815.5	1051.0
June, 2005	2	469.7	105.0
December, 2005	19	3062.7	612.5
January, 2006	83	14605.8	3122.0
February, 2006	28	895.5	608.5
March, 2006	30	1216.2	1006.5
April, 2006	32	3103.7	1202.6
May, 2006	22	7863.4	1062.5
June, 2006	6	2029.5	205.0
August, 2006	1	32.3	9.0
September, 2006	1	53.9	35.0
October, 2006	2	100.1	65.0

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
December, 2006	19	1290.5	282.5
January, 2007	56	9196.5	2229.0
February, 2007	21	1165.7	640.0
March, 2007	11	1635.0	401.0
April, 2007	37	3913.3	1041.0
May, 2007	15	8541.7	869.0
June, 2007	1	366.3	37.0
November, 2007	2	98.7	25.0
December, 2007	10	268.5	49.5
January, 2008	44	7857.7	1918.8
February, 2008	21	1755.3	630.3
March, 2008	9	458.4	199.0
April, 2008	13	986.8	332.4
May, 2008	14	8122.2	703.0
September, 2008	2	159.9	42.0
December, 2008	6	1863.4	372.0
January, 2009	25	4512.0	994.0
February, 2009	11	795.0	538.2
March, 2009	3	482.4	137.0
April, 2009	36	2737.1	857.7
May, 2009	19	10563.7	912.0
July, 2009	1	2.5	3.0
September, 2009	1	2.5	3.0
December, 2009	21	2727.1	471.6
January, 2010	6	741.6	169.0
March, 2010	5	350.3	115.0
April, 2010	28	1122.3	583.7
May, 2010	1	147.5	45.7
Summaries by Year			
2004 Total	16	1605.2	382.3
2005 Total	217	35884.2	7657.9
2006 Total	224	31190.9	7598.6
2007 Total	153	25185.6	5291.5
2008 Total	109	21203.7	4197.4
2009 Total	117	21822.4	3916.5
2010 Total	40	2361.8	913.4
Total	**876**	**139253.8**	**29957.4**

Figure II-4. Pounds of copper applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2010. Asterisk (*) denotes months with exceedances.

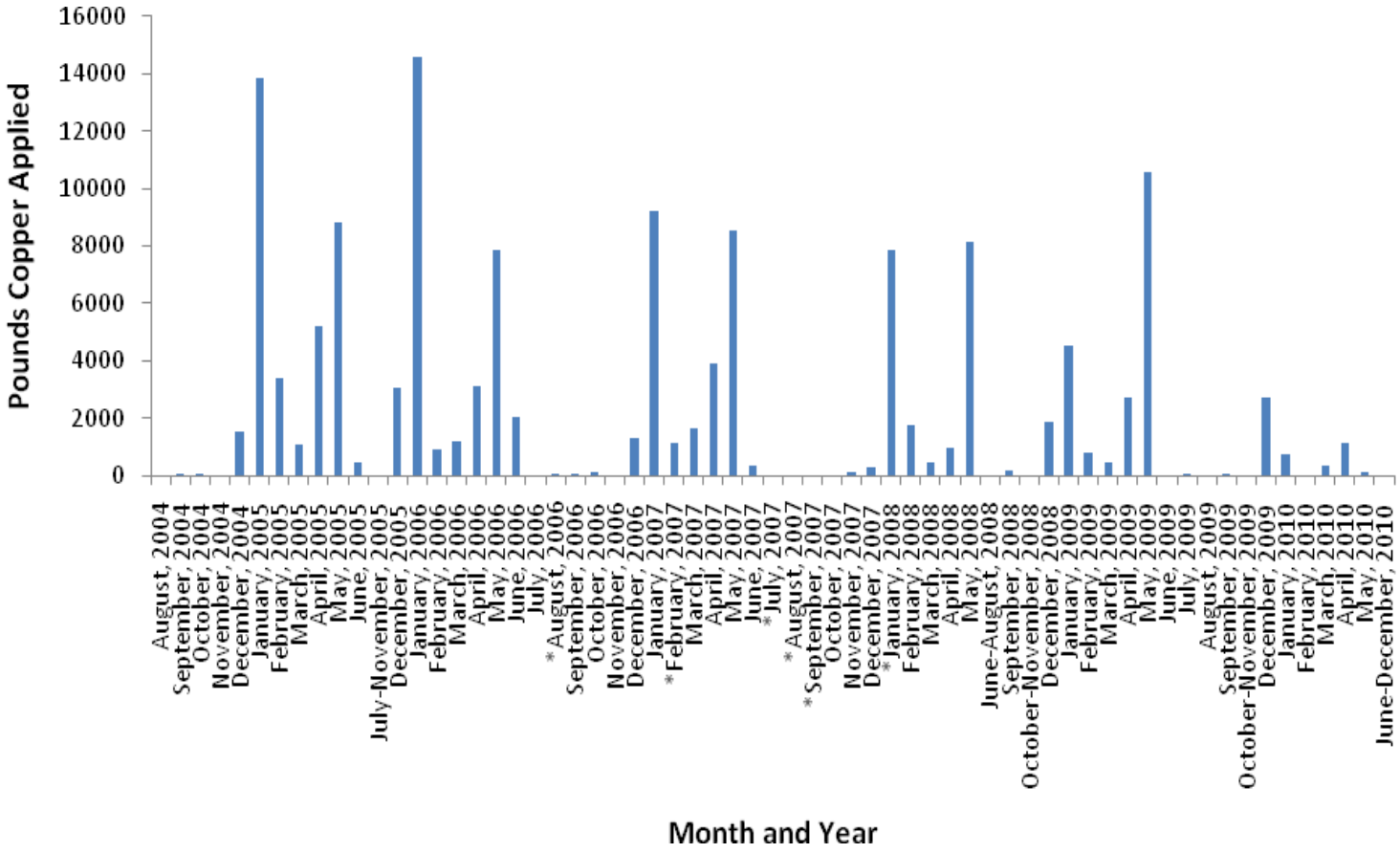


Table II-17. Total pounds active ingredient (AI) applied for copper based on PUR data from 2004-2010 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE DF	853.5
	ALMOND	BASIC COPPER 53	1623.1
		BASICOP	92.8
		BLUE SHIELD DF	12.3
		CHAMP FORMULA 2 FLOWABLE	159.9
		CHAMP FORMULA II DRY FLOWABLE	367.2
		CHAMPION WETTABLE POWDER	1111.7
		COPPER POWER FLOWABLE	7.5
		CUPROFIX ULTRA 40 DISPERSS	391.1
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	8999.6
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	9.8
		HYDROX	5134.0
		KOCIDE 101	3428.0
		KOCIDE 2000	4322.4
		KOCIDE DF	8889.0
		NORDOX	872.2
		NORDOX 75 WG	16376.4
		NU-COP 50 WP	480.5
		NU-COP 50DF	13339.5
	APPLE	KOCIDE DF	12.3
	APRICOT	NORDOX 75 WG	26.0
		NU-COP 50DF	7.7
	CHERRY	CHAMPION WETTABLE POWDER	81.8
		CUPROFIX DISPERSS	208.1
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	167.9
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	564.3
		HYDROX	81.8
		KOCIDE 101	1078.0
		KOCIDE DF	1001.7
		NORDOX	654.2
		NORDOX 75 WG	21.0
		NU-COP 50DF	252.6
	GRAPES (RAISIN, WINE)	CHAMP FORMULA 2 FLOWABLE	821.6
		COPPER-COUNT-N	0.4
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	18.3
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	292.1
		KOCIDE 101	554.4
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	414.0
		NU-COP 3L	361.6

Chemical Name	Commodity	Product Name	Lbs AI Applied
		NU-COP 50DF	131.7
		TENN-COP 5E	41.6
		TENN-COP 5E FUNGICIDE/BACTERICIDE	270.8
	N-OUTDR TRANSPL	CHAMP FORMULA 2 FLOWABLE	5.1
	NECTARINE	BLUE SHIELD DF	38.5
		HYDROX	77.0
		NORDOX 75 WG	116.3
		NU-COP 50DF	42.4
	PEACH	BLUE SHIELD DF	46.2
		HYDROX	38.5
		NORDOX 75 WG	460.9
		NU-COP 50DF	888.6
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	NORDOX 75 WG	26.0
	RICE (ALL OR UNSPEC)	BLUE VIKING COPPER SULFATE STAR SHINE CRYSTAL	900.9
		CHIPCO COPPER SULFATE CRYSTALS	41932.5
	SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS,ETC.)	KOCIDE 101	24.6
	TOMATO	KOCIDE 101	84.7
		KOCIDE DF	39.3
		NU-COP 50DF	154.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	BLUE SHIELD	69.3
		CHAMPION WETTABLE POWDER	30.8
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	73.8
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	4725.3
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	237.9
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	19.6
		HYDROX	671.4
		KOCIDE 101	2699.6
		KOCIDE 2000	1678.8
		KOCIDE DF	3899.1
		NORDOX	408.9
		NU-COP 50 WP	682.2
		NU-COP 50DF	5577.9
		NU-COP 50WP	69.3

ALFALFA - Total Pounds Copper Applied	**853.5**
ALMOND - Total Pounds Copper Applied	**65617.0**
APPLE - Total Pounds Copper Applied	**12.3**
APRICOT - Total Pounds Copper Applied	**33.7**
CHERRY - Total Pounds Copper Applied	**4111.4**
GRAPES - Total Pounds Copper Applied	**2906.6**
N-OUTDR TRANSPLANT - Total Pounds Copper Applied	**5.1**
NECTARINE - Total Pounds Copper Applied	**274.1**

Chemical Name	Commodity	Product Name	Lbs AI Applied
		PEACH - Total Pounds Copper Applied	1434.2
		PLUM - Total Pounds Copper Applied	26.0
		RICE - Total Pounds Copper Applied	42833.4
		SOIL APPLICATION - Total Pounds Copper Applied	24.6
		TOMATO - Total Pounds Copper Applied	278.0
		WALNUT - Total Pounds Copper Applied	20843.9
		Total Pounds Copper Applied (2004-2010)	139253.8

In the 2009 MPUR, the Coalition determined that discharge from a few parcels was responsible for the copper exceedances, and, consequently, management of copper was focused on parcels with the potential to discharge directly to the creek. Orchard and vineyard operators were encouraged to review their operations and determine if storm water runoff and irrigation return flows are managed properly. Growers were advised to consider tailwater management and practices to prevent copper from entering the waterway with runoff. This is consistent with the strategy used to address priority A/B constituent exceedances.

Diuron

Two exceedances of the diuron WQTL occurred in the Lone Tree Creek site subwatershed during 2007 storm monitoring and one occurred during 2008 storm monitoring. The Coalition did not monitor for diuron at Lone Tree Creek as a part of 2009 MPM, however MPM for diuron did occur in 2010 (January and February). In 2011 MPM for diuron is scheduled (January and February).

All PUR data are reviewed for the number of monthly diuron applications, pounds of active ingredient applied, and acres treated (Table II-18, Figure II-5). Applications of diuron have occurred in every month of the year except August, September, and October, although the majority of past applications have occurred in the period between November and February. Diuron applications have drastically decreased in the years since 2006; in 2010 only 71 lbs AI were applied versus 888 lbs AI in 2006 (Table II-18 and Figure II-5). Exceedances of the diuron WQTL occurred in winter months following months with high amounts of diuron applied (Figure II-5).

The largest amount of diuron applied from 2004 through 2010 is associated with walnuts (926 lbs AI) and alfalfa (808 lbs AI) (Table II-19).

Table II-18. Number of diuron applications, total pounds applied, and total acres treated by month for August 2004 through December 2010 in the Lone Tree Creek @ Jack Tone Rd site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
November, 2004	2	24.4	39.1
December, 2004	9	274.8	286.3
January, 2005	5	55.5	124.0
February, 2005	4	58.7	93.0
April, 2005	1	19.6	7.0
January, 2006	4	80.7	151.0
February, 2006	7	93.6	95.5
March, 2006	1	8.2	8.3

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
April, 2006	1	19.6	47.0
May, 2006	2	33.6	40.4
June, 2006	2	23.1	47.5
July, 2006	1	16.4	16.7
November, 2006	3	120.9	124.0
December, 2006	8	492.7	337.0
January, 2007	1	13.0	13.0
February, 2007	2	18.8	19.0
March, 2007	3	48.8	99.0
April, 2007	1	33.2	17.0
May, 2007	3	22.2	24.0
November, 2007	2	29.3	172.0
December, 2007	3	168.5	89.3
February, 2008	2	40.8	20.9
March, 2008	1	8.2	8.3
May, 2008	2	22.3	22.7
November, 2008	2	12.2	12.6
January, 2009	3	11.3	31.0
March, 2009	1	8.2	8.3
April, 2009	3	53.9	37.8
May, 2009	1	11.8	86.0
December, 2009	2	17.5	123.0
January, 2010	3	46.2	83.0
May, 2010	2	8.9	17.1
November, 2010	1	16.0	27.0
Summaries by Year			
2004 Total	11	299.1	325.4
2005 Total	10	133.7	224.0
2006 Total	29	888.7	867.4
2007 Total	15	333.9	433.3
2008 Total	7	83.5	64.5
2009 Total	10	102.7	286.2
2010 Total	6	71.1	127.1
Total	**88**	**1912.7**	**2327.9**

Figure II-5. Pounds of diuron applied within the Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2010. Asterisk (*) denotes months with exceedances.

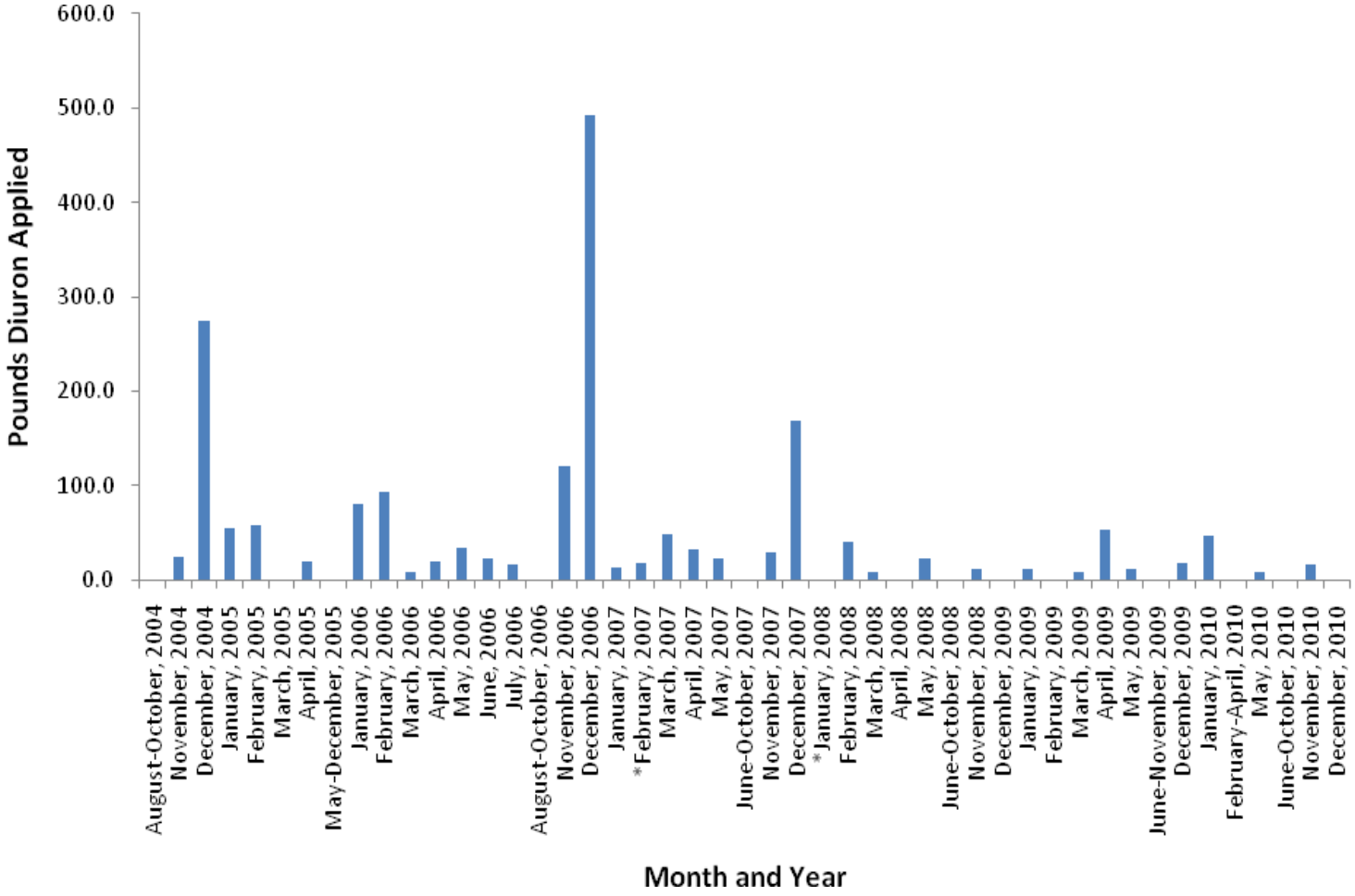


Table II-19. Total pounds active ingredient (AI) applied for diuron based on PUR data from 2004-2010 within the Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	758.6
		DUPONT DIREX 4L HERBICIDE	50.3
	GRAPES (RAISIN, WINE)	DIREX 4L	132.6
		DREXEL DIURON 4L HERBICIDE	13.0
		DU PONT KARMEX DF HERBICIDE	0.4
	OLIVE	DUPONT DIREX 4L HERBICIDE	28.0
	PASTURES (ALL OR UNSPEC)	DIREX 4L	3.9
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	832.5
		DIURON 400 HERBICIDE	46.9
		DIURON 4L HERBICIDE	11.8
		DREXEL DIURON 4L HERBICIDE	13.2
		DUPONT DIREX 4L HERBICIDE	21.6

ALFALFA - Total Pounds Diuron Applied	**808.9**
GRAPES - Total Pounds Diuron Applied	**146.0**
OLIVES - Total Pounds Diuron Applied	**28.0**
PASTURES - Total Pounds Diuron Applied	**3.9**
WALNUT - Total Pounds Diuron Applied	**926.0**
Total Pounds Diuron Applied (2004-2010)	**1912.7**

The Coalition's strategy for addressing diuron exceedances in the Lone Tree Creek subwatershed during outreach is described above under the chlorpyrifos section. In 2011, MPM for diuron is scheduled for January and February 2011 to assess the implementation and effectiveness of management practices.

Priority D Constituents

C. dubia, P. promelas and *S. capricornutum* water column toxicity and *H. azteca* sediment toxicity are listed as priority D constituents for Lone Tree Creek.

Ceriodaphnia dubia toxicity

Water column toxicity to *C. dubia* occurred in the Lone Tree Creek subwatershed upstream location, Lone Tree Creek @ Brennan Rd in February 2006 and at Lone Tree Creek @ Jack Tone Rd in January 2008. Both toxicities coincided with the presence of chlorpyrifos in the water at concentrations above the WQTL.

The Coalition's strategy for eliminating *C. dubia* toxicity involves focusing on chlorpyrifos. If chlorpyrifos can be prevented from entering storm water during the winter, the Coalition believes that *C. dubia* toxicity can also be reduced or eliminated. Therefore, the Coalition will continue with outreach as explained above under the chlorpyrifos section to address toxicity.

Pimephales promelas toxicity

P. promelas toxicity occurred in February 2005 at the upstream location, in February 2006 and in January 2008. The January 2008 toxicity was associated with an exceedance of the ammonia WQTL. Toxicity to *P. promelas* was not monitored during 2009 MPM because the Coalition believes the ammonia exceedances that were experienced were a result of dairy discharges in the Lone Tree Creek subwatershed. Because dairies are not members of the SJCDWQC, the Coalition believes it will be difficult to affect ammonia exceedances as non-members are often reluctant to cooperate with the Coalition and implement management practices.

Selenastrum capricornutum toxicity

Most recently, *S. capricornutum* toxicity occurred in January, April and May of 2008. The January exceedance was associated with an exceedance of the diuron WQTL. No exceedances of herbicides occurred during April or May, but applications of copper were common prior to sampling in both months. 2009 MPM included sampling for toxicity to *S. capricornutum* during April and May, but no toxicity occurred. In 2010, MPM for *S. capricornutum* toxicity occurred (January through May), no toxicity was experienced.

The Coalition's strategy for eliminating *S. capricornutum* toxicity involves focusing on copper and diuron. If these two constituents can be prevented from entering storm water during the winter, the Coalition believes that *S. capricornutum* toxicity can be reduced or eliminated. If the Coalition finds that diuron and copper exceedances are eliminated and *S. capricornutum* toxicity persists, growers applying other herbicides will be targeted for outreach.

Hyalella azteca toxicity

H. azteca toxicity occurred in May 2005 and April 2006. The Coalition has initiated MPM for sediment toxicities. As of 2009, the Coalition began testing for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. There was no MPM for *H. azteca* toxicity scheduled during 2010 nor will there be MPM in 2011. However, additional samples were collected to test for sediment toxicity in September 2010 as part of a Department of Pesticide Regulation (DPR) grant to reduce the impact of agricultural discharge on water quality. The DPR samples did not result in sediment toxicity.

Priority E Constituents

DO, pH, SC, TDS, *E. coli*, and ammonia are listed as priority E constituents for Lone Tree Creek. Although these constituents will remain low priority, the Coalition will continue to monitor these constituents, collect data and discuss these constituents during individual contacts and annual grower meetings.

Evaluation

This subwatershed is one of the first three priority site subwatersheds within the SJCDWQC and therefore the Coalition has focused its resources on identifying the sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals.

The Coalition's strategy for the Lone Tree Creek subwatershed has been to target a large portion of the growers who are applying products containing or related to the priority constituents (chlorpyrifos, diazinon, diuron and copper). Outreach includes grower notification, management practice outreach

and education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys of growers to document management practices and follow up contacts to assess future planned implementations have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. The Coalition will continue outreach in the subwatershed.

Overall, the number of applications, pounds of active ingredient applied, and acres treated with chlorpyrifos, diazinon, copper, and diuron have continued to decrease since 2005, which may be a result of educating growers about alternative products. Additionally, usage of particular products has decreased during historically peak application months, e.g. diazinon in January. Despite this, chlorpyrifos still exceeded the WQTL in Lone Tree Creek during January and July of 2010. Therefore, the Coalition will continue to assess water quality in 2011 when MPM is scheduled during months of historical exceedances. Any additional water quality issues will be discussed with the Regional Board and outreach may then expand to include dairy operations and new member contacts.

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

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper
- Diuron
- Simazine

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Selenastrum capricornutum* water column toxicity
- *Hyalella azteca* sediment toxicity

Priority E

- Dissolved Oxygen
- Lead
- Specific Conductivity
- Total Dissolved Solids
- *E. coli*

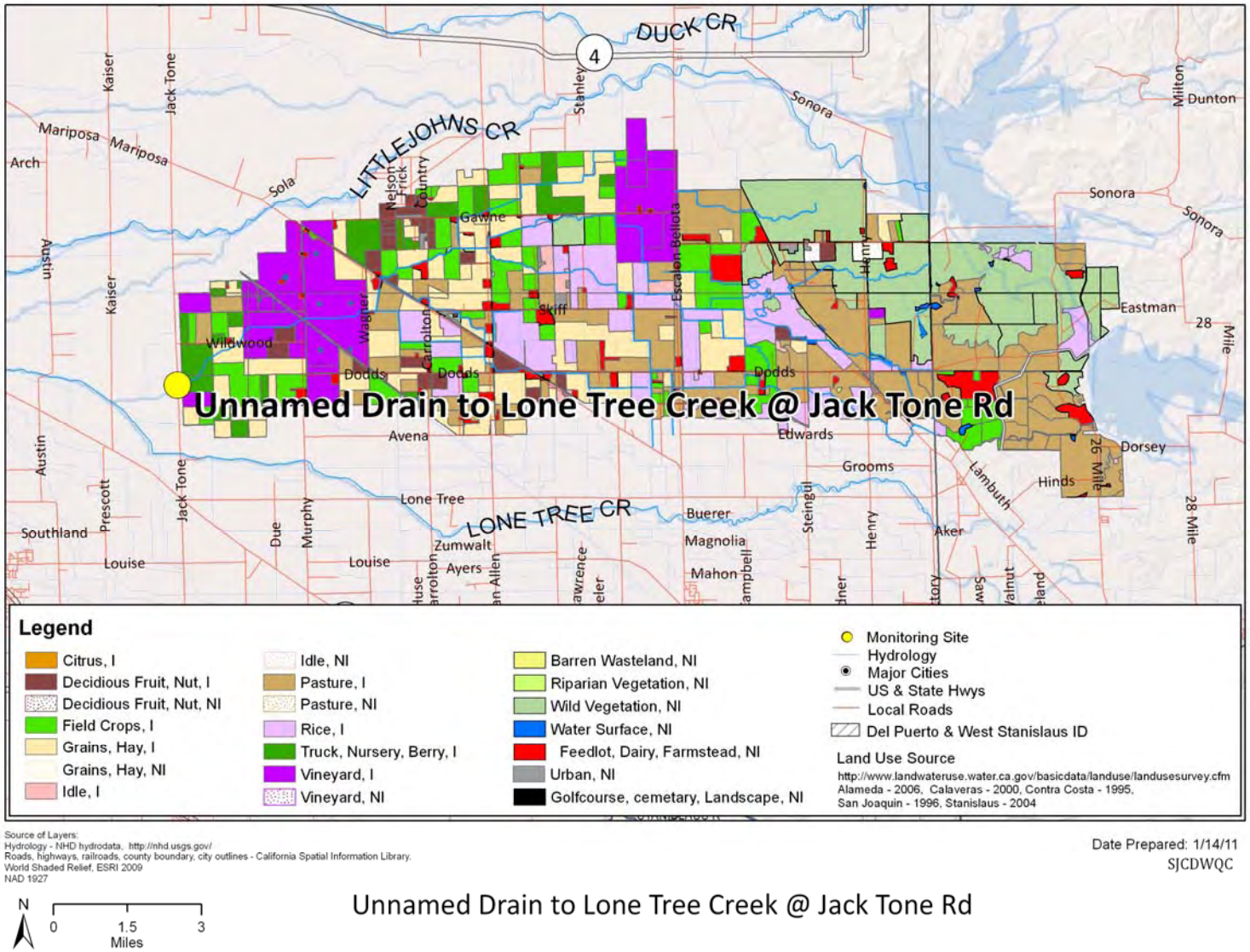
Description of Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (29,892 irrigated acres) – This site subwatershed is located to the north of the Lone Tree Creek site subwatershed and south of Littlejohns Creek. 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. Unlike most of the SJCDWQC area, rice is a major crop in the site subwatershed. Agriculture in the site subwatershed also consists of deciduous orchards, field crops, and grains. Figure III-1 illustrates the land use within this site subwatershed area. This site subwatershed includes an upstream location (Unnamed Drain to Lone Tee Creek @ Wagner Rd) which was sampled in 2008. Table III-1 includes the station name (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table III-1. Coordinates of the Unnamed Drain to Lone Tree Creek site subwatershed sampling locations.

Sample Site	Station Code	Target Lat	Target Long
Unnamed Drain to Lone Tree Creek @ Wagner Rd	531UDLTWR	37.8709	-121.0911
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.8536	-121.1457

Figure III-1. Site subwatershed map of land use for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sample site.



Subwatershed Monitoring History

Monitoring was initiated at Unnamed Drain to Lone Tree Creek (also called Temple Creek locally) during the irrigation season of 2006 and has continued through December 2010 (Table III-2). Specific information on the analyses conducted across each of the monitoring seasons is provided below (Table III-3). Unnamed Drain to Lone Tree Creek @ Jack Tone Rd is an Assessment Monitoring location under the current MRPP and the first monitoring rotation will occur in 2017-2018. The Coalition will conduct MPM at this site during the 2011 irrigation season.

Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and included additional and upstream sampling at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd during July and September for chlorpyrifos (Table III-4). During the 2008 irrigation season, Management Plan Monitoring included upstream sampling at Unnamed Drain to Lone Tree Creek @ Wagner Rd for chlorpyrifos during July and September (Table III-5). The MPM schedule for 2009 included sampling during all six months of the irrigation season for chlorpyrifos, copper, *C. dubia* toxicity, and *S. capricornutum* toxicity (Table III-6).

Beginning in July 2010 additional monitoring was conducted at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd as part of a DPR grant to reduce the impact of agricultural discharge on water quality. The DPR grant monitoring will continue through February 2011. In addition to the DPR grant samples, MPM was scheduled for copper (April-May and July-September), chlorpyrifos (January-February, May-July and September), diuron and simazine (January-February), *C. dubia* toxicity (January-February and September), *S. capricornutum* toxicity (February-March and May), and *H. azteca* sediment toxicity (September) (Table III-7).

A summary and discussion of exceedances are provided in the next section (Tables III-8 and III-9).

The Unnamed Drain to Lone Tree Creek (Temple Creek) is on the 2008 Basin Plan 303d list for ammonia, and electrical conductivity. The potential source of the impairment is listed as dairies.

Table III-2. Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	NA	NA	NA	4	2	6	2	6	NA	NA	NA	6	NA	2	1	6	3
Events Not Sampled	NA	NA	NA	NA	1	0	0	0	0	NA	NA	NA	0	NA	0	0	0	0
Total	**NA**	**NA**	**NA**	**NA**	**5**	**2**	**6**	**1**	**6**	**NA**	**NA**	**NA**	**6**	**NA**	**2**	**1**	**6**	**3**

Table III-3. Number of analyses performed per analyte in each sampling season and year for the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2006	2007		2008			2009				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*	Winter	Storm	Irrigation	Fall
Field and Physical Parameters															
NA	pH	4	4	9	2	10				6		2	1	6	3
NA	Specific Conductivity	4	4	9	2	10				6		2	1	6	3
NA	Dissolved Oxygen	3	4	9	2	10				6		2	1	6	3
EPA 160.1	Dissolved Solids	4	2	6	1	6									
EPA 160.2	Suspended Solids														
EPA 180.1	Turbidity	4	2	6	1	6									
SM 9223 B	*E. coli*	4	2	6	1	6									
EPA 110.2	Color	4	2	6	1	6									
EPA 415.1	Total Organic Carbon	4	2	6	1	6									
Walkley-Black	Total Organic Carbon (sediment)													1	
ASTM D422	Grain size (sediment)													1	
EPA 405.1	BOD	1	2	2											
Carbamates															
EPA 8321A	Aldicarb	4	2	6	1	6									
EPA 8321A	Carbaryl	4	2	6	1	6									
EPA 8321A	Carbofuran	4	2	6	1	6									
EPA 8321A	Methiocarb	4	2	6	1	6									
EPA 8321A	Methomyl	4	2	6	1	6									
EPA 8321A	Oxamyl	4	2	6	1	6									
Organochlorines															
EPA 8081A	DDD	4	2	6	1	6									
EPA 8081A	DDE	4	2	6	1	6									
EPA 8081A	DDT	4	2	6	1	6									
EPA 8081A	Dicofol	4	2	6	1	6									
EPA 8081A	Dieldrin	4	2	6	1	6									
EPA 8081A	Endrin	4	2	6	1	6									
EPA 8081A	Methoxychlor	4	2	6	1	6									
Organophosphates															
EPA 8141A	Azinphos methyl	4	2	6	1	6									
EPA 8141A	Chlorpyrifos	4	2	8	1	6				4		1	1	5	3
EPA 8141A	Diazinon	4	2	6	1	6								4	3

Method	Analyte	2006	2007		2008			2009				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*	Winter	Storm	Irrigation	Fall
EPA 8141A	Dimethoate	4	2	6	1	6									
EPA 8141A	Disulfoton	4	2	6	1	6									
EPA 8141A	Malathion	4	2	6	1	6									
EPA 8141A	Methamidophos	4	2	6	1	6									
EPA 8141A	Methidathion	4	2	6	1	6									
EPA 8141A	Parathion, Methyl	4	2	6	1	6									
EPA 8141A	Phorate	4	2	6	1	6									
EPA 8141A	Phosmet	4	2	6	1	6									
Pyrethroids															
EPA 8081A	Bifenthrin	4	2	6	1	6									
EPA 8081A	Cypermethrin	4	2	6	1	6									
EPA 8081A	Cyhalothrin, lambda	4	2	6	1	6									
EPA 8081A	Permethrin	4	2	6	1	6									
EPA 8081A	Cyfluthrin	4	2	6	1	6									
EPA 8081A	Esfenvalerate/ Fenvalerate	4	2	6	1	6									
Triazines															
EPA 619	Atrazine	4	2	6	1	6									
EPA 619	Cyanazine	4	2	6	1	6									
EPA 8321A	Diuron	4	2	6	1	6						1	1		
EPA 574M	Glyphosate	4	2	6	1	6									
EPA 8321A	Linuron	4	2	6	1	6									
EPA 8141A	Molinate	4	2	6	1	6									
EPA 549.2M	Paraquat dichloride	4	2	6	1	6									
EPA 619	Simazine	4	2	6	1	6						1	1		
EPA 8141A	Thiobencarb	4	2	6	1	6									
Metals (Total)															
EPA 200.8	Arsenic					6									
EPA 200.8	Boron					6									
EPA 200.8	Cadmium					6									
EPA 200.8	Copper					6				5				5	
EPA 200.8	Lead					6									
EPA 200.8	Molybdenum														
EPA 200.8	Nickel					6									
EPA 200.8	Selenium					6									

Method	Analyte	2006	2007		2008			2009				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*	Winter	Storm	Irrigation	Fall
EPA 200.8	Zinc					6									
Metals (Dissolved)															
EPA 200.8	Cadmium														
EPA 200.8	Copper									5				5	
EPA 200.8	Lead														
EPA 200.8	Nickel														
EPA 200.8	Zinc														
Nutrients															
EPA 350.2	Ammonia as N					6									
SM 2340 C	Hardness as CaCO3					6				5				5	
EPA 300.0	Nitrate as N					6									
EPA 353.2	Nitrate + Nitrite as N														
EPA 354.1	Nitrite as N					6									
EPA 351.3	Nitrogen, Total Kjeldahl					6									
EPA 365.2	Orthophosphate as P					6									
EPA 365.2	Phosphate as P					6									
Sediment Pesticides															
EPA 8270M_NCI_SIM	Bifenthrin													1	
EPA 8270M_NCI_SIM	Chlorpyrifos													1	
EPA 8270M_NCI_SIM	Cyfluthrin													1	
EPA 8270M_NCI_SIM	Cyhalothrin, lambda													1	
EPA 8270M_NCI_SIM	Cypermethrin													1	
EPA 8270M_NCI_SIM	Deltamethrin: Tralomethrin													1	
EPA 8270M_NCI_SIM	Esfenvalerate/ Fenvalerate													1	
EPA 8270M_NCI_SIM	Fenpropathrin													1	
EPA 8270M_NCI_SIM	Permethrin													1	
Toxicity															
EPA 821-02-012	*Ceriodaphnia dubia*	4	3	6	2	7				1		1	1	1	
EPA 821-02-012	*Pimephales promelas*	4	2	6	1	6									
EPA 821-02-013	*Selenastrum capricornutum*	4	4	6	1	7				1		2		1	
EPA 600/R-99-064	*Hyalella azteca*	1	1	2	2	2								1	

*Site not sample in the 2008 fall and 2009 winter, storm and fall seasons.

Table III-4. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos for the Unnamed Drain to Lone Tree Creek site subwatershed. "X" indicates the constituent sampled.

Sample Site	Date	Type	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	30-Jul-07	A	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	25-Sep-07	A	X

Table III-5. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos for the Unnamed Drain to Lone Tree Creek site subwatershed. "X" indicates constituent sampled.

Sample Site	Date	Type	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Wagner Rd	15-Jul-08	U	X
Unnamed Drain to Lone Tree Creek @ Wagner Rd	16-Sep-08	U	X

Table III-6. 2009 Management Plan sampling schedule for chlorpyrifos, copper, *Ceriodaphnia dubia* toxicity and *Selenastrum capricornutum* toxicity within the Unnamed Drain to Lone Tree Creek site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	*C. dubia* Toxicity	*S. capricornutum* Toxicity	Copper	Chlorpyrifos
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	14-Apr-09	MPM			X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12-May-09	MPM		X	X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	09-Jun-09	MPM				X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	14-Jul-09	MPM			X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11-Aug-09	MPM			X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	15-Sep-09	MPM	X		X	X

Table III-7. 2010 Management Plan sampling schedule for chlorpyrifos, diuron, simazine, copper, and *Ceriodaphnia dubia, Selenastrum capricornutum,* and *Hyalella azteca* toxicities within the Unnamed Drain to Lone Tree Creek site subwatershed.. "X" indicates constituents sampled.

Site Name	Sample Date	Monitoring Type	*C. dubia*	*S. capricornutum*	Copper	Chlorpyrifos	Diuron	Simazine	*H. azteca*	Chlorpyrifos for DPR	Diazinon for DPR	*H. azteca* for DPR
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	13-Jan-10	MPM	X			X	X	X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9-Feb-10	MPM	X	X		X	X	X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	16-Mar-10	MPM		X								
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	13-Apr-10	MPM			X							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11-May-10	MPM		X	X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8-Jun-10	MPM				X				X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	13-Jul-10	MPM			X	X				X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	10-Aug-10	MPM			X					X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7-Sept-10	MPM	X		X	X			X	X	X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12-Oct-10	MPM								X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9-Nov-10	MPM								X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7-Dec-10	MPM								X	X	

Exceedance History

Samples collected during monitoring from 2006-2009 at the Unnamed Drain to Lone Tree Creek sample site showed exceedances of DO (7), pH (1), SC (2), TDS (1), *E. coli* (10), DDE (1), copper (6), lead (2), carbofuran (1), chlorpyrifos (17), diuron (3), methidathion (1), simazine (2), and thiobencarb (3). Toxicity has occurred five times to *C. dubia* and five times to *S. capricornutum*. Sediment toxicity to *H. azteca* occurred five times (Table III-8 and Table III-9).

The 2010 irrigation season resulted in DO (1), copper (1), and chlorpyrifos (3) exceedances, and one instance of sediment toxicity to *H. azteca.*

All exceedances are listed in Tables III-8 and III-9 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. Constituents under a management plan are prioritized using the SJCDWQC Management Plan prioritization process flow chart (MPUR 2011 Figure 3, page 21). The priority level (A-E) assigned to each constituent is listed in the bottom row of Tables III-8 and III-9. The highest priority constituents for Unnamed Drain to Lone Tree Creek subwatershed are chlorpyrifos (A/B), copper, diuron and simazine (C) and toxicities to *C. dubia, S. capricornutum* and *H. azteca* (D). There was no change to constituent priority following 2010 exceedances.

Table III-8. Field, bacteria, inorganic and legacy pesticides (low priority) experienced in samples collected from locations within the Unnamed Drain to Lone Tree Creek site subwatershed between April 2006 and December 2010 (sorted by season and date).
If the WQTL is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream site is italicized.

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	DDE (p,p')[1], >0.00059 µg/L
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/20/2006	4.8					0.004
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006	6				2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	3/6/2007			841			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/22/2007			905	620		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007					2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/7/2007					250	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008					>2400	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008					250	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008	5.61	6.17			460	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/15/2008					690	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/12/2008					260	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/16/2008	6.7					
Unnamed Drain to Lone Tree Creek @ Wagner Rd	*Irrigation*	*9/16/2008*	*6.6*					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/11/2009	6.28					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	1/13/2010	2.36					
		Constituent Priority	**E**	**NP**	**E**	**E**	**E**	**NP**

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.

Table III-9. Metals, pesticides and toxicity exceedances (high priority) experienced in samples collected from locations within the Unnamed Drain to Lone Tree Creek site subwatershed between April 2006 and December 2010 (sorted by season and date).

If the WQTL is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Sample Site	Season	Sample Date	Copper Dissolved*, µg/L	Copper Total, µg/L	Lead Total, µg/L	Carbofuran, >0 µg/L	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	Methidathion[1], >0.7 µg/L	Simazine, >4 µg/L	Thiobencarb[1], >0 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/20/2006									0.12			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/18/2006					0.031							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/19/2006					0.045							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/11/2007					0.048	19	1.1	7		0		53
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/21/2007												83
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	2/28/2007						29						5
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	3/7/2007												57
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/12/2007									0.57			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/10/2007					0.034							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/9/2007											57	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/25/2007					0.017							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Storm	1/23/2008					0.045	7.7		6.4		0		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sediment	3/18/2008											54	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sediment	4/9/2008											21	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	4/15/2008		23 (8.4)	6.1 (2.7)									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/13/2008		7.8 (6.5)		0.64	0.41							34

Sample Site	Season	Sample Date	Copper Dissolved*, µg/L	Copper Total, µg/L	Lead Total, µg/L	Carbofuran, >0 µg/L	Chlorpyrifos, >0.015 µg/L	Diuron, >2 µg/L	Methidathion[1], >0.7 µg/L	Simazine, >4 µg/L	Thiobencarb[1], >0 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	6/10/2008					0.12				0.12J			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/15/2008		6.9 (5.7)			0.028							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/12/2008		6.8 (5.9)										
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Sediment	8/13/2008											82	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/16/2008		6.5 (4.3)	1.3 (1.0)		0.12					0		
Unnamed Drain to Lone Tree Creek @ Wagner Rd	*Irrigation*	*9/16/2008*					*0.14*							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/23/2008										65		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	5/12/2009					0.032							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	7/14/2009					0.66							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/15/2009					0.086					30		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	4/13/2010	5.5(4.70)											
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	8/10/2010					0.039							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation	9/7/2010											76	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Fall	11/9/2010					0.052							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Fall	12/7/2010					0.068							
Constituent Priority			**C**	**C**	**E**	**NP**	**A/B**	**C**	**NP**	**C**	**NP[2]**	**D**	**D**	**D**

NP-Not Prioritized; only one exceedance experienced in past and currently no TMDL for constituent.
NP[2] – not prioritized; thiobencarb is a pesticide applied only to rice and is therefore reported to the Regional Board and the Rice Coalition to manage.
*Dissolved not analyzed until October 2008.

2007 - 2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table III-10 for the following constituents: chlorpyrifos, diazinon, diuron, simazine, copper and water column toxicities to *C. dubia* and *S. capricornutum* and sediment toxicity to *H. azteca.*

2007

Additional monitoring at Unnamed Drain to Lone Tree Creek occurred in 2007 during July and September for chlorpyrifos, as well as monthly as a part of normal monitoring (Table III-10). Chlorpyrifos was detected in the additional July sample, and exceeded the WQTL during normal monitoring sample in July (0.034 µg/L) and the additional September sample (0.017 µg/L).

2008

In 2008, chlorpyrifos exceeded the WQTL during normal monitoring in the months of May, June, July, and September (Table III-10). There was also a detection of chlorpyrifos during normal monitoring in August that was very close to the WQTL (0.014µg/L). Upstream MPM (Lone Tree Creek @ Wagner Rd) occurred for chlorpyrifos in July and September of 2008; chlorpyrifos levels in samples exceeded the WQTL during September (Table III-10).

2009

The Coalition conducted MPM during the 2009 irrigation season for the following constituents: total and dissolved copper (April, May, July, August, and September), chlorpyrifos (May, June, July, and September), *S. capricornutum* toxicity (May), and *C. dubia* toxicity (September). Chlorpyrifos levels in samples exceeded the WQTL in May, July, and September, and toxicity to *C. dubia* was experienced in September as well (Table III-10).

2010

Samples were collected for MPM analysis of chlorpyrifos, diuron, simazine, and *C. dubia* and *S. capricornutum* toxicities during January and February, 2010. Management Plan Monitoring for copper, chlorpyrifos, and toxicity to *C. dubia, S. capricornutum,* and *H. azteca* took place during the 2010 irrigation season. As part of DPR grant MPM, chlorpyrifos and diazinon were monitored starting in June 2010 and will continue through February 2011.

2011

The DPR grant monitoring at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd continued through February 2011 for chlorpyrifos and diazinon. Chlorpyrifos (January-February, May-September and December), diuron and simazine (January-February), copper (April-May and July-September) and toxicity to *C. dubia* (January-February and September)*, S. capricornutum* (February-March and May)*,* and *H. azteca* (March and September) are scheduled for MPM in 2011.

Table III-10. Normal monitoring (NM), Management Plan Monitoring (MPM), and additional DPR grant monitoring (*) results for the Unnamed Drain to Lone Tree Creek site subwatershed between 2007 and 2010. Exceedance values are in bold.

	Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2007 NM (@ Jack Tone Rd)	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	**0.034**	<0.003	<0.003	NA	NA	NA
2007 MPM A (@ 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	NA	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)	NA	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
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	**0.032**	<0.003	**0.660**	NA	**0.086**	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
	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
	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
	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
	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

NA - Not applicable. This site was not sampled during this month.
*Additional-Department of Pesticide Regulation (DPR) grant monitoring.
NM- Normal Monitoring
MPM- Management Plan Monitoring
A- Additional Monitoring conducted in 2007.
US- Upstream Monitoring conducted in 2008.

Load Calculations

Loads have been calculated for chlorpyrifos, copper, diuron and simazine detections (Table III-11) in the site subwatershed based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (mg/L X 1000 or µg/L).

The load values for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table III-11. Instantaneous load calculations for chlorpyrifos, copper, diuron and simazine where discharge was measured in the Unnamed Drain to Lone Tree Creek site subwatershed (sorted by site, analyte, and date).

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µG/L	Loading Rate µG/SEC
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/18/06	40.64	0.031	35.67
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/15/06	17.86	0.011	5.56
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/19/06	10.41	0.045	13.27
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	02/11/07	27.09	0.048	36.82
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/10/07	21.51	0.034	20.71
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/30/07	32.45	0.014	12.86
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/25/07	15.92	0.017	7.66
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	01/23/08	12.18	0.045	15.52
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	01/23/08	12.18	0.079	27.25
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	05/13/08	21.52	0.41	249.85
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	06/10/08	15.85	0.12	53.86
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/15/08	17.55	0.028	13.91
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/12/08	11.11	0.014	4.40
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/16/08	18.38	0.12	62.46
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Chlorpyrifos	09/16/08	18.38	0.12	62.46
Unnamed Drain to Lone Tree Creek @ Wagner Rd	*Chlorpyrifos*	*09/16/08*	*30.9*	*0.14*	*122.50*
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	05/12/09	2.48	0.032	2.25
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/14/09	2.12	0.66	39.62
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/15/09	15.82	0.086	38.53
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	07/13/10	13.84	0.008	3.14
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	08/10/10	11.19	0.039	12.36
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	09/07/10	27.32	0.013	10.06
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	11/09/10	0.28	0.052	0.41
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Chlorpyrifos	12/07/10	3.3	0.068	6.35
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/15/08	4.67	23	3041.53
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/13/08	21.52	7.8	4753.18
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	06/10/08	15.85	4.8	2154.36
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/15/08	17.55	6.9	3429.05
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/12/08	11.11	6.8	2139.29
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Copper	09/16/08	18.38	6.2	3226.89
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/16/08	18.38	6.5	3383.03
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/14/09	2.74	4.3	333.63
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/14/09	2.74	8.5	659.50
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/12/09	2.48	5	351.13

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/12/09	2.48	7.3	512.65
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/14/09	2.12	1.5	90.05
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/14/09	2.12	4.6	276.15
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/11/09	10.5	1.5	445.99
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/11/09	10.5	3.8	1129.85
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/15/09	15.82	2.5	1119.94
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/15/09	15.82	5	2239.87
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	04/13/10	5.88	11	1831.54
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	05/11/10	4.11	4.3	500.45
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	07/13/10	13.84	5	1959.54
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	08/10/10	11.19	4.7	1489.28
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper	09/07/10	27.32	4.9	3790.74
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	04/13/10	5.88	5.5	915.77
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	05/11/10	4.11	2.1	244.40
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	07/13/10	13.84	0.81	317.44
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	08/10/10	11.19	2.3	728.79
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Copper (D)	09/07/10	27.32	1.9	1469.88
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	02/11/07	27.09	19	14575.04
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	02/28/07	7.49	29	6150.74
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	04/10/07	3.56	1.6	161.29
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	05/22/07	0	1.5	0.00
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	01/23/08	12.18	7.7	2655.74
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Diuron	01/23/08	12.18	7.8	2690.23
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	04/15/08	4.67	0.72	95.21
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	05/13/08	21.52	0.54	329.07
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	06/10/08	15.85	0.29	130.16
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	01/13/10	1.59	0.62	27.91
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Diuron	02/09/10	7.44	0.26	54.78
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	02/11/07	27.09	7	5369.75
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	02/28/07	7.49	2.4	509.03
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	04/10/07	3.56	0.08	8.06
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	05/22/07	0	3.4	0.00
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	01/23/08	12.18	6.4	2207.37
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd*	Simazine	01/23/08	12.18	8.4	2897.17
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	04/15/08	4.67	1	132.24
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	01/13/10	1.59	0.69	31.07
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Simazine	02/09/10	7.44	0.66	139.05

*Field duplicate
Copper (D)-Dissolved Copper

Source Identification and Outreach

Similar to the Dry Creek source identification and outreach, the Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2008 the Coalition conducted additional and upstream MPM during the months when exceedances historically occurred to better characterize water quality the subwatershed. Management Plan Monitoring continued in 2010 at the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Unnamed Drain to Lone Tree Creek subwatershed became high priority in 2008, the Coalition has actively engaged in grower outreach and education to address Unnamed Drain to Lone Tree Creek Management Plan's priority constituents. The Coalition has organized grower meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings and follow up meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent included in the management plan within the Unnamed Drain to Lone Tree Creek subwatershed.

Chlorpyrifos

Seventeen exceedances of the chlorpyrifos WQTL (0.015 µg/L) occurred in samples collected between 2006 and 2010, including one exceedance at the upstream sampling location (Table III-9). The Coalition evaluated monitoring and PUR data to identify possible sources.

PUR data were reviewed for the number of applications, amount of the chlorpyrifos applied (pounds applied), and acres treated (Table III-12, Figure III-2). The greatest amount of chlorpyrifos applied was in 2006 (6,759 lbs AI) with the lowest amount in 2008 (1,903 lbs AI). Overall, the number of applications and acres treated with chlorpyrifos in this subwatershed has decreased annually since 2006; however the pounds of chlorpyrifos used in 2009 increased compared to 2008 usage and then decreased again in 2010 (Table III-12, Figure III-2). Chlorpyrifos use during the 2010 irrigation months remained low, with no use in September; however, three exceedances were experienced in 2010 in August, November and December (Figure III-2).

The Coalition also used PUR data to assess which crops received the most applications of chlorpyrifos from 2006 to 2010 (Table III-13). Corn (6,661 lbs AI) received the highest applications of chlorpyrifos followed by walnuts (5,313 lbs AI). The most common product used within this subwatershed containing chlorpyrifos was Lorsban (Table III-13).

Table III-12. Number of chlorpyrifos applications, pounds applied and acres treated for January 2006 through December 2010 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed.
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
March, 2006	1	50.0	25.0
April, 2006	6	168.4	382.0
May, 2006	28	2168.0	1297.3
June, 2006	25	2515.2	1747.5
July, 2006	15	1037.5	673.5
August, 2006	6	340.6	290.0
September, 2006	6	294.1	295.0
November, 2006	1	185.8	100.0
March, 2007	5	172.4	209.0
April, 2007	6	303.8	325.0
May, 2007	23	2208.2	1558.0
June, 2007	11	741.1	637.0
July, 2007	2	71.5	57.0
August, 2007	1	80.0	37.0
October, 2007	1	199.4	100.0
March, 2008	6	206.0	338.0
April, 2008	2	182.3	157.0
May, 2008	10	955.5	643.0
June, 2008	2	208.4	231.0
July, 2008	6	351.7	247.0
March, 2009	9	629.4	562.0
April, 2009	1	40.0	57.3
May, 2009	5	852.4	444.5
June, 2009	3	368.1	194.0
July, 2009	14	1119.1	709.0
August, 2009	7	549.6	276.0
September, 2009	9	332.5	295.0
October, 2009	1	678.0	361.0
November, 2009	3	631.9	336.5
March, 2010	1	23.0	49.0
July, 2010	1	70.6	40.0
August, 2010	1	45.1	24.0
September, 2010	1	75.1	40.0
October, 2010	3	1093.0	582.0
November, 2010	2	1489.3	793.0
Summaries by Year			
2006 Total	88	6759.7	4810.3
2007 Total	49	3776.3	2923.0
2008 Total	26	1903.9	1616.0
2009 Total	52	5201.0	3235.3
2010 Total	9	2796.1	1528.0
Total	**224**	**20437.0**	**14112.6**

Figure III-2. Pounds of chlorpyrifos applied within the Unnamed Drain to Lone Tree Creek site subwatershed by month for 2006-2010. Asterisk (*) denotes months with exceedances.

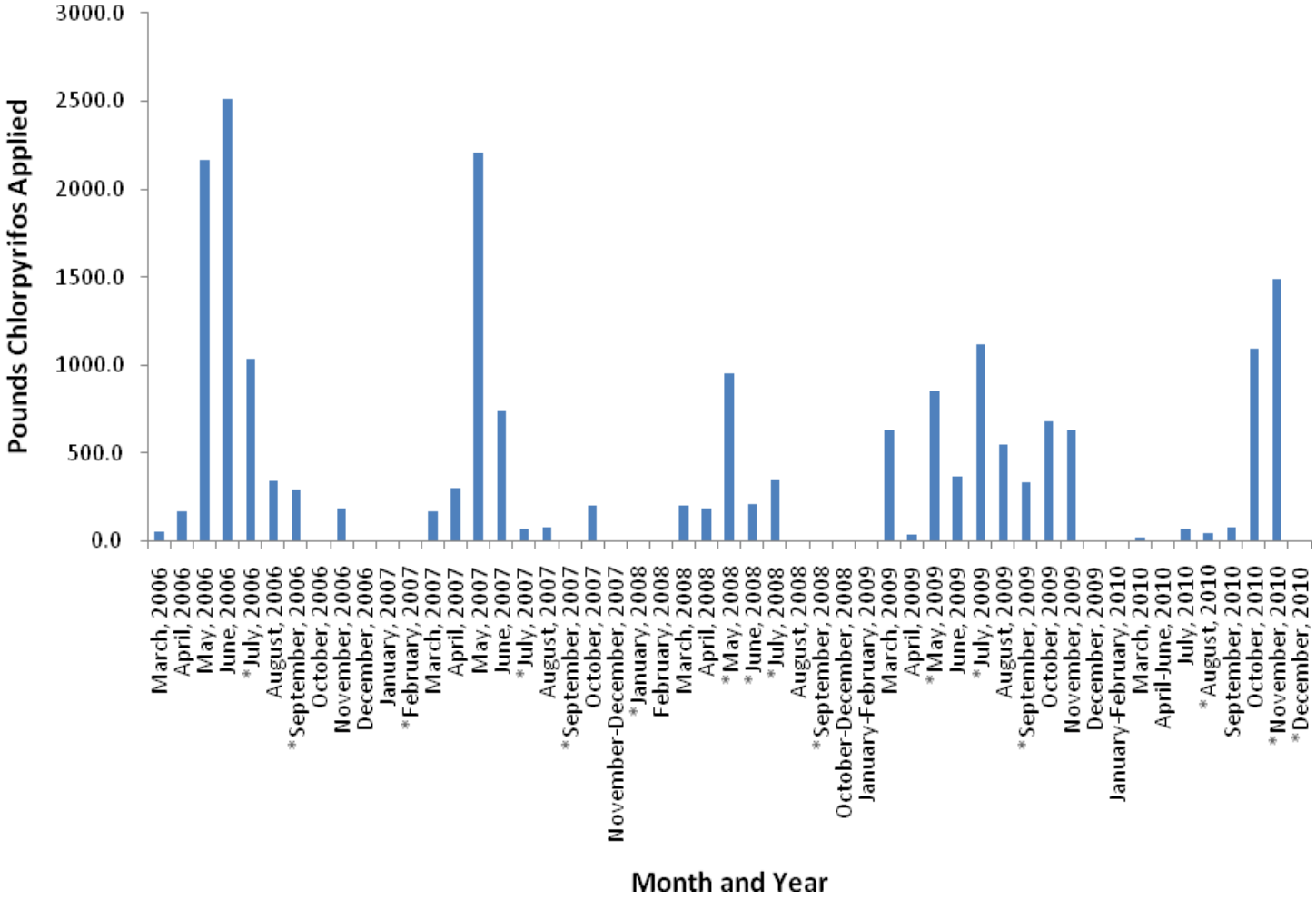


Table III-13. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2006-2010 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	166.8
		LORSBAN 4E-HF	887.5
		LORSBAN ADVANCED	23.0
		LORSBAN-4E	28.8
	ALMOND	GOVERN 4E INSECTICIDE	121.2
		LORSBAN 4E-HF	287.1
		LORSBAN ADVANCED	604.7
		LORSBAN-4E	1773.8
		WARHAWK	62.6
	APPLE	LORSBAN-4E	210.1
	CORN (FORAGE - FODDER)	GOVERN 4E INSECTICIDE	257.6
		LORSBAN 15G GRANULAR INSECTICIDE	5108.6
		LORSBAN 4E-HF	460.8
		LORSBAN-4E	109.1
		NUFOS 15G	651.6
		NUFOS 4E	74.2
	GRAPES (RAISIN, WINE)	LORSBAN 4E-HF	215.3
		LORSBAN ADVANCED	3892.2
		LORSBAN-4E	185.8
	N-OUTDR TRANSPL	WARHAWK	3.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	657.7
		LORSBAN 4E INSECTICIDE	934.3
		LORSBAN 4E-HF	831.4
		LORSBAN ADVANCED	190.8
		LORSBAN-4E	2664.1
		NUFOS 4E	34.6

ALFALFA - Total Pounds Chlorpyrifos Applied	**1106.2**
ALMOND - Total Pounds Chlorpyrifos Applied	**2849.5**
APPLE - Total Pounds Chlorpyrifos Applied	**210.1**
CORN - Total Pounds Chlorpyrifos Applied	**6661.8**
GRAPES - Total Pounds Chlorpyrifos Applied	**4293.3**
N-OUTDR TRANSPLANT - Total Pounds Chlorpyrifos Applied	**3.0**
WALNUT - Total Pounds Chlorpyrifos Applied	**5313.0**
Total Pounds Chlorpyrifos Applied (2006 - 2010)	**20437.0**

As described in the 2010 MPUR, previous analyses conducted by the Coalition indicate a few parcels are responsible for the chlorpyrifos exceedances and management should focus on growers located adjacent to the drain. Growers with almonds, walnuts, grapes, and corn have been targeted for outreach, and management practices aimed at preventing discharge during the irrigation season have been discussed. The Coalition noted that several growers employ recirculation and/or tailwater return systems (40% member acreage), allow grass to grow down orchard row centers (26% member acreage), and maintain vegetative filter strips around field edges and/or waterways (20% member acreage) to reduce runoff. The Coalition has determined these management practices can be increased and continues to focus on further outreach efforts to encourage management practices to retain and manage irrigation tailwater.

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition focused outreach to growers who had used chlorpyrifos within the last two years and contacted permittees associated with the targeted growers. Beginning in the fall of 2008, the Coalition made several individual contacts with permittees and/or growers to discuss the Unnamed Drain Management Plan strategy and relevant management practices. The Coalition hosted a subwatershed grower meeting in November 2008 and invited members to a Mid Valley Agricultural Services hosted grower meeting in March 2009 and a Spray Safe hosted grower meeting in February 2010 to further expand their grower audience as well as highlight chlorpyrifos management practices. Although meetings focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including copper, diuron, simazine and lead exceedances, *C. dubia, S. capricornutum* and *H. azteca* toxicity, and DO, SC, TDS and *E. coli* exceedances. Grower surveys completed at the meetings, documenting members' current practices and indicating which recommended practices growers anticipate implementing in the upcoming years, have been compiled and assessed by the Coalition.

The Coalition contacted 34 targeted growers, accounting for 6,463 acres within the subwatershed. To date, the Coalition has received surveys from all targeted members and has achieved 100% of targeted grower contacts.

The Coalition began following up with growers in the fall of 2010 through the winter of 2011 to determine which additional management practices were implemented in 2010 and if additional practices have been planned for 2011. Of the initial 34 targeted growers 18 members were required to complete a follow up survey. To date, 100% of the follow up meetings with the first priority subwatersheds have been completed and all members who were recommended management practices have implemented those practices. Of the 18 growers who implemented management practices (% acres), 31% reduced use of pesticides found in exceedances, 4% are using center grass rows, grass waterways/grass filter strips, 4% installed retention pond/holding basin/return systems, 24% reduced runoff water volumes using irrigation management, and 37% installed sprinkler or micro irrigation. The growers who implemented new management practices represent 61% or 3,934 acres of the 6,463 targeted acres. Growers will be contacted again (if necessary) during the fall of 2011 to determine what practices were implemented during the dormant season and/or the 2011 irrigation year. Not all growers will need to be contacted during the fall of 2012. To obtain the information on practices implemented since the interview/meeting, the Coalition anticipates either conducting phone calls or sending out a brief letter that includes a survey for the grower to complete.

During 2010, samples collected for additional DPR grant monitoring at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd revealed three more exceedances of the chlorpyrifos WQTL (August, November and December). Due to these recent exceedances of the chlorpyrifos WQTL experienced during 2010 at Unnamed Drain to Lone Tree Creek, the Coalition will continue to assess water quality at the site during 2011 MPM for chlorpyrifos during months with past exceedances.

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd will continue to be monitored for MPM constituents throughout 2011. If any additional exceedances occur, the Coalition will discuss with the Regional Board necessary actions for outreach that may include contacting other viable sources such as dairy operations and/or contact new members to the Coalition. The Coalition will work to complete target individual grower outreach but will continue to conduct outreach on a grower group level in 2011.

Priority C constituents

Copper, diuron and simazine are listed as priority C constituent in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed management plan.

Copper

Water samples for Unnamed Drain to Lone Tree Creek in 2008 exceeded the WQTL for copper in every month except June, but no exceedances of copper occurred at this site during 2009. During 2010 MPM there was one exceedance of the copper WQTL which occurred in April (Table III-9).

PUR data were reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table III-14, Figure III-3). Copper is one of the most heavily applied pesticides in the site subwatershed. Overall, the number of copper applications, amount of copper applied (pounds AI), and the number of acres treated has decreased since 2006. The largest amount applied was in 2007 (25,345 lbs AI) and the smallest amount was applied in 2010 (3,084 lbs AI). The greatest use has consistently occurred in May. Not all exceedances occurred during months of the greatest use (Figure III-3).

The largest amount of copper applied from 2006 through 2010 was to walnuts (36,874 lbs AI) followed by rice (31,987 lbs AI) (Table III-14). Several different products containing copper are used throughout the Coalition area, including DuPont Kocide and Kocide (Table III-14).

Table III-14. Number of copper applications, total pounds applied and total acres treated by month for January 2006 through December 2010 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
January, 2006	5	1491.3	265.0
February, 2006	5	234.3	200.5
March, 2006	17	724.3	578.5
April, 2006	30	6351.9	1623.4
May, 2006	35	11276.6	1678.0
June, 2006	10	2167.0	569.0
July, 2006	6	609.8	396.0
August, 2006	3	152.0	106.0
September, 2006	6	351.4	235.5
October, 2006	5	338.8	217.0
January, 2007	6	2082.8	541.0
February, 2007	2	93.5	97.0
March, 2007	14	2380.3	560.0
April, 2007	38	8422.1	1675.0
May, 2007	22	11473.6	1402.0
June, 2007	3	759.4	141.0
July, 2007	1	56.5	70.0
December, 2007	1	77.0	8.0
January, 2008	2	406.9	88.0
February, 2008	3	140.9	114.3
March, 2008	8	524.4	244.3
April, 2008	10	1498.7	316.5

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
May, 2008	11	7206.2	606.0
June, 2008	1	86.0	70.0
December, 2008	1	234.6	44.0
January, 2009	4	498.2	104.0
February, 2009	2	176.4	133.0
March, 2009	6	1572.6	271.8
April, 2009	29	6103.2	1665.4
May, 2009	19	9635.1	918.5
July, 2009	1	2.5	3.0
September, 2009	1	2.5	3.0
November, 2009	1	234.6	44.0
December, 2009	3	314.0	25.0
February, 2010	2	138.8	258.0
March, 2010	3	243.0	75.0
April, 2010	19	1668.3	677.6
May, 2010	12	917.8	546.4
June, 2010	1	22.1	9.0
September, 2010	1	15.4	10.0
December, 2010	2	79.2	16.0
Summaries by Year			
2006 Total	122	23697.4	5868.9
2007 Total	87	25345.1	4494.0
2008 Total	36	10097.8	1483.0
2009 Total	66	18539.3	3167.7
2010 Total	40	3084.5	1592.0
Total	**351**	**80764.1**	**16605.7**

Figure III-3. Pounds of copper applied within the Unnamed Drain to Lone Tree Creek site subwatershed by month for 2006-2010. Asterisk (*) denotes months with exceedances.

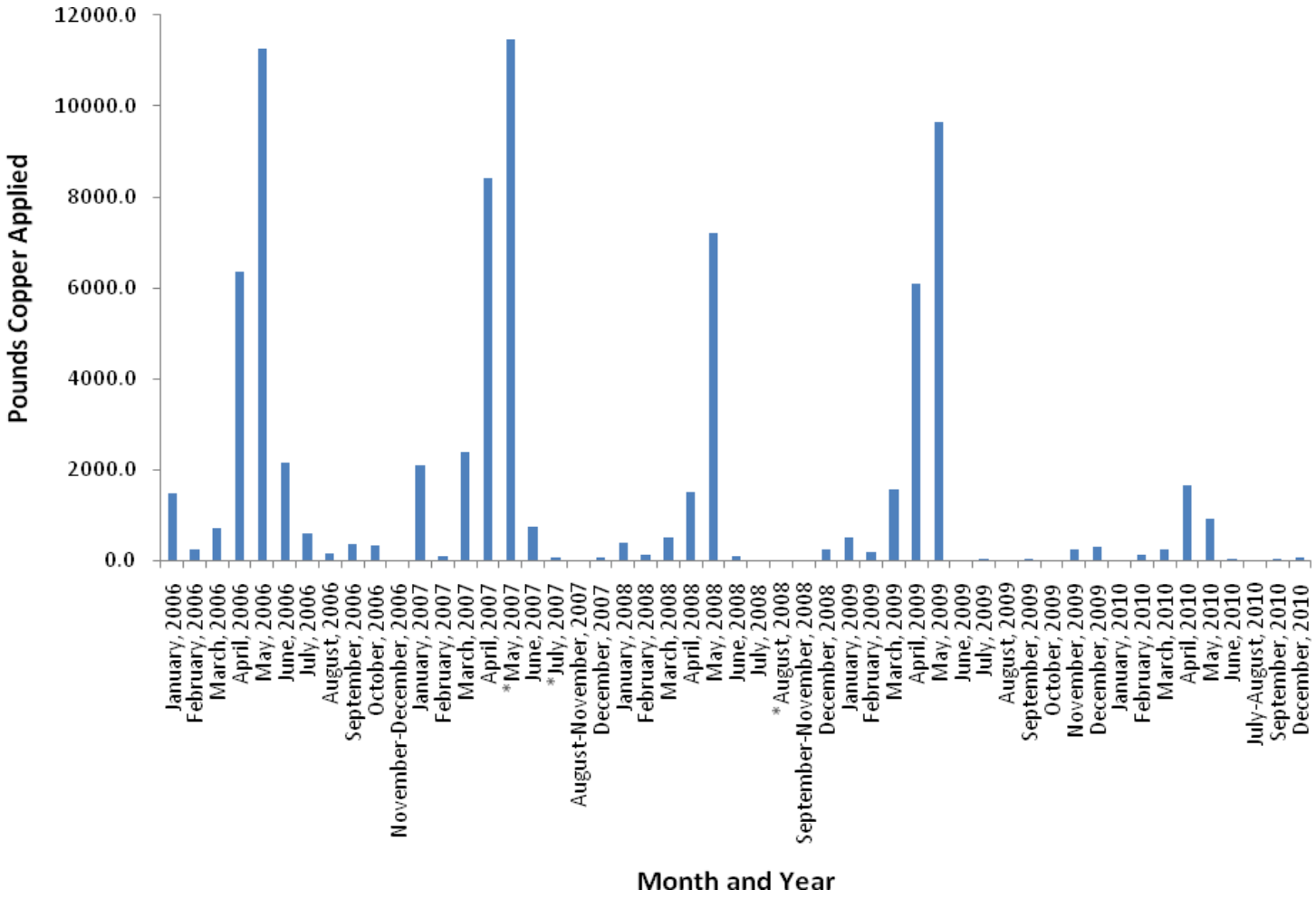


Table III-15. Total pounds active ingredient (AI) applied for copper based on PUR data from 2006-2010 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE DF	329.1
	ALMOND	BLUE SHIELD DF	12.3
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	215.5
		KOCIDE 101	1378.9
		KOCIDE 2000	1507.5
		KOCIDE DF	750.9
		NORDOX	76.1
		NORDOX 75 WG	1318.5
		NU-COP 50DF	49.3
	CHERRY	CUPROFIX ULTRA 40 DISPERSS	234.6
		HTH ALKALINITY PLUS	234.6
		KOCIDE 101	214.9
		NU-COP 50DF	635.3
	GRAPES (RAISIN, WINE)	CHAMP FORMULA 2 FLOWABLE	444.7
		COPPER-COUNT-N	1.5
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	216.3
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	61.3
		HYDROX	92.4
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	185.2
		NU-COP 3L	284.7
		NU-COP 50DF	92.2
		STRETCH FUNGICIDE	3.5
		TENN-COP 5E FUNGICIDE/BACTERICIDE	509.9
	N-OUTDR TRANSPL	CHAMP FORMULA 2 FLOWABLE	5.1
	NECTARINE	NORDOX 75 WG	136.9
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	CHAMP FORMULA 2 FLOWABLE	75.7
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	48.8
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	86.0
		KOCIDE 101	1001.8
		KOCIDE 2000	169.5
		NU-COP 50DF	409.6
	PEACH	NORDOX 75 WG	124.8
	PEAR	KOCIDE 101	16.2
	PEPPERS (FRUITING VEGETABLE), (BELL, CHILI, ETC.)	KOCIDE DF	100.7
	RICE (ALL OR UNSPEC)	BLUE VIKING COPPER SULFATE STAR SHINE CRYSTAL	2128.5
		CHIPCO COPPER SULFATE CRYSTALS	29859.3
	TOMATO	HYDROX	101.6
		KOCIDE DF	136.1
		NU-COP 50DF	639.9
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	BLUE SHIELD DF	92.4
		CHAMP FORMULA 2 FLOWABLE	96.2
		COPPER SULFATE CRYSTALS	222.8
		CUPROFIX ULTRA 40 DISPERSS	140.8
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	73.8

Chemical Name	Commodity	Product Name	Lbs AI Applied
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1686.1
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	579.9
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	378.2
		HYDROX	808.5
		KENTAN DF	196.2
		KOCIDE 101	6420.4
		KOCIDE 2000	865.1
		KOCIDE DF	4704.6
		NORDOX 75 WG	226.5
		NU-COP 50 WP	997.2
		NU-COP 50DF	19385.8

ALFALFA - Total Pounds Copper Applied	**329.1**
ALMOND - Total Pounds Copper Applied	**5308.9**
CHERRY - Total Pounds Copper Applied	**1319.4**
GRAPES - Total Pounds Copper Applied	**1891.9**
PEACH - Total Pounds Copper Applied	**124.8**
PEAR - Total Pounds Copper Applied	**16.2**
N-OUTDR TRANSPLANT - Total Pounds Copper Applied	**5.1**
NECTARINE - Total Pounds Copper Applied	**136.9**
ONION - Total Pounds Copper Applied	**1791.3**
PEPPERS - Total Pounds Copper Applied	**100.7**
RICE - Total Pounds Copper Applied	**31987.8**
TOMATO - Total Pounds Copper Applied	**877.6**
WALNUT - Total Pounds Copper Applied	**36874.3**
Total Pounds Copper Applied (2006 - 2010)	**80764.1**

The Coalition will continue with its Management Plan strategy for copper as outlined above in the chlorpyrifos outreach section when conducting individual contacts. Previous analyses reported by the Coalition in the 2010 Management Plan Update suggested that management of copper in this watershed should focus on growers making applications late in the summer. Orchard and vineyard operators are advised to consider irrigation tailwater retention to prevent copper from entering the waterway with runoff. Storm runoff management relevant to copper applications has been advised to prevent the winter exceedances. Individual contacts that occurred within this subwatershed for copper are described under the chlorpyrifos outreach section above and have included discussions of copper exceedances.

Diuron

Concentrations of diuron have exceeded the WQTL (2 µg/L) three times in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed, in February 2007 (sample and resample), and January 2008. The February 2007 exceedance was associated with *C. dubia* and *S. capricornutum* toxicities. The Coalition monitored for diuron at Unnamed Drain as a part of 2010 MPM in January and February and no exceedance occurred. Applications, pounds applied, and acres treated in 2009 and 2010 were similar (Table III-16, Figure III-4). Alfalfa, walnuts, and grapes received the most applications of diuron (Table III-17).

Table III-16. Number of diuron applications, total pounds applied, and total acres treated by month for January 2006 through December 2010 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
January, 2006	5	124.6	140.0
February, 2006	20	841.1	1197.4
March, 2006	1	66.5	80.0
April, 2006	1	15.0	9.4
May, 2006	2	24.8	46.0
July, 2006	1	8.9	20.0
August, 2006	1	29.2	15.0
October, 2006	6	126.8	171.3
November, 2006	8	503.6	212.9
December, 2006	11	665.8	462.0
January, 2007	1	13.1	33.0
February, 2007	10	701.9	1380.0
March, 2007	2	32.7	20.0
April, 2007	2	48.4	77.0
May, 2007	1	3.4	5.0
November, 2007	6	207.3	141.2
December, 2007	4	336.3	224.0
January, 2008	1	7.8	10.0
February, 2008	1	7.8	23.0
March, 2008	3	41.2	127.0
April, 2008	1	12.5	6.4
November, 2008	5	174.0	135.4
December, 2008	3	305.1	208.0
January, 2009	5	66.1	124.0
February, 2009	1	43.4	22.2
March, 2009	2	157.2	108.0
May, 2009	2	32.9	46.0
November, 2009	6	161.1	124.0
December, 2009	6	384.6	253.0
January, 2010	3	237.9	168.2
February, 2010	5	296.5	208.3
May, 2010	2	6.6	35.3
July, 2010	1	12.0	7.5
November, 2010	5	132.5	289.5
December, 2010	2	161.1	91.0
Summaries by Year			
2006 Total	56	2406.3	2354.0
2007 Total	26	1343.0	1880.2
2008 Total	14	548.4	509.8
2009 Total	22	845.4	677.2
2010 Total	18	846.6	799.8
Total	**136**	**5989.8**	**6221.0**

Figure III-4. Pounds of diuron applied within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2006-2010. Asterisk (*) denotes months with exceedances.

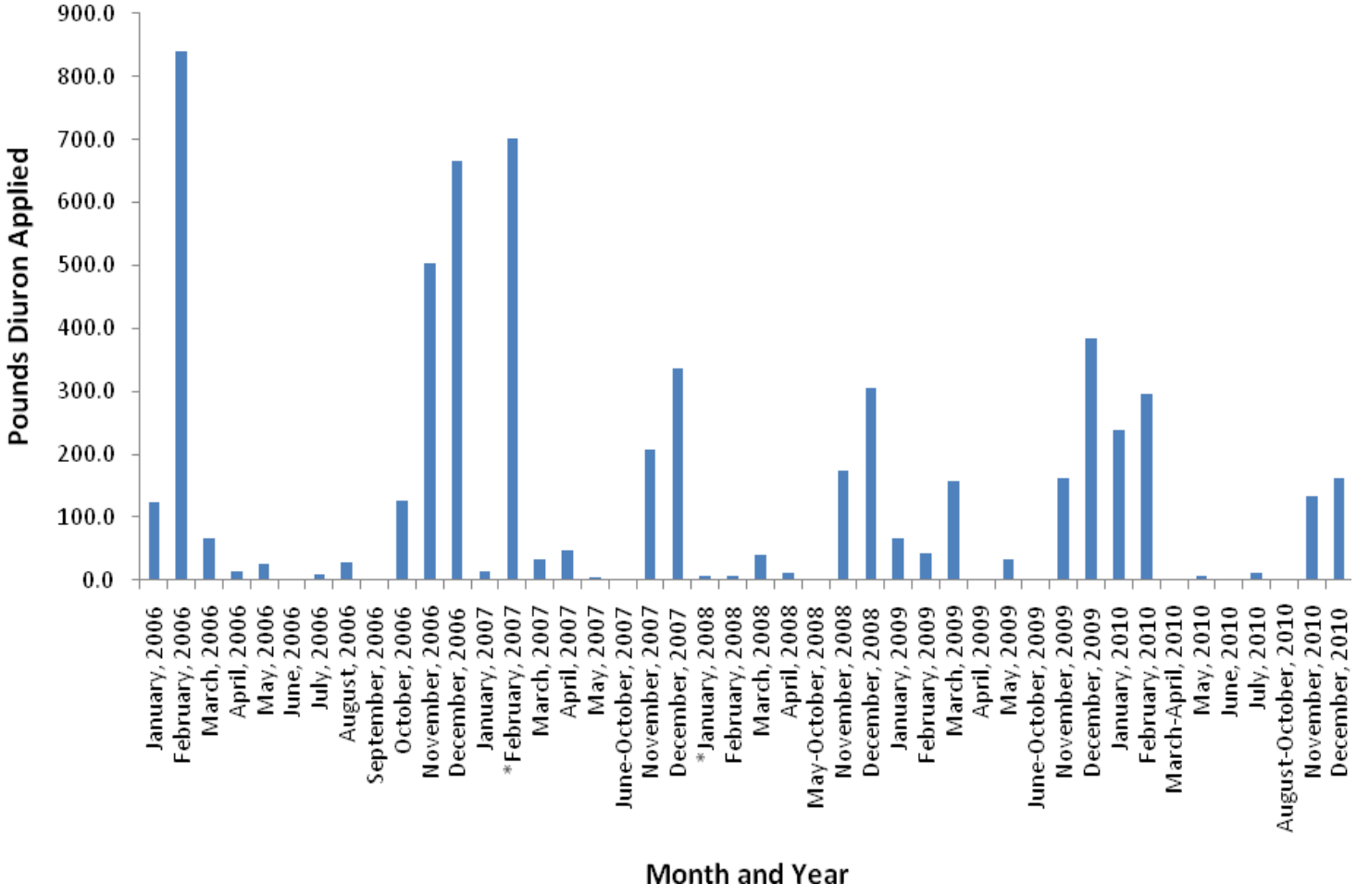


Table III-17. Total pounds active ingredient (AI) applied for diuron based on PUR data from 2006-2010 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	1628.0
		DIURON 4L	144.3
		DUPONT DIREX 4L HERBICIDE	19.2
	APPLE	DIREX 4L	68.4
		DUPONT DIREX 4L HERBICIDE	33.6
	GRAPES (RAISIN, WINE)	DIREX 4L	66.5
		DIURON 400 HERBICIDE	50.8
		DIURON 4L HERBICIDE	514.2
		DUPONT DIREX 4L HERBICIDE	102.5
		KARMEX DF HERBICIDE	701.9
		KARMEX XP HERBICIDE	701.7
	PEAR	DIREX 4L	25.0
	SOIL FUM/PREPLT	DIREX 4L	16.6
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	DIREX 4L	469.5
		DU PONT KROVAR I DF HERBICIDE	150.0
		DUPONT DIREX 4L HERBICIDE	10.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	870.2
		DIREX 80DF	42.0
		DIURON 4L	144.3
		DIURON 4L HERBICIDE	41.8
		DREXEL DIURON 4L HERBICIDE	81.1
		DU PONT KARMEX DF HERBICIDE	12.0
		DUPONT DIREX 4L HERBICIDE	30.0
		KARMEX DF HERBICIDE	66.2

ALFALFA - Total Pounds Diuron Applied	**1791.5**
APPLE - Total Pounds Diuron Applied	**101.9**
GRAPES - Total Pounds Diuron Applied	**2137.6**
PEAR - Total Pounds Diuron Applied	**25.0**
SOIL FUM/PREPLT - Total Pounds Diuron Applied	**16.6**
UNCULTIVATED NON-AG AREAS - Total Pounds Diuron Applied	**629.5**
WALNUT - Total Pounds Diuron Applied	**1287.6**
Total Pounds Diuron Applied (2006 - 2010)	**5989.8**

Previous analyses reported by the Coalition in the 2010 Management Plan Update found that only a small number of applications occurred in a few sections suggesting the exceedances were a function of movement from one or two parcels. Management of diuron in this watershed has focused on providing information to the small number of growers whose parcels have the potential to drain to the creek, which is consistent with the strategy outlined to address priority A/B constituent exceedances under the chlorpyrifos section. The Coalition has addressed diuron exceedances by discussing diuron exceedances and management with individual growers relevant to preventing storm and irrigation discharge to waterways. In 2011, MPM is scheduled for diuron during the months of historical exceedances (January and February).

Simazine

Simazine exceeded the WQTL (4.0 µg/L) twice, once on February 11, 2007 and again on January 23, 2008. Simazine was not monitored as part of 2009 or 2010 MPM. In 2011, MPM for simazine is scheduled to occur during months of past exceedances.

Simazine has been applied in this watershed in every month except for June and September, but it is applied primarily during the winter months (Table III-18, Figure III-5). Simazine applications in 2010 decreased to the lowest pounds applied (974 lbs AI) and the decrease was a dramatic drop in active ingredient applied relative to 2009 (31,040 lbs AI) in number of applications, pounds applied, and acres treated. Simazine was primarily applied to grapes and walnuts (Table III-19).

Table III-18. Number of simazine applications, total pounds applied, and total acres treated by month for January 2006 through December 2010 in the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed.

If a month is not included in the table, no applications were made.

Month/Year	Number of Simazine Applications	Pounds of AI Applied	Acres Treated
January, 2006	7	188.2	234.0
February, 2006	7	365.2	259.8
March, 2006	3	38.3	127.0
April, 2006	1	16.9	9.4
May, 2006	2	25.5	46.0
July, 2006	1	9.0	20.0
August, 2006	1	27.0	15.0
October, 2006	4	91.1	86.3
November, 2006	8	363.9	237.9
December, 2006	4	1076.4	976.0
January, 2007	1	8.0	80.0
February, 2007	3	96.0	176.0
March, 2007	3	61.3	40.0
April, 2007	2	19.8	27.0
May, 2007	1	3.5	5.0
October, 2007	1	11.0	28.0
November, 2007	7	316.7	153.2
December, 2007	6	1243.5	1044.3
January, 2008	4	120.8	173.0
February, 2008	1	19.6	36.0
March, 2008	3	45.2	191.0
December, 2008	8	969.5	396.4
January, 2009	5	58.9	143.0
February, 2009	6	271.5	288.3
March, 2009	4	59.9	117.4
April, 2009	12	437.3	596.0
May, 2009	4	27659.2	182.0
June, 2009	2	113.8	72.3
November, 2009	19	2398.4	1080.0
December, 2009	2	41.8	46.0
January, 2010	2	296.1	148.2
February, 2010	4	498.3	249.4
March, 2010	1	1.1	2.0

Month/Year	Number of Simazine Applications	Pounds of AI Applied	Acres Treated
May, 2010	1	15.5	10.3
July, 2010	1	14.9	7.5
November, 2010	5	149.1	51.0
Summaries by Year			
2006 Total	38	2201.5	2011.4
2007 Total	24	1759.8	1553.5
2008 Total	16	1155.1	796.4
2009 Total	54	31040.7	2525.0
2010 Total	14	974.9	468.4
Total	**146**	**37132.1**	**7354.8**

Figure III-5. Pounds of simazine applied within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd site subwatershed by month for 2006 - 2010. Asterisk (*) denotes months with exceedances.

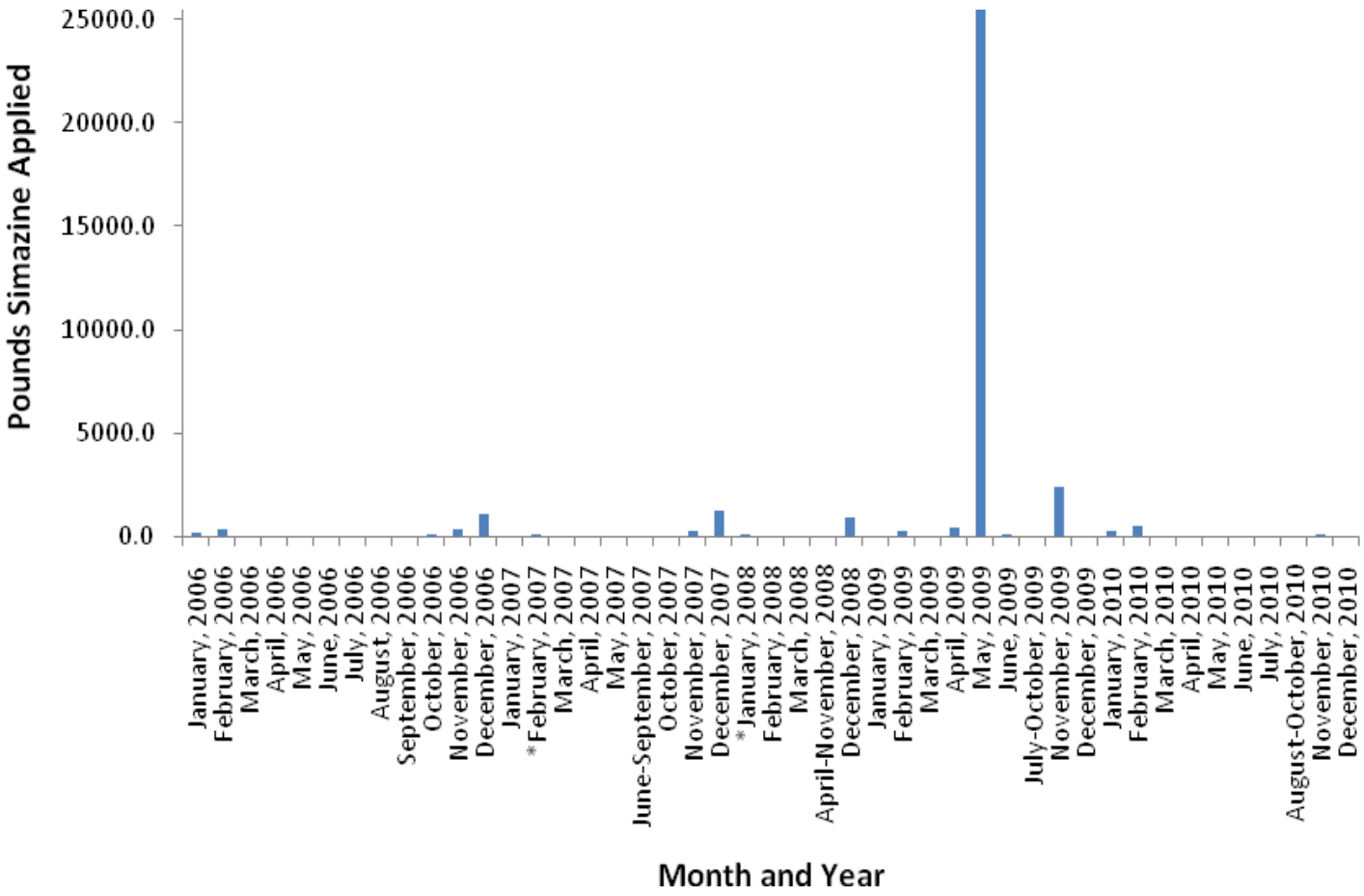


Table III-19. Total pounds active ingredient (AI) applied for simazine based on PUR data from 2006-2010 within the Unnamed Drain to Lone Tree Creek @ Jack Tone Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
SIMAZINE	ALMOND	DREXEL SIMAZINE 4L	38.8
		PRINCEP 4L	131.8
		PRINCEP CALIBER 90 HERBICIDE	109.2
		SIM-TROL 4L	365.6
		SIM-TROL 90DF	45.1
	GRAPES (RAISIN, WINE)	DREXEL SIMAZINE 4L	54.1
		PRINCEP 4L	923.5
		PRINCEP CALIBER 90 HERBICIDE	1310.4
		SIMAZINE 4L HERBICIDE	1286.7
		SIMAZINE 90DF	1179.0
		SIM-TROL 4L	1361.6
		SIM-TROL 90DF	470.2
	NECTARINE	SIM-TROL 4L	4.4
	PEACH	SIM-TROL 4L	2.7
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	DREXEL SIMAZINE 4L	130.2
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DREXEL SIMAZINE 4L	29.1
		PRINCEP 4L	27842.2
		PRINCEP CALIBER 90 HERBICIDE	308.1
		SIMAZINE 4L HERBICIDE	120.2
		SIMAZINE 90 WATER DISPERSIBLE GRANULAR HERBICIDE	295.6
		SIMAZINE 90DF	31.8
		SIM-TROL 4L	1038.6
		SIM-TROL 90DF	38.7
		SIM-TROL 9DF	14.9

ALMOND - Total Pounds Simazine Applied	**690.4**
GRAPES - Total Pounds Simazine Applied	**6585.4**
NECTARINE - Total Pounds Simazine Applied	**4.4**
PEACH - Total Pounds Simazine Applied	**2.7**
UNCULTIVATED NON-AG AREAS - Total Pounds Simazine Applied	**130.2**
WALNUT - Total Pounds Simazine Applied	**29719.0**
Total Pounds Simazine Applied (2006 - 2010)	**37132.1**

Priority D Constituents

The following priority D constituents have been listed under the Unnamed Drain to Lone Tree Creek management plan: water column toxicity to *C. dubia* and *S. capricornutum* and sediment toxicity to *H. azteca*.

Ceriodaphnia dubia toxicity

In 2008, toxicity to *C. dubia* was experienced in both January and September. Prior to 2008 monitoring, there was only one occurrence of toxicity to *C. dubia,* during February 2007. Toxicity to *C. dubia* was also experienced during September 2009 MPM. All toxicity occurrences coincided with exceedances of the chlorpyrifos WQTL in the same month. The Coalition's strategy to address toxicity to *C. dubia* has been to focus on chlorpyrifos exceedances. If chlorpyrifos can be prevented from entering the

waterway by controlling the movement of soluble pesticides (as discussed in the chlorpyrifos section) the toxicity may be reduced or eliminated.

Selenastrum capricornutum toxicity

S. capricornutum toxicity occurred four times during February and March 2007 sampling and once in 2008 during May sampling. The 2008 toxicity was associated with an exceedance of copper. *S. capricornutum* toxicity did not occur during 2009 MPM and did not occur during 2010 MPM in the months of February, March and May. The Coalition believes that management of copper and herbicides such as diuron and simazine will eliminate the toxicity to algae.

Hyalella azteca toxicity

H. azteca toxicity occurred in August 2007 and in March, April and August of 2008 and in September 2010. Starting in 2009, the Coalition began testing for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. The Coalition began MPM for sediment toxicity which will continue at this location through 2011.

Priority E Constituents

The following priority E constituents are listed under the Unnamed Drain to Lone Tree Creek Site Subwatershed management plan: DO, *E. coli*, SC, TDS, and lead. The Coalition had one exceedance of DO during January 2010 MPM. Although these constituents will remain low priority, the Coalition will continue to collect these data and these constituents have been discussed during individual contacts and will continue to be discussed at annual grower meetings.

Evaluation

This subwatershed is one of the first high priority site subwatersheds within the SJCDWQC and therefore the Coalition has focused its resources on identifying the sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals.

The Coalition's strategy for the Unnamed Drain to Lone Tree Creek subwatershed has been to target a large portion of growers applying products containing or related to the priority constituents (chlorpyrifos, copper, diuron, and simazine). Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual grower surveys documenting management practices and follow up contacts to assess future planned implementations have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. The Coalition will continue outreach in the subwatershed.

Chlorpyrifos exceedances of the WQTL continued to occur at Unnamed Drain to Lone Tree Creek (August, November and December 2010). Therefore, the Coalition will continue to assess water quality in 2011 when MPM is scheduled during months of historical exceedances. Any additional water quality issues will be discussed with the Regional Board and may include expanded outreach to potential sources of water quality impairment such as dairy operations and new member contacts.

HIGH PRIORITY SITE SUBWATERSHEDS (2010 – 2012)

IV. GRANT LINE CANAL @ CLIFTON COURT RD

Management Plan Constituents

Priority A/B
- Chlorpyrifos

Priority C
- Copper

Priority D
- *Hyalella azteca* sediment toxicity
- *Selenastrum capricornutum* water column toxicity

Priority E
- Arsenic
- DDE
- Dissolved Oxygen
- *E. coli*
- Lead
- pH
- Specific Conductivity
- Total Dissolved Solids

Description of Grant Line Canal @ Clifton Court Rd Site Subwatershed

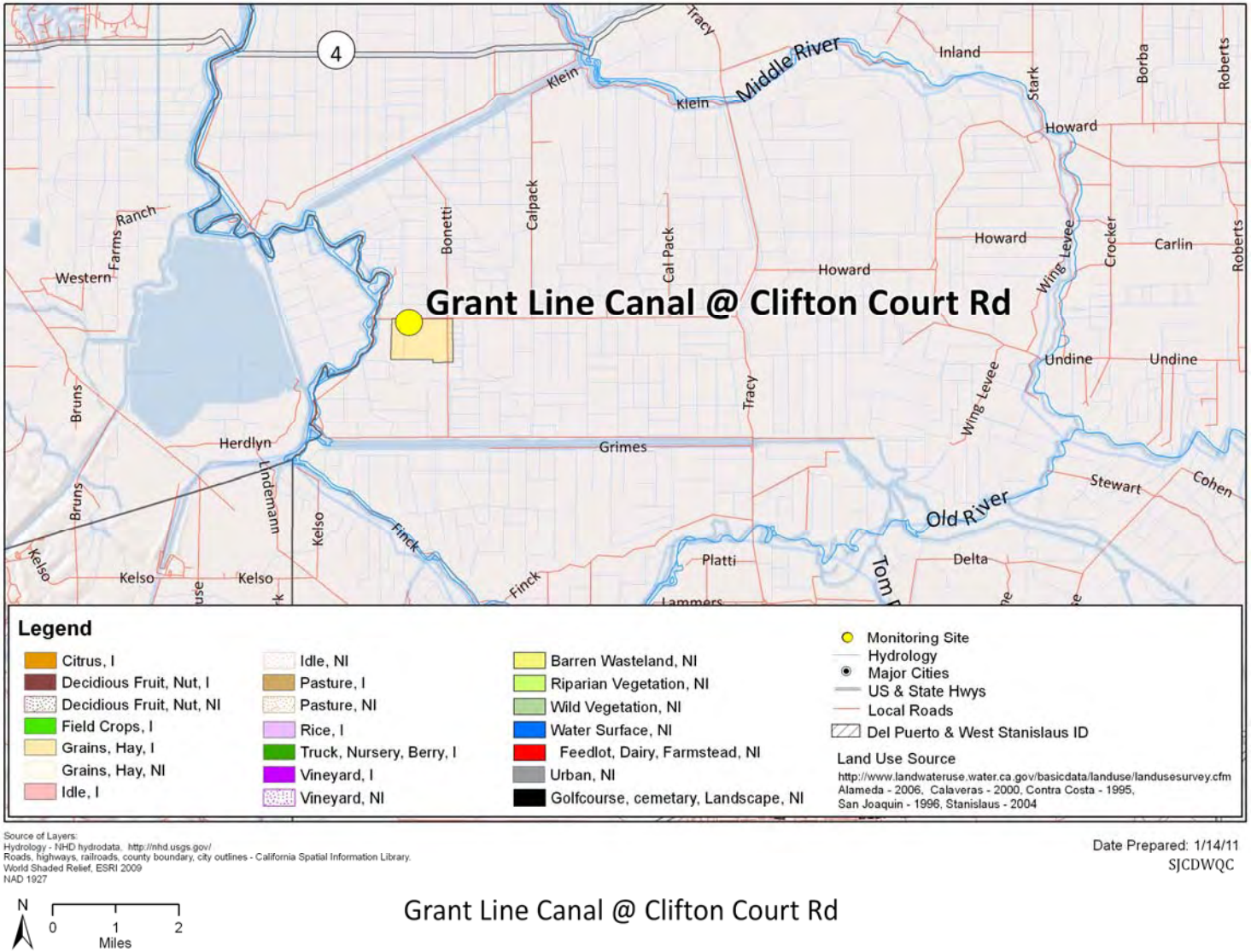
Grant Line @ Clifton Court Road (259 irrigated acres) – This site is located on the southwest section of Union Island. Table IV-1 includes the station name (sample site), station code and target latitude/longitudes for the site sampled within this subwatershed. The site is west of the Grant Line Canal @ Calpack Rd site, immediately south of Clifton Court road, and drains fields east and south. The crops are primarily alfalfa, field crops, tomatoes and grain. Figure IV-1 illustrates the land use within this site subwatershed area.

The Grant Line Canal (GLC) is located in the Bay-Delta tidal prism and receives water from east and west inputs. Source water of the GLC depends on delta tides, the natural flows of large waterbodies such as the San Joaquin River (SJR), and the operation of agriculture barriers.

Table IV-1. Coordinates of the Grant Line Canal @ Clifton Court Rd site subwatershed sampling locations.

Sample Site	Station Code	Target Latitude	Target Longitude
Grant Line Canal @ Clifton Court Rd	544XGLCAA	37.8414	-121.5288

Figure IV-1. Site subwatershed map of land use for sample site at Grant Line Canal @ Clifton Court Rd.



Subwatershed Monitoring History

Monitoring at Grant Line Canal @ Clifton Court Rd began in the storm season of 2005 and continued to through the storm and irrigation seasons of 2006 through 2008 (Table IV-2). Starting in October 2008, Grant Line Canal @ Clifton Court Rd was removed from the monitoring schedule and became an Assessment site under the new MRPP. It is scheduled to be monitored for all Assessment constituents in 2026-2027. The constituents sampled at this location from 2005-2010 are listed in Table IV-3.

Management Plan Monitoring occurred at Grant Line Canal @ Clifton Court Rd in 2007 for copper (Table IV-4). The site subwatershed was monitored twice a month for copper in 2007 during June, July and September.

During 2009, samples were not collected at Grant Line Canal @ Clifton Court Rd. In 2010 MPM took place at this location for copper (May-September), chlorpyrifos (September), toxicity to *S. capricornutum* (May), and sediment toxicity to *H. azteca* (September) (Table IV-5).

The Grant Line Canal is not considered impaired in the 2008 Basin Plan, however the Old River section that runs from the SJR to the Delta Mendota Canal, parallel to the Canal, is 303d listed and is impaired as a result of low DO due to hydromodification. The export waters of the Delta are 303d listed for chlorpyrifos, low DO and salinity. This includes the Delta Mendota Canal and the California Aqueduct, both of which receive water from GLC. The source for these impairments is listed as unknown.

Table IV-2. Grant Line Canal @ Clifton Court Rd sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA	NA	NA	5	NA
Events Not Sampled	NA	0	0	0	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	0	NA
Total	**NA**	**2**	**5**	**2**	**5**	**2**	**6**	**2**	**6**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**5**	**NA**

NA - Not applicable. This site was not sampled during this season/year.

Table IV-3. Number of analyses performed per analyte in each sampling season and year for the Grant Line Canal @ Clifton Court Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008*			2009*	2010*			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter-Fall	Winter	Storm	Irrigation	Fall
Field and Physical Parameters															
NA	Dissolved Oxygen	1	5	3	5	3	9	3	8					5	
NA	Specific Conductivity	2	5	3	5	3	9	3	8					5	
NA	pH	1	5	3	5	3	9	3	8					5	
EPA 110.2	Color	2	5	2	5	2	6	1	6						
EPA 160.1	Dissolved Solids	2	5	2	5	2	6	1	6						
EPA 160.2	Suspended Solids														
EPA 180.1	Turbidity	2	5	2	5	2	6	1	6						
SM 9223	*E. coli*	2	5	2	5	2	7	1	6						
EPA 415.1	Total Organic Carbon	2	5	2	5	2	6	1	6						
Walkley-Black	Total Organic Carbon (sediment)													1	
ASTM D422	Grain size (sediment)													1	
EPA 405.1	BOD				1	2	2								
Carbamates															
EPA 8321A	Aldicarb				5	2	6	1	6						
EPA 8321A	Carbaryl				5	2	6	1	6						
EPA 8321A	Carbofuran				5	2	6	1	6						
EPA 8321A	Diuron				5	2	6	1	6						
EPA 8321A	Linuron				5	2	6	1	6						
EPA 8321A	Methiocarb				5	2	6	1	6						
EPA 8321A	Methomyl				5	2	6	1	6						
EPA 8321A	Oxamyl				5	2	6	1	6						
Organochlorines															
EPA 8081A	DDD(p,p')				5	2	6	1	6						
EPA 8081A	DDE(p,p')				5	2	6	1	6						
EPA 8081A	DDT(p,p')				5	2	6	1	6						
EPA 8081A	Dicofol				5	2	6	1	6						
EPA 8081A	Dieldrin				5	2	6	1	6						
EPA 8081A	Endrin				5	2	6	1	6						

Method	Analyte	2005		2006		2007		2008*			2009*	2010*			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter-Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Methoxychlor				5	2	6	1	6						
Organophosphates															
EPA 8141A	Azinphos methyl				5	2	6	1	6						
EPA 8141A	Chlorpyrifos	2	5	2	5	2	6	1	6					1	
EPA 8141A	Demeton-s														
EPA 8141A	Diazinon	2	5	2	5	2	6	1	6						
EPA 8141A	Dichlorvos														
EPA 8141A	Dimethoate				5	2	6	1	6						
EPA 8141A	Disulfoton				5	2	6	1	6						
EPA 8141A	Malathion				5	2	6	1	6						
EPA 8141A	Methamidophos				5	2	6	1	6						
EPA 8141A	Methidathion				5	2	6	1	6						
EPA 8141A	Molinate				5	2	6	1	6						
EPA 8141A	Parathion, Methyl				5	2	6	1	6						
EPA 8141A	Phorate				5	2	6	1	6						
EPA 8141A	Phosmet				5	2	6	1	6						
EPA 8141A	Thiobencarb				5	2	6	1	6						
Pyrethroids															
EPA 8081A	Bifenthrin		1	2	5	2	6	1	6						
EPA 8081A	Cyfluthrin, total		1	2	5	2	6	1	6						
EPA 8081A	Cyhalothrin, lambda, total	2	5	2	5	2	6	1	6						
EPA 8081A	Cypermethrin, total	2	5	2	5	2	6	1	6						
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	5	2	5	2	6	1	6						
EPA 8081A	Permethrin, total	2	5	2	5	2	6	1	6						
Triazines															
EPA 547M	Glyphosate				5	2	6	1	6						
EPA 549.2M	Paraquat dichloride				5	2	6	1	6						
EPA 619	Atrazine				5	2	6	1	6						
EPA 619	Cyanazine				5	2	6	1	6						
EPA 619	Simazine				5	2	6	1	6						
Metals (Total)															
EPA 200.8	Arsenic				5	2	6	1	6						
EPA 200.8	Boron				5	2	6	1	6						

Method	Analyte	2005		2006		2007		2008*			2009*	2010*			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter-Fall	Winter	Storm	Irrigation	Fall
EPA 200.8	Cadmium				5	2	6	1	6						
EPA 200.8	Copper				5	2	8	1	6					5	
EPA 200.8	Lead				5	2	6	1	6						
EPA 200.8	Molybdenum														
EPA 200.8	Nickel				5	2	6	1	6						
EPA 200.8	Selenium				5	2	2	1	6						
EPA 200.8	Zinc				5	2	6	1	6						
Metals (Dissolved)															
EPA 200.8	Cadmium														
EPA 200.8	Copper													5	
EPA 200.8	Lead														
EPA 200.8	Nickel														
EPA 200.8	Zinc														
Nutrients															
SM 2340 C	Hardness as CaCO3				5	2	8	1	6					5	
EPA 300.0	Nitrate as N				5	2	6	1	6						
EPA 350.2	Ammonia as N				5	2	6	1	6						
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	1	6						
EPA 354.1	Nitrite as N				5	2	6	1	6						
EPA 353.2	Nitrate + Nitrite as N														
EPA 365.2	Orthophosphate as P				5	2	6	1	6						
EPA 365.2	Phosphate as P				5	2	6	1	6						
Sediment Pesticides															
EPA 8270M_NCI_SIM	Bifenthrin													1	
EPA 8270M_NCI_SIM	Chlorpyrifos													1	
EPA 8270M_NCI_SIM	Cyfluthrin													1	
EPA 8270M_NCI_SIM	Cyhalothrin, lambda													1	
EPA 8270M_NCI_SIM	Cypermethrin													1	
EPA 8270M_NCI_SIM	Deltamethrin: Tralomethrin													1	
EPA 8270M_NCI_SIM	Esfenvalerate/ Fenvalerate													1	

Method	Analyte	2005		2006		2007		2008*			2009*	2010*			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter-Fall	Winter	Storm	Irrigation	Fall
EPA 8270M_NCI_SIM	Fenpropathrin													1	
EPA 8270M_NCI_SIM	Permethrin													1	
Toxicity															
EPA 821/R-02-012	*Ceriodaphnia dubia*	2	5	2	5	2	7	2	6						
EPA 821/R-02-012	*Pimephales promelas*	2	5	2	5	2	7	1	6						
EPA 821/R-02-013	*Selenastrum capricornutum*	2	5	2	5	2	7	2	7					1	
EPA 600/R-99-064	*Hyalella azteca*		3	1	1	2	1	1	1					1	

*Site not sampled during the 2008 fall season, 2009 sample year, and 2010 winter, storm and fall seasons.

Table IV-4. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos within the Grant Line Canal @ Clifton Court Rd site subwatershed. "X" indicates constituent sampled.

Sample Site	Date	Type	Copper
Grant Line Canal @ Clifton Court Rd	20-Jun-07	A	X
Grant Line Canal @ Clifton Court Rd	30-Jul-07	A	X
Grant Line Canal @ Clifton Court Rd	25-Sep-07	A	X

Table IV-5. 2010 Management Plan Monitoring schedule for chlorpyrifos, copper, and *Selenastrum capricornutum* and *Hyalella azteca* toxicities within the Grant Line Canal @ Clifton Court Rd site subwatershed. "X" indicates constituents sampled.

Site Name	Sample Date	Monitoring Type	*S. capricornutum*	Copper	Chlorpyrifos	*H. azteca*
Grant Line Canal @ Clifton Court Rd	11-May-10	MPM	X	X		
Grant Line Canal @ Clifton Court Rd	8-Jun-10	MPM		X		
Grant Line Canal @ Clifton Court Rd	13-Jul-10	MPM		X		
Grant Line Canal @ Clifton Court Rd	10-Aug-10	MPM		X		
Grant Line Canal @ Clifton Court Rd	7-Sept-10	MPM		X	X	X

Exceedance History

During Coalition monitoring, exceedances of WQTL for field and physical parameters, *E. coli*, metals, pesticides, and sediment toxicity have occurred at Grant Line Canal @ Clifton Court Rd. Between 2005 and 2009, ambient water monitoring sampling events have resulted in exceedances of the WQTLs for DO (27), pH (7), SC (22), *E. coli* (19), TDS (16), ammonia (1), arsenic (10), copper (6), lead (3), nickel (1), carbofuran (1), chlorpyrifos (6), DDE (2), DDT (1), dimethoate (1), one water column toxicities to *C. dubia*, three to *S. capricornutum*, and three instances of sediment toxicity to *H. azteca*.

Exceedances in 2010 include DO (4), SC (3), chlorpyrifos (1), toxicity to *S. capricornutum* (1) and sediment toxicity to *H. azteca* (1).

All exceedances are listed in Table IV-6 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table IV-6 and is determined using the SJCDWQC Management Plan prioritization process flow chart (MPUR 2011 Figure 3, page 21). The highest priority constituents for Grant Line Canal @ Clifton Court Rd subwatershed are chlorpyrifos (A/B), copper (C) and *H. azteca* toxicity (D).

Table IV-6. All exceedances experienced in samples collected from locations within the Grant Line Canal @ Clifton Court Rd site subwatershed between February 2005 and September 2010 (sorted by season and date).

If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, >700 µS/cm	*E. coli*, >235 MPN/100 mL	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	Arsenic, >10 µg/L	Copper Total, µg/L	Lead Total, µg/L	Nickel Total µg/L	Carbofuran, >0 µg/L	Chlorpyrifos, >0.015 µg/L	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L	Dimethoate[1], >1 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Grant Line Canal @ Clifton Court Rd	Storm	2/16/2005	5.3		1743	240	1200													
Grant Line Canal @ Clifton Court Rd	Storm	3/21/2005	3.8		1715	240	1100							0.02						
Grant Line Canal @ Clifton Court Rd	Irrigation	5/17/2005			801		550													
Grant Line Canal @ Clifton Court Rd	Irrigation	6/21/2005	5.4																	
Grant Line Canal @ Clifton Court Rd	Irrigation	7/19/2005	6.4			1600														
Grant Line Canal @ Clifton Court Rd	Irrigation	8/16/2005	4.7			1600														
Grant Line Canal @ Clifton Court Rd	Irrigation	9/20/2005	3.8																8.8	
Grant Line Canal @ Clifton Court Rd	Storm	2/27/2006				500														
Grant Line Canal @ Clifton Court Rd	Storm	3/15/2006				500														
Grant Line Canal @ Clifton Court Rd	Storm	4/27/2006	1.1	6.11	1214														91.25	
Grant Line Canal @ Clifton Court Rd	Irrigation	5/16/2006		6.48		2400														
Grant Line Canal @ Clifton Court Rd	Irrigation	6/20/2006	6.36			550	530		12	52 (9)	15 (3.02)	70 (50.4)								
Grant Line Canal @ Clifton Court Rd	Irrigation	7/18/2006	3.6			1600		1.8		31 (10.9)	7.2 (4.01)						11			
Grant Line Canal @ Clifton Court Rd	Irrigation	8/15/2006	2.5	6.42		920														
Grant Line Canal @ Clifton Court Rd	Irrigation	9/19/2006	2.1	5.99	814	360	600		35	100 (27.9)	35 (16.25)				0.014					
Grant Line Canal @ Clifton Court Rd	Storm	2/11/2007			1204	240	740							0.08						
Grant Line Canal @ Clifton Court Rd	Storm	2/28/2007		6.37	1099		700							0.018	0.008	0.01				

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, >700 µS/cm	*E. coli*, >235 MPN/100 mL	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	Arsenic, >10 µg/L	Copper Total, µg/L	Lead Total, µg/L	Nickel Total µg/L	Carbofuran, >0 µg/L	Chlorpyrifos, >0.015 µg/L	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L	Dimethoate[1], >1 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Grant Line Canal @ Clifton Court Rd	Storm	3/7/2007	4.21	6.3																
Grant Line Canal @ Clifton Court Rd	Irrigation	4/11/2007	3.56				480						0.09							
Grant Line Canal @ Clifton Court Rd	Irrigation	5/22/2007	5.77						20	24 (19)										
Grant Line Canal @ Clifton Court Rd	Irrigation	6/12/2007	4.09			2400														
Grant Line Canal @ Clifton Court Rd	Irrigation	6/20/2007	4		1011															
Grant Line Canal @ Clifton Court Rd	Irrigation	7/10/2007	0.14			2400			11	17 (14.7)										
Grant Line Canal @ Clifton Court Rd	Irrigation	8/7/2007			997	2400	590		14											
Grant Line Canal @ Clifton Court Rd	Irrigation	8/9/2007			810															
Grant Line Canal @ Clifton Court Rd	Irrigation	9/4/2007			838	1700	550		14					0.13						
Grant Line Canal @ Clifton Court Rd	Storm	1/23/2008	4.33		1483		1100							0.14				0		19
Grant Line Canal @ Clifton Court Rd	Storm	1/30/2008	3.2		1625															
Grant Line Canal @ Clifton Court Rd	Storm	3/18/2008	5.97		1759															
Grant Line Canal @ Clifton Court Rd	Irrigation	4/15/2008	4.82		763	2000	490													
Grant Line Canal @ Clifton Court Rd	Irrigation	5/13/2008			821	260	880		17											3
Grant Line Canal @ Clifton Court Rd	Irrigation	5/21/2008	1.15																	
Grant Line Canal @ Clifton Court Rd	Irrigation	6/10/2008	4.24		892	440	650													
Grant Line Canal @ Clifton Court Rd	Irrigation	7/15/2008			879		590		28											
Grant Line Canal @ Clifton Court Rd	Irrigation	8/12/2008							12	28 (18)										
Grant Line Canal @ Clifton Court Rd	Irrigation	9/16/2008		8.61	1099		620		14											
Grant Line Canal @ Clifton Court Rd	Irrigation	5/11/2010	6.23																	11
Grant Line Canal @ Clifton Court Rd	Irrigation	6/8/2010			1523															

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, 6.5-8.5 units	Specific Conductivity, >700 µS/cm	*E. coli*, >235 MPN/100 mL	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	Arsenic, >10 µg/L	Copper Total, µg/L	Lead Total, µg/L	Nickel Total µg/L	Carbofuran, >0 µg/L	Chlorpyrifos, >0.015 µg/L	DDE (p,p'), >0.00059 µg/L	DDT (p,p'), >0.00059 µg/L	Dimethoate[1], >1 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Grant Line Canal @ Clifton Court Rd	Irrigation	7/13/2010	6.71																	
Grant Line Canal @ Clifton Court Rd	Irrigation	8/10/2010	6.37		1172															
Grant Line Canal @ Clifton Court Rd	Irrigation	9/7/2010	6.28		798									0.044					30	
	Constituent Priority		**E**	**E**	**E**	**E**	**E**	**NP**	**E**	**C**	**E**	**NP**	**NP**	**A/B**	**E**	**NP**	**NP**	**NP**	**D**	**D**

NP – Not prioritized; fewer than two exceedances for this constituent at this site within three years and currently no TMDL for constituent.

2007-2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table IV-7 for the following constituents: chlorpyrifos, copper and water column toxicities for *S. capricornutum* and sediment toxicity to *H. azteca.*

2007

In 2007 Grant Line Canal @ Clifton Court Rd was monitored monthly for copper from April through September, plus additional monitoring in June and September. The copper WQTL was exceeded in samples collected in May and July during normal monitoring events; however, the amount of copper detected in MPM samples of the same months was not above the WQTL (Table IV-7). All samples had detectable amounts of copper except the additional MPM sample collected in July (Table IV-7).

2008

No upstream location was monitored as a part of MPM at Grant Line Canal @ Clifton Court Rd in 2008. Although there was no upstream monitoring for Grant Line Canal @ Clifton Court Rd during 2008, normal monitoring occurred and the results were used to assess copper exceedances at that site for 2008. Copper was detected in all samples collected during the irrigation season. However, the copper WQTL was exceeded only once; in the sample collected during August (Table IV-7).

2009

Grant Line Canal @ Clifton Court Rd was not scheduled for 2009 MPM and was neither a Core nor Assessment Monitoring Site in 2009.

2010

The Coalition conducted MPM at Grant Line Canal @ Clifton Court Rd during the irrigation season of 2010 for copper, chlorpyrifos, *S. capricornutum* toxicity, and *H. azteca* toxicity. An exceedance of the WQTL for chlorpyrifos occurred during the September 7, 2010 MPM event (Table IV-7).

2011

Management Plan Monitoring is scheduled for copper (May-September), chlorpyrifos (January-March and September), *S. capricornutum* toxicity (January and May), and *H. azteca* toxicity (March and September).

Table IV-7. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for the Grant Line Canal @ Clifton Court Rd site subwatershed between 2007 and 2010. Exceedance values in bold.

	MONTH:	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Clifton Court Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Copper (µg/L)	5.5	**24**	10	**17**	10	8.5
2007 MPM A (@ Clifton Court Rd)	Date	NA	NA	6/20/07	7/30/07	NA	9/25/07
	Copper (µg/L)	NA	NA	8.5	<0.01	NA	3.7
2008 NM (@ Clifton Court Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Copper (µg/L)	6.5	7.9	5.9	6.2	**28**	5.9
2010 MPM (@Clifton Court Rd)	Date	NA	5/11/10	6/8/10	7/13/10	8/10/10	9/7/10
	Copper, total (µg/L)	NA	15	3.4	65	40	32
	Copper, dissolved (µg/L)	NA	6	1.6	2.7	2.1	2.3
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	**0.044**
	S. capricornutum toxicity (% Control)	NA	**11**	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	**30**

NA - Not applicable; this site was not sampled during this month for particular consistent.
NM- Normal Monitoring
MPM- Management Plan Monitoring
A- Additional Monitoring conducted in 2007.

Load Calculations

Loads have been calculated for the chlorpyrifos and copper detections (Table IV-8) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (mg/L X 1000 or µg/L).

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table IV-8. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured at the Grant Line Canal @ Clifton Court site subwatershed (sorted by analyte, site and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	03/21/05	0	0.02	0
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	02/11/07	0	0.08	0
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	02/28/07	0	0.018	0
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	01/23/08	0	0.14	0
Grant Line Canal @ Clifton Court Rd	Chlorpyrifos	09/07/10	4.61	0.044	5.74
Grant Line Canal @ Clifton Court Rd	Copper	05/16/06	1.47	9	374.63
Grant Line Canal @ Clifton Court Rd	Copper	06/20/06	3.58	52	5271.49
Grant Line Canal @ Clifton Court Rd	Copper	07/18/06	0	31	0
Grant Line Canal @ Clifton Court Rd	Copper	08/15/06	0	11	0
Grant Line Canal @ Clifton Court Rd	Copper	09/19/06	0	100	0

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Grant Line Canal @ Clifton Court Rd	Copper	02/11/07	0	4.7	0
Grant Line Canal @ Clifton Court Rd	Copper	02/28/07	0	6.7	0
Grant Line Canal @ Clifton Court Rd	Copper	05/22/07	0	24	0
Grant Line Canal @ Clifton Court Rd*	Copper	05/22/07	0	26	0
Grant Line Canal @ Clifton Court Rd	Copper	06/12/07	0	10	0
Grant Line Canal @ Clifton Court Rd	Copper	06/20/07	0	8.5	0
Grant Line Canal @ Clifton Court Rd	Copper	08/07/07	0	10	0
Grant Line Canal @ Clifton Court Rd	Copper	09/25/07	0	3.7	0
Grant Line Canal @ Clifton Court Rd	Copper	01/23/08	0	7.3	0
Grant Line Canal @ Clifton Court Rd	Copper	04/15/08	0	6.5	0
Grant Line Canal @ Clifton Court Rd	Copper	05/13/08	0	7.9	0
Grant Line Canal @ Clifton Court Rd	Copper	06/10/08	0	5.9	0
Grant Line Canal @ Clifton Court Rd	Copper	07/15/08	0	6.2	0
Grant Line Canal @ Clifton Court Rd	Copper	08/12/08	0	28	0
Grant Line Canal @ Clifton Court Rd	Copper	09/16/08	0	5.9	0
Grant Line Canal @ Clifton Court Rd	Copper	05/11/10	7.55	15	3206.90
Grant Line Canal @ Clifton Court Rd	Copper	06/08/10	0	3.4	0
Grant Line Canal @ Clifton Court Rd	Copper	07/13/10	0	65	0
Grant Line Canal @ Clifton Court Rd	Copper	08/10/10	7.68	40	8698.98
Grant Line Canal @ Clifton Court Rd	Copper	09/07/10	4.61	32	4177.32
Grant Line Canal @ Clifton Court Rd	Copper (D)	05/11/10	7.55	6	1282.76
Grant Line Canal @ Clifton Court Rd	Copper (D)	06/08/10	0	1.6	0
Grant Line Canal @ Clifton Court Rd	Copper (D)	07/13/10	0	2.7	0
Grant Line Canal @ Clifton Court Rd	Copper (D)	08/10/10	7.68	2.1	456.70
Grant Line Canal @ Clifton Court Rd	Copper (D)	09/07/10	4.61	2.3	300.25

*Field Duplicate
Copper (D)-Dissolved Copper

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data were reviewed to determine the most frequent crop type and timing associated with applications. Management Plan Monitoring continued in 2010 at the Grant Line Canal @ Clifton Court Rd site subwatershed during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Grant Line Canal @ Clifton Court Rd became high priority in 2010, the Coalition has actively engaged in grower outreach and education to address Grant Line Canal @ Clifton Court Rd Management Plan's highest priority constituents. The Coalition has organized grower meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings and follow up meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent listed under the management plan for the Grant Line Canal @ Clifton Court Rd site subwatershed.

Chlorpyrifos

Six exceedances of the chlorpyrifos WQTL (0.015 µg/L) occurred in samples collected from 2005 through 2010. Grant Line Canal @ Clifton Court Rd was not sampled during 2009. Samples for 2010 MPM resulted in one exceedance of chlorpyrifos in September. The Coalition evaluated monitoring and PUR data to identify possible sources.

PUR data from 2004 to 2007 were reviewed for the number of applications of chlorpyrifos, amount of active ingredient applied (pounds applied), and acres treated (Table IV-9, Figure IV-2). No applications of chlorpyrifos were reported in 2008, 2009 or 2010. The greatest chlorpyrifos use occurred in 2005 (899 lbs AI) with the lowest use occurring in 2004 (355 lbs AI). Overall, the amount of chlorpyrifos applied within this subwatershed has decreased since 2005. In 2004, the greatest amount of chlorpyrifos use occurred between July and September from 2005 through 2007. Not all exceedances occurred during months of the greatest amount of use, and some exceedances occurred in months with no applications that month and several months prior (Figure IV-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos. The only applications of chlorpyrifos were to alfalfa and asparagus in this subwatershed, with alfalfa receiving the majority of applications and pounds applied (1,579 lbs AI) (Table IV-10). The most common product containing chlorpyrifos used within this watershed was Lorsban (Table IV-10).

Table IV-9. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for January 2005 through December 2010 in the Grant Line Canal @ Clifton Court Rd subwatershed. No chlorpyrifos PUR data was reported for 2008-2010.

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
August, 2004	9	355.9	712.4
March, 2005	12	233.5	549.2
July, 2005	9	348.5	746.0
August, 2005	4	218.8	275.7
September, 2005	2	99.1	198.0
March, 2006	3	142.8	286.5
April, 2006	5	50.3	202.0
August, 2006	9	319.8	594.9
September, 2006	1	51.6	103.0
October, 2006	6	297.5	318.0
July, 2007	6	283.2	282.0
September, 2007	6	281.1	282.0
Summaries by Year			
2004 Total	9	355.9	712.4
2005 Total	27	899.9	1768.9
2006 Total	24	862.0	1504.4
2007 Total	12	564.4	564.0
Total	**72**	**2682.2**	**4549.7**

Figure IV-2. Pounds of chlorpyrifos applied within the Grant Line Canal @ Clifton Court Rd site subwatershed by month for 2005 – 2010. Asterisk (*) denotes months with exceedances. No chlorpyrifos PUR data reported for 2008-2010.

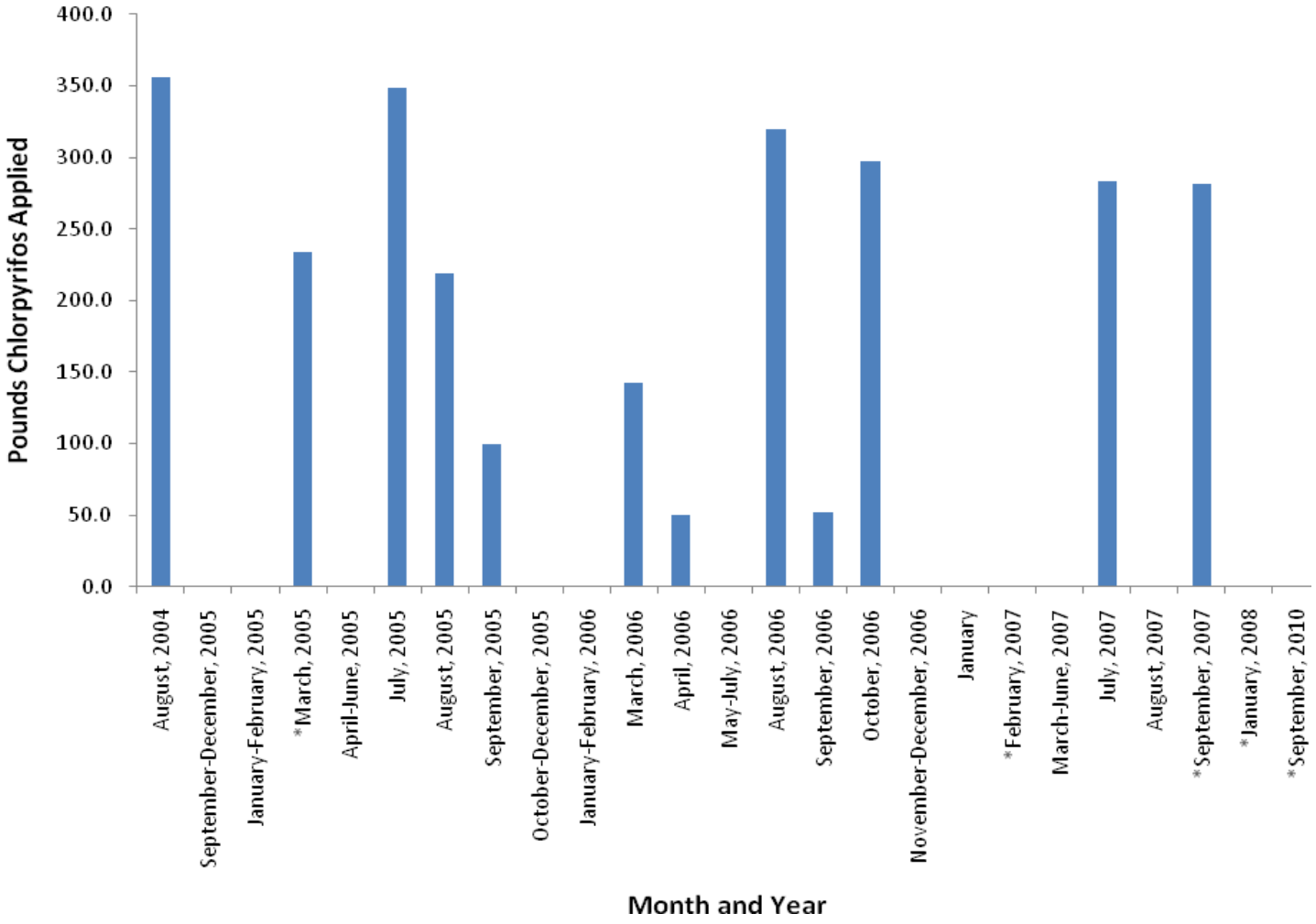


Table IV-10. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2005-2010 within the Grant Line Canal @ Clifton Court Rd subwatershed.
No chlorpyrifos PUR data was reported for 2008-2010.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	587.3
		LORSBAN 4E-HF	991.7
	ASPARAGUS (SPEARS, FERNS, ETC.)	LORSBAN 4E INSECTICIDE	541.3
		LORSBAN 4E-HF	561.9

ALFALFA - Total Pounds Chlorpyrifos Applied	**1579.0**
ASPARAGUS - Total Pounds Chlorpyrifos Applied	**1103.1**
Total Pounds Chlorpyrifos Applied (2004 - 2010)	**2682.2**

No use of chlorpyrifos has been reported in this subwatershed since 2007. However, exceedances of the WQTL for chlorpyrifos continued to occur in September 2010. The Coalition anticipates that targeted outreach will increase the use of these practices and other irrigation water management practices within Grant Line Canal @ Clifton Court Rd.

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition focused outreach to growers who had used chlorpyrifos within the last two years and contacted permittees associated with the targeted growers. In early January 2010, the Coalition sent out mailings to invite targeted growers and their associated permittees to a meeting on January 28, 2010 to discuss the Grant Line Canal management plan strategy and relevant management practices. Various management practices that are effective in reducing runoff of water and sediment that contribute to high priority exceedances, specifically related to chlorpyrifos, copper and algae and sediment toxicity have been discussed. The attendees at the meeting grow mostly alfalfa or other row crops. Therefore, the Coalition discussed alfalfa pest management as well as switching to products other than those containing chlorpyrifos as another option for reducing/eliminating the presence of chlorpyrifos in waterbodies that are pumped directly into Grant Line Canal. Focus was also on drift issues and concerns including minimizing spray drift by spraying in favorable conditions, using appropriate nozzle sizes and spray pressures, and maintaining low speeds when applying by ground (6 mph). Although the meeting focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including copper, *S. capricornutum* and *H. azteca* toxicity, *E. coli*, pH, DO, SC, TDS, DDE, arsenic, and lead. Grower surveys completed at the meeting documenting the members' current practices and indicating which recommended practices growers anticipate implementing in the upcoming years, have been compiled and assessed by the Coalition.

Because of the relatively small number of members in the Grant Line Canal @ Clifton Court Rd site subwatershed and its similarity in issues and crop type to the Grant Line Canal near Calpack Rd site subwatershed (see next section), these subwatersheds were targeted together. The Coalition contacted two growers within the Grant Line Canal at Clifton Court Rd subwatershed and two growers within the Grant Line Canal near Calpack subwatershed and all members have completed and returned surveys. This accounts for 259 acres in the Grant Line Canal @ Clifton Court subwatershed and 686 acres in the Grant Line Canal near Calpack Rd. To date, the Coalition has received surveys from all targeted members and thus has achieved 100% targeted grower contact.

The Coalition began contacting members in the winter of 2011 to determine if additional management practices were implemented in 2010 and if additional practices are planned for 2011. Growers will be contacted again (if necessary) during fall 2011 to determine what practices were implemented during the dormant season and/or 2011 irrigation year. To obtain information on practices implemented since the interview/meeting, the Coalition sent out a brief letter that included a survey for the grower to complete. Two targeted growers were required to participate in filling out a follow up survey. To date, 100% of the follow up meetings with the second priority subwatersheds have been completed and all members who were recommended management practices have implemented. Of the two growers who implemented management practices (% acres), 42% reduced use of pesticides found in exceedances, 16% treat runoff waters with PAM or other materials, 42% reduced runoff water volumes using irrigation management. The growers who implemented new management practices represent 100% or 259 acres of the 259 targeted acres.

In 2010, Coalition MPM at Grant Line Canal @ Clifton Court occurred to evaluate the implementation of new management practices and will occur throughout 2011 during months of past exceedances.

Priority C Constituents

The only priority C constituent listed for the Grant Line Canal @ Clifton Court Rd is copper.

Copper

Six exceedances of the copper hardness-based WQTL occurred in the Grant Line Canal @ Clifton Court subwatershed (June, July and September 2006, May and July 2007 and August 2008). The Coalition began monitoring for both the total and dissolved copper fractions in October 2008 to better characterize copper contamination in the subwatershed. The amount of copper applied within the subwatershed has decreased since 2006 (675 lbs AI) and 2008 (181 lbs AI) with no applications reported in 2005, 2009 or 2010 were reported (Table IV-11, Figure IV-3). Copper applications have only occurred in March in this subwatershed, yet exceedances occurred during irrigation months, often in mid-late summer (Table IV-11, Figure IV-3). In 2010, MPM for copper took place during months of past exceedances and no exceedances of the copper WQTL occurred.

The Coalition also used PUR data to assess which crops received the most applications of copper. Copper is only applied to alfalfa (1,394 lbs AI) in this subwatershed (Table IV-12). The most common product containing copper used in this subwatershed was Kocide (Table IV-12).

Table IV-11. Number of copper applications, total pounds applied and total acres treated by month for January 2005 through December 2010 in the Grant Line Canal @ Clifton Court Rd site subwatershed. If a month is not included in the table, no applications were made.
No copper PUR data was reported for 2005 and 2009-2010.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
March, 2006	5	675.3	438.5
March, 2007	4	537.3	437.0
March, 2008	2	181.6	225.0
Summaries by Year			
2006 Total	5	675.3	438.5
2007 Total	4	537.3	437.0
2008 Total	2	181.6	225.0
Total	**11**	**1394.1**	**1100.5**

Figure IV-3. Pounds of copper applied within the Grant Line canal @ Clifton Court Rd site subwatershed by month for 2005 – 2010. Asterisk (*) denotes months with exceedances. No copper PUR data reported for 2005 or 2009-2010.

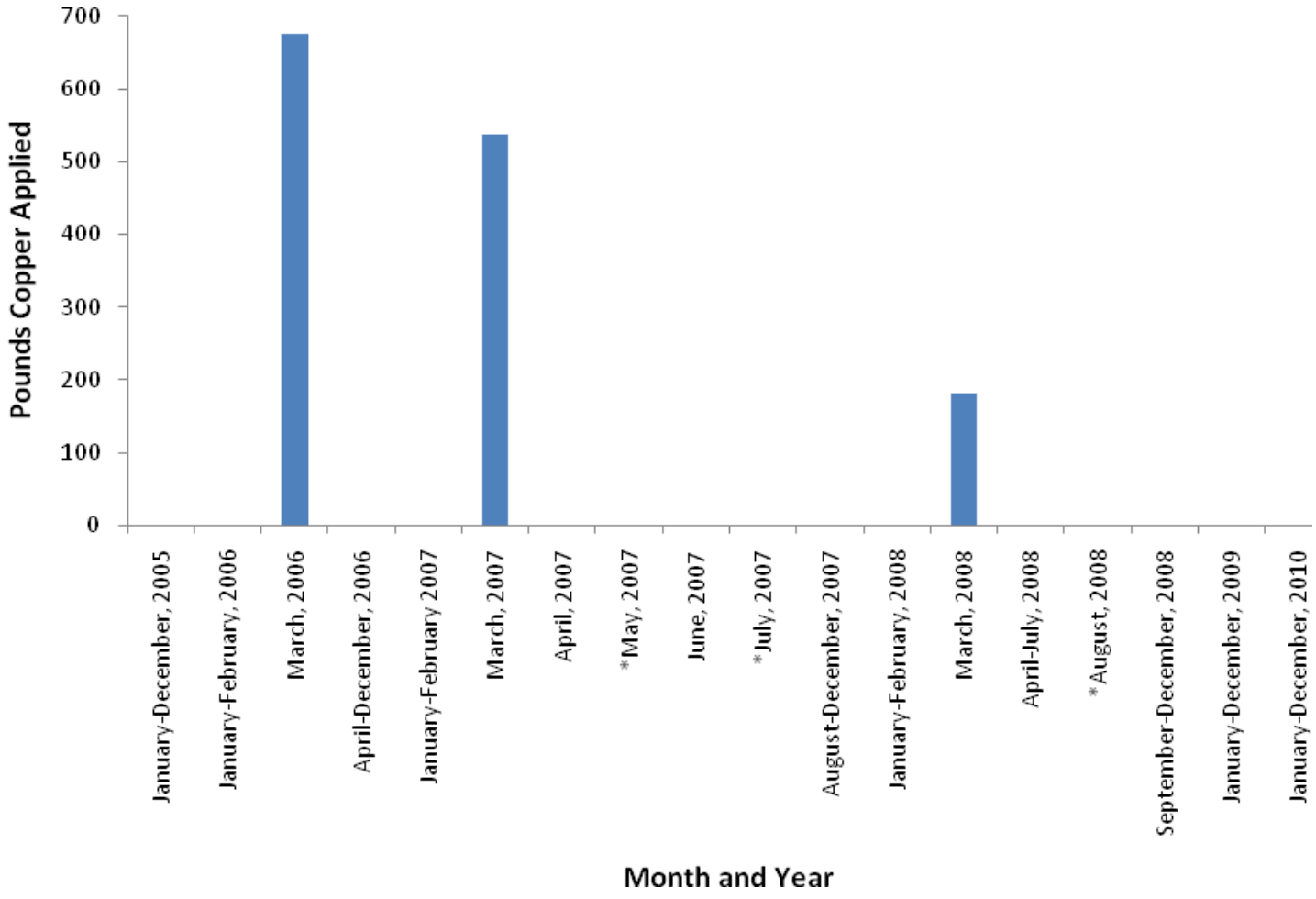


Table IV-12. Total pounds active ingredient (AI) applied for copper based on PUR data from 2005-2010 within the Grant Line Canal @ Clifton Court Rd subwatershed.
No copper PUR data was reported for 2005 and 2009-2010.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 101	675.3
		KOCIDE 2000	181.6
		KOCIDE DF	537.3

ALFALFA - Total Pounds Copper Applied	**1394.1**
Total Pounds Copper Applied (2004 - 2010)	**1394.1**

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts regarding copper. Alfalfa operators have been encouraged to consider irrigation tailwater retention to prevent copper from entering the waterway with runoff. Storm water runoff management was also discussed to prevent against winter exceedances. Individual contacts that occurred within this subwatershed are described under the chlorpyrifos outreach section above and have included discussions of copper exceedances and the above management practices.

Priority D Constituents

Priority D constituents under the Grant Line Canal @ Clifton Court Rd management plan include water column toxicity for *S. capricornutum* and sediment toxicity *H. azteca.*

Selenastrum capricornutum toxicity

S. capricornutum toxicity occurred twice during 2008 in January and May and once during MPM monitoring in May 2010. *S. capricornutum* toxicity did not occur during 2009 MPM. Due to the 2010 toxicity, *S. capricornutum* toxicity has been moved from a priority E constituent to priority D. The Coalition believes that management of copper and herbicides such as diuron and simazine will eliminate the toxicity to algae.

Hyalella azteca toxicity

H. azteca toxicity occurred in September 2005, April 2006 and September 2010. The Coalition has initiated management plan sampling for sediment toxicity. As of 2009, the Coalition now tests for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. In 2011 MPM for sediment toxicity is scheduled for this site during March and September.

Priority E Constituents

Priority E constituents under the Grant Line Canal @ Clifton Court Rd management plan include DO, pH, SC, TDS, *E. coli,* DDE, arsenic and lead. Although these constituents will remain low priority, the Coalition will continue to collect these data and these constituents have been discussed during individual contacts and will continue to be discussed at annual grower meetings.

There have been 10 exceedances of the arsenic WQTL (10 µg/L) from 2006 through 2008, all occurring during irrigation months. Available PUR records indicate no product containing arsenic has been applied in this subwatershed for the past 10 years.

Evaluation

Grant Line Canal @ Clifton Court Rd is one of the second three priority site subwatersheds within the SJCDWQC and has just completed its first year of focused outreach (2010-2012). The Coalition's strategy for the Grant Line Canal @ Clifton Court Rd subwatershed has been to target growers who have applied chlorpyrifos in the past. Focus will be on tailwater management and minimizing spray drift. Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual grower surveys documenting current management practices and assessing planned implementations have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. The final stages of outreach includes following up with growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

During 2011, MPM will continue during months of past exceedances.

V. GRANT LINE CANAL NEAR CALPACK RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Hyalella azteca* sediment toxicity
- *Selenastrum capricornutum* water column toxicity

Priority E

- Arsenic
- Dissolved Oxygen
- *E. coli*
- Specific Conductivity
- Total Dissolved Solids

Description of Grant Line Canal near Calpack Rd Site Subwatershed

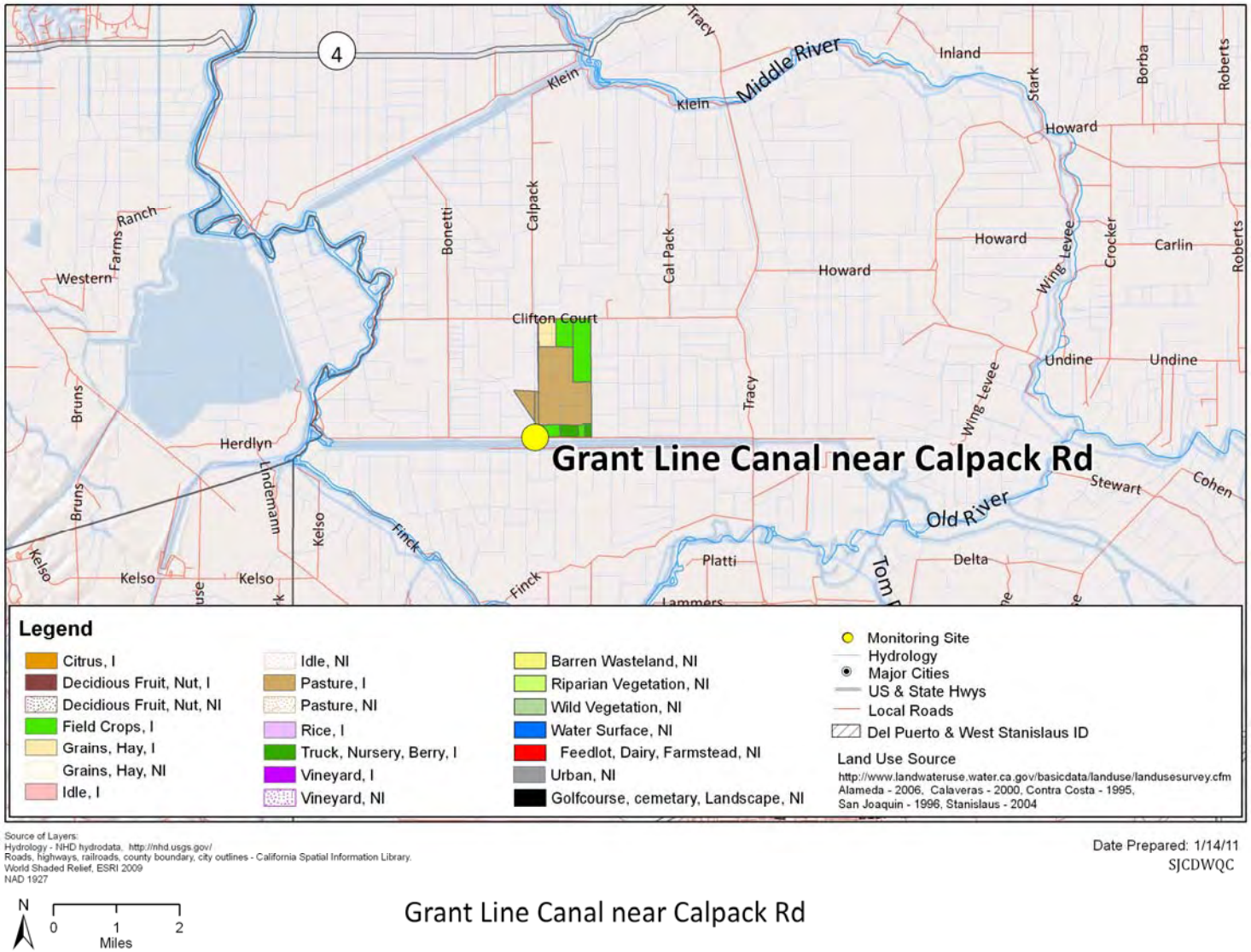
Grant Line Canal near Calpack Rd (1,070 irrigated acres) is located on the southwest section of Union Island. Table V-1 includes the station name (sample site), station code and target latitude/longitudes for the site sampled within this subwatershed. The site is adjacent to the GLC at a pumping station and drains fields immediately to the north and east of the drain pump. The crops grown are primarily alfalfa, field crops (e.g. asparagus and tomatoes), and grains (Figure V-1).

The GLC is located in the Bay-Delta tidal prism and receives water from east and west inputs. The source of water in the GLC depends on delta tides, natural flows of large waterbodies such as the SJR, the operation of agriculture barriers, and the operation of the pumping plants at Clifton Court Forebay.

Table V-1. Coordinates of the Grant Line Canal near Calpack Rd site subwatershed sampling locations.

Sample Site	Station Code	Target Latitude	Target Longitude
Grant Line Canal near Calpack Rd	544XGLCCR	37.8205	-121.4999

Figure V-1. Site subwatershed map of land use for sample site at Grant Line Canal near Calpack Rd.



Subwatershed Monitoring History

Monitoring at Grant Line Canal near Calpack Rd began in the storm season of 2005 and continued through 2008 (Table V-2). Starting in October 2008, Grant Line Canal near Calpack Rd was removed from the monitoring schedule and became an Assessment site under the new MRPP. It is scheduled for Assessment monitoring in 2028-2029. The constituents sampled at this location from 2005-2010 are listed in Table V-3.

Management Plan Monitoring occurred at Grant Line Canal near Calpack Rd in 2007 for chlorpyrifos and toxicity to *C. dubia* (Table V-4). The site subwatershed was monitored twice a month for chlorpyrifos during July and August 2007 and twice for *C. dubia* toxicity during July 2007.

No sampling occurred at Grant Line Canal near Calpack Rd in 2009. In 2010 MPM took place at this location for chlorpyrifos (May-August), toxicity to *S. capricornutum* (April-July), and sediment toxicity to *H. azteca* (September) (Table V-5).

The Grant Line Canal is not considered impaired in the 2008 Basin Plan, however the Old River section that runs from the SJR to the Delta Mendota Canal, parallel to the Canal, is 303d listed and is impaired as a result of low DO due to hydromodification. The export waters of the Delta are 303d listed for chlorpyrifos, low DO and salinity. This includes the Delta Mendota Canal and the California Aqueduct, both of which receive water from Grant Line Canal. The source of these impairments is listed as unknown.

Table V-2. Grant Line Canal near Calpack Rd sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA	NA	NA	5	NA
Events Not Sampled	NA	0	0	0	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	0	NA
Total	**NA**	**2**	**5**	**2**	**5**	**2**	**6**	**2**	**6**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**5**	**NA**

NA - Not applicable. This site was not sampled during this season/year.

Table V-3. Number of analyses performed per analyte in each sampling season and year for the Grant Line Canal near Calpack Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008			2009	2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter-Fall*	Winter*	Storm*	Irrigation	Fall*
Field and Physical Parameters															
NA	Dissolved Oxygen	4	6	3	6	4	10	3	9					5	
NA	Specific Conductivity	4	6	3	6	4	10	3	9					5	
NA	pH	3	6	3	6	4	10	3	9					5	
EPA 110.2	Color	2	5	2	5	2	6	1	6						
EPA 160.1	Dissolved Solids	2	5	2	5	2	6	1	6						
EPA 160.2	Suspended Solids														
EPA 180.1	Turbidity	2	5	2	5	2	6	1	6						
EPA 415.1	Total Organic Carbon	2	5	2	5	2	6	1	6						
SM 9223	*E. coli*	2	5	2	6	2	7	1	6						
EPA 405.1	BOD				1	2	2								
Carbamates															
EPA 8321A	Aldicarb				5	2	6	1	6						
EPA 8321A	Carbaryl				5	2	6	1	6						
EPA 8321A	Carbofuran				5	2	6	1	6						
EPA 8321A	Diuron				5	2	6	1	6						
EPA 8321A	Linuron				5	2	6	1	6						
EPA 8321A	Methiocarb				5	2	6	1	6						
EPA 8321A	Methomyl				5	2	6	1	6						
EPA 8321A	Oxamyl				5	2	6	1	6						
Organochlorines															
EPA 8081A	DDD(p,p')				5	2	6	1	6						
EPA 8081A	DDE(p,p')				5	2	6	1	6						
EPA 8081A	DDT(p,p')				5	2	6	1	6						
EPA 8081A	Dicofol				5	2	6	1	6						
EPA 8081A	Dieldrin				5	2	6	1	6						
EPA 8081A	Endrin				5	2	6	1	6						
EPA 8081A	Methoxychlor				5	2	6	1	6						
Organophosphates															
EPA 8141A	Azinphos methyl				5	2	6	1	6						

Method	Analyte	2005		2006		2007		2008			2009	2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter-Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 8141A	Chlorpyrifos	2	5	2	5	2	8	1	6					3	
EPA 8141A	Demeton-s														
EPA 8141A	Diazinon	2	5	2	5	2	6	1	6						
EPA 8141A	Dichlorvos														
EPA 8141A	Dimethoate				5	2	6	1	6						
EPA 8141A	Disulfoton				5	2	6	1	6						
EPA 8141A	Malathion				5	2	6	1	6						
EPA 8141A	Methamidophos				5	2	6	1	6						
EPA 8141A	Methidathion				5	2	6	1	6						
EPA 8141A	Molinate				5	2	6	1	6						
EPA 8141A	Parathion, Methyl				5	2	6	1	6						
EPA 8141A	Phorate				5	2	6	1	6						
EPA 8141A	Phosmet				5	2	6	1	6						
EPA 8141A	Thiobencarb				5	2	6	1	6						
Pyrethroids															
EPA 8081A	Bifenthrin		1	2	5	2	6	1	6						
EPA 8081A	Cyfluthrin, total		1	2	5	2	6	1	6						
EPA 8081A	Cyhalothrin, lambda, total	2	5	2	5	2	6	1	6						
EPA 8081A	Cypermethrin, total	2	5	2	5	2	6	1	6						
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	5	2	5	2	6	1	6						
EPA 8081A	Permethrin, total	2	5	2	5	2	6	1	6						
Triazines															
EPA 547M	Glyphosate				5	2	6	1	6						
EPA 549.2M	Paraquat dichloride				5	2	6	1	6						
EPA 619	Atrazine				5	2	6	1	6						
EPA 619	Cyanazine				5	2	6	1	6						
EPA 619	Simazine				5	2	6	1	6						
Metals (Total)															
EPA 200.8	Arsenic				5	2	6	1	6						
EPA 200.8	Boron				5	2	6	1	6						
EPA 200.8	Cadmium				5	2	6	1	6						
EPA 200.8	Copper				5	2	6	1	6						
EPA 200.8	Lead				5	2	6	1	6						
EPA 200.8	Molybdenum														

Method	Analyte	2005		2006		2007		2008			2009	2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter-Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 200.8	Nickel				5	2	6	1	6						
EPA 200.8	Selenium				5	2	2	1	6						
EPA 200.8	Zinc				5	2	6	1	6						
Nutrients															
SM 2340 C	Hardness as CaCO3				5	2	6	1	6						
EPA 300.0	Nitrate as N				5	2	6	1	6						
EPA 350.2	Ammonia as N				5	2	6	1	6						
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	1	6						
EPA 354.1	Nitrite as N				5	2	6	1	6						
EPA 353.2	Nitrate + Nitrite as N														
EPA 365.2	Orthophosphate as P				5	2	6	1	6						
EPA 365.2	Phosphate as P				5	2	6	1	6						
Toxicity															
EPA 821/R-02-012	*Ceriodaphnia dubia*	3	6	2	6	2	8	1	6						
EPA 821/R-02-012	*Pimephales promelas*	2	5	2	5	2	7	1	6						
EPA 821/R-02-013	*Selenastrum capricornutum*	3	5	2	5	2	9	2	8					3	
EPA 600/R-99-064	*Hyalella azteca*		5	1	1	2	1	1	1					1	

*Site not sampled during the 2008 fall season, 2009 sampling year, and the 2010 winter, storm and fall seasons.

Table V-4. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos within the Grant Line Canal near Calpack Rd site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	Chlorpyrifos	*Ceriodaphnia dubia* Toxicity
Grant Line Canal near Calpack Rd	30-Jul-07	A	X	X
Grant Line Canal near Calpack Rd	28-Aug-07	A	X	

Table V-5. 2010 Management Plan Monitoring schedule for chlorpyrifos and *Hyalella azteca* and *Selenastrum capricornutum* toxicities within the Grant Line Canal near Calpack Rd site subwatershed. "X" indicates constituents sampled.

Site Name	Sample Date	Monitoring Type	*S. capricornutum*	Chlorpyrifos	*H. azteca*
Grant Line Canal near Calpack Rd	13-Apr-10	MPM	X		
Grant Line Canal near Calpack Rd	11-May-10	MPM	X	X	
Grant Line Canal near Calpack Rd	13-Jul-10	MPM	X	X	
Grant Line Canal near Calpack Rd	10-Aug-10	MPM		X	
Grant line Canal near Calpack Rd	7-Sept-10	MPM			X

Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli,* metals, pesticides, and water column and sediment toxicity have occurred at this site (Table V-6). Sample results from 2005 to 2010 at Grant Line near Calpack Rd included exceedances of WQTLs for DO (38), SC (47), *E. coli* (19), TDS (25), ammonia (1), arsenic (4), chlorpyrifos (4), DDE (1), disulfoton (1), diuron (1) and linuron (1). There have been a total of 20 instances of toxicity, three to *C. dubia,* seven to *H. azteca,* and ten to *S. capricornutum*.

In 2010, MPM results from sampling the Grant Line Canal near Calpack Rd accounted for exceedances in: DO (3), SC (5) and one instances of sediment toxicity to *H. azteca*.

All exceedances are listed in Table V-6 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table V-6 and is determined using the SJCDWQC Management Plan prioritization process flow chart (MPUR 2011 Figure 3, page 21). The top priority constituents for Grant Line Canal near Calpack Rd subwatershed are chlorpyrifos (A/B) and toxicity to *C. dubia and H. azteca* (D).

Table V-6. All exceedances experienced in samples collected from locations within the Grant Line near Calpack Rd site subwatershed between February 2005 and September 2010 (sorted by season and date).

If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte.

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	Specific Conductivity, >700 µS/cm	*E. coli*, >235 MPN/100 mL	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	DDE (p,p'), >0.00059 µg/L	Disulfoton, >0.05 µg/L	Diuron, >2 µg/L	Linuron, >1.4 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Grant Line Canal near Calpack Rd	Storm	2/16/2005		1412	240	930										7
Grant Line Canal near Calpack Rd	Storm	2/23/2005	6.8	1834												
Grant Line Canal near Calpack Rd	Storm	3/21/2005		1970		1200			0.076					75		
Grant Line Canal near Calpack Rd	Storm	4/4/2005	4.8	2140												
Grant Line Canal near Calpack Rd	Irrigation	5/17/2005	6.3	847		550									43.8	
Grant Line Canal near Calpack Rd	Irrigation	6/21/2005	5.1	835	1600	520										
Grant Line Canal near Calpack Rd	Irrigation	7/19/2005	4.8		500				0.053						68.8	
Grant Line Canal near Calpack Rd	Irrigation	8/16/2005	3.8	1077	1600	670			0.15					5		
Grant Line Canal near Calpack Rd	Irrigation	8/23/2005	4.2	759												
Grant Line Canal near Calpack Rd	Irrigation	9/20/2005	2.9	1390	500	840									88.8	
Grant Line Canal near Calpack Rd	Storm	2/27/2006		1910		1200										
Grant Line Canal near Calpack Rd	Storm	3/15/2006		1660		1100										
Grant Line Canal near Calpack Rd	Storm	4/27/2006	5	2220											20	
Grant Line Canal near Calpack Rd	Irrigation	5/16/2006	1		2400			12	0.12					10		
Grant Line Canal near Calpack Rd	Irrigation	5/25/2006	4.1	806												
Grant Line Canal near Calpack Rd	Irrigation	6/20/2006	2.88	791	2400	530		16								
Grant Line Canal near Calpack Rd	Irrigation	7/18/2006	2.2	757	2000	590				0.0067						

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	Specific Conductivity, >700 µS/cm	*E. coli*, >235 MPN/100 mL	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	DDE (p,p'), >0.00059 µg/L	Disulfoton, >0.05 µg/L	Diuron, >2 µg/L	Linuron, >1.4 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Grant Line Canal near Calpack Rd	Irrigation	8/15/2006	1.3	727	2400		4.1						1.6			
Grant Line Canal near Calpack Rd	Irrigation	9/19/2006	2.8		300											
Grant Line Canal near Calpack Rd	Storm	2/11/2007		1583	2000	1000										
Grant Line Canal near Calpack Rd	Storm	2/28/2007		1505		940										
Grant Line Canal near Calpack Rd	Storm	3/7/2007		1624											12.5	
Grant Line Canal near Calpack Rd	Storm	3/29/2007		1200											5	
Grant Line Canal near Calpack Rd	Irrigation	4/11/2007	2.76	972	490	610										44
Grant Line Canal near Calpack Rd	Irrigation	4/19/2007														89
Grant Line Canal near Calpack Rd	Irrigation	5/22/2007	6.24	1222		750										
Grant Line Canal near Calpack Rd	Irrigation	6/12/2007	5.48	1209	980	790										
Grant Line Canal near Calpack Rd	Irrigation	7/10/2007	6.2	1289	550	790										79
Grant Line Canal near Calpack Rd	Irrigation	7/17/2007	3	1123												
Grant Line Canal near Calpack Rd	Irrigation	7/30/2007	1.22	998												
Grant Line Canal near Calpack Rd	Irrigation	8/7/2007	3.42	956	980	630					0.083	2.8				
Grant Line Canal near Calpack Rd	Irrigation	8/9/2007	4.97	1174												
Grant Line Canal near Calpack Rd	Irrigation	8/28/2007	2.3	1654												
Grant Line Canal near Calpack Rd	Irrigation	9/4/2007	1.89	1225		810		12								
Grant Line Canal near Calpack Rd	Storm	1/23/2008	5.49	1736		1200										2
Grant Line Canal near Calpack Rd	Storm	1/30/2008	5.34	1877												25
Grant Line Canal near Calpack Rd	Sediment	3/18/2008		1891												
Grant Line Canal near Calpack Rd	Irrigation	4/15/2008	5.84	1205		800										12

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	Specific Conductivity, >700 µS/cm	*E. coli*, >235 MPN/100 mL	Dissolved Solids, >450 mg/L	Ammonia, >1.5 mg/L	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	DDE (p,p'), >0.00059 µg/L	Disulfoton, >0.05 µg/L	Diuron, >2 µg/L	Linuron, >1.4 µg/L	*C. dubia*, (% Control)	*H. azteca*, (% Control)	*S. capricornutum*, (% Control)
Grant Line Canal near Calpack Rd	Irrigation	4/23/2008	3.59	1112												52
Grant Line Canal near Calpack Rd	Irrigation	5/13/2008		1733		1100										1
Grant Line Canal near Calpack Rd	Irrigation	5/21/2008	4.95	1067												49
Grant Line Canal near Calpack Rd	Irrigation	6/10/2008	3.33	1066	240	560										
Grant Line Canal near Calpack Rd	Irrigation	7/15/2008	3.8	927	>2400	530										
Grant Line Canal near Calpack Rd	Irrigation	8/12/2008	0.45	945	>2400	570										
Grant Line Canal near Calpack Rd	Sediment	8/13/2008	2.79	899												
Grant Line Canal near Calpack Rd	Irrigation	9/16/2008	0.47	1049	2400	680		11								
Grant Line Canal near Calpack Rd	Irrigation	4/13/2010		1713												
Grant Line Canal near Calpack Rd	Irrigation	5/11/2010	4.75	1357												
Grant Line Canal near Calpack Rd	Irrigation	7/13/2010	6.55	934												
Grant Line Canal near Calpack Rd	Irrigation	8/10/2010	5.50	925												
Grant Line Canal near Calpack Rd	Irrigation	9/7/2010		1017											91	
		Constituent Priority	**E**	**E**	**E**	**E**	**NP**	**E**	**A/B**	**NP**	**NP**	**NP**	**NP**	**D**	**D**	**D**

NP – Not prioritized; fewer than two exceedances for this constituent at this site within three years, and currently no TMDL for constituent.

2007-2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table V-7 for the following constituents: chlorpyrifos and water column toxicities for *C. dubia* and *S. capricornutum* and sediment toxicity for *H. azteca.*

2007

In 2007, Grant Line Canal near Calpack Rd was monitored monthly for chlorpyrifos and toxicity to *C. dubia* from April through September plus additional monitoring conducted in July for chlorpyrifos only and in August for both. The chlorpyrifos WQTL was never exceeded in samples collected during normal monitoring (NM) and additional (A) MPM events (Table V-7).

2008

Although no MPM at Grant Line Canal near Calpack Rd occurred during 2008, normal monitoring took place and the results were used to assess chlorpyrifos exceedances and toxicity to *C. dubia.* There were neither exceedances of chlorpyrifos nor toxicity to *C. dubia* (Table V-7).

2009

Grant Line Canal near Calpack Rd was not scheduled for 2009 MPM.

2010

The Coalition conducted MPM at Grant Line Canal near Calpack Rd during 2010 for chlorpyrifos (May-August), *S. capricornutum* toxicity (April-July) and *H. azteca* sediment toxicity (September). Sediment samples collected during the September 7, 2010 MPM were toxic for *H. azteca*.

2011

Management Plan Monitoring is scheduled to occur at Grant Line Canal near Calpack Rd for chlorpyrifos (March and May-August), *S. capricornutum* toxicity (January-February and April-July), for *C. dubia* toxicity (March, May and August) and *H. azteca* toxicity (March and September) in 2011.

Table V-7. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for the Grant Line Canal near Calpack Rd site subwatershed between 2007 and 2010. Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (near Calpack Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	C. dubia toxicity (% Control)	100	95	95	100	100	100
2007 MPM A (near Calpack Rd)	Date	NA	NA	NA	7/30/07	8/28/07	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	100	NA
2008 NM (near Calpack Rd)	Date	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	C. dubia toxicity (% Control)	100	87.5	100	100	100	100
2010 MPM (near Calpack Rd)	Date	4/13/10	5/11/10	NA	7/13/10	8/10/10	9/07/10
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	<0.003	NA
	S. capricornutum toxicity (% Control)	426	691	NA	620	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	**91**

NA - Not applicable; this site was not sampled during this month for particular consistent.
NM- Normal Monitoring
MPM- Management Plan Monitoring
A- Additional Monitoring conducted in 2007.

Load Calculations

Loads have been calculated for the chlorpyrifos detections (Table V-8) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (mg/L X 1000 or µg/L).

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table V-8. Instantaneous load calculations for chlorpyrifos where discharge was measured in the Grant Line near Calpack Rd site subwatershed (sorted by analyte, site and date).

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Grant Line Canal near Calpack Rd	Chlorpyrifos	03/21/05	0	0.076	0
Grant Line Canal near Calpack Rd	Chlorpyrifos	07/19/05	0	0.053	0
Grant Line Canal near Calpack Rd	Chlorpyrifos	08/16/05	0	0.15	0
Grant Line Canal near Calpack Rd	Chlorpyrifos	06/20/06	0	0.011	0

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. Management Plan Monitoring continued in 2010 at the Grant Line Canal near Calpack Rd site subwatershed during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Grant Line Canal near Calpack Rd became high priority in 2010, the Coalition has actively engaged in grower outreach and education to address Grant Line Canal near Calpack Rd management plan's priority constituents. The Coalition has organized meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings and follow up meetings with targeted members have informed growers about management practices as well as assessed current and expected implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent listed under the management plan within the Grant Line Canal @ near Calpack Rd site subwatershed.

Chlorpyrifos

Four exceedances of the chlorpyrifos WQTL (0.015 µg/L) occurred in this subwatershed from 2005 through 2010. Grant Line Canal @ Clifton Court Rd was not sampled in 2009 and there were no exceedances of the chlorpyrifos WQTL during 2010 MPM sampling (May, July and August). The Coalition evaluated monitoring and PUR data to identify possible sources.

PUR data were reviewed for the number of applications of chlorpyrifos, amount of active ingredient applied (pounds applied), and acres treated (Table V-9, Figure V-2). The greatest amount of chlorpyrifos use occurred in 2005 (5,064 lbs AI) whereas no use occurred from 2008 – 2010 (Table V-9, Figure V-2). Not all exceedances occurred during months of the greatest amount of use, however all months with exceedances did have applications (Figure V-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos (Table V-10). The largest amount of chlorpyrifos applied was to alfalfa (8,652 lbs AI) followed by asparagus (2,318 lbs AI). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table V-10).

Table V-9. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for 2004–2010 in the Grant Line Canal near Calpack Rd site subwatershed.
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
August, 2004	11	293.0	627.4
September, 2004	5	41.3	82.4
March, 2005	86	1580.3	3306.4
July, 2005	39	1071.9	2266.3
August, 2005	37	1273.7	2145.6
September, 2005	38	1138.4	2067.6
March, 2006	40	893.4	2294.5
April, 2006	6	61.5	247.0
May, 2006	13	209.8	345.7
July, 2006	7	216.7	435.0
August, 2006	34	1577.2	3531.4
September, 2006	22	1155.6	2207.0
October, 2006	19	949.7	1030.0
August, 2007	7	203.8	407.0

Month/Year*	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
September, 2007	9	370.7	475.1
October, 2007	9	312.7	313.0
Summaries by Year			
2004 Total	16	334.2	709.8
2005 Total	200	5064.2	9785.8
2006 Total	141	5063.9	10090.5
2007 Total	25	887.2	1195.1
Total	**382**	**11349.5**	**21781.2**

*No chlorpyrifos PUR data reported for 2008-2010.

Figure V-2. Pounds of chlorpyrifos applied within the Grant Line Canal near Calpack Rd site subwatershed by month for 2004-2010. Asterisk (*) denotes months in which chlorpyrifos exceedances were detected at the site. No chlorpyrifos PUR data reported for 2008-2010.

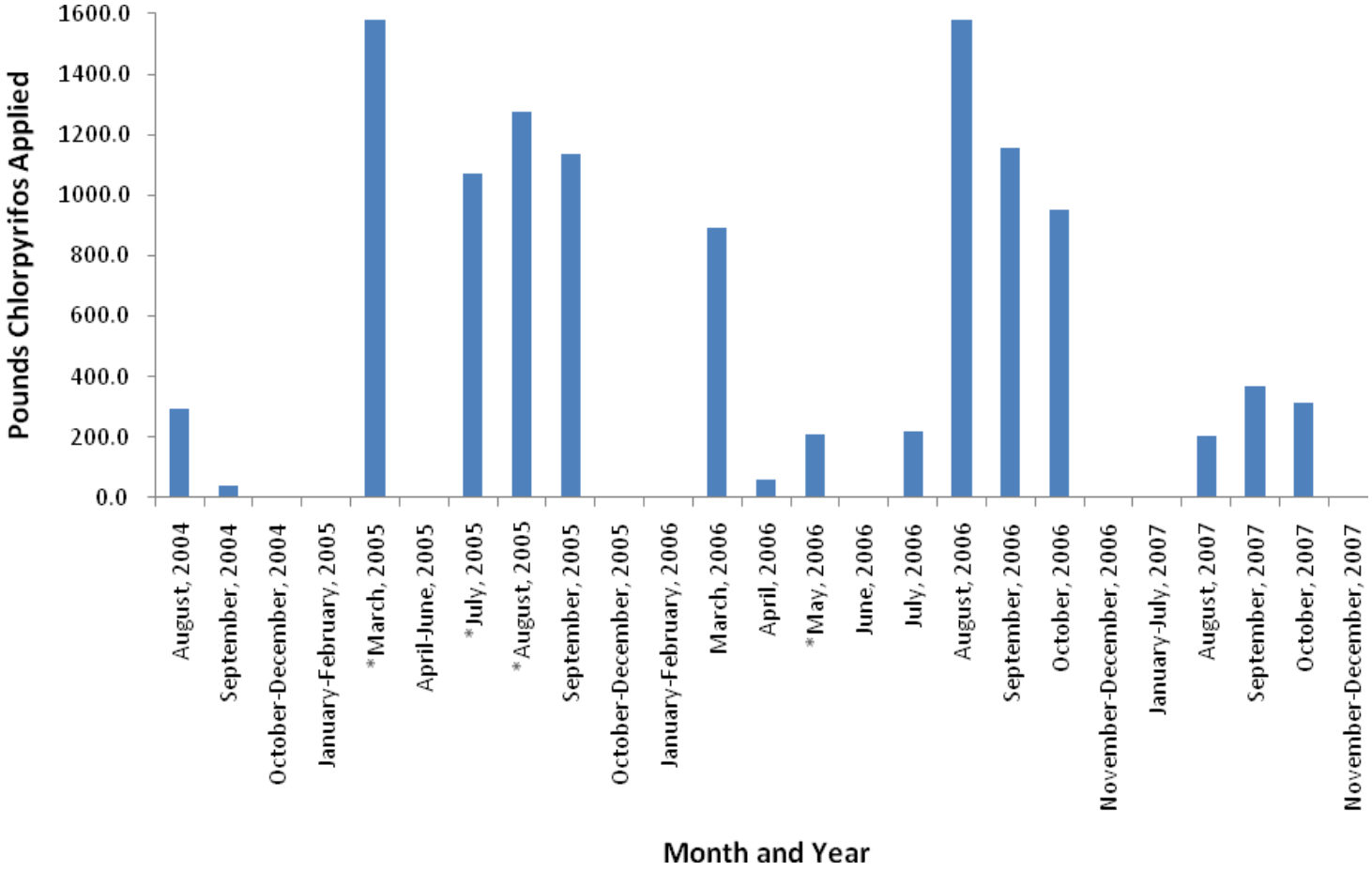


Table V-10. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2004-2010 within the Grant Line Canal near Calpack Rd subwatershed. No chlorpyrifos PUR data reported for 2008-2010.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	3440.8
		LORSBAN 4E INSECTICIDE	96.4
		LORSBAN 4E-HF	5114.8
	ASPARAGUS (SPEARS, FERNS, ETC.)	LORSBAN 4E INSECTICIDE	509.2
		LORSBAN 4E-HF	1809.1
	CORN (FORAGE - FODDER)	LORSBAN 4E-HF	37.4
	GRAPES	LORSBAN 4E-HF	41.9
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	LORSBAN 15G GRANULAR INSECTICIDE	100.5
	SUGARBEET, GENERAL	LORSBAN 4E-HF	199.4

ALFALFA - Total Pounds Chlorpyrifos Applied	**8652.0**
ASPARAGUS - Total Pounds Chlorpyrifos Applied	**2318.3**
CORN - Total Pounds Chlorpyrifos Applied	**37.4**
GRAPES - Total Pounds Chlorpyrifos Applied	**41.9**
ONION - Total Pounds Chlorpyrifos Applied	**100.5**
SUGARBEET - Total Pounds Chlorpyrifos Applied	**199.4**
Total Pounds Chlorpyrifos Applied (2004 - 2010)	**11349.5**

The Coalition determined that the most efficient and effective method of outreach is to target specific members who have used chlorpyrifos in the past and to contact both the growers and associated permittees. No use of chlorpyrifos has been reported since 2007 and no exceedances have occurred in the subwatershed since 2006 (see the SJCDWQC General Survey Summary Report submitted on December 30, 2008 for details on the management practices within this subwatershed). The Coalition anticipates that targeted outreach will increase the use of irrigation water management practices within Grant Line Canal near Calpack Rd.

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition focused outreach to growers who had used chlorpyrifos within the last two years and contacted permittees associated with the targeted growers. In early January 2010, the Coalition sent out mailings to six targeted growers to invite members and their associated permittees to a meeting on January 28, 2010 to discuss the Grant Line Canal management plan strategy and relevant management practices. During the meetings, Coalition representatives presented an overview of the Coalition's purpose, current water quality issues, and status of the ILRP. Various management practices that are effective in reducing runoff and sediment deposition were discussed. The attendees at the meeting grow alfalfa or other row crops. Therefore, the Coalition discussed alfalfa weevil, worm, and aphid management as well as switching to products other than those containing chlorpyrifos. Focus was also on drift issues and concerns including minimizing drift by spraying in favorable conditions, using appropriate nozzle sizes and spray pressures, and maintaining low speeds when applying by ground (6 mph). Although the meeting focused mainly on chlorpyrifos exceedances, all water quality results were reviewed and discussed including, *C. dubia*, *S. capricornutum,* and *H. azteca* toxicities, and exceedances of arsenic , *E. coli*, DO, SC, and TDS. Grower

surveys completed at the meeting documenting the members' current practices and indicating which recommended practices growers anticipated implementing in the upcoming years have been compiled and assessed by the Coalition.

As discussed in the previous section; because of the small number of members in the Grant Line Canal near Calpack Rd site subwatershed and the similarity in issues and crop types to the Grant Line Canal @ Clifton Court Rd site subwatershed, these subwatersheds have been targeted jointly. The Coalition sent out mailings to the targeted growers from both subwatersheds (two members from either subwatershed) in early January to invite members and their associated permittees to a meeting on January 28, 2010. All of the growers contacted by the Coalition within the two Grant Line Canal subwatersheds completed and returned surveys. This accounts for 259 acres in the Grant Line Canal @ Clifton Court subwatershed and 686 acres in the Grant Line Canal near Calpack Rd. To date, the Coalition has received surveys for all targeted members and thus has achieved 100% targeted grower contact.

The Coalition began contacting members in the winter of 2011 to determine what management practices were implemented in 2010 and if additional practices are planned for 2011. Growers will be contacted again (if necessary) during the fall of 2011 to determine if practices were implemented during the dormant season and/or the 2011 irrigation year. The initial two targeted growers were required to participate in filling out a follow up survey. To date, 100% of the follow up meetings with the second high priority subwatersheds have been completed and all members who were recommended management practices have implemented. Of the two growers who implemented management practices (% acres), 38% reduced use of pesticides found in exceedances, 23% treat runoff waters with PAM or other materials and 39% reduced runoff water volumes using irrigation management. The growers who implemented new management practices represent 100% or 686 acres of the 686 targeted acres. Not all growers will need to be contacted during the fall of 1212.

In 2010, Coalition MPM at Grant Line Canal near Calpack Rd occurred to evaluate the implementation of new management practices and will occur throughout 2011 during months of past exceedances.

Priority D Constituents

Priority D constituents under the Grant Line Canal near Calpack Rd include water column toxicity to *C. dubia* and *S. capricornutum* and sediment toxicity to *H. azteca*.

***Ceriodaphnia dubia* toxicity**

C. dubia is listed as a priority D constituent for the Grant Line Canal near Calpack Rd subwatershed. Toxicity to *C. dubia* occurred three times during normal monitoring, once each in March and August 2005 and May 2006. All three toxicities were associated with chlorpyrifos exceedances. The Coalition conducted additional MPM in 2007 along with normal monitoring in 2007 and 2008, but no toxicity was experienced. No MPM took place for *C. dubia* toxicity in 2009 or in 2010.

The Coalition's strategy for eliminating *C. dubia* toxicity has been to focus on chlorpyrifos. If chlorpyrifos can be prevented from entering the waterways during the irrigation season, the Coalition believes that *C. dubia* toxicity can also be reduced or eliminated. All but one chlorpyrifos exceedance had associated *C. dubia* toxicity, and the last chlorpyrifos exceedance coincided with the last *C. dubia* toxicity, which further confirms the Coalition's strategy should be effective.

Selenastrum capricornutum toxicity

S. capricornutum toxicity occurred once in 2005 (February), three times in 2007 [April (sample and resample) and July] and six times during 2008 (sample and resample: January, April and May). *S. capricornutum* toxicity did not occur during 2010 MPM. In 2011 MPM for *S. capricornutum* toxicity is scheduled for January, February, April and May.

Hyalella azteca toxicity

H. azteca toxicity occurred in May, July and September 2005, April 2006, March 2007 and September 2010. Toxicity was not experienced during 2008 sampling. The Coalition has initiated management plan sampling for sediment toxicity. As of 2009, the Coalition now tests for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. The Coalition will conduct MPM for sediment toxicity at this site in 2011 during March and September.

Priority E Constituents

Priority E constituents under the Grant Line Canal near Calpack Rd management plan include arsenic, DO, SC, TDS and *E. coli*. Although these constituents will remain low priority, the Coalition will continue to collect these data and these constituents have been discussed during individual contacts and will continue to be discussed at annual grower meetings.

There have been four exceedances of the arsenic WQTL (10 µg/L) from 2006 through 2008; all occurring during irrigation months. Available PUR data indicate no product containing arsenic has been applied in this subwatershed in the past 10 years.

Evaluation

Grant Line Canal near Calpack Rd is one of the second high priority site subwatersheds within the SJCDWQC and just completed its first year of focused outreach (2010-2012). The Coalition's strategy for the Grant Line Canal near Calpack Rd subwatershed has been to target growers who have applied chlorpyrifos in the past. Focus will be on tailwater management and minimizing spray drift. Outreach includes grower notification, management practice education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practices and assess planned implementations have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. The final stages of outreach include following up with growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

During 2011, MPM will continue during months of past exceedances.

VI. LITTLEJOHNS CREEK @ JACK TONE RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos
- Diazinon

Priority C

- Copper

Priority D

- *Selenastrum capricornutum* water column toxicity

Priority E

- Dissolved Oxygen
- *E. coli*

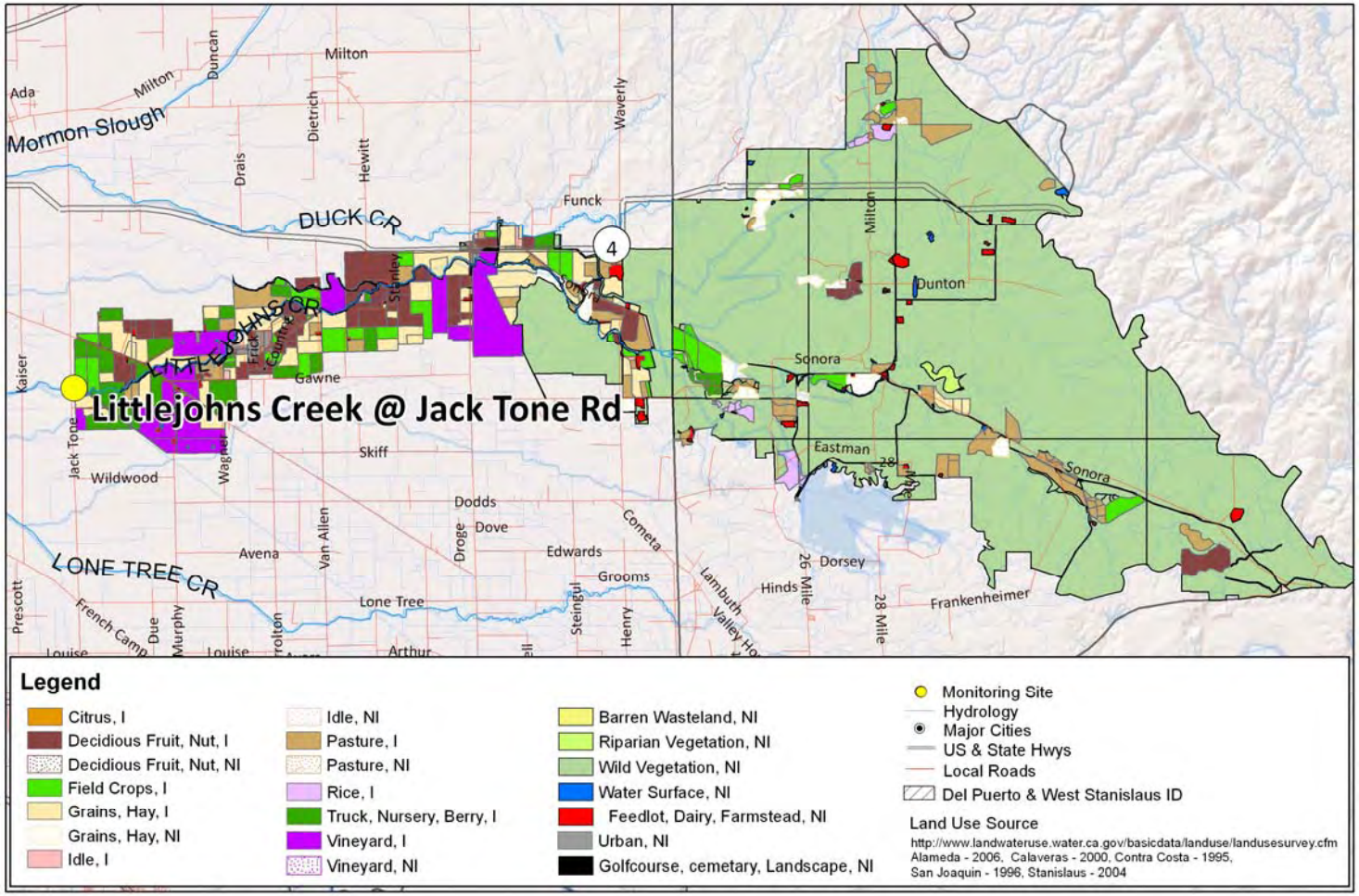
Description of Littlejohns Creek @ Jack Tone Rd Site Subwatershed

Littlejohns Creek @ Jack Tone Road (17,596 irrigated acres) originates at the western edge of Woodward Reservoir, flowing east through the Farmington Flood Control basin and eventually confluences with Lone Tree Creek to form French Camp Slough. The Creek originally flowed intermittently, but summer releases from water storage (from at least five dams) and irrigation return flows have resulted in year round flow. Within the Woodward Reservoir subwatershed there are at least 38 mines, both underground and open pit, related to at least five underground mines that were active through 1955. The crops grown in the site subwatershed represent all of the major types of agriculture present in the Coalition region including field crops, orchards, grains, and vineyards as well as irrigated pasture (Figure VI-1). This site subwatershed includes two upstream locations (Littlejohns Creek @ 26 Mile Rd and Littlejohns Creek @ Escalon Bellota) which were sampled in 2008. Table VI-1 includes the sample site (station name), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table VI-1. Coordinates of the Littlejohns Creek @ Jack Tone Rd site subwatershed sampling locations.

Sample Site	Station Code	Target Latitude	Target Longitude
Littlejohns Creek @ Escalon Bellota	531XLCAER	37.9255	-120.9991
Littlejohns Creek @ 26 Mile Rd	531LCATMR	37.8932	-120.8776
Littlejohns Creek @ Jack Tone Rd†	531XLCAJR	37.8896	-121.1461

Figure VI-1. Site subwatershed map of land use for sample site at Littlejohns Creek @ Jack Tone Rd.



Subwatershed Monitoring History

Monitoring of ambient water at Littlejohns Creek @ Jack Tone Rd was initiated during the irrigation season of 2004 and continued through the 2008 irrigation season (Table VI-2). Starting in October 2008, Littlejohns Creek @ Jack Tone Rd was removed from the monitoring schedule and became an Assessment site under the new MRPP. It is scheduled for Assessment monitoring in 2013-2014. The constituents sampled at this location from 2005-2010 are listed in Table VI-3.

Normal monitoring and Management Plan Monitoring occurred within the Littlejohns Creek site subwatershed in 2007 and 2008 for chlorpyrifos and toxicity to *S. capricornutum* (Tables VI-4 and VI-5). Littlejohns Creek was monitored twice in July for chlorpyrifos and twice in August for *S. capricornutum* toxicity in 2007. In 2008, upstream monitoring occurred for both chlorpyrifos and *S. capricornutum* toxicity in July and August at Littlejohns Creek @ Escalon Bellota Rd. Upstream monitoring for total metals occurred at Littlejohns Creek @ Escalon Bellota Rd in May and June and at Littlejohns Creek @ 26 Mile Rd in May - September 2008.

Neither normal monitoring nor Management Plan Monitoring occurred during 2009. Littlejohns Creek became a high priority site starting in 2010 where MPM was conducted for copper (May-June and September), chlorpyrifos (April and June-July) and toxicity to *S. capricornutum* (April, July and August) (Table VI-6). Additional samples were collected for chlorpyrifos and diazinon (June-December) and for sediment toxicity (September) as part of a DPR grant to reduce the impact of agricultural discharge on water quality. The DPR grant monitoring will continue through February 2011.

Littlejohns Creek is considered an impaired waterbody in the 2008 Central Valley Basin Plan and is on the 303d list for *E. coli* and unknown toxicity. The source for these impairments is listed as unknown.

Table VI-2. Littlejohns Creek @ Jack Tone Rd sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	2	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA	NA	NA	6	3
Events Not Sampled	0	0	0	0	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	0	0
Total	**2**	**2**	**5**	**2**	**5**	**2**	**6**	**2**	**6**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**6**	**3**

NA - Not applicable. This site was not sampled during this season/year.

Table VI-3. Number of analyses performed per analyte in each sampling season and year for the Littlejohns Creek @ Jack Tone Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2004	2005		2006		2007		2008			2009	2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter-Fall*	Winter*	Storm*	Irrigation	Fall
Field and Physical Parameters																
NA	Dissolved Oxygen	2	4	5	2	5	3	10	2	7					7	3
NA	Specific Conductivity	2	4	5	3	5	3	10	2	7					7	3
NA	pH	2	4	5	3	5	3	10	2	7					7	3
EPA 110.2	Color	2	2	5	2	5	2	8	1	6						
EPA 160.1	Dissolved Solids	2	2	5	2	5	2	9	1	6						
EPA 160.2	Suspended Solids															
EPA 180.1	Turbidity	2	2	5	2	5	2	8	1	6						
SM 9223	*E. coli*	2	2	5	2	6	2	7	1	6						
EPA 415.1	Total Organic Carbon	2	2	5	2	7	2	6	1	6						
EPA 405.1	BOD					1	2	2								
Carbamates																
EPA 8321A	Aldicarb					5	2	6	1	6						
EPA 8321A	Carbaryl					5	2	6	1	6						
EPA 8321A	Carbofuran					5	2	6	1	6						
EPA 8321A	Diuron					5	2	6	1	6						
EPA 8321A	Linuron					5	2	6	1	6						
EPA 8321A	Methiocarb					5	2	6	1	6						
EPA 8321A	Methomyl					5	2	6	1	6						
EPA 8321A	Oxamyl					5	2	6	1	6						
Organochlorines																
EPA 8081A	DDD(p,p')					5	2	6	1	6						
EPA 8081A	DDE(p,p')					5	2	6	1	6						
EPA 8081A	DDT(p,p')					5	2	6	1	6						
EPA 8081A	Dicofol					5	2	6	1	6						
EPA 8081A	Dieldrin					5	2	6	1	6						
EPA 8081A	Endrin					5	2	6	1	6						
EPA 8081A	Methoxychlor					5	2	6	1	6						
Organophosphates																
EPA 8141A	Azinphos methyl					5	2	6	1	6						

Method	Analyte	2004	2005		2006		2007		2008			2009	2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter-Fall*	Winter*	Storm*	Irrigation	Fall
EPA 8141A	Chlorpyrifos	2	2	5	2	5	2	7	1	6					5	3
EPA 8141A	Demeton-s															
EPA 8141A	Diazinon	2	2	5	2	5	2	6	1	6					4	3
EPA 8141A	Dichlorvos															
EPA 8141A	Dimethoate					5	2	6	1	6						
EPA 8141A	Disulfoton					5	2	6	1	6						
EPA 8141A	Malathion					5	2	6	1	6						
EPA 8141A	Methamidophos					5	2	6	1	6						
EPA 8141A	Methidathion					5	2	6	1	6						
EPA 8141A	Molinate					5	2	6	1	6						
EPA 8141A	Parathion, Methyl					5	2	6	1	6						
EPA 8141A	Phorate					5	2	6	1	6						
EPA 8141A	Phosmet					5	2	6	1	6						
EPA 8141A	Thiobencarb					5	2	6	1	6						
Pyrethroids																
EPA 8081A	Bifenthrin			1	2	5	2	6	1	6						
EPA 8081A	Cyfluthrin, total			1	2	5	2	6	1	6						
EPA 8081A	Cyhalothrin, lambda, total	2	2	5	2	5	2	6	1	6						
EPA 8081A	Cypermethrin, total	2	2	5	2	5	2	6	1	6						
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	2	5	2	5	2	6	1	6						
EPA 8081A	Permethrin, total	2	2	5	2	5	2	6	1	6						
Triazines																
EPA 547M	Glyphosate					5	2	6	1	6						
EPA 549.2M	Paraquat dichloride					5	2	6	1	6						
EPA 619	Atrazine					5	2	6	1	6						
EPA 619	Cyanazine					5	2	6	1	6						
EPA 619	Simazine					5	2	6	1	6						
Metals (Total)																
EPA 200.8	Arsenic					6	2	6	1	6						
EPA 200.8	Boron					6	2	6	1	6						
EPA 200.8	Cadmium					6	2	6	1	6						
EPA 200.8	Copper					6	2	6	1	6					3	
EPA 200.8	Lead					6	2	6	1	6						
EPA 200.8	Molybdenum															

Method	Analyte	2004	2005		2006		2007		2008			2009	2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter-Fall*	Winter*	Storm*	Irrigation	Fall
EPA 200.8	Nickel					6	2	6	1	6						
EPA 200.8	Selenium					6	2	2	1	6						
EPA 200.8	Zinc					6	2	6	1	6						
Metals (Dissolved)																
EPA 200.8	Cadmium															
EPA 200.8	Copper														3	
EPA 200.8	Lead															
EPA 200.8	Nickel															
EPA 200.8	Zinc															
Nutrients																
SM 2340 C	Hardness as CaCO3					7	2	6	1	6					3	
EPA 300.0	Nitrate as N					6	2	6	1	6						
EPA 350.2	Ammonia as N					6	2	6	1	6						
EPA 351.3	Nitrogen, Total Kjeldahl					6	2	6	1	6						
EPA 354.1	Nitrite as N					6	2	6	1	6						
EPA 353.2	Nitrate + Nitrite as N															
EPA 365.2	Orthophosphate as P					6	2	6	1	6						
EPA 365.2	Phosphate as P					6	2	6	1	6						
Toxicity																
EPA 821/R-02-012	*Ceriodaphnia dubia*	2	2	5	2	6	2	7	1	6						
EPA 821/R-02-012	*Pimephales promelas*	2	3	5	2	5	2	7	1	6						
EPA 821/R-02-013	*Selenastrum capricornutum*	3	3	5	2	5	2	9	1	7					3	
EPA 600/R-99-064	*Hyalella azteca*	2		5	1	1	2	2	1	1					1	

*Site not sampled during the 2008 fall season, 2009 sampling year, and 2010 winter and storm seasons.

Table VI-4. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos for the Littlejohns Creek @ Jack Tone Rd site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	Chlorpyrifos	*Selenastrum capricornutum* Toxicity
Littlejohns Creek @ Jack Tone Rd	30-Jul-07	A	X	
Littlejohns Creek @ Jack Tone Rd	28-Aug-07	A		X

Table VI-5. 2008 Management Plan upstream (U) sampling schedule for the Littlejohns Creek site subwatershed. "X" indicates constituents sampled.

Sample Site	Date	Type	Chlorpyrifos	Total Metals	*Selenastrum capricornutum* Toxicity
Littlejohns Creek @ 26 Mile Rd	13-May-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	13-May-08	U		X	
Littlejohns Creek @ 26 Mile Rd	10-Jun-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	10-Jun-08	U		X	
Littlejohns Creek @ 26 Mile Rd	15-Jul-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	15-Jul-08	U	X		X
Littlejohns Creek @ 26 Mile Rd	12-Aug-08	U		X	
Littlejohns Creek @ Escalon Bellota Rd	12-Aug-08	U	X		X
Littlejohns Creek @ 26 Mile Rd	16-Sep-08	U		X	

Table VI-6. 2010 Management Plan Monitoring schedule for chlorpyrifos, diazinon, copper, and *Selenastrum capricornutum* and *Hyalella azteca* toxicities for the Littlejohns Creek site subwatershed. "X" indicates the constituents sampled.

Site Name	Sample Date	Monitoring Type	*S. capricornutum*	Copper	Chlorpyrifos	Chlorpyrifos for DPR	Diazinon for DPR	*H. Azteca* for DPR
Littlejohns Creek @ Jack Tone Rd	13-Apr-10	MPM	X		X			
Littlejohns Creek @ Jack Tone Rd	11-May-10	MPM		X				
Littlejohns Creek @ Jack Tone Rd	8-Jun-10	MPM		X	X	X	X	
Littlejohns Creek @ Jack Tone Rd	13-Jul-10	MPM	X		X	X	X	
Littlejohns Creek @ Jack Tone Rd	10-Aug-10	MPM	X			X	X	
Littlejohns Creek @ Jack Tone Rd	7-Sept-10	MPM		X		X	X	X
Littlejohns Creek @ Jack Tone Rd	12-Oct-10	MPM				X	X	
Littlejohns Creek @ Jack Tone Rd	9-Nov-10	MPM				X	X	
Littlejohns Creek @ Jack Tone Rd	7-Dec-10	MPM				X	X	

Exceedance History

Exceedances of WQTLs for field and physical parameters, *E. coli,* metals, pesticides, and water column and sediment toxicity have occurred at this site (Table VI-7). For monitoring between 2004 and 2008 there have been exceedances of WQTLs for: DO (21), pH (2), *E. coli* (6), total copper (5), dissolved copper (1), carbofuran (1), chlorpyrifos (8), and diazinon (1). There have been six instances of water column toxicity, one to *P. promelas* and five to *S. capricornutum,* and there have been two instances of sediment toxicity to *H. azteca*.

Exceedances of the WQTL during 2010 MPM included DO (4), dissolved copper (1) and chlorpyrifos (1).

All exceedances are listed in Table VI-7 by season and date and are based on WQTLs listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table VI-7 and is determined using the SJCDWQC Management Plan prioritization process flow chart (MPUR 2011 Figure 3, page 21). The top priority constituents for the Littlejohns Creek subwatershed are chlorpyrifos and diazinon (A/B), copper (C) and toxicity to *S. capricornutum* (D).

Table VI-7. All exceedances experienced in samples collected from locations within the Littlejohns Creek @ Jack Tone Rd site subwatershed between August 2004 and December 2010 (sorted by season and date).
If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream site is italicized.

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, 6.5-8.5 units	*E. coli*, >235 MPN/100 mL	Copper Dissolved[1], µg/L	Copper Total, µg/L	Carbofuran, >0 µg/L	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	*P. promelas*, (% Control)	*S. capricornutum*, (% Control)	*H. azteca*, (% Control)
Littlejohns Creek @ Jack Tone Rd	Irrigation	8/24/2004										55	
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/23/2004	6.7										
Littlejohns Creek @ Jack Tone Rd	Storm	2/16/2005			1600						70		
Littlejohns Creek @ Jack Tone Rd	Storm	3/1/2005		6.37									
Littlejohns Creek @ Jack Tone Rd	Storm	3/21/2005			900							85	
Littlejohns Creek @ Jack Tone Rd	Irrigation	5/17/2005			900								
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/19/2005	6.6						0.017				
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/20/2005	5.4		900								
Littlejohns Creek @ Jack Tone Rd	Storm	3/15/2006			1600								
Littlejohns Creek @ Jack Tone Rd	Irrigation	5/16/2006					4.4 (3.9)						
Littlejohns Creek @ Jack Tone Rd	Irrigation	6/20/2006	6.7										
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/18/2006	3.1						0.027				
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/19/2006	5.4										

Sample Site	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, 6.5-8.5 units	*E. coli*, >235 MPN/100 mL	Copper Dissolved[1], µg/L	Copper Total, µg/L	Carbofuran, >0 µg/L	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	*P. promelas*, (% Control)	*S. capricornutum*, (% Control)	*H. azteca*, (% Control)
Littlejohns Creek @ Jack Tone Rd	Storm	2/11/2007							0.029	0.11			
Littlejohns Creek @ Jack Tone Rd	Storm	2/28/2007			2400		11 (9)						
Littlejohns Creek @ Jack Tone Rd	Storm	3/6/2007											78.75
Littlejohns Creek @ Jack Tone Rd	Storm	3/29/2007											83.75
Littlejohns Creek @ Jack Tone Rd	Irrigation	6/12/2007					3.6 (3.3)						
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/10/2007	6.85									71	
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/17/2007	6.6										
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/30/2007							0.018				
Littlejohns Creek @ Jack Tone Rd	Irrigation	8/28/2007	5.85										
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/4/2007	5.72										
Littlejohns Creek @ Jack Tone Rd	Irrigation	4/15/2008							0.034			6	
Littlejohns Creek @ Jack Tone Rd	Irrigation	4/23/2008										44	
Littlejohns Creek @ Jack Tone Rd	Irrigation	5/13/2008	6.7				4.2 (4.1)	0.41					
Littlejohns Creek @ 26 Mile Rd	*Irrigation*	*5/13/2008*	*4.54*	*6.32*									
Littlejohns Creek @ Jack Tone Rd	Irrigation	6/10/2008							0.077				
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/15/2008							0.025				
Littlejohns Creek @ 26 Mile Rd	*Irrigation*	*7/15/2008*	*5.50*										
Littlejohns Creek @ Jack Tone Rd	Sediment	8/13/2008	6.19										
Littlejohns Creek @ 26 Mile Rd	*Irrigation*	*8/12/2008*	*6.45*										
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/16/2008	6.34				4.2 (3.5)						
Littlejohns Creek @ 26 Mile Rd	*Irrigation*	*9/16/2008*	*3.65*										
Littlejohns Creek @ Jack Tone Rd	Irrigation	5/11/2010				1.7 (1.46)							
Littlejohns Creek @ Jack Tone Rd	Irrigation	7/13/2010	6.53										
Littlejohns Creek @ Jack Tone Rd	Irrigation	8/10/2010	6.25										
Littlejohns Creek @ Jack Tone Rd	Irrigation	9/7/2010	5.50										
Littlejohns Creek @ Jack Tone Rd	Irrigation	10/12/2010	6.00										
Littlejohns Creek @ Jack Tone Rd	Fall	11/9/2010							0.04				
	Constituent Priority		**E**	**NP**	**E**	**C**	**C**	**NP**	**A/B**	**A/B**	**NP**	**D**	**NP[1]**

NP – Not prioritized; fewer than two exceedances for constituent at site within three years, currently no TMDL for constituent.
NP[1] – Not prioritized; both toxic samples were from the same sampling event (sample and resample to test for persistence).
[1]Dissolved not analyzed until October 2008.

2007-2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table VI-8 for chlorpyrifos, diazinon, copper and toxicity to *S. capricornutum* and *H. azteca*.

2007

In 2007, Littlejohns Creek @ Jack Tone Rd was monitored for chlorpyrifos and toxicity to *S. capricornutum* from April through September plus additional monitoring conducted in July for chlorpyrifos, and August for toxicity to *S. capricornutum*. No exceedances of the chlorpyrifos WQTL occurred (Table VI-8). No other detections or toxicities occurred (Table VI-8).

2008

In accordance with the 2008 upstream MPM schedule, Littlejohns Creek @ 26 Mile Rd and Littlejohns Creek @ Escalon Bellota Rd were monitored for chlorpyrifos and toxicity to *S. capricornutum* in July and August 2008. Upstream MPM also occurred in 2008 for metals at Littlejohns Creek @ 26 Mile Rd during May-September and at Littlejohns Creek @ Escalon Bellota during May-August (Tables VI-5 and VI-8). These locations were selected to provide information on the contribution from either the upper or lower site subwatershed to the load of metals measured at the Littlejohns Creek site. Although total metals were monitored at both the upstream sites, (previous section, Table VI-5); only copper is reported in Table VI-8. There were no other exceedances of WQTLs at this location and all results were reported in the 2009 SAMR. The chlorpyrifos WQTL was exceeded in samples collected during April, June, and July at the normal monitoring site, but never at the upstream monitoring site (Table VI-8). *S. capricornutum* toxicity occurred in April at the normal monitoring site, but never at the upstream monitoring site (Table VI-8). Copper was detected at Littlejohns Creek @ Jack Tone Rd during every sampling event in the 2008 irrigation season with exceedances in May and September. Copper was detected at both upstream sites during all MPM except in April at Littlejohns Creek @ 26 Mile Rd. The copper WQTL was exceeded only once in July at Littlejohns Creek @ 26 Mile Rd.

2009

Littlejohns Creek was not scheduled for 2009 MPM and was neither a Core nor Assessment Monitoring Site in 2009.

2010

The Coalition conducted MPM at Littlejohns Creek @ Jack Tone Rd during the irrigation season of 2010 for copper (May-June and September), chlorpyrifos (April and June-July), and *S. capricornutum* toxicity (April, July and August). Additional samples were collected for chlorpyrifos and diazinon (June-December) and for sediment toxicity (September) as part of a DPR grant to reduce the impact of agricultural discharge on water quality. November DPR samples exceeded the WQTL for chlorpyrifos (Table VI-8).

2011

The DPR grant monitoring for chlorpyrifos and diazinon continued through February 2011. Management Plan Monitoring for 2011 is scheduled for copper (February, May, June and September), chlorpyrifos (February, April and June-July), diazinon (February) and *S. capricornutum* toxicity (March-April and July-August).

Table VI-8. Normal monitoring (NM), Management Plan Monitoring (MPM), and additional DPR grant monitoring (*) results for the Littlejohns Creek @ Jack Tone Rd site subwatershed between 2007 and 2010. Exceedance values are in bold.

	MONTH:	APR	MAY	JUNE	JULY	AUG	SEPT		OCT	NOV	DEC
2007 NM (@Jack Tone Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07		NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	0.013	<0.003	<0.003		NA	NA	NA
	S. capricornutum toxicity (% Control)	133	164	251	**71**	192	181		NA	NA	NA
2007 MPM A (@ Jack Tone Rd)	Date	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	**0.018**	NA	NA		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	NA	363	NA		NA	NA	NA
2008 NM (@ Jack Tone Rd)	Date	4/15/08	5/13/08	6/10/08	7/13/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	3.9	**4.2 (4.1)**	3.1	3.4	2.0	**4.2 (3.5)**		NA	NA	NA
	Chlorpyrifos (µg/L)	**0.034**	<0.003	**0.077**	**0.025**	<0.003	<0.003		NA	NA	NA
	S. capricornutum toxicity (% Control)	**6**	93	131	184	167	155		NA	NA	NA
2008 MPM US (@ 26 Mile Rd)	Date	NA	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	NA	1.6	0.9	**3.1**	0.8	1.0		NA	NA	NA
2008 MPM US (@ Escalon Bellota Rd)	Date	NA	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08		NA	NA	NA
	Copper (µg/L)	1.9	1.8	NA	NA	NA	NA		NA	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA		NA	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA	139	117	NA		NA	NA	NA
2010 MPM (@ Jack Tone Rd)	Date	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, total (µg/L)	NA	2.4	4.5	NA	NA	2.3	NA	NA	NA	NA
	Copper, dissolved (µg/L)	NA	**1.7**	2.2	NA	NA	2.5	NA	NA	NA	NA
	Chlorpyrifos (µg/L)	<0.003	NA	<0.003	<0.003	<0.003*	0.013*	NA	<0.003*	**0.040***	0.014*
	Diazinon (µg/L)	NA	NA	<0.004*	<0.004*	<0.004*	<0.004*	NA	<0.004*	<0.004*	<0.004*
	S. capricornutum toxicity (% Control)	904	NA	NA	360	879	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	NA	110*	NA	NA	NA

NA – No MPM occurred on this date for this constituent.
*Additional-Department of Pesticide Regulation (DPR) grant monitoring.
NM- Normal Monitoring
MPM- Management Plan Monitoring
A- Additional Monitoring conducted in 2007.
US- Upstream Monitoring conducted in 2008.

Load Calculations

Loads have been calculated for the chlorpyrifos, copper and diazinon detections (Table VI-9) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (mg/L X 1000 or µg/L).

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Table VI-9. Instantaneous load calculations for chlorpyrifos, copper and diazinon where discharge was measured in the Littlejohns Creek site subwatershed (sorted by analyte and sample date). Upstream sites are in italics.

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	02/11/07	0	0.029	0
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	01/23/08	2.45	0.0039	0.27
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	11/09/10	0	0.04	0
Littlejohns Creek @ Jack Tone Rd	Chlorpyrifos	12/07/10	0	0.014	0
Littlejohns Creek @ Jack Tone Rd	Copper	05/16/06	23.5	4.4	2927.98
Littlejohns Creek @ Jack Tone Rd*	Copper	08/15/06	12.79	2.1	760.57
Littlejohns Creek @ Jack Tone Rd*	Copper	08/15/06	12.79	2.2	796.78
Littlejohns Creek @ Jack Tone Rd	Copper	08/15/06	12.79	2.5	905.44
Littlejohns Creek @ Jack Tone Rd	Copper	02/11/07	0	6.8	0
Littlejohns Creek @ Jack Tone Rd	Copper	09/04/07	0	2.7	0
Littlejohns Creek @ Jack Tone Rd	Copper	01/23/08	2.45	3.8	263.63
Littlejohns Creek @ 26 Mile Rd	*Copper*	*09/16/08*	*0*	*1*	*0*
Littlejohns Creek @ Jack Tone Rd	Diazinon	02/27/06	10.45	0.035	10.36
Littlejohns Creek @ Jack Tone Rd	Diazinon	02/11/07	0	0.11	0
Littlejohns Creek @ Jack Tone Rd	Diazinon	01/23/08	2.45	0.017	1.18

*Field Duplicate

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2008 the Coalition conducted additional and upstream MPM during the months when exceedances historically occurred to better characterize water quality the subwatershed. Management Plan Monitoring continued in 2010 at the Littlejohns Creek @ Jack Tone Rd site subwatershed during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Littlejohns Creek @ Jack Tone Rd became high priority in 2010, the Coalition has actively engaged in grower outreach and education to address Littlejohns Creek @ Jack Tone Rd management plan's highest priority constituents. The Coalition has organized meetings and mailings to educate

growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings and follow up meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos and diazinon are listed as priority A/B constituents under the management plan for the Littlejohns Creek site subwatershed.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L eight times in this subwatershed from 2004 through 2010. Littlejohns Creek @ Jack Tone Rd was not sampled during 2009. In 2010 MPM resumed and an exceedance of the chlorpyrifos WQTL occurred in November. The Coalition evaluated monitoring and PUR data to identify possible sources.

The PUR data were reviewed for the number of applications of chlorpyrifos, amount of the AI applied (pounds applied), and acres treated (Table VI-10, Figure VI-2). The greatest chlorpyrifos use occurred in 2009 (6,949 lbs AI) with the lowest use occurring in 2008 (1,172 lbs AI). In 2005-2007, the greatest amount of chlorpyrifos use occurred in May whereas in 2004 it was in July, in 2008 in March, in 2009 November, and in 2010 October had the greatest use followed by a November exceedance (Table VI-10, Figure VI-2). Exceedances do not always occur during months of the greatest amount of use (Figure VI-2).

The Coalition also used PUR data to assess which crops received the most applications of chlorpyrifos. The largest amount of chlorpyrifos was applied to walnuts (13,042 lbs AI); followed by grapes (6,032 lbs AI) (Table VI-11). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table VI-11). The Coalition has focused its outreach to target growers farming these crops.

Table VI-10. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for January 2004 through December 2010 in the Littlejohns Creek @ Jack Tone Rd site subwatershed.
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
March, 2004	17	705.7	846.7
April, 2004	4	262.5	220
May, 2004	19	1395.0	745.5
June, 2004	3	168.9	133
July, 2004	16	1732.7	888
August, 2004	13	1034.2	578.2
March, 2005	7	223.4	260
April, 2005	2	95.7	98.2
May, 2005	20	1464.5	752.3
June, 2005	9	621.6	314.5
July, 2005	22	1669.1	1253.1
August, 2005	9	285.5	462.2
September, 2005	4	123.4	142
March, 2006	2	68.6	65
April, 2006	2	38.5	50

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
May, 2006	28	2279.5	1288.3
June, 2006	13	744.2	381.5
July, 2006	18	1374.6	971.5
August, 2006	16	830.8	926.5
September, 2006	1	40.1	80
March, 2007	13	721.4	738
April, 2007	5	358.5	243
May, 2007	12	730.7	453
June, 2007	2	156.8	78
July, 2007	5	240.4	328
August, 2007	4	195.6	207
March, 2008	9	410.5	395.8
April, 2008	3	247.5	215
May, 2008	2	232.9	144
June, 2008	4	111.6	165
July, 2008	4	170.2	220
March, 2009	5	213.3	141
April, 2009	1	40.0	57.3
May, 2009	3	486.2	249.5
June, 2009	9	1222.7	620.4
July, 2009	9	714.9	358.5
August, 2009	7	569.1	285
September, 2009	3	40.0	40
October, 2009	4	2617.9	1394
November, 2009	5	1045.1	556.5
March, 2010	1	28.2	15
May, 2010	1	4.5	12
July, 2010	1	70.6	40
August, 2010	3	142.7	76
September, 2010	1	75.1	40
October, 2010	3	1493.0	795
November, 2010	2	860.1	458
Summaries by Year			
2004 Total	72	5298.9	3411.4
2005 Total	73	4483.2	3282.3
2006 Total	80	5376.3	3762.8
2007 Total	41	2403.4	2047
2008 Total	22	1172.7	1139.8
2009 Total	46	6949.3	3702.2
2010 Total	12	2674.3	1436
Total	**346**	**28358.1**	**18781.5**

Figure VI-2. Pounds of chlorpyrifos applied within the Littlejohns Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2010. Asterisk (*) denotes months with exceedances.

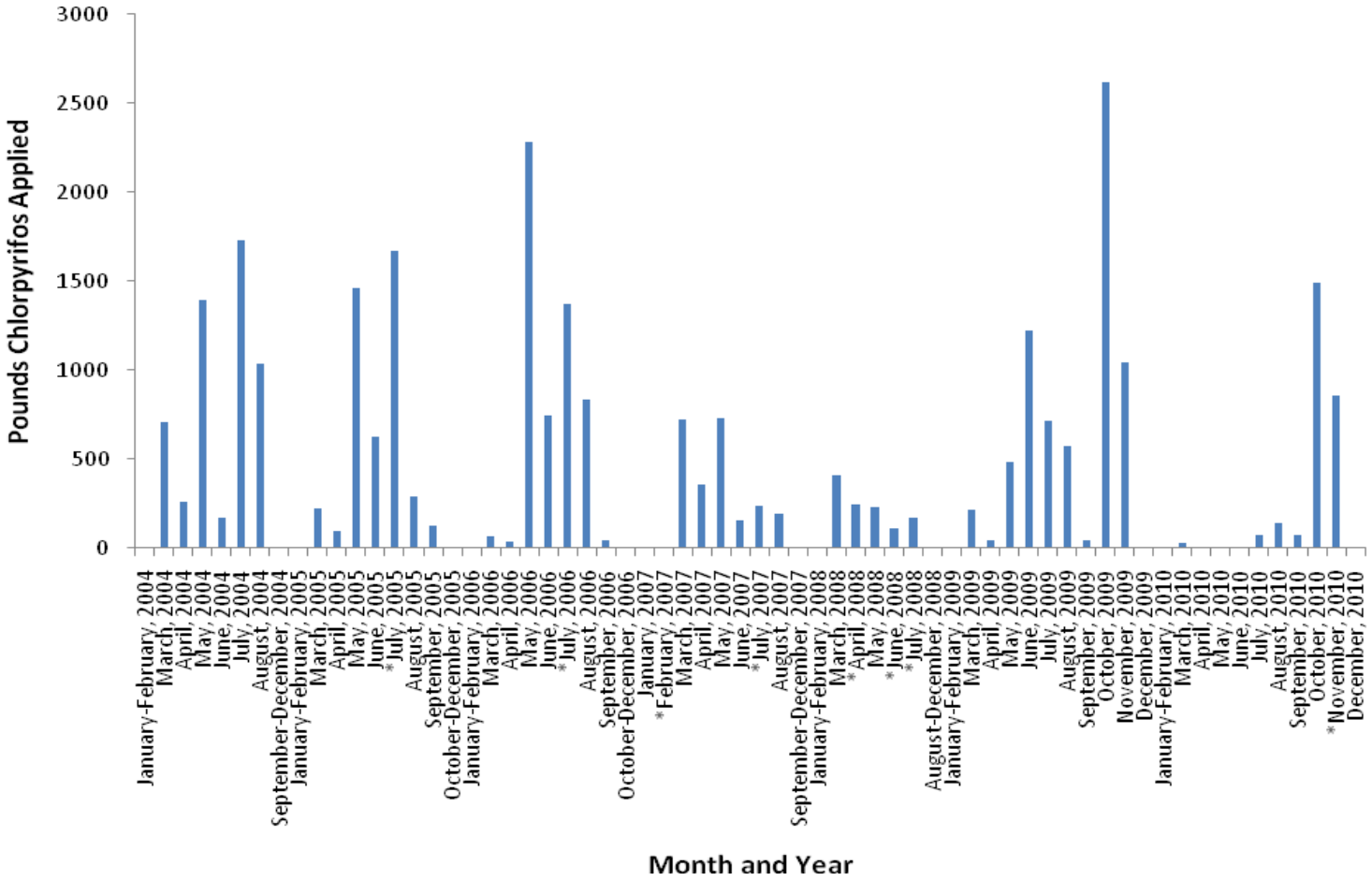


Table VI-11. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2004-2010 within the Littlejohns Creek @ Jack Tone Rd subwatershed. "Unknown Commodity" is listed as the commodity for crops that were not identified in the PUR data.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	GOVERN 4E INSECTICIDE	20.2
		LOCK-ON INSECTICIDE	1173.3
		LORSBAN 4E-HF	40.2
		LORSBAN-4E	412.1
	ALMOND	LORSBAN 4E-HF	79.8
		LORSBAN ADVANCED	167.1
		LORSBAN-4E	562.9
	APPLE	LORSBAN ADVANCED	165.3
		LORSBAN-4E	529.7
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	1090.2
		LORSBAN-4E	199.0
		NUFOS 15G	578.9
	GRAPES, WINE	LORSBAN 4E-HF	16.0
		LORSBAN ADVANCED	6016.2
	UNKNOWN	CHLORPYRIFOS 4E AG	655.8
		LORSBAN 15G GRANULAR INSECTICIDE	165.6
		LORSBAN 4E INSECTICIDE	211.2
		LORSBAN 4E-HF	1139.0
		LORSBAN 4E-SG	165.4
		LORSBAN-4E	1684.1
		NUFOS 15G	172.5
		NUFOS 4E	71.2
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	137.2
		GOVERN 4E INSECTICIDE	2067.7
		LORSBAN 4E INSECTICIDE	1596.8
		LORSBAN 4E-HF	1649.9
		LORSBAN ADVANCED	430.1
		LORSBAN-4E	7126.2
		NUFOS 4E	34.6

ALFALFA - Total Pounds Chlorpyrifos Applied	**1645.9**
ALMOND - Total Pounds Chlorpyrifos Applied	**809.8**
APPLE - Total Pounds Chlorpyrifos Applied	**695.0**
CORN - Total Pounds Chlorpyrifos Applied	**1868.1**
GRAPES - Total Pounds Chlorpyrifos Applied	**6032.1**
UNKNOWN - Total Pounds Chlorpyrifos Applied	**4264.7**
WALNUT - Total Pounds Chlorpyrifos Applied	**13042.5**
Total Pounds Chlorpyrifos Applied (2004-2010)	**28358.1**

Previous analysis conducted by the Coalition and reported in the 2010 Management Plan Update general survey results indicated 35.5% of the member acreage utilized recirculation and/or tailwater return systems or reported no runoff. The Coalition anticipated that targeted outreach to increase the use of irrigation tailwater management practices within Littlejohns Creek @ Jack Tone Rd (refer to the SJCDWQC General Survey Summary Report submitted on December 30, 2008 for details on the management practices within this subwatershed).

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition determined that the most efficient and effective method of outreach is to target specific members who have used chlorpyrifos in the past two years and to contact both the growers and associated permittees. In early January 2010, the Coalition sent out mailings to the 16 targeted growers to invite members and their associated permittees to a meeting on January 25, 2010 to discuss the Littlejohns Creek management plan strategy and relevant management practices. Various management practices that are effective in reducing runoff of water and sediment specifically related to chlorpyrifos, diazinon, copper, and algae toxicity, were discussed. The attendees at the meeting held on January 28, 2010 operate mostly orchards and vineyards. Therefore, time was spent to address orchard blight management practices. Focus was also on drift and concerns including minimizing spray drift by spraying in favorable conditions, using appropriate nozzle sizes and spray pressures, and maintaining low speeds when applying by ground (6 mph). Additionally, due to the high number of algae toxicities in the subwatershed, herbicide use was also addressed. All water quality results were reviewed and discussed including diazinon and copper exceedances, *S. capricornutum* toxicity, and exceedances of the *E. coli* and DO WQTLs. Grower surveys completed at the meetings, documenting members' current practices and indicating which recommended practices growers anticipated implementing in the upcoming years, have been compiled and assessed by the Coalition.

The Coalition contacted 16 growers within the Littlejohns Creek subwatershed and 16 members completed and returned surveys. This accounts for 2,796 acres within the subwatershed. To date, the Coalition has received surveys for all targeted members and thus has achieved 100% of targeted grower contacts.

The Coalition began contacting members in the winter of 2011 to determine what additional management practices were implemented in 2010 and if additional practices are planned for 2011. To obtain the information on practices implemented since the interview/meeting, the Coalition sent out a brief letter that included a survey for the grower to complete. Of the initial 16 targeted growers 13 members were required to participate in completing a follow up survey. To date, 100% of the follow up meetings with the second priority subwatersheds have been completed and all members who had recommended management practices have implemented those practices. Of the 13 growers who implemented management practices (% acres), 28% reduced use of pesticides found in exceedances, 25% use center gr4ass rows, grass waterways/filter strips, 34% reduced runoff water volumes using irrigation management and 13% installed sprinkler or micro irrigation systems. The growers who implemented new management practices represent 92% or 2,566 acres of the 2,796 targeted acres.

Coalition MPM at Littlejohns Creek @ Jack Tone Rd during 2010 revealed one exceedance of the chlorpyrifos WQTL in November. To evaluate the implementation of new management practices, the Coalition will continue MPM at Littlejohns Creek @ Jack Tone Rd during 2011.

Diazinon

Diazinon levels exceeded the WQTL of 0.1µg/L once in this subwatershed during storm monitoring on February 11, 2007. Littlejohns Creek @ Jack Tone Rd was not sampled during 2009 monitoring. No MPM for diazinon occurred during 2010.

Overall, the amount of diazinon applied within the subwatershed has decreased between 2004 (214 lbs AI) and 2009 (31 lbs AI), but pounds applied in 2010 (102 lbs AI) increased compared to the previous

years (Table VI-12, Figure VI-3). In 2004 and 2009, the greatest amount of diazinon use occurred in December whereas in 2006 and 2008 the greatest use occurred in May, in 2007 in March and in 2010 in June; no applications were made in 2005 (Table VI-12, Figure VI-3). The single exceedance occurred in February 2007, but interestingly applications had not been reported since March 2006 (Figure VI-3).

The Coalition also used PUR data to assess which crops receive the most applications of diazinon. The largest amount of diazinon applied was associated with almonds (163 lbs AI) and an unknown crop (102 lbs AI), see Table VI-13.

Table VI-12. Number of diazinon applications, total pounds applied, and total acres treated by month for January 2004 through December 2010 in the Littlejohns Creek @ Jack Tone Rd site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year*	Number of Diazinon Applications	Pounds of AI Applied	Acres Treated
January, 2004	1	65.7	33
February, 2004	1	26.9	18
May, 2004	1	10.0	10
December, 2004	2	111.6	75
January, 2006	1	52.1	35
February, 2006	1	16	8
May, 2006	4	6.7	5.1
March, 2007	1	16	8
April, 2007	1	1.6	3
May, 2007	3	8.9	1
June, 2007	1	1.5	0
April, 2008	2	9.7	2.5
May, 2008	3	10.1	2.5
March, 2009	1	16	8
December, 2009	2	15.9	16
April, 2010	1	30	20
June, 2010	1	50	25
August, 2010	1	22.5	15
Summaries by Year			
2004 Total	5	214.2	136
2006 Total	6	74.8	48.1
2007 Total	6	27.9	12
2008 Total	5	19.7	5
2009 Total	3	31.9	24
2010 Total	3	102.5	60
Total	**28**	**471.0**	**285.1**

*No diazinon PUR data reported for 2005.

Figure VI-3. Pounds of diazinon applied within the Littlejohns Creek @ Jack Tone Rd site subwatershed by month for 2004 through 2010. Asterisk (*) denotes months with exceedances. No diazinon PUR data reported for 2005.

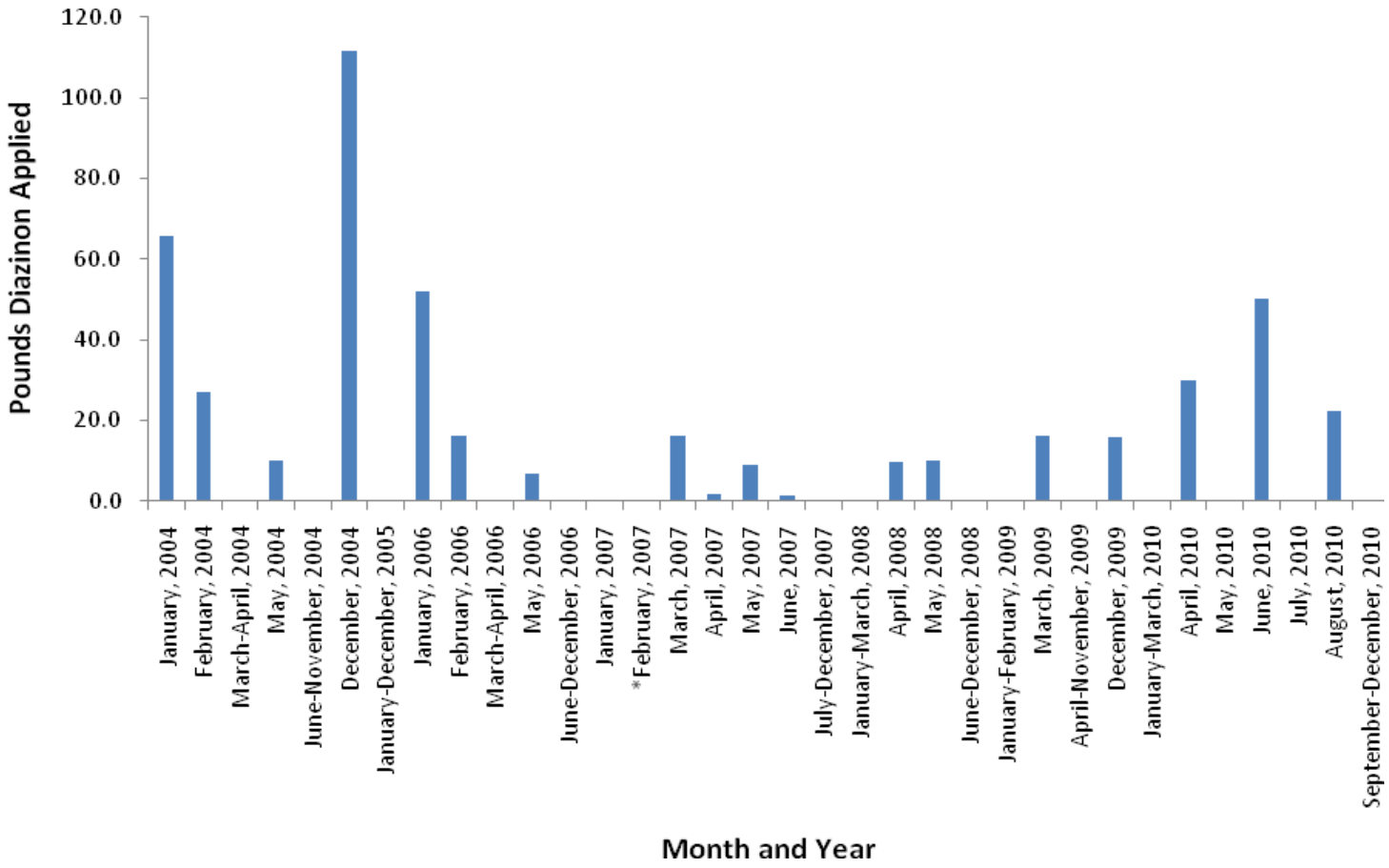


Table VI-13. Total pounds active ingredient (AI) applied for diazinon based on PUR data from 2004-2010 within the Littlejohns Creek @ Jack Tone Rd subwatershed. "Unknown Commodity" is listed as the commodity for crops that were not identified in the PUR data.
No diazinon PUR data reported for 2005.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	ALMOND	DIAZINON AG 500	52.1
		DIAZOL AG 500	111.6
	APPLE	DIAZINON 50W	72.5
	CHERRY	DIAZINON 50W	78.0
	NECTARINE	DIAZINON AG 500	7.9
	PEACH	DIAZINON AG 500	7.9
	TOMATOES, FOR PROCESSING/CANNING	DIAZINON 50W	18.6
		DIAZINON AG 500	19.7
	UNKNOWN	DIAZINON AG 500	26.9
		DIAZINON AG500 INSECTICIDE	65.7
		GOWAN DIAZINON 4E	10.0

ALMOND - Total Pounds Diazinon Applied	**163.7**
APPLE - Total Pounds Diazinon Applied	**72.5**
CHERRY - Total Pounds Diazinon Applied	**78.0**
NECTARINE - Total Pounds Diazinon Applied	**7.9**
PEACH - Total Pounds Diazinon Applied	**7.9**
TOMATOES - Total Pounds Diazinon Applied	**38.3**
UNKNOWN - Total Pounds Diazinon Applied	**102.6**
Total Pounds Diazinon Applied (2004-2010)	**471.0**

There were no reported applications of diazinon for seven months prior to the single exceedance in February 2007. Consequently, the source of the diazinon exceedance is unknown. The Coalition is focusing its outreach to address irrigation and storm water management. Individual contacts occurring within this subwatershed are described under the chlorpyrifos outreach section above and include discussions of diazinon exceedances and management practices.

Priority C Constituents

Copper is the only priority C constituent listed in the Littlejohns Creek @ Jack Tone Rd management plan.

Copper

Copper has exceeded the WQTL six times in this subwatershed from 2004 through 2010. Littlejohns Creek was not sampled during 2009 monitoring. During 2010 MPM an exceedance of dissolved copper occurred in May. The Coalition uses a combination of monitoring data and evaluation of PUR data to identify possible sources.

PUR data are reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table VI-14, Figure VI-4). Overall, the amount of copper applied within the subwatershed has remained relatively high since 2005. A slight decrease in amount of copper used occurred between 2009 (20,959 lbs AI) and 2010 (14,779 lbs AI). In 2004-2010 the greatest amount of copper use consistently occurred in April. Not all exceedances occurred during months of the greatest amount of use (Figure VI-4).

The Coalition also used PUR data to determine which crops received the most applications (Table VI-15). The largest amount of copper applied from 2004 through 2010 was to walnuts (106,070 lbs AI). The most common products used in this subwatershed containing copper are Dupont Kocide and Kocide (Table VI-15).

Table VI-14. Number of copper applications, total pounds applied, and total acres treated by month for January 2004 through December 2010 in the Littlejohns Creek @ Jack Tone Rd site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
January, 2004	2	324.7	85
February, 2004	5	219.1	142
March, 2004	25	4208.2	1076.1
April, 2004	33	9725.0	2036.5
May, 2004	3	1007.9	84
September, 2004	9	501.3	377.5
October, 2004	5	274.8	139
November, 2004	3	406.2	90
December, 2004	3	1450.5	125
February, 2005	1	33.2	8
March, 2005	25	4345.1	814.8
April, 2005	60	17219.8	3082.7
May, 2005	43	11504.4	2181.5
June, 2005	13	911.3	461.3
October, 2005	3	229.6	187
December, 2005	5	600.7	116
January, 2006	2	568.0	85
February, 2006	1	33.2	8
March, 2006	7	376.7	162
April, 2006	48	10962.6	1866.1
May, 2006	35	10203.6	1762.2
June, 2006	8	1686.3	562
July, 2006	6	609.8	396
August, 2006	3	152.0	106
September, 2006	7	392.2	257.5
October, 2006	7	465.1	299
January, 2007	1	581.0	180
February, 2007	1	1.6	3
March, 2007	15	2852.7	522
April, 2007	64	14310.4	2431
May, 2007	10	3285.9	522
June, 2007	1	61.6	40
February, 2008	1	2.2	3
March, 2008	9	822.8	190
April, 2008	8	852.0	241.5
May, 2008	1	294.7	60
January, 2009	3	1605.7	377
February, 2009	1	136.3	130
March, 2009	9	3571.0	364.8
April, 2009	49	11833.5	3751.4
May, 2009	13	3111.6	679

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
November, 2009	4	387.4	127.5
December, 2009	3	314.0	25
February, 2010	2	138.8	258
March, 2010	8	1783.7	438
April, 2010	43	7612.7	3486.6
May, 2010	25	4767.8	1671.6
June, 2010	1	22.1	9
September, 2010	1	15.4	10
November, 2010	3	438.9	114
Summaries by Year			
2004 Total	88	18117.7	4155.1
2005 Total	150	34844.2	6851.3
2006 Total	124	25449.5	5503.8
2007 Total	92	21093.2	3698
2008 Total	19	1971.7	494.5
2009 Total	82	20959.5	5454.7
2010 Total	83	14779.2	5987.2
Total	**638**	**137215.1**	**32144.5**

Figure VI-4. Pounds of copper applied within the Littlejohns Creek @ Jack Tone Rd site subwatershed by month for 2004 - 2010. Asterisk (*) denotes months with exceedances.

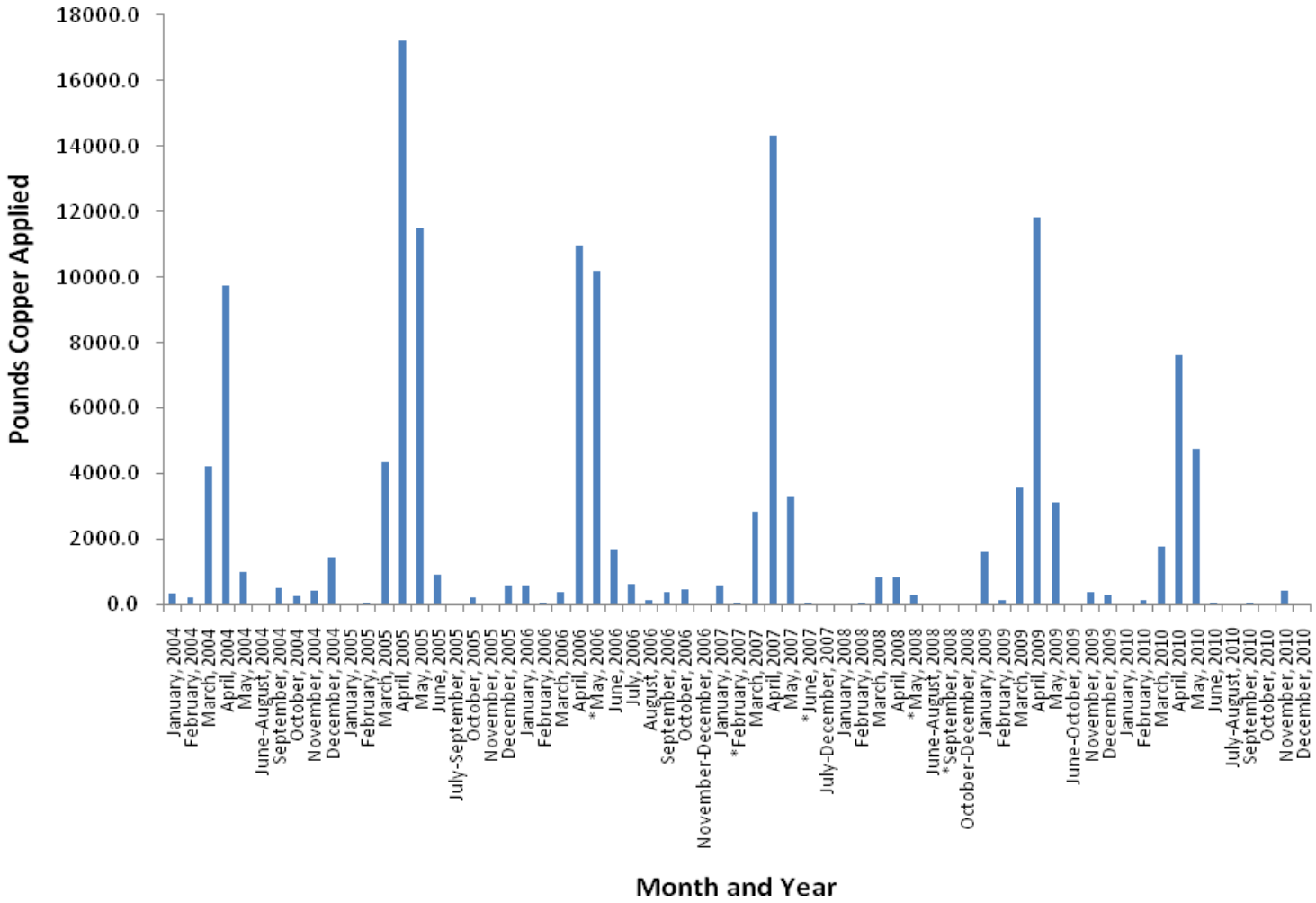


Table VI-15. Total pounds active ingredient (AI) applied for copper based on PUR data from 2004-2010 within the Littlejohns Creek @ Jack Tone Rd subwatershed. "Unknown Commodity" is listed as the commodity for crops that were not identified in the PUR data.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALMOND	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	138.8
		KOCIDE 2000	581.0
		KOCIDE DF	1072.0
		NORDOX 75 WG	1650.7
	APPLE	KOCIDE 101	33.9
		KOCIDE DF	115.4
	CHERRY	KOCIDE 101	1448.0
		KOCIDE 4.5 LF	131.1
		NU-COP 50DF	30.8
		TRIANGLE BRAND COPPER SULFATE INSTANT POWDER	990.0
	GRAPES, WINE	CHAMP FORMULA 2 FLOWABLE	93.0
		COPPER-COUNT-N	1.5
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	835.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	854.7
		HYDROX	92.4
		KOCIDE 101	1197.7
		NU-COP 3L	95.3
		TENN-COP 5E FUNGICIDE/BACTERICIDE	180.5
	NECTARINE	NORDOX 75 WG	91.3
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	KOCIDE 2000	16.7
		KOCIDE 2000 T/N/O	10.8
		PHYTON-27 BACTERICIDE & FUNGICIDE	2.5
		PHYTON-27 FUNGICIDE	1.3
	OLIVE	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	387.4
		NU-COP 50DF	438.9
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	CHAMP FORMULA 2 FLOWABLE	75.7
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	48.8
		KOCIDE 101	1001.8
		NU-COP 50DF	409.6
	PEACH	NORDOX 75 WG	91.3
	PEAR	KOCIDE 101	35.5
		KOCIDE DF	13.8
	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	KOCIDE DF	100.7
	TOMATOES, FOR PROCESSING/CANNING	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	6.5
		HYDROX	101.6
		KOCIDE 101	326.8
		KOCIDE 4.5 LF	329.2
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	77.1
		KOCIDE DF	1502.1
		NU-COP 3L	41.3
		NU-COP 50DF	933.2
		NU-COP 50WP	73.9
	UNKNOWN	CHAMP FORMULA 2 FLOWABLE	438.5
		CHAMPION WETTABLE POWDER	154.0

Chemical Name	Commodity	Product Name	Lbs AI Applied
		CHIPCO COPPER SULFATE CRYSTALS	846.5
		KOCIDE 101	9956.1
		KOCIDE 2000	106.5
		KOCIDE DF	2890.0
		NORDOX 75 WG	218.1
		NU-COP 50DF	765.4
		PHYTON-27 BACTERICIDE & FUNGICIDE	0.3
		TENN-COP 5E	109.4
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	BASIC COPPER 53	2156.0
		BLUE SHIELD DF	215.6
		CHAMP FORMULA 2 FLOWABLE	481.7
		COPPER SULFATE CRYSTALS	222.8
		CUPROFIX ULTRA 40 DISPERSS	140.8
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	107.0
		DUPONT KOCIDE 101 FUNGICIDE/BACTERICIDE	492.8
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2241.8
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	3452.0
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	3861.8
		HYDROX	1301.3
		KENTAN DF	196.2
		KOCIDE 101	36704.6
		KOCIDE 2000	3246.8
		KOCIDE DF	15197.1
		NORDOX 75 WG	573.0
		NU-COP 50 WP	3471.4
		NU-COP 50DF	32007.3

ALMOND - Total Pounds Copper Applied	**3442.6**
APPLE - Total Pounds Copper Applied	**149.3**
CHERRY - Total Pounds Copper Applied	**2599.9**
GRAPES - Total Pounds Copper Applied	**3350.6**
NECTARINE - Total Pounds Copper Applied	**91.3**
N-OUTDR GRWN TRNSPLNT - Total Pounds Copper Applied	**31.3**
OLIVE - Total Pounds Copper Applied	**826.3**
ONION - Total Pounds Copper Applied	**1535.9**
PEACH - Total Pounds Copper Applied	**91.3**
PEAR - Total Pounds Copper Applied	**49.3**
PEPPERS - Total Pounds Copper Applied	**100.7**
TOMATOES - Total Pounds Copper Applied	**3391.8**
UNKNOWN - Total Pounds Copper Applied	**15484.9**
WALNUT - Total Pounds Copper Applied	**106070.0**
Total Pounds Copper Applied (2004-2010)	**137215.1**

The Coalition will continue with its strategy for copper outlined above under the chlorpyrifos outreach section. Orchard and vineyard operators are advised to consider irrigation tailwater management to prevent copper from entering the waterway with runoff. Storm runoff management relevant to copper applications will also be discussed to prevent the winter exceedances. Individual contacts occurring within this subwatershed will include discussions of copper exceedances and the above management practices. This is consistent with the strategy used to address priority A/B constituent exceedances.

Priority D Constituents

Water column toxicity to *S. capricornutum* is the only priority D constituent listed under the Littlejohns Creek management plan. Although the Coalition will continue to monitor for toxicity to *S. capricornutum,* it remains low priority. Toxicity to *S. capricornutum* has occurred five times in the Littlejohns Creek subwatershed from 2004-2009. One occurrence of toxicity to *S. capricornutum* was associated with a copper exceedance.

***Selenastrum capricornutum* toxicity**

The Coalition's strategy for addressing *S. capricornutum* toxicity is to focus on copper exceedances. If copper can be prevented from entering the waterways, toxicity could be reduced or eliminated. *S. capricornutum* toxicity has been highlighted in recent meetings by Coalition representatives and management practices relevant to toxicity, such as water retention, have been discussed as well. The Coalition sampled for *S. capricornutum* toxicity as a part of 2010 MPM (April, July and August); however, there was no toxicity to *S. capricornutum*. If copper exceedances subside, but toxicity persists, the Coalition will assess other herbicides used within the subwatershed as potential causes.

Priority E Constituents

Priority E constituents listed under the Littlejohns Creek management plan are DO, and *E. coli*. Although the Coalition will continue to collect these data, the constituents will remain low priority for the foreseeable future.

Evaluation

Littlejohns Creek is one of the second set of high priority site subwatersheds within the SJCDWQC and just completed its first year of focused outreach (2010-2012). The Coalition's strategy for the Littlejohns Creek @ Jack Tone Rd subwatershed has been to target growers applying products containing or related to priority constituents (chlorpyrifos and diazinon) in the past two years and to identify the sources of agricultural discharge within the subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals. Outreach includes grower notification, management practice education, tracking the implementation of management practices, and providing information on special studies of management practice efficacy.

All individual grower surveys documenting current management practice implementation and assessing planned implementations have been completed and returned to the Coalition representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. The final stages of outreach include following up with growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

In 2011, MPM will continue to take place during months of past exceedances.

HIGH PRIORITY SITE SUBWATERSHEDS (2011 – 2013)

VII. FRENCH CAMP SLOUGH

Management Plan Constituents

Priority A

- Chlorpyrifos
- Diazinon

Priority C

- Copper
- Diuron

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Hyalella azteca* sediment toxicity
- *Selenastrum capricornutum* toxicity

Priority E

- Dissolved Oxygen
- pH
- *E. coli*
- Dieldrin
- Lead

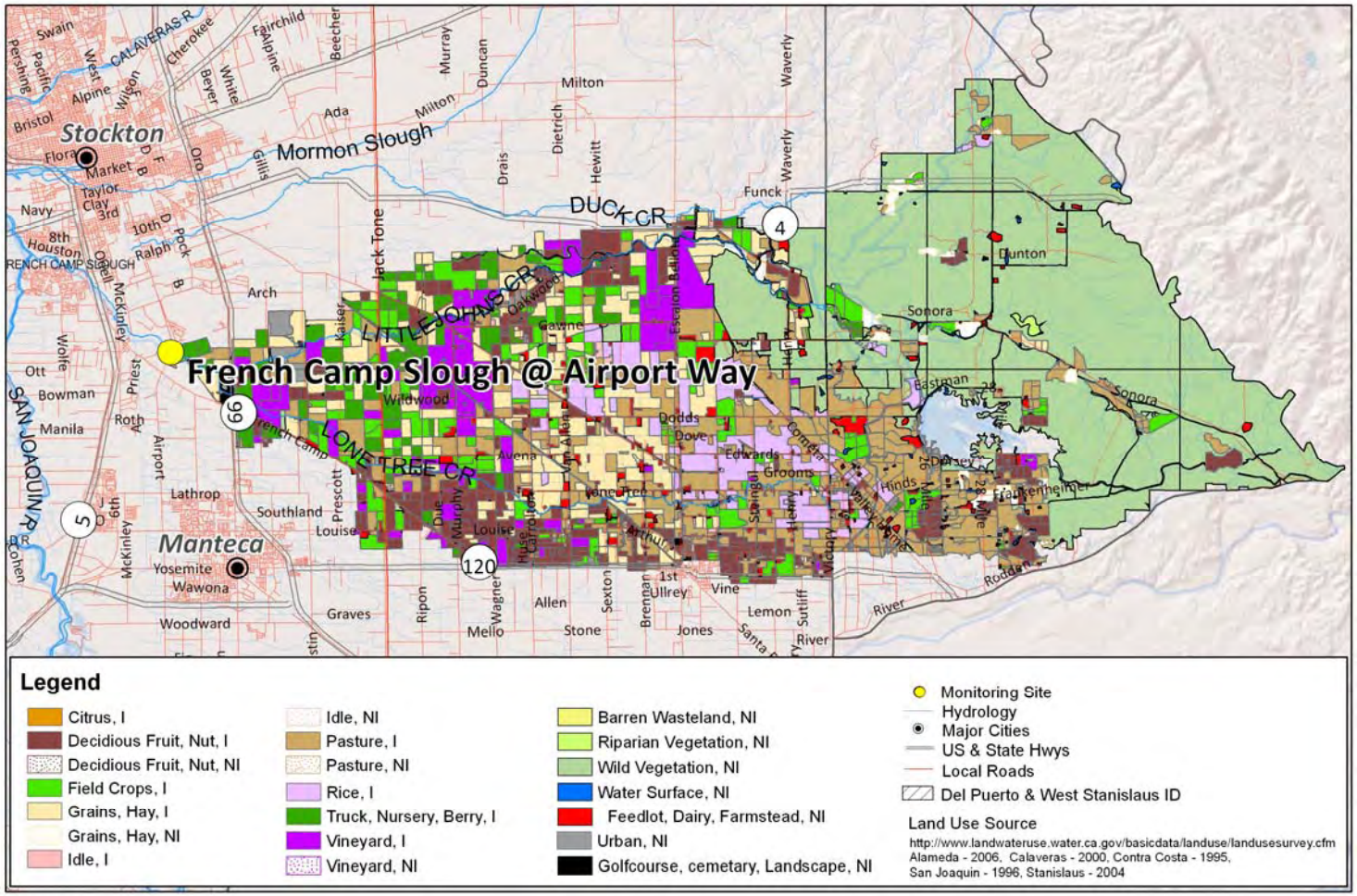
Description of French Camp Slough @ Airport Way Site Subwatershed

French Camp Slough @ Airport Way (75,694 irrigated acres) – The main waterbodies draining this site subwatershed are Littlejohns Creek and Lone Tree Creek, which confluence to form French Camp Slough. This site was selected as a downstream companion site to the Littlejohns Creek @ Jack Tone Road and Lone Tree Creek @ Jack Tone Road sites. These waterbodies drain agricultural land to the east of Manteca and Stockton and eventually flow through urban areas prior to their discharge to the San Joaquin River. This site represents all of the major types of agriculture present in the Coalition region including field crops, orchards, grains and hay, vineyards as well as irrigated pasture (Figure VII-1). Table VII-1 includes the station name (sample site), station code and target latitude/longitudes for the single site sampled within this subwatershed.

Table VII-1. Coordinates of the French Camp Slough @ Airport Way Site Subwatershed

Sample Site	Station Code	Target Latitude	Target Longitude
French Camp Slough @ Airport Way	531SJC504	37.881700	-121.249300

Figure VII-1. Site subwatershed map of land use for sample site at French Camp Slough @ Airport Way.



Source of Layers:
Hydrology - NHD hydrodata, http://nhd.usgs.gov/
Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library.
World Shaded Relief, ESRI 2009
NAD 1927

Date Prepared: 1/13/11
SJCDWQC

N
0 2 4
Miles

French Camp Slough @ Airport Way

Subwatershed Monitoring History

Monitoring was initiated in this watershed in the storm season of 2005 and has occurred continuously through 2010 (Tables VII-2).

French Camp Slough @ Airport Way is a Core Monitoring location under the new MRPP, but the site is scheduled for Assessment Monitoring during 2011. Core monitoring is scheduled to resume again in January 2012.

The constituents sampled at this location from 2005 through 2010 are listed in Table VII-3. Exceedances of field, organic and inorganic parameters as well as toxicity have occurred at the French Camp Slough monitoring location. A summary and discussion of exceedances are provided in the next section (Table VII-6).

Management Plan Monitoring began at French Camp Slough in 2007 (Table VII-4). In 2007, MPM for copper (June-August) and chlorpyrifos (July and August) occurred. In 2008 and 2009, no MPM was scheduled. In 2010 MPM occurred for *S. capricornutum* toxicity (April), copper (May through August), chlorpyrifos (May and July through October), dieldrin (July), and toxicity to *H. azteca* (September) were monitored (Table VII-5). In 2011, no MPM is scheduled for French Camp Slough @ Airport Way. However, this location is scheduled for monitoring of Assessment Monitoring constituents January through December 2011 and the Coalition continues to conduct MPM at the upstream sites along Lone Tree Creek and Littlejohns Creek. Management Plan Monitoring is described in more detail later in this document (Table VII-7).

French Camp Slough is considered impaired under the 2008 Basin Plan and is 303d listed for chlorpyrifos, diazinon, *E. coli*, DO, sediment toxicity and water column toxicity. Agriculture is listed as the potential source for the chlorpyrifos, diazinon, and toxicity; all other impairments have unknown sources.

Table VII-2. French Camp Slough @ Airport Way sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	2	6	2	3	0	6	3	2	1	6	3
Events not Sampled	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**NA**	**2**	**5**	**2**	**5**	**2**	**6**	**2**	**6**	**2**	**3**	**0**	**6**	**3**	**2**	**1**	**6**	**3**

Table VII-3. Number of analyses performed per analyte in each sampling season and year for the French Camp Slough @ Airport Way sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008			2009				2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Field and Physical Parameters																		
NA	Dissolved Oxygen	3	5	4	4	4	10	3	7	2	4		6	3	2	1	6	3
NA	Specific Conductivity	3	5	4	5	4	10	3	7	2	4		6	3	2	1	6	3
NA	pH	3	5	4	5	4	10	3	7	2	4		6	3	2	1	6	3
EPA 110.2	Color	2	5	2	5	2	7	1	6									
EPA 160.1	Dissolved Solids	2	5	2	5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 160.2	Suspended Solids							1		2	3		6	3	2	1	6	3
EPA 180.1	Turbidity	2	5	2	5	2	7	2	6	2	3		6	3	2	1	6	3
EPA 415.1	Total Organic Carbon	2	5	2	6	2	6	2	6	2	3		6	3	2	1	6	3
SM 9223	*E. coli*	2	5	2	5	2	7	2	6	2	3		6	3	2	1	6	3
Walkley-Black	Total Organic Carbon (sediment)																1	
ASTM D422	Grain size (sediment)																1	
EPA 405.1	BOD				1	2	2											
Carbamates																		
EPA 8321A	Aldicarb				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 8321A	Carbaryl				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 8321A	Carbofuran				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 8321A	Diuron				5	2	6	2	6	2			1					
EPA 8321A	Linuron				5	2	6	2	6	2			1					
EPA 8321A	Methiocarb				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 8321A	Methomyl				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 8321A	Oxamyl				5	2	6	2	6	2	3		6	3	2	1	6	3
Organochlorines																		
EPA 8081A	DDD(p,p')				5	2	6	2	6	2	3		6	3				
EPA 8081A	DDE(p,p')				5	2	6	2	6	2	3		6	3				
EPA 8081A	DDT(p,p')				5	2	6	2	6	2	3		6	3				
EPA 8081A	Dicofol				5	2	6	2	6	2	3		6	3				
EPA 8081A	Dieldrin				5	2	6	2	6	2	3		6	3			1	
EPA 8081A	Endrin				5	2	6	2	6	2	3		6	3				
EPA 8081A	Methoxychlor				5	2	6	2	6	2	3		6	3				
Group A Pesticides																		
EPA 8081A	Aldrin												5	3				

Method	Analyte	2005		2006		2007		2008			2009				2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Chlordane												5	3				
EPA 8081A	Endosulfan I												5	3				
EPA 8081A	Endosulfan II												5	3				
EPA 8081A	HCH, alpha												5	3				
EPA 8081A	HCH, beta												5	3				
EPA 8081A	HCH, delta												5	3				
EPA 8081A	HCH, gamma												5	3				
EPA 8081A	Heptachlor												5	3				
EPA 8081A	Heptachlor epoxide												5	3				
EPA 8081A	Toxaphene												5	3				
Organophosphates																		
EPA 8141A	Azinphos methyl				5	2	6	2	6	2	3		6	3				
EPA 8141A	Chlorpyrifos	2	5	2	5	2	8	2	6	2	3		6	3			4	1
EPA 8141A	Demeton-s							1		2	3		6	3				
EPA 8141A	Diazinon	2	5	2	5	2	6	2	6	2	3		6	3				
EPA 8141A	Dichlorvos							1		2	3		6	3				
EPA 8141A	Dimethoate				5	2	6	2	6	2	3		6	3				
EPA 8141A	Disulfoton				5	2	6	2	6	2	3		6	3				
EPA 8141A	Malathion				5	2	6	2	6	2	3		6	3				
EPA 8141A	Methamidophos				5	2	6	2	6	2	3		6	3				
EPA 8141A	Methidathion				5	2	6	2	6	2	3		6	3				
EPA 8141A	Molinate				5	2	6	1	6									
EPA 8141A	Parathion, Methyl				5	2	6	2	6	2	3		6	3				
EPA 8141A	Phorate				5	2	6	2	6	2	3		6	3				
EPA 8141A	Phosmet				5	2	6	2	6	2	3		6	3				
EPA 8141A	Thiobencarb				5	2	6	1	6									
EPA 8141A	Trifluralin												1					
Pyrethroids																		
EPA 8081A	Bifenthrin		1	2	5	2	6	1	6									
EPA 8081A	Cyfluthrin, total		1	2	5	2	6	1	6									
EPA 8081A	Cyhalothrin, lambda, total	2	5	2	5	2	6	1	6									
EPA 8081A	Cypermethrin, total	2	5	2	5	2	6	1	6									
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	5	2	5	2	6	1	6									
EPA 8081A	Permethrin, total	2	5	2	5	2	6	1	6									
Triazines																		
EPA 547M	Glyphosate				5	2	6	1	6									

Method	Analyte	2005		2006		2007		2008		2009				2010				
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 549.2M	Paraquat dichloride				5	2	6	1	6									
EPA 619	Atrazine				5	2	6	1	6				1					
EPA 619	Cyanazine				5	2	6	1	6				1					
EPA 619	Simazine				5	2	6	1	6				1					
Metals (Total)																		
EPA 200.8	Arsenic				5	2	6	1	6									
EPA 200.8	Boron				5	2	6	1	6									
EPA 200.8	Cadmium				5	2	6	1	6									
EPA 200.8	Copper				5	2	9	1	6								4	
EPA 200.8	Lead				5	2	6	1	6									
EPA 200.8	Molybdenum																	
EPA 200.8	Nickel				5	2	6	1	6									
EPA 200.8	Selenium				5	2	2	1	6									
EPA 200.8	Zinc				5	2	6	1	6									
Metals (Dissolved)																		
EPA 200.8	Cadmium																	
EPA 200.8	Copper																4	
EPA 200.8	Lead																	
EPA 200.8	Nickel																	
EPA 200.8	Zinc																	
Nutrients																		
SM 2340 C	Hardness as CaCO3				6	2	9	1	6								4	
EPA 300.0	Nitrate as N				5	2	6	1	6									
EPA 350.2	Ammonia as N				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 354.1	Nitrite as N				5	2	6	1	6									
EPA 353.2	Nitrate + Nitrite as N							1		2	3		6	3	2	1	6	3
EPA 365.2	Orthophosphate as P				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 365.2	Phosphate as P				5	2	6	2	6	2	3		6	3	2	1	6	3
Sediment Pesticides																		
EPA 8270M_NCI_SIM	Bifenthrin																1	
EPA 8270M_NCI_SIM	Chlorpyrifos																1	
EPA 8270M_NCI_SIM	Cyfluthrin																1	

Method	Analyte	2005		2006		2007		2008		2009				2010				
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8270M_ NCI_SIM	Cyhalothrin, lambda																1	
EPA 8270M_ NCI_SIM	Cypermethrin																1	
EPA 8270M_ NCI_SIM	Deltamethrin: Tralomethrin																1	
EPA 8270M_ NCI_SIM	Esfenvalerate/ Fenvalerate																1	
EPA 8270M_ NCI_SIM	Fenpropathrin																1	
EPA 8270M_ NCI_SIM	Permethrin																1	
Toxicity																		
EPA 821/R-02-012	*Ceriodaphnia dubia*	2	5	3	5	3	6	1	6									
EPA 821/R-02-012	*Pimephales promelas*	2	5	2	5	2	6	1	6									
EPA 821/R-02-013	*Selenastrum capricornutum*	3	5	2	5	2	6	1	7								1	
EPA 600/R-99-064	*Hyalella azteca*		5	1	1	1	2	2	1								1	

Table VII-4. 2007 Management Plan Monitoring schedule for chlorpyrifos and copper for the French Camp Slough @ Airport Way subwatershed. "X" indicates constituents sampled.

Site Name	Sample Date	Monitoring Type	Copper	Chlorpyrifos
French Camp Slough @ Airport Way	12-Jun-07	MPM	X	
French Camp Slough @ Airport Way	10-Jul-07	MPM	X	X
French Camp Slough @ Airport Way	7-Aug-07	MPM	X	X

Table VII-5. 2010 Management Plan Monitoring schedule for chlorpyrifos, dieldrin, copper, *Selenastrum capricornutum* and *Hyalella azteca* toxicity for the French Camp Slough @ Airport Way subwatershed. "X" indicates constituents sampled.

Site Name	Sample Date	Monitoring Type	*S. capricornutum*	Copper	Chlorpyrifos	Dieldrin	*H. azteca*
French Camp Slough @ Airport Way	13-Apr-10	MPM	X				
French Camp Slough @ Airport Way	11-May-10	MPM		X	X		
French Camp Slough @ Airport Way	8-Jun-10	MPM		X			
French Camp Slough @ Airport Way	13-Jul-10	MPM		X	X	X	
French Camp Slough @ Airport Way	10-Aug-10	MPM		X	X		
French Camp Slough @ Airport Way	7-Sept-10	MPM			X		X
French Camp Slough @ Airport Way	12-Oct-10	MPM			X		

Exceedance History

Between 2005 and 2010, exceedances of field, organic and inorganic parameters as well as toxicity have occurred. These exceedances include DO (15), pH (3), *E. coli* (26), copper (12),chlorpyrifos (10), and two each of lead, diazinon, dieldrin, diuron, and thiobencarb, and one each of azinphos methyl, carbofuran, dimethoate, and methidathion. Water from this site was toxic to *C. dubia* and *S. capricornutum* twice each, and sediment was toxic to *H. azteca* four times.

During 2010, there were two DO, five *E. coli*, and one chlorpyrifos exceedance. Sediment toxicity to *H. azteca* also occurred.

All exceedances are listed in Table VII-6 by season and date and are based on WQTL listed in the overall introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table VII-6 for those analytes with two or more exceedances within the last three years.

Table VII-6. All exceedances experienced in samples collected from the French Camp Slough @ Airport Way Coalition monitoring site between February 2005 and September 2010 (sorted by season and date).

If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Thiobencarb is not a priority for the Coalition because the Rice Coalition is responsible for rice herbicides.

Station Name	Season	Sample Date	Oxygen, Dissolved, >7mg/L	pH, none	*E. coli*, >235 MPN/100 mL	Copper Total, µg/L	Lead, µg/L	Azinphos methyl, >0.01µg/L	Carbofuran, ND	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	Dieldrin, >0.00014 µg/L	Dimethoate, >1.0 µg/L	Diuron, >2 µg/L	Methidathion, ND	Thiobencarb, µ,ND	*Ceriodaphnia dubia*, (% Control)	*Selenastrum capricornutum*, (% Control)	*Hyalella azteca*, (% Control)
French Camp Slough @ Airport Way	Storm	2/16/2005			1600													78	
French Camp Slough @ Airport Way	Irrigation	5/17/2005		9.02	500														
French Camp Slough @ Airport Way	Irrigation	6/21/2005			300														
French Camp Slough @ Airport Way	Irrigation	7/19/2005	6.00		1600					0.033									
French Camp Slough @ Airport Way	Irrigation	8/16/2005	5.80		1600					0.043									
French Camp Slough @ Airport Way	Irrigation	9/20/2005	4.80		300														
French Camp Slough @ Airport Way	Storm	2/27/2006								0.037									
French Camp Slough @ Airport Way	Storm	3/15/2006			1600												0		
French Camp Slough @ Airport Way	Storm	4/27/2006																	91.25
French Camp Slough @ Airport Way	Irrigation	5/16/2006			340	8.4 (4.8)	1.5 (1.18)												
French Camp Slough @ Airport Way	Irrigation	6/20/2006	6.80		550	6.6 (6)		0.13											
French Camp Slough @ Airport Way	Irrigation	7/18/2006	6.10		1200	7 (6.2)				0.027									
French Camp Slough @ Airport Way	Irrigation	8/15/2006	6.80		920	8 (6.2)													
French Camp Slough @ Airport Way	Storm	2/11/2007	0.91		2400	30 (14.7)				0.049	0.11			3.2	1.4		0		
French Camp Slough @ Airport Way	Storm	2/28/2007			2400	11 (10.1)													

Station Name	Season	Sample Date	Oxygen, Dissolved, >7mg/L	pH, none	*E. coli*, >235 MPN/100 mL	Copper Total, µg/L	Lead, µg/L	Azinphos methyl, >0.01µg/L	Carbofuran, ND	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	Dieldrin, >0.00014 µg/L	Dimethoate, >1.0 µg/L	Diuron, >2 µg/L	Methidathion, ND	Thiobencarb, µ,ND	*Ceriodaphnia dubia*, (% Control)	*Selenastrum capricornutum*, (% Control)	*Hyalella azteca*, (% Control)
French Camp Slough @ Airport Way	Irrigation	5/22/2007			310	5.9 (5.3)										0.18			
French Camp Slough @ Airport Way	Irrigation	6/12/2007				5.9 (4.6)	1.2 (1.12)									0.16			
French Camp Slough @ Airport Way	Irrigation	6/20/2007				6.7 (5.7)													
French Camp Slough @ Airport Way	Irrigation	7/10/2007				5.4 (5.3)						0.0053							
French Camp Slough @ Airport Way	Irrigation	7/30/2007				6.9 (5.2)													
French Camp Slough @ Airport Way	Irrigation	8/7/2007			260														
French Camp Slough @ Airport Way	Irrigation	8/9/2007																	32
French Camp Slough @ Airport Way	Irrigation	8/28/2007				5.9 (5.3)													
French Camp Slough @ Airport Way	Irrigation	9/4/2007			290														
French Camp Slough @ Airport Way	Storm	1/23/2008			390						0.12			3.3					
French Camp Slough @ Airport Way	Storm Sed	3/18/2008																	94
French Camp Slough @ Airport Way	Irrigation	4/15/2008			290													22	
French Camp Slough @ Airport Way	Irrigation	5/13/2008	5.83	5.95	280				0.2	0.4									
French Camp Slough @ Airport Way	Irrigation	6/10/2008																	
French Camp Slough @ Airport Way	Irrigation	7/15/2008			240							0.0083J	2						
French Camp Slough @ Airport Way	Irrigation	8/12/2008								0.022									
French Camp Slough @ Airport Way	Irrigation Sed	8/13/2008	6.27																
French Camp Slough @ Airport Way	Irrigation	9/16/2008	6.51							0.039									
French Camp Slough @ Airport Way	Fall	10/14/2008		4.01															

Station Name	Season	Sample Date	Oxygen, Dissolved, >7mg/L	pH, none	*E. coli*, >235 MPN/100 mL	Copper Total, µg/L	Lead, µg/L	Azinphos methyl, >0.01µg/L	Carbofuran, ND	Chlorpyrifos, >0.015 µg/L	Diazinon, >0.1 µg/L	Dieldrin, >0.00014 µg/L	Dimethoate, >1.0 µg/L	Diuron, >2 µg/L	Methidathion, ND	Thiobencarb, µ,ND	*Ceriodaphnia dubia*, (% Control)	*Selenastrum capricornutum*, (% Control)	*Hyalella azteca*, (% Control)
French Camp Slough @ Airport Way	Fall	11/4/2008	5.05																
French Camp Slough @ Airport Way	Non Contiguous, Winter	1/13/2009	6.42																
French Camp Slough @ Airport Way	Irrigation	7/14/2009			240														
French Camp Slough @ Airport Way	Irrigation	8/11/2009	5.66																
French Camp Slough @ Airport Way	Fall	10/6/2009								0.029									
French Camp Slough @ Airport Way	Storm	1/13/2010	2.11																
French Camp Slough @ Airport Way	Winter	2/9/2010			1300														
French Camp Slough @ Airport Way	Irrigation	4/13/2010			>2400														
French Camp Slough @ Airport Way	Irrigation	5/11/2010			360														
French Camp Slough @ Airport Way	Irrigation	6/8/2010			270														
French Camp Slough @ Airport Way	Irrigation	8/10/2010								0.022									
French Camp Slough @ Airport Way	Irrigation	9/7/2010			550														1
French Camp Slough @ Airport Way	Fall	11/9/2010	6.36																
		Constituent Priority	E	E	E	C	E	NP	NP	A/B	A/B	E	NP	C	NP	NP[1]	D	D	D

NP[1]- not prioritized; thiobencarb is only applied to rice and therefore will be managed under the Rice Coalition.

2007-2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan monitoring, are listed in Table VII-7 for the following constituents: chlorpyrifos, copper, dieldrin and water column toxicities for *S. capricornutum* and sediment toxicity to *H. azteca.*

2007

In 2007, MPM was implemented at the French Camp Slough @ Airport Way monitoring site for copper and chlorpyrifos. An exceedance of the chlorpyrifos WQTL (0.049 µg/L) occurred in February. Table VII-6 shows monitoring results for these constituents from all sampling events during the 2007 irrigation season.

2008

Due to continued exceedances of copper during additional MPM in 2007, the Coalition decided to continue monitoring at site subwatershed locations upstream of French Camp Slough (Lone Tree Creek, Littlejohns Creek and Unnamed Drain to Lone Tree Creek). These sites were sampled for chlorpyrifos and copper as part of MPM to better determine the sources of exceedances during the irrigation season. With the MPM at Lone Tree Creek, Littlejohns Creek and Unnamed Drain to Lone Tree Creek, the Coalition determined no additional upstream monitoring would be necessary (Table VII-6).

2009

Management Plan Monitoring did not occur at French Camp Slough @ Airport Way during 2009. Management Plan Monitoring occurred at Lone Tree Creek and Unnamed Drain to Lone Tree Creek for chlorpyrifos and copper during the irrigation season.

2010

In 2010 MPM was conducted at French Camp Slough @ Airport Way for *S. capricornutum* toxicity (April), copper (May-August), chlorpyrifos (May and July-October), dieldrin (July) and *H. azteca* toxicity (September). An exceedance of chlorpyrifos occurred in August and sediment toxicity occurred in September.

2011

No MPM is scheduled for French Camp Slough @ Airport Way during 2011. However, this location will be monitored for Assessment Monitoring constituents in 2011.

Table VII-7. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for the French Camp Slough @ Airport Way site subwatershed between 2007 and 2010. Exceedance values are in bold.

	MONTH:	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT
2007 NM (@ Airport Way)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07	NA
	Copper (ug/L)	5.7	**5.9**	**5.9**	**5.4**	5	4.5	NA
	Chlorpyrifos (ug/L)	0.013	<0.00259	0.013	0.014	<0.003	<0.003	NA
2007 MPM (@ Airport Way)	Date	NA	NA	6/20/07	7/30/07	8/28/07	NA	NA
	Copper (ug/L)	NA	NA	**6.7**	**6.9**	**5.9**	NA	NA
	Chlorpyrifos (ug/L)	NA	NA	NA	0.011	<0.003	NA	NA
2010 MPM (@Airport Way)	Date	4/13/10	5/11/10	6/08/10	7/13/10	8/10/10	9/07/10	10/12/10
	Copper, total (ug/L)	NA	4.3	6.2	6	4.6	NA	NA
	Copper, dissolved (ug/L)	NA	2.7	3.5	3.5	2.9	NA	NA
	Chlorpyrifos (ug/L)	NA	<0.003	NA	<0.003	**0.022**	0.009	<0.003
	Dieldrin (ug/L)	NA	NA	NA	<0.003	NA	NA	NA
	S. capricornutum toxicity (% Control)	1923	NA	NA	NA	NA	NA	NA
	H. azteca toxicity (% Control)	NA	NA	NA	NA	NA	**1**	NA

NA – No MPM occurred on this date for this constituent.
NM- Normal Monitoring
MPM Management Plan Monitoring

Load Calculations

Loads were calculated for the chlorpyrifos, copper, diazinon and diuron detections (Table VII-8) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (mg/L X 1000 or µg/L).

The load values presented for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table VII-8. Instantaneous load calculations for chlorpyrifos, copper, diazinon and diuron where discharge was measured in the French Camp Slough site subwatershed (sorted by analyte and sample date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
French Camp Slough @ Airport Way	Chlorpyrifos	05/17/05	43.56	0.011	13.57
French Camp Slough @ Airport Way	Chlorpyrifos	07/19/05	59.4	0.033	55.51
French Camp Slough @ Airport Way	Chlorpyrifos	08/16/05	90.4	0.043	110.07
French Camp Slough @ Airport Way	Chlorpyrifos	03/15/06	2030	0.005	287.42
French Camp Slough @ Airport Way	Chlorpyrifos	05/16/06	54.83	0.015	23.29
French Camp Slough @ Airport Way	Chlorpyrifos	07/18/06	77.96	0.027	59.61
French Camp Slough @ Airport Way	Chlorpyrifos	09/19/06	60.56	0.013	22.29
French Camp Slough @ Airport Way	Chlorpyrifos	02/11/07	70.48	0.049	97.79
French Camp Slough @ Airport Way	Chlorpyrifos	04/10/07	32.12	0.013	11.82
French Camp Slough @ Airport Way	Chlorpyrifos	06/12/07	47.33	0.013	17.42

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
French Camp Slough @ Airport Way	Chlorpyrifos	07/10/07	27.64	0.014	10.96
French Camp Slough @ Airport Way*	Chlorpyrifos	07/10/07	27.64	0.014	10.96
French Camp Slough @ Airport Way	Chlorpyrifos	07/30/07	66.63	0.011	20.75
French Camp Slough @ Airport Way	Chlorpyrifos	01/23/08	8.13	0.008	1.84
French Camp Slough @ Airport Way	Chlorpyrifos	04/15/08	57.81	0.003	4.91
French Camp Slough @ Airport Way*	Chlorpyrifos	04/15/08	57.81	0.0041	6.71
French Camp Slough @ Airport Way	Chlorpyrifos	05/13/08	52.12	0.4	590.35
French Camp Slough @ Airport Way	Chlorpyrifos	08/12/08	18.46	0.022	11.50
French Camp Slough @ Airport Way	Chlorpyrifos	09/16/08	76.09	0.039	84.03
French Camp Slough @ Airport Way	Chlorpyrifos	04/14/09	56.42	0.0045	7.19
French Camp Slough @ Airport Way	Chlorpyrifos	10/06/09	68.06	0.029	55.89
French Camp Slough @ Airport Way	Chlorpyrifos	08/10/10	25.75	0.022	16.04
French Camp Slough @ Airport Way	Chlorpyrifos	09/07/10	87.76	0.009	22.37
French Camp Slough @ Airport Way	Copper	05/16/06	54.83	8.4	13042.02
French Camp Slough @ Airport Way	Copper	07/18/06	77.96	7	15453.15
French Camp Slough @ Airport Way	Copper	08/15/06	90.95	8	20603.45
French Camp Slough @ Airport Way	Copper	09/19/06	60.56	3.8	6516.53
French Camp Slough @ Airport Way	Copper	02/11/07	70.48	30	59873.46
French Camp Slough @ Airport Way	Copper	04/10/07	32.12	5.7	5184.39
French Camp Slough @ Airport Way	Copper	05/22/07	71.95	5.9	12020.71
French Camp Slough @ Airport Way	Copper	06/12/07	47.33	5.9	7907.44
French Camp Slough @ Airport Way	Copper	06/20/07	27.38	6.7	5194.64
French Camp Slough @ Airport Way*	Copper	07/10/07	27.64	5.3	4148.21
French Camp Slough @ Airport Way	Copper	07/10/07	27.64	5.4	4226.48
French Camp Slough @ Airport Way	Copper	07/30/07	66.63	6.9	13018.66
French Camp Slough @ Airport Way	Copper	08/07/07	38.79	5	5492.08
French Camp Slough @ Airport Way	Copper	08/28/07	58.55	5.9	9781.97
French Camp Slough @ Airport Way	Copper	09/04/07	44.24	4.5	5637.35
French Camp Slough @ Airport Way	Copper	01/23/08	8.13	12	2762.61
French Camp Slough @ Airport Way*	Copper	04/15/08	57.81	4.7	7693.93
French Camp Slough @ Airport Way	Copper	04/15/08	57.81	4.9	8021.33
French Camp Slough @ Airport Way	Copper	05/13/08	52.12	5.6	8264.94
French Camp Slough @ Airport Way	Copper	06/10/08	19.99	3.2	1811.38
French Camp Slough @ Airport Way	Copper	07/15/08	30.2	4.8	4104.83
French Camp Slough @ Airport Way	Copper	08/12/08	18.46	2.8	1463.65
French Camp Slough @ Airport Way	Copper	09/16/08	76.09	3.9	8403.10
French Camp Slough @ Airport Way	Copper	05/11/10	31.87	4.3	3880.59
French Camp Slough @ Airport Way	Copper	06/08/10	13.89	6.2	2438.60
French Camp Slough @ Airport Way	Copper	07/13/10	45.48	6	7727.14
French Camp Slough @ Airport Way	Copper	08/10/10	25.75	4.6	3354.15
French Camp Slough @ Airport Way	Copper (D)	05/11/10	31.87	2.7	2436.65
French Camp Slough @ Airport Way	Copper (D)	06/08/10	13.89	3.5	1376.63
French Camp Slough @ Airport Way	Copper (D)	07/13/10	45.48	3.5	4507.50
French Camp Slough @ Airport Way	Copper (D)	08/10/10	25.75	2.9	2114.57
French Camp Slough @ Airport Way	Diazinon	02/16/05	706	0.052	1039.57
French Camp Slough @ Airport Way	Diazinon	07/19/05	59.4	0.013	21.87
French Camp Slough @ Airport Way	Diazinon	03/15/06	2030	0.087	5001.07
French Camp Slough @ Airport Way	Diazinon	02/11/07	70.48	0.11	219.54
French Camp Slough @ Airport Way	Diazinon	01/23/08	8.13	0.12	27.63

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
French Camp Slough @ Airport Way	Diuron	05/16/06	54.83	0.21	326.05
French Camp Slough @ Airport Way	Diuron	02/11/07	70.48	3.2	6386.50
French Camp Slough @ Airport Way	Diuron	04/10/07	32.12	0.36	327.44
French Camp Slough @ Airport Way	Diuron	05/22/07	71.95	0.3	611.22
French Camp Slough @ Airport Way	Diuron	07/10/07	27.64	0.38	297.42
French Camp Slough @ Airport Way*	Diuron	07/10/07	27.64	0.4	313.07
French Camp Slough @ Airport Way	Diuron	01/23/08	8.13	3.3	759.72
French Camp Slough @ Airport Way*	Diuron	04/15/08	57.81	0.79	1293.23
French Camp Slough @ Airport Way	Diuron	04/15/08	57.81	0.84	1375.08
French Camp Slough @ Airport Way	Diuron	06/10/08	19.99	0.23	130.19

*Field Duplicate
Copper (D)-Dissolved Copper

Source Identification

The Coalition considers past and 2010 monitoring results and associated PUR data to addressed source identification. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In past years (2007, 2008, and 2009), the Coalition conducted additional and upstream MPM during the months when exceedances historically occurred to better characterize water quality in the subwatershed. Management Plan Monitoring continued in 2010 at the French Camp Slough @ Airport Way site during months when exceedances historically occurred to assess water quality in the subwatershed as outreach in the area progressed. The main waterbodies draining this site subwatershed are Littlejohns Creek and Lone Tree Creek, which confluence to form French Camp Slough. Both Littlejohns Creek and Lone Tree Creek are high priority subwatersheds being monitored for MPM constituents.

While the French Camp Slough subwatershed is a high priority in 2011 through 2013, the Coalition plans to actively engage in grower outreach and education to address French Camp Slough management plan's priority constituents. The Coalition will continue to organize general as well as focused meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings and follow up meetings with targeted members will inform growers about management practices as well as assess current and expected future implementation of additional management practices.

Priority A/B Constituent

Chlorpyrifos and diazinon are listed as priority A/B constituents.

Chlorpyrifos

The WQTL for chlorpyrifos (0.015 µg/L) has been exceeded at this site repeatedly during the months of February (2006, 2007), July (2005, 2006), and August (2005, 2008, 2010) (Table VII-6). The months of May, September, and October also each experienced an exceedance of the chlorpyrifos WQTL in 2008 (Table VII-6). Only the February 2007 exceedance was associated with *C. dubia* toxicity. To assess the potential sources of the pesticide, the Coalition examines monitoring results as well as associated PUR data.

PUR data were reviewed for the number of monthly applications of chlorpyrifos, pounds of active ingredient applied, and the acres treated (Table VII-9, Figure VII-2). The greatest amount of chlorpyrifos use between 2005 through 2010 occurred in 2006 (17,956 lbs AI) with the lowest use occurring in 2010 (5,511 lbs AI). The greatest chlorpyrifos use has generally been between the months of May and August; however October was the month with the greatest use for both 2009 and 2010.

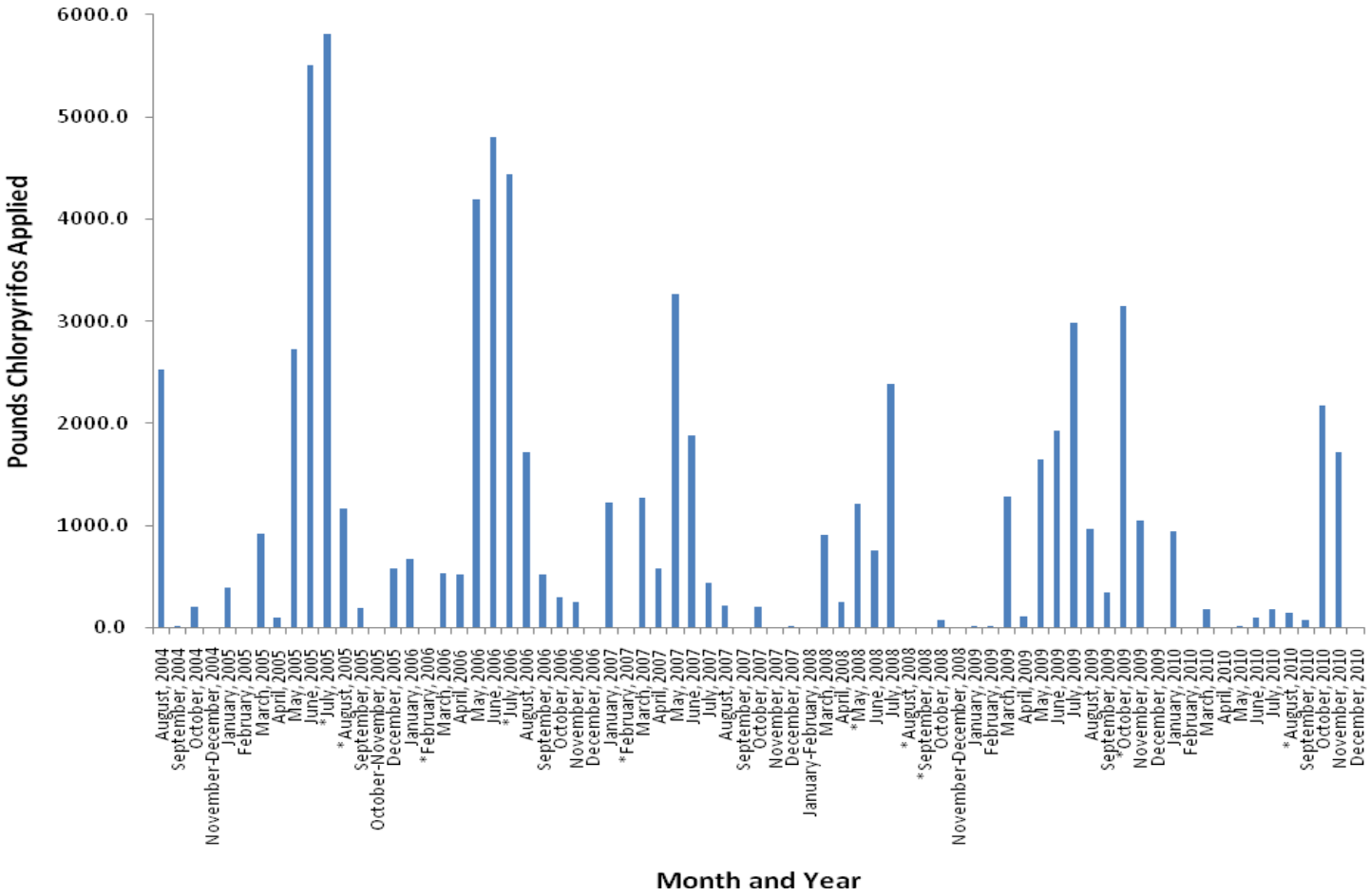
The Coalition also reviewed PUR data to determine which crops received the most applications of chlorpyrifos (Table VII-10). The largest amount of chlorpyrifos applied from 2004 through 2010 was to walnuts (21,526 lbs AI) followed by corn (19,496 lbs AI). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table VII-10).

Table VII-9. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for August 2004 – December 2010 in the French Camp Slough @ Airport Way site subwatershed.
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
August, 2004	47	2529.5	2274.2
September, 2004	1	19.9	20
October, 2004	4	208.6	93.0
January, 2005	4	388.4	207
March, 2005	25	920.4	1584
April, 2005	2	95.7	98.2
May, 2005	46	2724.3	1522.3
June, 2005	51	5502.8	2920.1
July, 2005	97	5809.8	4380.6
August, 2005	28	1167.4	1372.2
September, 2005	7	197.8	390
December, 2005	5	575.6	288.4
January, 2006	10	668.0	356
March, 2006	12	536.4	813
April, 2006	13	526.4	854
May, 2006	54	4191.6	2559.3
June, 2006	56	4798.8	3307.6
July, 2006	69	4442.8	3323.5
August, 2006	35	1719.7	1757
September, 2006	12	526.3	648
October, 2006	3	297.6	152.4
November, 2006	2	249.0	134
January, 2007	11	1227.0	658
March, 2007	24	1266.0	1640
April, 2007	10	577.3	498
May, 2007	48	3264.4	2321
June, 2007	29	1885.4	1501
July, 2007	11	434.7	545
August, 2007	5	215.8	217
October, 2007	1	199.4	100
December, 2007	2	10.0	7.2
March, 2008	22	911.9	1324.6
April, 2008	3	247.5	215

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
May, 2008	12	1209.9	855
June, 2008	15	759.7	666
July, 2008	29	2390.6	1181.3
October, 2008	2	69.5	114.3
January, 2009	1	4.0	10
February, 2009	1	1.6	46.8
March, 2009	21	1285.4	1508
April, 2009	2	110.1	92.3
May, 2009	18	1641.4	917.5
June, 2009	23	1932.2	981.2
July, 2009	45	2989.1	1804.1
August, 2009	18	965.2	694.8
September, 2009	10	350.7	307
October, 2009	9	3152.0	1677.4
November, 2009	5	1045.1	556.5
January, 2010	9	948.4	505
March, 2010	5	184.6	241.4
May, 2010	1	4.5	12
June, 2010	2	93.2	69
July, 2010	5	175.8	122
August, 2010	3	142.7	76
September, 2010	1	75.1	40
October, 2010	11	2169.1	1155
November, 2010	3	1718.4	915
Summaries by Year			
2004 Total	52	2758.0	2387.2
2005 Total	265	17382.1	12762.8
2006 Total	266	17956.6	13904.8
2007 Total	141	9079.9	7487.2
2008 Total	83	5589.1	4356.2
2009 Total	153	13476.8	8595.6
2010 Total	40	5511.7	3135.4
Total	**1000**	**71754.2**	**52629.2**

Figure VII-2. Pounds of chlorpyrifos applied within the French Camp Slough @ Airport Way site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.



TableVII-10.Total pounds of active ingredient (AI) for chlorpyrifos based on PUR data from 2004-2010 within the French Camp Slough @ Airport Way subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	GOVERN 4E INSECTICIDE	30.3
		LOCK-ON INSECTICIDE	2732.5
		LORSBAN 4E-HF	2601.0
		LORSBAN ADVANCED	194.4
		LORSBAN-4E	833.2
	ALMOND	CHLORPYRIFOS 4E AG	1639.9
		GOVERN 4E INSECTICIDE	312.9
		LORSBAN 4E INSECTICIDE	642.4
		LORSBAN 4E-HF	1532.3
		LORSBAN ADVANCED	1557.0
		LORSBAN-4E	7594.0
		WARHAWK	231.5
	APPLE	LORSBAN ADVANCED	244.1
		LORSBAN-4E	940.6
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	71.6
		GOVERN 4E INSECTICIDE	313.1
		LORSBAN 15G GRANULAR INSECTICIDE	12325.7
		LORSBAN 4E-HF	2131.6
		LORSBAN ADVANCED	30.8
		LORSBAN-4E	422.1
		NUFOS 15G	4127.4
		NUFOS 4E	74.2
	GRAPES, WINE	LORSBAN 4E-HF	1085.3
		LORSBAN ADVANCED	8084.6
		LORSBAN-4E	460.9
	NECTARINE	LORSBAN 4E INSECTICIDE	5.0
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	WARHAWK	3.0
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	LORSBAN 15G GRANULAR INSECTICIDE	1.6
	PEACH	LORSBAN 4E INSECTICIDE	5.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	459.5
		GOVERN 4E INSECTICIDE	3724.2
		LORSBAN 4E INSECTICIDE	2289.1
		LORSBAN 4E-HF	4453.8
		LORSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	1.0
		LORSBAN ADVANCED	679.8
		LORSBAN-4E	9857.7
		NUFOS 4E	61.0

ALFALFA - Total Pounds Chlorpyrifos Applied	**6391.4**
ALMOND - Total Pounds Chlorpyrifos Applied	**13510.0**
APPLE - Total Pounds Chlorpyrifos Applied	**1184.7**
CORN - Total Pounds Chlorpyrifos Applied	**19496.5**
GRAPES - Total Pounds Chlorpyrifos Applied	**9630.7**
NECTARINE - Total Pounds Chlorpyrifos Applied	**5.0**

Chemical Name	Commodity	Product Name	Lbs AI Applied
		N-OUTDR GRWN TRNSPLNT - Total Pounds Chlorpyrifos Applied	3.0
		ONION - Total Pounds Chlorpyrifos Applied	1.6
		PEACH - Total Pounds Chlorpyrifos Applied	5.0
		WALNUT - Total Pounds Chlorpyrifos Applied	21526.1
		Total Pounds Chlorpyrifos Applied (2004-2010)	71754.2

The Coalition noted in the 2008 Management Plan that the chlorpyrifos concentrations found in French Camp Slough were most likely the result of runoff in storm water or irrigation return flows. The large concentrations of the chlorpyrifos exceedances suggest that the chlorpyrifos was a result of runoff rather than spray drift.

As discussed above, PUR data indicated numerous applications of large amounts of chlorpyrifos occur across the watershed in all years. Exceedances at locations upstream from French Camp; Unnamed Drain to Lone Tree Creek (Temple Creek) and Lone Tree Creek have coincided with several exceedances at French C amp Slough, indicating contamination is occurring across the subwatershed /immediately upstream of French Camp Slough. Therefore, management of chlorpyrifos in this watershed should focus on providing information on a watershed basis to growers to review their operation and determine if storm water runoff and irrigation return flows are managed properly, specifically to growers with the potential to drain to the creek.

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition is focusing outreach to growers who have parcels in the direct drainage area of the subwatershed and who used chlorpyrifos within the last two years and has compiled a targeted list of growers.

The Coalition began conducting individual contact meetings with targeted growers during the winter of 2011. Although meetings focus mainly on chlorpyrifos exceedances, all water quality results are reviewed and discussed including exceedances of DO, pH, *E. coli,* dieldrin, lead, diazinon, diuron, copper, and *C. dubia, H. azteca,* and *S. capricornutum* toxicity. The Coalition contacted 13 targeted growers accounting for 2,736 acres of direct drainage within the subwatershed. To date, the Coalition has achieved 100% of initial contact for targeted growers in the French Camp Slough subwatershed.

Grower surveys completed at the meetings, documenting members' current practices and indicating which recommended practices growers anticipated implementing in the upcoming years, will be compiled and assessed by the Coalition. The Coalition is hopeful growers will be able to implement recommended practices during the irrigation season of 2011. Follow up meetings with targeted growers will occur in the fall of 2011 through the winter of 2012 to determine what additional management practices were implemented in 2011 and if additional practices are planned for 2012.

Management Plan Monitoring was conducted in 2010 at French Camp Slough @ Airport Way during months when previous exceedances occurred. The Coalition plans to conduct MPM through 2013 to evaluate improvements in water quality as recommended management practice implementation occurs.

Diazinon

The WQTL for diazinon (0.1µg/L) has been exceeded twice at this site (February 2007 and January 2008) (Table VII-6). The February 2007 exceedance coincided with *C. dubia* toxicity. French Camp Slough was not monitored for diazinon during January (storm event) and February 2010.

The PUR from the French Camp Slough subwatershed area were reviewed for diazinon use (Table VII-11, Figure VII-3). The greatest amount of diazinon use occurred in 2005 (1,852 lbs AI) with the lowest use in 2010 (175 lbs AI). The greatest diazinon use has occurred consistently in the month of January (Table VII-11, Figure VII-3).

The Coalition also used PUR data to determine which crops receive the most applications of diazinon (Table VII-12). The largest amount of diazinon applied from 2004 through 2010 was to almonds (4,449 lbs AI) followed by peaches (360 lbs AI). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table VII-12).

Table VII-11. Number of diazinon applications, total pounds applied and total acres treated by month for August 2004 – December 2010 in the French Camp Slough @ Airport Way site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Diazinon Applications	Pounds of AI Applied	Acres Treated
August, 2004	2	10.1	20
December, 2004	8	149.4	97.3
January, 2005	25	1567.9	1014
February, 2005	5	99.1	57.5
August, 2005	1	39.7	40
December, 2005	7	145.6	72.5
January, 2006	28	1349.4	925
February, 2006	2	75.5	48
May, 2006	4	6.7	5.1
December, 2006	10	156.1	101.5
January, 2007	3	97.3	50
February, 2007	5	72.4	40
March, 2007	2	17.5	9
April, 2007	1	1.6	3
May, 2007	3	8.9	1
June, 2007	1	1.5	0
July, 2007	2	81.1	59
August, 2007	1	4.8	30
December, 2007	5	5.3	4.3
January, 2008	11	771.3	462
February, 2008	2	50	20
April, 2008	2	9.7	2.5
May, 2008	3	10.1	2.5
July, 2008	1	2.0	10
December, 2008	1	15.9	8
January, 2009	2	60.8	26
March, 2009	1	16	8
May, 2009	2	14.9	7.8

Month/Year	Number of Diazinon Applications	Pounds of AI Applied	Acres Treated
June, 2009	3	82.8	146.7
August, 2009	1	1.9	10
December, 2009	16	379.6	161.8
February, 2010	1	12.6	6
April, 2010	3	67	42
June, 2010	1	50	25
August, 2010	1	22.5	15
December, 2010	2	23.8	16
Summaries by Year			
2004 Total	10	159.5	117.3
2005 Total	38	1852.4	1184
2006 Total	44	1587.7	1079.6
2007 Total	23	290.3	196.3
2008 Total	20	858.9	505
2009 Total	25	555.9	360.3
2010 Total	8	175.9	104
Total	**168**	**5480.6**	**3546.4**

Figure VII-3. Pounds of diazinon applied within the French Camp Slough @ Airport Way site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

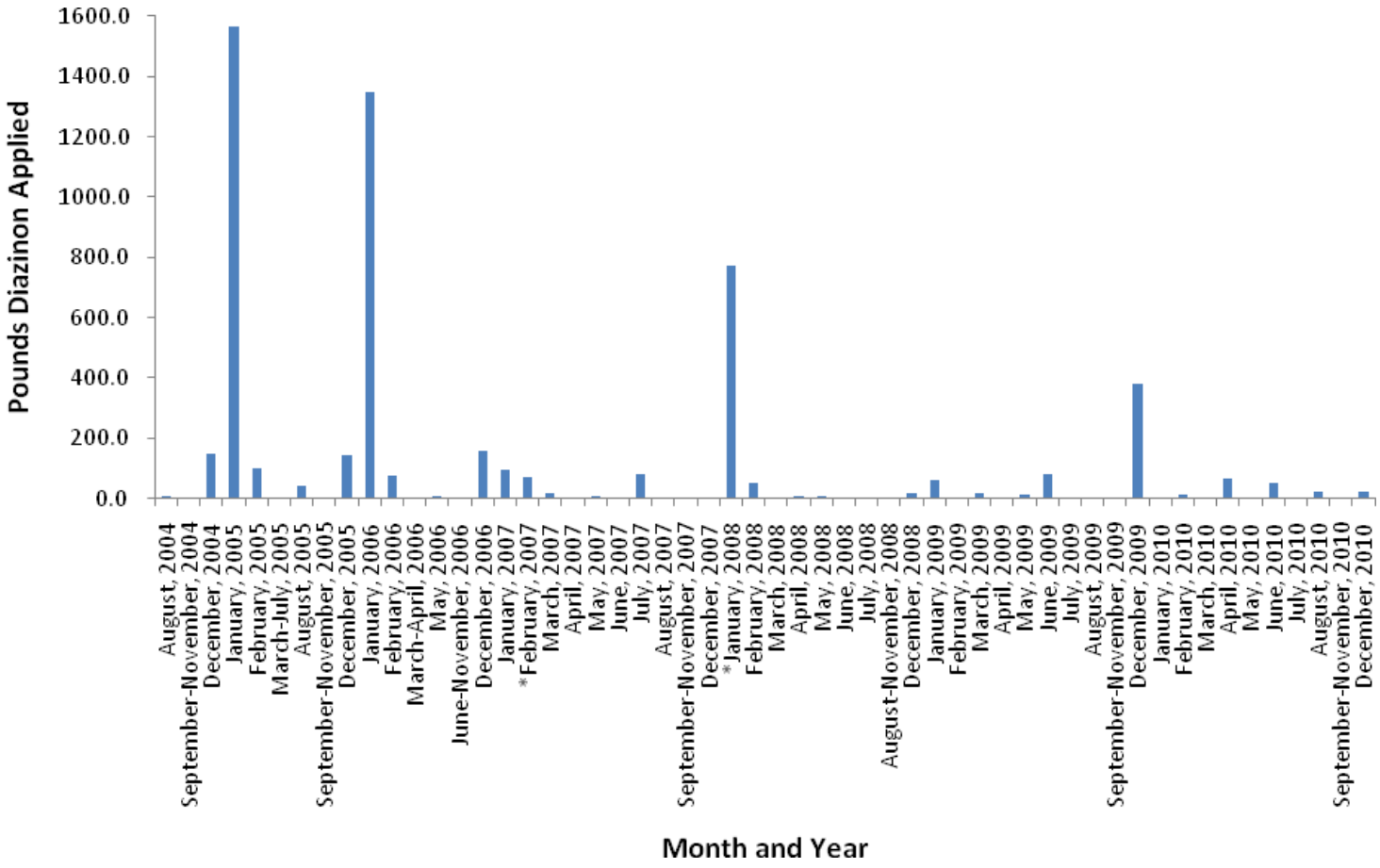


Table VII-12.Total pounds active ingredient (AI) applied for diazinon based on PUR data from 2004-2010 within the French Camp Slough @ Airport Way subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	ALMOND	CLEAN CROP DIAZINON AG600 WBC	233.3
		DIAZINON 50W	191.3
		DIAZINON AG 500	1885.4
		DIAZOL 50 W	103.0
		DIAZOL AG 500	1730.4
		GOWAN DIAZINON 4E	305.9
	APPLE	D.Z.N. DIAZINON 50W (WITHDRAWN)	37.8
		DIAZINON 50W	72.5
		DIAZOL 50 W	3.8
	APRICOT	CLEAN CROP DIAZINON AG600 WBC	2.5
		DIAZOL 50 W	8.8
	CHERRY	CLEAN CROP DIAZINON AG600 WBC	39.9
		D.Z.N. DIAZINON AG600 WBC (WITHDRAWN)	44.9
		DIAZINON 50W	258.7
		DIAZOL 50 W	7.0
	GRAPES, WINE	DIAZINON AG 500	19.8
	NECTARINE	CLEAN CROP DIAZINON AG600 WBC	6.2
		D.Z.N. DIAZINON AG600 WBC (WITHDRAWN)	7.5
		DIAZINON AG 500	19.8
		DIAZOL 50 W	5.8
		DIAZOL AG 500	19.8
	PEACH	CLEAN CROP DIAZINON AG600 WBC	252.1
		DIAZINON AG 500	51.6
		DIAZOL 50 W	6.8
		DIAZOL AG 500	9.9
		DREXEL DIAZINON INSECTICIDE	40.5
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	DIAZOL 50 W	8.8
	TOMATOES, FOR PROCESSING/CANNING	DIAZINON 50W	18.6
		DIAZINON AG 500	19.7
		DIAZOL AG 500	4.8
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CLEAN CROP DIAZINON AG500 INSECTICIDE	17.7
		DIAZINON AG 500	39.7
		PROKIL DIAZINON 4EC	6.4

ALMOND - Total Pounds Diazinon Applied	**4449.2**
APPLE - Total Pounds Diazinon Applied	**114.1**
APRICOT - Total Pounds Diazinon Applied	**11.2**
CHERRY - Total Pounds Diazinon Applied	**350.6**
GRAPES - Total Pounds Diazinon Applied	**19.8**
NECTARINE - Total Pounds Diazinon Applied	**59.2**
PEACH - Total Pounds Diazinon Applied	**360.8**
PLUM - Total Pounds Diazinon Applied	**8.8**
TOMATOES - Total Pounds Diazinon Applied	**43.2**
WALNUT - Total Pounds Diazinon Applied	**63.8**
Total Pounds Diazinon Applied (2004-2010)	**5480.6**

The Coalition's strategy for addressing diazinon exceedances in the French Camp Slough subwatershed involves contacting specific growers whose parcels have the potential to drain to the creek. Individual grower contacts that occurred within this subwatershed are described under the chlorpyrifos outreach section above and included discussions of management practices relevant to storm water retention.

Priority C Constituents

Water samples from French Camp Slough had exceedances for priority C constituents copper and diuron.

Copper

Twelve exceedances of the copper WQTL have occurred in the French Camp Slough site subwatershed in May through August 2006 and 2007, and in February 2007. None of the exceedances were associated with toxicity to *S. capricornutum*. During 2010 MPM, French Camp Slough was monitored for copper in months of past exceedances and there no exceedances of the copper WQTL were experienced. However, copper exceedances at subwatersheds located upstream continued to occur during irrigation months in 2010; Littlejohns Creek on May 11, 2010 and Unnamed Drain on April 13, 2010.

The PUR data were reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table VII-13, Figure VII-4). Since 2005 there has been a general decrease in the amount of copper applied; the amount of copper used in 2005 was 89,133 lbs AI compared to 8,853 lbs AI in 2010. The greatest amount of copper use has been consistently in the months of April and May. Not all exceedances occurred during months of the greatest amount of use (Figure VII-4).

The largest amount of copper applied from 2004 through 2010 was associated with walnuts (156,940 lbs AI) and almonds (90,248 lbs AI), see Table VII-14. The most common products containing copper used within this subwatershed are DuPont Kocide and Kocide (Table VII-14).

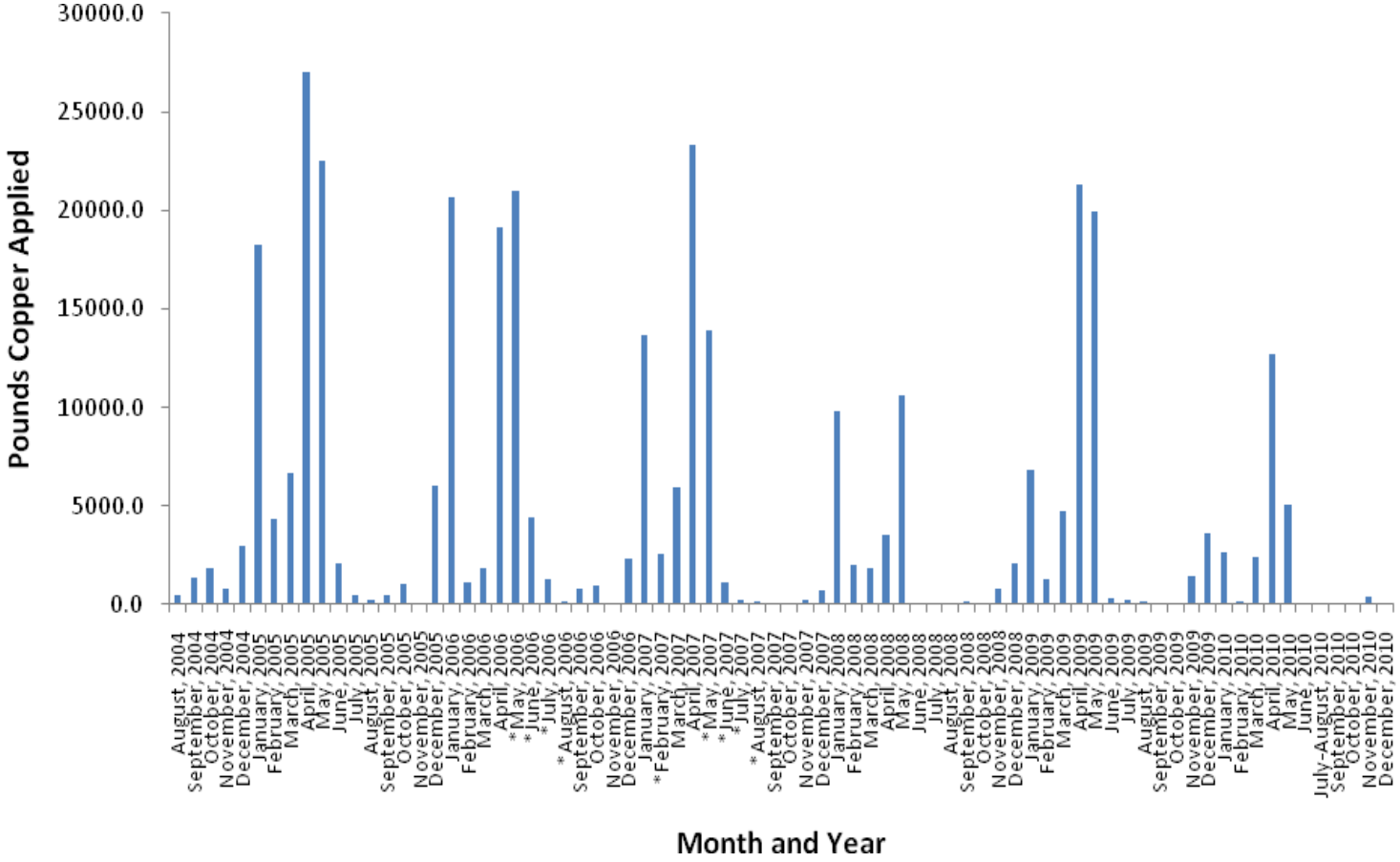
Table VII-13. Number of copper applications, total pounds applied and total acres treated by month for August 2004 – December 2010 in the French Camp Slough @ Airport Way site subwatershed.
If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
August, 2004	5	448.2	265
September, 2004	19	1345.8	877.4
October, 2004	20	1840.8	837
November, 2004	7	821.3	259
December, 2004	18	3003.8	489.3
January, 2005	81	18223.9	3505.8
February, 2005	55	4344.0	1590.8
March, 2005	57	6634.7	1802.2
April, 2005	125	27034.7	5924.3
May, 2005	94	22525.8	4598.4
June, 2005	21	2056.9	933.3
July, 2005	8	462.4	392.9
August, 2005	5	248.1	229
September, 2005	10	510.5	332

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
October, 2005	14	1059.6	709
December, 2005	28	6032.9	832.5
January, 2006	116	20669.8	4539
February, 2006	37	1163.1	855.8
March, 2006	43	1878.9	1379
April, 2006	112	19104.6	5029.0
May, 2006	72	20992.3	3571.7
June, 2006	19	4443.5	1189
July, 2006	12	1292.3	794.8
August, 2006	4	184.3	115
September, 2006	12	779.1	524.5
October, 2006	14	968.7	626
December, 2006	21	2338.6	340.5
January, 2007	80	13630.4	3454
February, 2007	31	2540.3	1048
March, 2007	43	5959.3	1634
April, 2007	136	23286.8	4903
May, 2007	36	13874.9	2058
June, 2007	11	1091.1	622
July, 2007	7	240.3	475
August, 2007	1	138.8	43
October, 2007	5	19.7	14
November, 2007	9	211.8	66
December, 2007	14	732.1	126.5
January, 2008	58	9833.3	2404.8
February, 2008	26	2043.0	761.3
March, 2008	26	1858.1	779.3
April, 2008	41	3536.4	1465.4
May, 2008	21	10617.3	936
June, 2008	1	86.0	70
July, 2008	2	48.8	141
September, 2008	2	159.9	42
November, 2008	1	770	100
December, 2008	7	2098.0	416
January, 2009	33	6820.6	1515.5
February, 2009	15	1299.9	818.2
March, 2009	19	4761.9	715.8
April, 2009	146	21300.9	7085.2
May, 2009	58	19910.2	2860.8
June, 2009	12	324.1	499.5
July, 2009	5	216.9	232
August, 2009	2	181.8	126
September, 2009	1	2.5	3
November, 2009	7	1461.3	280.5
December, 2009	26	3636.7	593.6
January, 2010	16	2678.3	749
February, 2010	3	157.2	272
March, 2010	19	2448.3	670
April, 2010	105	12709.5	5178.3

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
May, 2010	29	5049.2	1835.3
June, 2010	1	22.1	9
September, 2010	1	15.4	10
November, 2010	3	438.9	114
December, 2010	2	79.2	16
Summaries by Year			
2004 Total	69	7459.9	2727.7
2005 Total	498	89133.6	20850.1
2006 Total	462	73815.2	18964.3
2007 Total	373	61725.5	14443.5
2008 Total	185	31050.6	7115.7
2009 Total	324	59916.8	14730.1
2010 Total	179	23598.2	8853.6
Total	**2090**	**346699.7**	**87684.9**

Figure VII-4. Pounds of copper applied within the French Camp Slough @ Airport Way site subwatershed by month for 2004-2010.
Asterisk (*) denotes months with exceedances.



TableVII-14.Total pounds active ingredient (AI) applied for copper based on PUR data from 2004-2010 within the French Camp Slough @ Airport Way subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 101	15.4
		KOCIDE DF	964.0
	ALMOND	BASIC COPPER 53	1623.1
		BASICOP	92.8
		BLUE SHIELD DF	12.3
		CHAMP FORMULA 2 FLOWABLE	209.3
		CHAMP FORMULA II DRY FLOWABLE	1226.9
		CHAMPION WETTABLE POWDER	1111.7
		COPPER POWER FLOWABLE	7.5
		CUPROFIX DISPERSS	678.0
		CUPROFIX ULTRA 40 DISPERSS	1578.4
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	13856.5
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	157.2
		HYDROX	6427.6
		KOCIDE 101	5341.6
		KOCIDE 2000	9039.9
		KOCIDE DF	11994.0
		NORDOX	948.4
		NORDOX 75 WG	19636.0
		NU-COP 50 WP	973.3
		NU-COP 50DF	15333.8
	APPLE	KOCIDE 101	33.9
		KOCIDE DF	127.7
		NU-COP 50DF	107.8
	APRICOT	NORDOX 75 WG	26.0
		NU-COP 50DF	7.7
	CHERRY	CHAMPION WETTABLE POWDER	81.8
		CUPROFIX DISPERSS	208.1
		CUPROFIX ULTRA 40 DISPERSS	234.6
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	184.0
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	44.2
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	862.1
		HTH ALKALINITY PLUS	234.6
		HYDROX	158.8
		KOCIDE 101	2603.0
		KOCIDE 4.5 LF	131.1
		KOCIDE DF	1345.9
		NORDOX	654.2
		NORDOX 75 WG	21.0
		NU-COP 50DF	1491.5
		TRIANGLE BRAND COPPER SULFATE INSTANT POWDER	4306.5
	GRAPES, WINE	CHAMP FLOWABLE	17.8
		CHAMP FORMULA 2 FLOWABLE	1809.0
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	279.1
		COPPER-COUNT-N	1.9

Chemical Name	Commodity	Product Name	Lbs AI Applied
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	835.4
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	426.9
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	1562.2
		HYDROX	92.4
		KOCIDE 101	3140.3
		KOCIDE 2000	347.5
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	414.0
		KOCIDE DF	30.7
		NORDOX	645.2
		NU-COP 3L	456.9
		NU-COP 50DF	270.1
		STRETCH FUNGICIDE	3.5
		TENN-COP 5E	72.1
		TENN-COP 5E FUNGICIDE/BACTERICIDE	1046.7
		WIL-DRY	86.0
	NECTARINE	BLUE SHIELD DF	38.5
		HYDROX	77.0
		NORDOX 75 WG	253.2
		NU-COP 50DF	42.4
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	CHAMP FORMULA 2 FLOWABLE	5.1
		CLEAN CROP C-O-C-S WETTABLE	8.9
		KOCIDE 2000	16.7
		KOCIDE 2000 T/N/O	10.8
		PHYTON-27 BACTERICIDE & FUNGICIDE	2.5
		PHYTON-27 FUNGICIDE	1.3
	OLIVE (ALL OR UNSPEC)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	526.2
		NU-COP 50DF	2433.2
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	CHAMP FORMULA 2 FLOWABLE	75.7
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	376.9
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	615.5
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	86.0
		KOCIDE 101	2156.8
		KOCIDE 2000	751.3
		KOCIDE DF	1481.4
		NU-COP 50DF	477.4
	PEACH	BLUE SHIELD DF	46.2
		HYDROX	38.5
		KOCIDE 2000	58.1
		NORDOX 75 WG	740.9
		NU-COP 50DF	888.6
	PEAR	KOCIDE 101	35.5
		KOCIDE DF	13.8
	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	36.3
		KOCIDE 101	369.6
		KOCIDE 2000	6.5
		KOCIDE DF	1870.9
		NU-COP 50DF	145.5
	PLUM (INCLUDES WILD PLUMS FOR HUMAN	NORDOX 75 WG	26.0

Chemical Name	Commodity	Product Name	Lbs AI Applied
	CONSUMPTION)		
	RICE (ALL OR UNSPEC)	BLUE VIKING COPPER SULFATE STAR SHINE CRYSTAL	2128.5
		CHIPCO COPPER SULFATE CRYSTALS	49069.4
	SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS,ETC.)	KOCIDE 101	24.6
	TOMATOES, FOR PROCESSING/CANNING	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	6.5
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	21.2
		HYDROX	101.6
		KOCIDE 101	2017.5
		KOCIDE 2000	16.1
		KOCIDE 4.5 LF	351.3
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	77.1
		KOCIDE DF	3684.2
		NU-COP 3L	93.4
		NU-COP 50DF	2083.5
		NU-COP 50WP	741.5
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	BASIC COPPER 53	2156.0
		BLUE SHIELD	69.3
		BLUE SHIELD DF	261.8
		CHAMP FORMULA 2 FLOWABLE	481.7
		CHAMPION WETTABLE POWDER	130.9
		COPPER SULFATE CRYSTALS	222.8
		CUPROFIX ULTRA 40 DISPERSS	140.8
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	411.2
		DUPONT KOCIDE 101 FUNGICIDE/BACTERICIDE	492.8
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	9018.0
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	5547.0
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	7434.5
		HYDROX	2169.9
		KENTAN DF	728.2
		KOCIDE 101	42512.0
		KOCIDE 2000	6052.2
		KOCIDE DF	26695.9
		NORDOX	408.9
		NORDOX 75 WG	879.3
		NU-COP 50 WP	5705.9
		NU-COP 50DF	45352.2
		NU-COP 50WP	69.3

ALFALFA - Total Pounds Copper Applied	**979.4**
ALMOND - Total Pounds Copper Applied	**90248.1**
APPLE - Total Pounds Copper Applied	**269.4**
APRICOT - Total Pounds Copper Applied	**33.7**
CHERRY - Total Pounds Copper Applied	**12561.5**
GRAPES - Total Pounds Copper Applied	**11537.9**
NECTARINE - Total Pounds Copper Applied	**411.0**
N-OUTDR GRWN TRNSPLNT - Total Pounds Copper Applied	**45.2**
OLIVE - Total Pounds Copper Applied	**2959.4**

Chemical Name	Commodity	Product Name	Lbs AI Applied
		ONION - Total Pounds Copper Applied	6021.0
		PEACH - Total Pounds Copper Applied	1772.2
		PEAR - Total Pounds Copper Applied	49.3
		PEPPERS - Total Pounds Copper Applied	2428.7
		PLUM - Total Pounds Copper Applied	26.0
		RICE - Total Pounds Copper Applied	51197.9
		SOIL APPLICATION - Total Pounds Copper Applied	24.6
		TOMATOES - Total Pounds Copper Applied	9194.0
		WALNUT - Total Pounds Copper Applied	156940.3
		Total Pounds Copper Applied (2004-2010)	346699.7

The Coalition noted in the 2008 Management Plan that copper appears to be mobilized during winter storm water discharges and through irrigation return flows to French Camp Slough. As discussed above, copper is heavily used in the subwatershed with numerous applications being made across numerous sections. Therefore, the Coalition plans to provide information on a watershed basis to growers to review their operation and determine if storm water runoff and irrigation return flows are managed properly, specifically to growers with the potential to drain to the creek. This is consistent with the strategy to address priority A/B constituent exceedances.

Diuron

Two exceedances of the diuron WQTL (2 µg/L) occurred in the French Camp Slough site subwatershed, in February 2007 and January 2008. Diuron was not monitored for during the 2009 to 2010 storm season. However, in 2011 French Camp Slough is scheduled for Assessment Monitoring where diuron and all other constituents of concern will be analyzed.

PUR data were reviewed for the number of monthly diuron applications, pounds of active ingredient applied, and acres treated (Table VII-15, Figure VII-5). There has been a general decrease in diuron use since 2006. The amount of diuron used in 2006 was 6,510 lbs AI compared to 1,199 lbs AI in 2010. The months with the greatest amount of use have consistently been between October and January (Figure VII-5).

The largest amounts of diuron applied from 2005 through 2010 have been associated with alfalfa (7,926 lbs AI), walnuts (4,922 lbs AI) and grapes (4,342 lbs AI), see Table VII-16.

Table VII-15. Number of diuron applications, total pounds applied and total acres treated by month for August 2004 – December 2010 in the French Camp Slough @ Airport Way site subwatershed.

If a month is not included in the tables, no applications were made.

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
September, 2004	1	175.4	90
November, 2004	10	544.0	445
December, 2004	30	1424.3	1024.3
January, 2005	15	1001.1	1435
February, 2005	12	176.6	144
March, 2005	1	26.0	40
April, 2005	7	140.1	180.5
June, 2005	1	2.3	60
July, 2005	2	37.7	27
September, 2005	6	80.7	338
October, 2005	8	361.3	430.5
November, 2005	6	242.9	131
December, 2005	15	832.1	697.2
January, 2006	18	1049.4	844
February, 2006	31	1267.2	1572.9
March, 2006	2	74.7	88.3
April, 2006	5	69.7	74.9
May, 2006	8	153.7	142.4
June, 2006	2	23.1	47.5
July, 2006	2	25.3	36.7
August, 2006	2	69.2	65
September, 2006	2	102.9	165
October, 2006	11	446.5	499.3
November, 2006	20	1427.9	1010.5
December, 2006	25	1800.8	1253
January, 2007	2	26.1	46
February, 2007	13	722.2	1400
March, 2007	9	266.5	396
April, 2007	6	88.6	128
May, 2007	8	212.6	299
October, 2007	1	40	50
November, 2007	18	486.5	638.5
December, 2007	18	1360.4	1011.6
January, 2008	4	225.5	341
February, 2008	3	48.6	43.9
March, 2008	7	228.6	259.8
April, 2008	2	23.7	12.16
May, 2008	6	98.6	61.7
June, 2008	1	160	100
October, 2008	1	43.7	75
November, 2008	9	241.7	185.8
December, 2008	6	586.7	400
January, 2009	9	108.0	206
February, 2009	2	123.4	72.2
March, 2009	7	249.4	158.3

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
April, 2009	4	213.9	137.8
May, 2009	4	107.3	164
June, 2009	1	57.3	39.2
July, 2009	1	160	100
October, 2009	2	174.0	135
November, 2009	10	305.5	223
December, 2009	18	999.9	896.9
January, 2010	6	325.7	272.4
February, 2010	7	437.4	299.6
May, 2010	3	9.3	42.1
July, 2010	1	12	7.5
November, 2010	8	244.0	381.5
December, 2010	3	171.1	101.2
Summaries by Year			
2004 Total	41	2143.8	1559.3
2005 Total	73	2900.8	3483.2
2006 Total	128	6510.3	5799.5
2007 Total	75	3202.9	3969.1
2008 Total	39	1657.1	1479.4
2009 Total	58	2498.7	2132.4
2010 Total	28	1199.5	1104.3
Total	**442**	**20113.1**	**19527.1**

Figure VII-5. Pounds of diuron applied within the French Camp Slough @ Airport Way site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

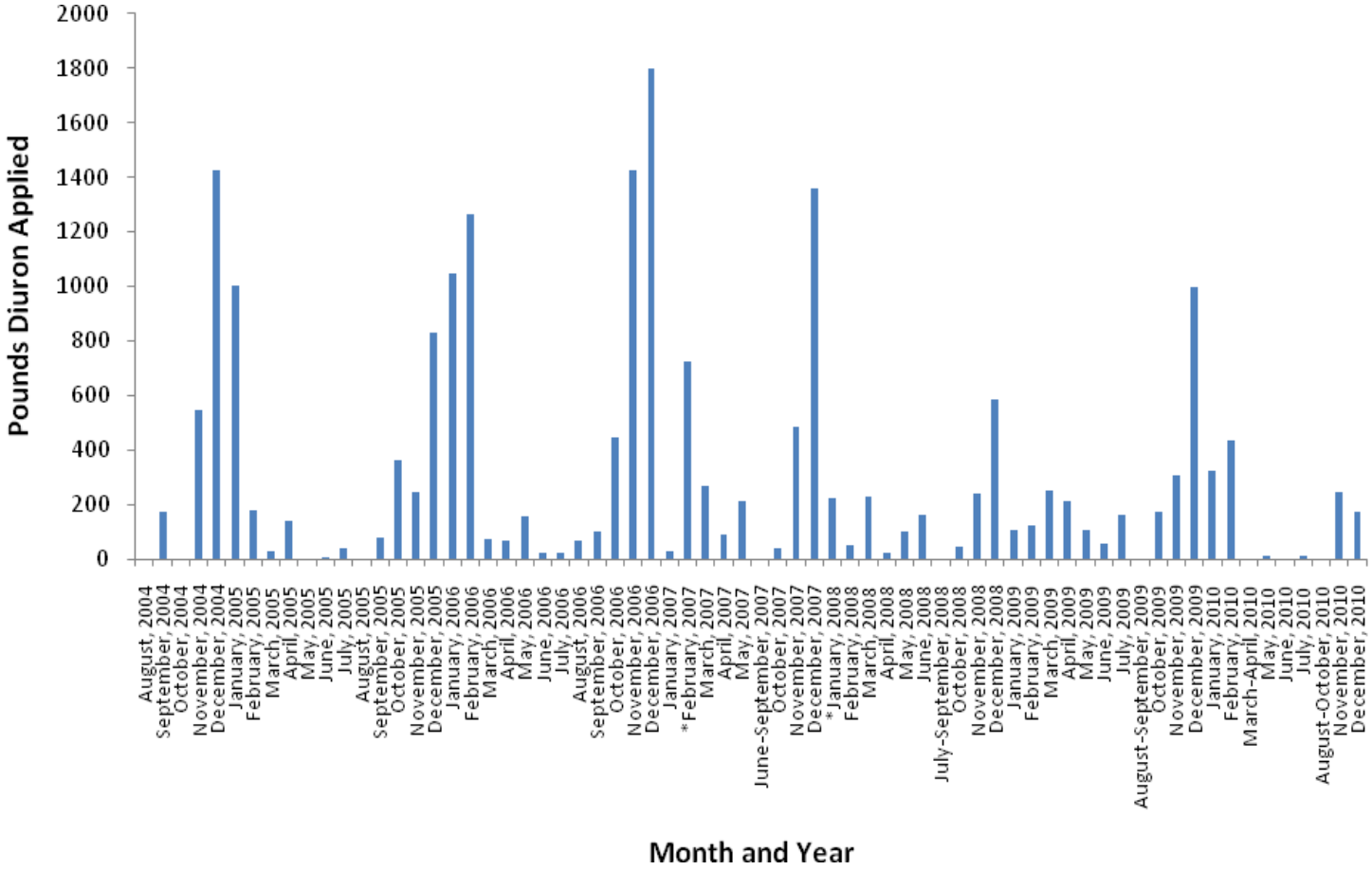


Table VII-16.Total pounds active ingredient (AI) applied for diuron based on PUR data from 2004-2010 within the French Camp Slough @ Airport Way subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	6501.8
		DIURON 4L	196.7
		DUPONT DIREX 4L HERBICIDE	344.8
		KARMEX DF HERBICIDE	883.2
	APPLE	DIREX 4L	254.0
		DIREX 80DF	8.8
		DUPONT DIREX 4L HERBICIDE	47.6
		KARMEX DF HERBICIDE	22.4
	CORN (FORAGE - FODDER)	DU PONT KARMEX DF HERBICIDE	2.3
	COTTON, GENERAL	GINSTAR EC COTTON DEFOLIANT	7.6
	GRAPES, WINE	DIREX 4L	1899.4
		DIURON 400 HERBICIDE	50.8
		DIURON 4L HERBICIDE	636.0
		DREXEL DIURON 4L HERBICIDE	97.0
		DU PONT KARMEX DF HERBICIDE	0.4
		DUPONT DIREX 4L HERBICIDE	112.9
		KARMEX DF HERBICIDE	703.4
		KARMEX XP HERBICIDE	842.3
	OLIVE (ALL OR UNSPEC)	DUPONT DIREX 4L HERBICIDE	28.0
	PASTURES (ALL OR UNSPEC)	DIREX 4L	3.9
	PEAR	DIREX 4L	25.0
	SOIL APPLICATION, PREPLANT-OUTDOOR (SEEDBEDS,ETC.)	DIREX 4L	16.6
	UNCULTIVATED NON-AG AREAS (ALL OR UNSPEC)	DIREX 4L	844.8
		DIREX 80DF	1056.0
		DIURON 80 DF HERBICIDE	204.8
		DU PONT KROVAR I DF HERBICIDE	150.0
		DUPONT DIREX 4L HERBICIDE	10.0
		DUPONT KARMEX XP HERBICIDE	240.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	3623.8
		DIREX 80DF	61.0
		DIURON 400 HERBICIDE	76.3
		DIURON 4L	202.7
		DIURON 4L HERBICIDE	53.6
		DREXEL DIURON 4L HERBICIDE	275.8
		DU PONT KARMEX DF HERBICIDE	205.8
		DUPONT DIREX 4L HERBICIDE	89.1
		KARMEX DF HERBICIDE	334.5

ALFALFA - Total Pounds Diuron Applied	**7926.6**
APPLE - Total Pounds Diuron Applied	**332.7**
CORN - Total Pounds Diuron Applied	**2.3**
COTTON - Total Pounds Diuron Applied	**7.6**
GRAPES - Total Pounds Diuron Applied	**4342.2**
OLIVE - Total Pounds Diuron Applied	**28.0**
PASTURES - Total Pounds Diuron Applied	**3.9**
PEAR - Total Pounds Diuron Applied	**25.0**

Chemical Name	Commodity	Product Name	Lbs AI Applied
		SOIL APPLICATION - Total Pounds Diuron Applied	16.6
		UNCULTIVATED NON-AG AREAS - Total Pounds Diuron Applied	2505.6
		WALNUT - Total Pounds Diuron Applied	4922.5
		Total Pounds Diuron Applied (2004-2010)	20113.1

Diuron is most likely transported to French Camp Slough via storm water runoff. As discussed above, diuron applications have decreased over the past five years. However, the Coalition plans to provide information on a watershed basis to growers to review their operation and determine if storm water runoff is managed properly, specifically to growers with the potential to drain to the creek. This is consistent with the strategy to address priority A/B constituent exceedances.

Priority D Constituents

Ceriodaphnia dubia toxicity

C. dubia toxicity was experienced in March 2006 and February 2007 (Table VII-6). The February toxicity event was associated with exceedances of chlorpyrifos and diazinon. The Toxicity Identification Evaluation (TIE) indicated that a metabolically activated pesticide was the cause of toxicity and the concentrations of diazinon and chlorpyrifos accounted for the toxicity. The March toxicity was not associated with any exceedance of a chemical. The TIE indicated PBO did not reduce toxicity and that a C18 column removed the toxicity indicating that the cause of the toxicity was a non-organophosphate organic compound, most probably a pyrethroid.

Controlling the movement of soluble pesticides to the slough, as discussed above under the chlorpyrifos section, will address the toxicity to *C. dubia*.

Hyalella azteca toxicity

H. azteca toxicity has occurred four times at this site (April 2006, August 2007, March 2008, and September 2010) (Table VII-5). The April 2006 toxicity was significant but sediment chemistry analyses were not performed and the exact constituent causing the toxicity and the source(s) remain unknown. The August 2007 toxicity was with a very low mortality rate (< 10%) and this toxicity is not considered to be biologically meaningful. The March 2008 toxicity was greater than the 80% survival (94%) which is the test acceptability criteria for a control, therefore was not considered ecologically significant. The samples collected during resampling in April 2008 were not toxic.

Starting in 2010, the Coalition began analyzing for pyrethroids and chlorpyrifos in toxic sediment samples below the threshold of 80 percent recovery. Sediment samples collected from French Camp Slough as part of MPM on September 7, 2010 tested toxic to *H. azteca* (1% survival compared to the control). Additional chemistry analyses for pyrethroids and chlorpyrifos were performed on the French Camp samples and the results indicated they contained pyrethroids and chlorpyrifos. Pyrethroids have a high sorption rate to sediment particles and can be carried with suspended particles in storm water runoff and irrigation tailwater to waterways. The Coalition is hopeful that by addressing storm water and irrigation tailwater management during outreach, movement of pyrethroids to waterways will also be addressed.

Selenastrum capricornutum toxicity

S. capricornutum toxicity has occurred at this site in February 2005 and April 2008 (Table VII-6). Neither one of the *S. capricornutum* toxicities were associated with an exceedance of any herbicides or copper.

The Coalition plans to discuss toxicity to *S. capricornutum* and other management plan constituents during individual grower meetings in an effort to decrease the occurrence of future toxicities.

Priority E Constituents

The following priority E constituents are listed under the French Camp Slough Site Subwatershed management plan: DO, *E. coli*, pH, dieldrin, and lead. Although these constituents will remain low priority, the Coalition will continue to collect sampling data and discuss these constituents during individual contacts and annual grower meetings.

Evaluation

French Camp Slough is a third priority site subwatershed within the SJCDWQC and is in its first year of focused outreach (2011 through 2013).

The Coalition's strategy for the French Camp Slough subwatershed is to focus on providing information on a watershed basis to growers to review their operation and determine if irrigation return flows are managed properly. Orchard growers should be targeted for outreach especially prior to the irrigation season. Outreach includes grower notification, management practice outreach and education, tracking the implementation of management practices, and providing information on special studies of management practice efficacy. The Coalition believes that because land use in this subwatershed is predominately orchards, outreach aimed toward relevant management practice implementation will target the largest audience and result in the greatest improvement of water quality.

Individual surveys to document current management practice implementations and assess future planned implementations are in the process of being filled out and will be completed by the end of October 2011. The Coalition will then assess these results and plan the final stages of outreach including re-contacting growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

VIII. MOKELUMNE RIVER @ BRUELLA RD

Management Plan Constituents

Priority C

- Copper

Priority D

- *Ceriodaphnia dubia* water column toxicity
- *Selenastrum capricornutum* water column toxicity

Priority E

- DO
- pH
- *E. coli*
- DDT

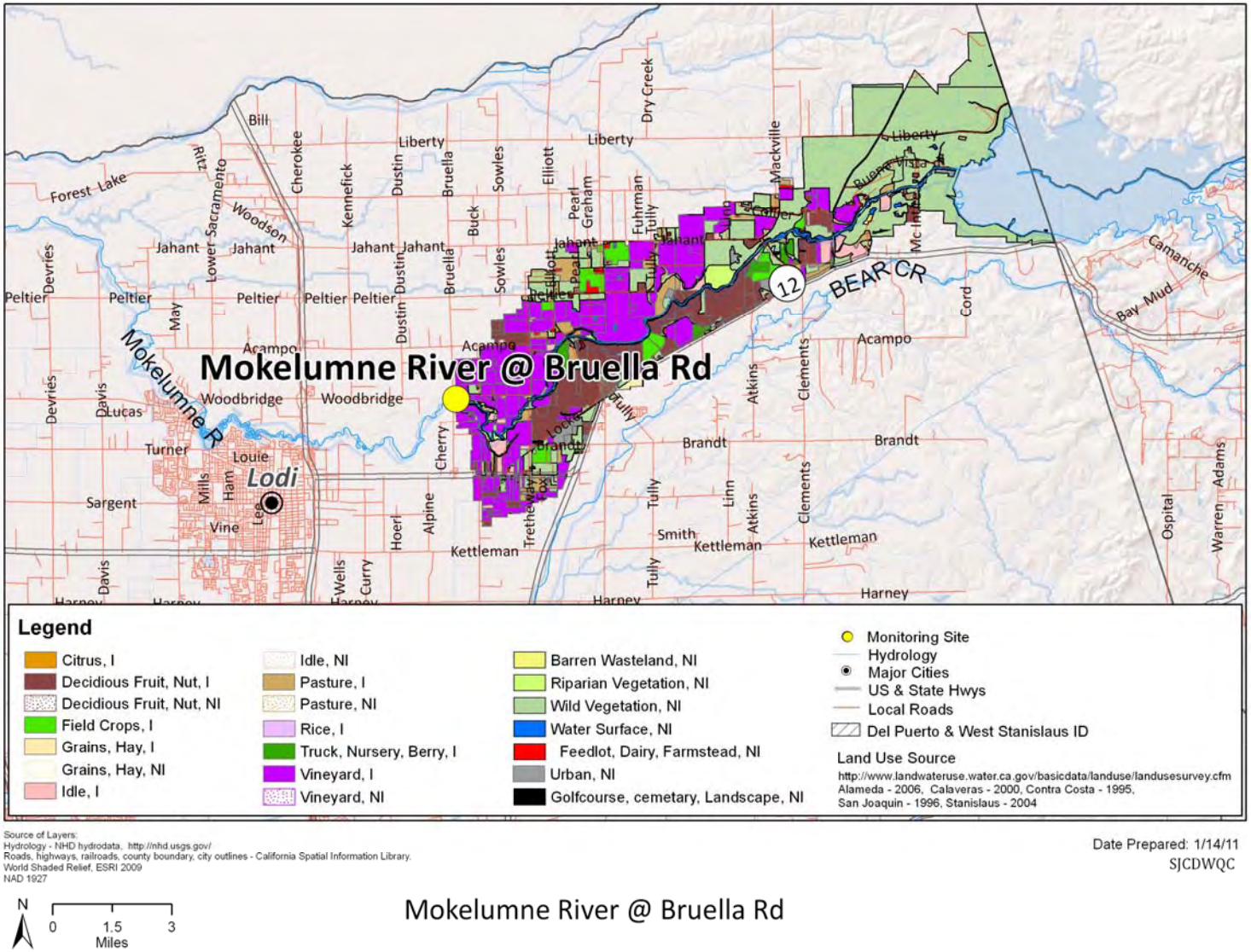
Description of Mokelumne River @ Bruella Rd Site Subwatershed

Mokelumne River @ Bruella Road (11,636 irrigated acres) – Upstream agriculture is primarily vineyards although some orchards are immediately adjacent to the site. Water released from Comanche Reservoir controls the amount of flow at this site as the vineyards are primarily irrigated by drip and the orchards are irrigated by microspray. This site integrates the signal from a relatively large upstream area (Figure VIII-1). This site subwatershed includes the upstream location Mokelumne River @ Fish Hatchery which was sampled in 2008 (Table VIII-1). Table VIII-1 includes the station name (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table VIII-1. Coordinates of the Mokelumne River @ Bruella Rd site subwatershed sampling location.

Sample Site	Station Code	Target Latitude	Target Longitude
Mokelumne River @ Bruella Rd	531XMRABR	38.160100	-121.205100
Mokelumne River @ Fish Hatchery	531CMRAFH	38.22639	-121.02639

Figure VIII-1. Site subwatershed map of land use for sample site at Mokelumne River @ Bruella Rd.



Source of Layers:
Hydrology - NHD hydrodata, http://nhd.usgs.gov/
Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library.
World Shaded Relief, ESRI 2009
NAD 1927

Date Prepared: 1/14/11
SJCDWQC

N
0 1.5 3
Miles

Mokelumne River @ Bruella Rd

Subwatershed Monitoring History

Mokelumne River @ Bruella Rd ambient water monitoring was initiated in the first season of Coalition monitoring in August of 2004 (Tables VIII-2, VIII -3). During one irrigation event in 2005 an upstream location (Mokelumne River @ Fish Hatchery) was selected to determine the contribution of sources upstream of the hatchery.

Mokelumne River @ Bruella Road is a Core Monitoring location under the new MRPP; this site is also scheduled for Assessment Monitoring during 2011. Core monitoring will resume at this location again in 2012.

The constituents sampled at this location from 2004 through 2010 are listed in Table VIII-3. Exceedances of field, organic and inorganic parameters as well as toxicity have occurred at the Mokelumne River @ Bruella Rd monitoring location. A summary and discussion of exceedances are provided in the next section (Table VIII-6).

Management Plan Monitoring began at Mokelumne River @ Bruella Rd in 2007. In 2007, MPM for water column toxicity to *C. dubia* and *S. capricornutum* took place during the irrigation months (April-September). In 2008, MPM was conducted during the irrigation season of 2008 at Mokelumne River @ Bruella Rd for copper (June, July and August), *C. dubia* toxicity (June and September) and *S. capricornutum* toxicity (May, July and August). In 2009, no MPM was scheduled and Core Monitoring took place. In 2010 MPM occurred at Mokelumne River @ Bruella Rd for *S. capricornutum* toxicity (April, May, July and August) and for total and dissolved copper (June-August). Management Plan Monitoring is described in better detail later in this document. During 2011, Mokelumne River is an Assessment Site and will be monitored for all priority constituents on a monthly basis.

Mokelumne River is considered an impaired waterbody in the Basin Plan and is listed on the 303d list for chlorpyrifos, copper, mercury, DO, zinc and water toxicity. Agriculture is listed as the potential source for the chlorpyrifos impairment.

Table VIII-2. Mokelumne River @ Bruella Rd sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	2	2	5	2	5	2	6	2	6	2	3	0	6	3	2	1	6	3
Events not Sampled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	2	5	2	5	2	6	2	6	2	3	0	6	3	2	1	6	3

Table VIII-3. Number of analyses performed per analyte in each sampling season and year for the Mokelumne River @ Bruella Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2004	2005		2006		2007		2008			2009				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Field and Physical Parameters																			
NA	Dissolved Oxygen	3	3	7	3	5	3	10	3	12	2	3		6	3	2	1	6	3
NA	Specific Conductivity	3	3	7	3	5	3	10	3	12	2	3		6	3	2	1	6	3
NA	pH	3	3	7	3	5	3	10	3	12	2	3		6	3	2	1	6	3
EPA 110.2	Color	2	2	5	2	5	2	6	1	6									
EPA 160.1	Dissolved Solids	2	2	5	2	5	3	7	2	6	2	3		6	3	2	1	6	3
EPA 160.2	Suspended Solids								1		2	3		6	3	2	1	6	3
EPA 180.1	Turbidity	2	2	5	2	5	3	6	2	6	2	3		6	3	2	1	6	3
EPA 415.1	Total Organic Carbon	2	2	5	2	5	2	6	2	6	2	3		6	3	2	1	6	3
SM 9223	*E. coli*	2	2	5	2		2		2	6	2	3		6	3	2	1	6	3
EPA 405.1	BOD					1	3	2											
Carbamates																			
EPA 8321A	Aldicarb					5	2	6	1	6									
EPA 8321A	Carbaryl					5	2	6	1	6									
EPA 8321A	Carbofuran					5	2	6	1	6									
EPA 8321A	Diuron					5	2	6	1	6									
EPA 8321A	Linuron					5	2	6	1	6									
EPA 8321A	Methiocarb					5	2	6	1	6									
EPA 8321A	Methomyl					5	2	6	1	6									
EPA 8321A	Oxamyl					5	2	6	1	6									
Organochlorines																			
EPA 8081A	DDD(p,p')					5	2	6	2	6	2	3		6	3				
EPA 8081A	DDE(p,p')					5	2	6	2	6	2	3		6	3				
EPA 8081A	DDT(p,p')					5	2	6	2	6	2	3		6	3				
EPA 8081A	Dicofol					5	2	6	2	6	2	3		6	3				
EPA 8081A	Dieldrin					5	2	6	2	6	2	3		6	3				
EPA 8081A	Endrin					5	2	6	2	6	2	3		6	3				
EPA 8081A	Methoxychlor					5	2	6	2	6	2	3		6	3				
Group A Pesticides																			
EPA 8081A	Aldrin								1		2	3		6	3				

Method	Analyte	2004	2005		2006		2007		2008			2009				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Chlordane								1		2	3		6	3				
EPA 8081A	Endosulfan I								1		2	3		6	3				
EPA 8081A	Endosulfan II								1		2	3		6	3				
EPA 8081A	HCH, alpha								1		2	3		6	3				
EPA 8081A	HCH, beta								1		2	3		6	3				
EPA 8081A	HCH, delta								1		2	3		6	3				
EPA 8081A	HCH, gamma								1		2	3		6	3				
EPA 8081A	Heptachlor								1		2	3		6	3				
EPA 8081A	Heptachlor epoxide								1		2	3		6	3				
EPA 8081A	Toxaphene								1		2	3		6	3				
Organophosphates																			
EPA 8141A	Azinphos methyl					5	2	6	1	6									
EPA 8141A	Chlorpyrifos	2	2	5	2	5	2	6	1	6									
EPA 8141A	Demeton-s																		
EPA 8141A	Diazinon	2	2	5	2	5	2	6	1	6									
EPA 8141A	Dichlorvos																		
EPA 8141A	Dimethoate					5	2	6	1	6									
EPA 8141A	Disulfoton					5	2	6	1	6									
EPA 8141A	Malathion					5	2	6	1	6									
EPA 8141A	Methamidophos					5	2	6	1	6									
EPA 8141A	Methidathion					5	2	6	1	6									
EPA 8141A	Molinate					5	2	6	1	6									
EPA 8141A	Parathion, Methyl					5	2	6	1	6									
EPA 8141A	Phorate					5	2	6	1	6									
EPA 8141A	Phosmet					5	2	6	1	6									
EPA 8141A	Thiobencarb					5	2	6	1	6									
Pyrethroids																			
EPA 8081A	Bifenthrin			1	2	5	2	6											
EPA 8081A	Cyfluthrin, total			1	2	5	2	6											
EPA 8081A	Cyhalothrin, lambda, total	2	2	5	2	5	2	6											
EPA 8081A	Cypermethrin, total	2	2	5	2	5	2	6											

Method	Analyte	2004	2005		2006		2007		2008			2009				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	2	5	2	5	2	6											
EPA 8081A	Permethrin, total	2	2	5	2	5	2	6											
Triazines																			
EPA 547M	Glyphosate					5	2	6	1	6									
EPA 549.2M	Paraquat dichloride					5	2	6	1	6									
EPA 619	Atrazine					5	2	6	1	6									
EPA 619	Cyanazine					5	2	6	1	6									
EPA 619	Simazine					5	2	6	1	6									
Metals (Total)																			
EPA 200.8	Arsenic					5	2	6	1	6									
EPA 200.8	Boron					5	2	6	1	6									
EPA 200.8	Cadmium					5	2	6	1	6									
EPA 200.8	Copper					5	2	6	1	9								3	
EPA 200.8	Lead					5	2	6	1	6									
EPA 200.8	Molybdenum																		
EPA 200.8	Nickel					5	2	6	1	6									
EPA 200.8	Selenium					5	2	6	1	6									
EPA 200.8	Zinc					5	2	6	1	6									
Metals (Dissolved)																			
EPA 200.8	Cadmium																		
EPA 200.8	Copper																	3	
EPA 200.8	Lead																		
EPA 200.8	Nickel																		
EPA 200.8	Zinc																		
Nutrients																			
SM 2340 C	Hardness as CaCO3					5	2	6	1	9								3	
EPA 300.0	Nitrate as N					5	2	6	1	6									
EPA 350.2	Ammonia as N					5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 351.3	Nitrogen, Total Kjeldahl					5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 354.1	Nitrite as N					5	2	6	1	6									
EPA 353.2	Nitrate + Nitrite as N								1		2	3		6	3	2	1	6	3

Method	Analyte	2004	2005		2006		2007		2008			2009				2010			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 365.2	Orthophosphate as P					5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 365.2	Phosphate as P					4	2	6	2	6	2	3		6	3	2	1	6	3
Toxicity																			
EPA 821/R-02-012	*Ceriodaphnia dubia*	3	4	6	3	5	3	8	1	8									
EPA 821/R-02-012	*Pimephales promelas*	2	2	5	2	5	3	6											
EPA 821/R-02-013	*Selenastrum capricornutum*	2	3	5	2	5	3	8	1	11								4	
EPA 600/R-99-064	*Hyalella azteca*	2		5		1	1	1	1	1									

Table VIII-4. 2008 Management Plan additional (A) sampling schedule for *C. dubia* and *S. capricornutum* toxicities for the Mokelumne River @ Bruella Rd subwatershed. "X" indicates the constituents sampled.

Sample Site	Date	Type	Copper	*Ceriodaphnia dubia*	*Selenastrum capricornutum*
Mokelumne River @ Bruella Rd	7-May-08	A			x
Mokelumne River @ Bruella Rd	3-Jun-08	A	x	x	
Mokelumne River @ Bruella Rd	8-Jul-08	A	x		x
Mokelumne River @ Bruella Rd	5-Aug-08	A	x		x
Mokelumne River @ Bruella Rd	9-Sept-08	A		x	

Table VIII-5. 2010 Management Plan Monitoring schedule for copper and *S. capricornutum* toxicity for the Mokelumne River @ Bruella Rd subwatershed. "X" indicates the constituents sampled.

Sample Site	Date	Type	*S. capricornutum*	Copper
Mokelumne River @ Bruella Rd	13-Apr-10	MPM	X	
Mokelumne River @ Bruella Rd	11-May-10	MPM	X	
Mokelumne River @ Bruella Rd	8-Jun-10	MPM		X
Mokelumne River @ Bruella Rd	13-Jul-10	MPM	X	X
Mokelumne River @ Bruella Rd	10-Aug-10	MPM	X	X

Exceedance History

Between 2004 and 2010, exceedances of field parameters, field, organic, and inorganic parameters as well as toxicity have occurred at this site. These exceedances include DO (5), pH (6), *E. coli* (2), copper (3), DDT (2), *C. dubia* toxicity (5) and *S. capricornutum* toxicity (7). Toxicity occurred five times to *C. dubia* and three times to *S. capricornutum*.

During 2010, the only exceedance of the WQTL to occur was for pH.

All exceedances are listed in Table VIII -6 by season and date and are based on WQTL listed in the introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table VIII -6 for those analytes with two or more exceedances over the last three years.

Table VIII-6. All exceedances experienced in samples collected from the Mokelumne River Coalition monitoring sites between August 2004 and December 2010 (sorted by season and date).
If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream site is italicized.

Station Name	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, none	*E. coli*, >235 MPN/100 mL	Copper Total, µg/L	DDT (p,p'), >0.00059 µg/L	*Ceriodaphnia dubia*, (% Control)	*Selenastrum capricornutum*, (% Control)
Mokelumne River @ Bruella Rd	Irrigation	8/24/2004							51
Mokelumne River @ Bruella Rd	Irrigation	9/23/2004						5	
Mokelumne River @ Bruella Rd	Storm	3/21/2005						35	84
Mokelumne River @ Bruella Rd	Irrigation	5/17/2005							92
Mokelumne River @ Bruella Rd	Irrigation	6/21/2005	5.10					35	
Mokelumne River @ Bruella Rd	Irrigation	7/19/2005	6.60						
Mokelumne River @ Fish Hatchery	*Irrigation*	*9/20/2005*	*5.50*						
Mokelumne River @ Bruella Rd	Storm	2/27/2006						5	
Mokelumne River @ Bruella Rd	Storm	3/10/2006						5	
Mokelumne River @ Bruella Rd	Irrigation	5/16/2006	6.90	6.48					
Mokelumne River @ Bruella Rd	Irrigation	6/20/2006	6.70				0.0096		
Mokelumne River @ Bruella Rd	Irrigation	8/15/2006		6.33					

Station Name	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, none	*E. coli*, >235 MPN/100 mL	Copper Total, µg/L	DDT (p,p'), >0.00059 µg/L	*Ceriodaphnia dubia*, (% Control)	*Selenastrum capricornutum*, (% Control)
Mokelumne River @ Bruella Rd	Irrigation	4/10/2007		8.52					
Mokelumne River @ Bruella Rd	Irrigation	6/12/2007				1.8 (1.7)			
Mokelumne River @ Bruella Rd	Irrigation	7/10/2007				4.7 (1.9)			57
Mokelumne River @ Bruella Rd	Irrigation	8/7/2007				2.4 (1.9)			
Mokelumne River @ Bruella Rd	Irrigation1 NM	4/15/2008			390				44
Mokelumne River @ Bruella Rd	Irrigation1 RS	4/23/2008							19
Mokelumne River @ Bruella Rd	Irrigation2 MPM	5/7/2008							10
Mokelumne River @ Bruella Rd	Irrigation2 NM & MPM-RS	5/13/2008							27
Mokelumne River @ Bruella Rd	Irrigation2 RS	5/21/2008							73
Mokelumne River @ Bruella Rd	Irrigation4 MPM	7/8/2008							82
Mokelumne River @ Bruella Rd	Irrigation5	8/11/2009					0.015		
Mokelumne River @ Bruella Rd	Irrigation6	9/15/2009	6.95	5.09					
Mokelumne River @ Bruella Rd	Fall1	10/6/2009			1100				
Mokelumne River @ Bruella Rd	Fall2	11/10/2009		6.06					
Mokelumne River @ Bruella Rd	Winter 1	2/9/2010		6.08					
		Constituent Priority	**E**	**E**	**E**	**C**	**E**	**D**	**D**

RS- Resample

2007-2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table VIII-7 for the following constituents: copper and water column toxicities for *C. dubia* and *S. capricornutum.*

2007

In 2007, MPM was implemented at the Mokelumne River @ Bruella Rd monitoring site for water column toxicity to *C. dubia* and *S. capricornutum*. Table VIII-7 provides monitoring results for these constituents from all sampling events during the 2007 irrigation season and indicates which constituents were being targeted in each Management Plan Monitoring event.

2008

Additional MPM was conducted during the irrigation season of 2008 at Mokelumne River @ Bruella Rd for copper (June, July and August), *C. dubia* toxicity (June and September) and for *S. capricornutum* toxicity (May, July and August. Table VII-7 provides monitoring results for these constituents, MPM samples collected in May and July were both toxic to *S. capricornutum*.

2009

During 2009, Core Monitoring took place, no MPM occurred. Table VII-6 includes all exceedances experienced at this location.

2010

In 2010 MPM occurred at Mokelumne River @ Bruella Rd for *S. capricornutum* toxicity (April, May, July and August) and for total and dissolved copper (June through August). There were no exceedances in any MPM samples collected during 2010.

2011

During 2011, Mokelumne River @ Bruella Rd is scheduled to be monitored for Assessment Monitoring which will include all high priority constituents.

Table VIII-7. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for the Mokelumne River @ Bruella Rd site subwatershed between 2007 and 2010. Exceedance values are in bold.

	MONTH:	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Bruella Rd)	Date	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	C. dubia (% survival)	100	95	90	100	100	100
	S. capricornutum (% Control)	132	141	186	**57****	138	118
2007 MPM (@ Bruella Rd)	Date	NA	NA	6/20/07	NA	8/28/07	9/25/07
	C. dubia (% Control)	NA	NA	100	NA	NA	100
	S. capricornutum (% Control)	NA	NA	NA	NA	76	NA
2008 MPM (@ Bruella Rd)	Date	NA	5/07/08	6/03/08	7/08/08	8/05/08	9/09/08
	C. dubia (% Control)	NA	NA	100	NA	NA	100
	S. capricornutum (% Control)	NA	**10***	NA	**82****	314	NA
	Copper, total (ug/L)	NA	NA	1.4	1.2	1.1	NA
2010 MPM (@ Bruella Rd)	Date	4/13/10	5/11/10	6/08/10	7/13/10	8/10/10	9/07/10
	S. capricornutum (% Control)	189	444	NA	327	871	NA
	Copper, total (ug/L)	NA	NA	1	0.56	0.73	NA
	Copper, dissolved (ug/L)	NA	NA	0.68	0.27	0.47	NA

*May 2008 *S. capricornutum* toxicity was resampled two times (5-13-08 and 5-21-08) both resampling events were also toxic to *S. capricornutum*.
***S. capricornutum* toxicity was resampled the following week. Toxicity was not persistent.
NA – No MPM occurred on this date for this constituent.
NM- Normal Monitoring
MPM-Management Plan Monitoring

Load Calculations

Load calculations are not relevant to the management of priority constituents in this site subwatershed.

Loads were calculated for the copper detections (Table VIII-8) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (µg/L).

Table VIII-8. Instantaneous load calculations for copper where discharge was measured in the Mokelumne River @ Bruella Rd site subwatershed.

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Mokelumne River @ Bruella Rd	Copper	09/16/08	206.25	1.1	6424.42

Source Identification

The Coalition considers past and 2010 monitoring results and associated PUR data to addressed source identification. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In past years (2007 and

2008), the Coalition conducted additional MPM during the months when exceedances historically occurred to better characterize water quality the subwatershed. During 2010, MPM continued at the Mokelumne River @ Bruella Rd site during months when exceedances historically occurred to assess water quality in the subwatershed as outreach in the area progressed.

While the Mokelumne River subwatershed is a high priority site from 2011 through 2013, the Coalition plans to actively engage in grower outreach and education to address Mokelumne River management plan's priority constituents. The Coalition will continue to organize general as well as focused grower meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual meetings and follow up meetings with targeted members will inform growers about management practices as well as assess current and expected future implementation of additional management practices.

Priority C Constituent

Copper is the only priority C constituent under the Mokelumne River management plan.

Copper

Three exceedances of the copper WQTL occurred in the Mokelumne River site subwatershed in June, July, and August 2007. The July exceedance was associated with *S. capricornutum* water column toxicity. The Coalition evaluated monitoring and PUR data to identify possible sources.

PUR data were reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table VIII-9). The greatest amount of copper applied was in 2007 (17,245 lbs AI) with the lowest amount applied in 2009 (2, 407 lbs AI). From 2008 to 2010, there was significantly less use compared to previous years; this trend coincided with fewer acres being treated. Over the years, the greatest amounts of copper use occurred in this watershed in April (Table VIII -9, Figure VIII - 2). Not all exceedances occurred during months of greatest use (Figure VIII-2).

The Coalition also used PUR data to assess which crops received the most applications of copper from 2004 to 2010, see Table VIII-10. In the past, copper has been heavily used in this subwatershed with applications being made across numerous parcels. The largest amount of copper applied from 2004 through 2010 was to walnuts (48,941 lbs AI) followed by grapes (12,186 lbs AI). The most common products used within this subwatershed containing copper were Dupont Kocide and Kocide (Table VIII-10).

Table VIII-9.Number of copper applications, total pounds applied and total acres treated by month for January 2004 – December 2010 in the Mokelumne River @ Bruella Rd site subwatershed.

If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
January, 2004	2	107.5	17.5
February, 2004	6	1715.1	110
March, 2004	22	3933.2	833.3
April, 2004	37	4027.5	1216.2
May, 2004	10	556.7	268.5

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
June, 2004	9	330.9	227
July, 2004	3	124.1	105
October, 2004	2	193.4	105
November, 2004	4	795.2	79
December, 2004	8	1521.3	139.5
January, 2005	1	24.6	5
February, 2005	4	3125.2	233.5
March, 2005	25	1877.1	701
April, 2005	58	4507.6	1910.5
May, 2005	21	4251.3	996
June, 2005	7	690.7	305
July, 2005	4	138	48.5
October, 2005	1	147.4	20
December, 2005	9	2080.6	177.5
February, 2006	5	2405.7	140
March, 2006	2	194.0	14
April, 2006	41	5642.1	1405.7
May, 2006	40	6142.0	1466.5
June, 2006	2	49.2	19
July, 2006	4	396.0	59.45
August, 2006	3	246.1	82
November, 2006	3	604.8	46
December, 2006	8	1207.8	141
February, 2007	1	53.8	10
March, 2007	16	4175.6	558
April, 2007	38	8429.8	2058
May, 2007	13	1927.2	529
July, 2007	1	90	40
November, 2007	2	1024.1	133
December, 2007	11	1544.9	194
January, 2008	1	92.4	27
February, 2008	3	1316.6	146
March, 2008	3	288.6	55
April, 2008	16	749.9	538
May, 2008	1	69.7	60
June, 2008	4	270	72
October, 2008	1	77	10
December, 2008	7	745.5	133
February, 2009	2	189.5	31
April, 2009	17	1022.4	563
May, 2009	7	435.2	245
June, 2009	1	4.2	4
December, 2009	6	756.2	135
February, 2010	3	55.6	41
March, 2010	3	120.4	70
April, 2010	24	3921.2	1543
May, 2010	4	15.9	46
June, 2010	1	9.2	20
Summaries by Year			

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
2004 Total	103	13304.9	3100.9
2005 Total	130	16842.5	4397
2006 Total	108	16887.7	3373.6
2007 Total	82	17245.4	3522
2008 Total	36	3609.7	1041
2009 Total	33	2407.4	978
2010 Total	35	4122.3	1720
Total	**527**	**74419.9**	**18132.5**

Figure VIII-2.Pounds of copper applied within the Mokelumne River @ Bruella Rd site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

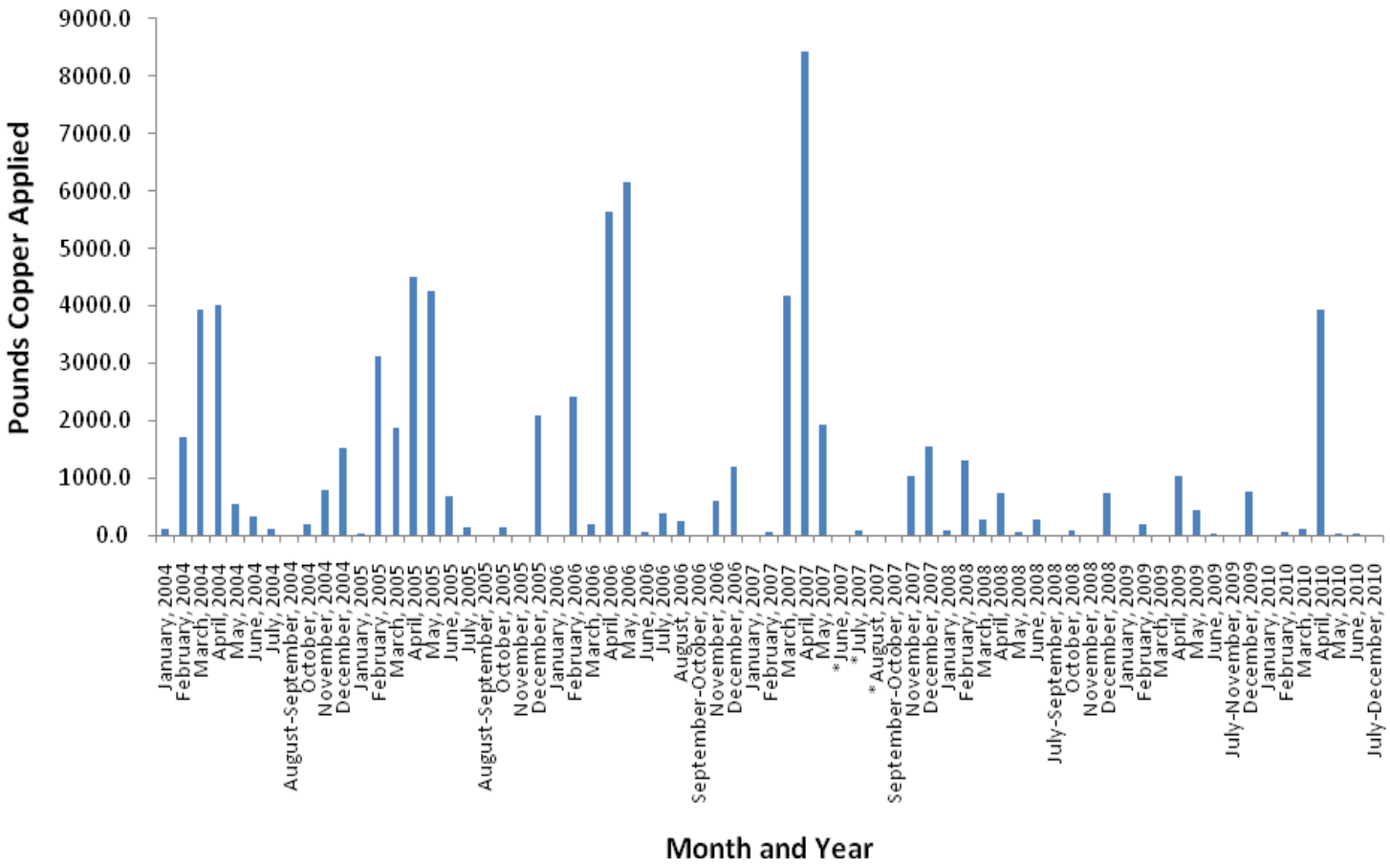


Table VIII-10.Total pounds active ingredient (AI) applied for copper based on PUR data from 2004-2010 within the Mokelumne River @ Bruella Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALMOND	KOCIDE DF	15.4
	APPLE	KOCIDE DF	1482.8
	CHERRY	BASIC COPPER 53	356.7
		CHAMPION WETTABLE POWDER	154.0
		CUPROFIX ULTRA 40 DISPERSS	794.2
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	185.6
		HTH ALKALINITY PLUS	149.3
		HYDROX	442.8
		KOCIDE 101	874.0
		KOCIDE 2000	148.5
		KOCIDE DF	1955.6
		NU-COP 50 WP	1313.6
		NU-COP 50DF	2626.5
		TRIANGLE BRAND COPPER SULFATE	594.0
		TRIANGLE BRAND COPPER SULFATE INSTANT POWDER	2103.8
	GRAPES, WINE	BLUE SHIELD DF	304.9
		CHAMP DP	8.6
		CHAMP FLOWABLE	415.0
		CHAMP FORMULA 2 FLOWABLE	2699.8
		CHAMPION WETTABLE POWDER	1489.0
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	1057.9
		C-O-C-S 15 SULPHUR 25 DUST	63.0
		CSC COPPER SULFUR DUST	48.8
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	44.7
		DUPONT KOCIDE 4.5LF FUNGICIDE/BACTERICIDE	41.8
		FIRST CHOICE COPPER SULFUR 15-25 DUST	952.5
		HYDROX	431.2
		KOCIDE 101	198.7
		KOCIDE 2000	16.4
		KOCIDE 2000 T/N/O	6.5
		KOCIDE 4.5 LF	442.3
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	80.1
		KOCIDE DF	2074.4
		NORDOX	382.4
		NORDOX 75 WG	357.2
		NU-COP 3L	321.1
		NU-COP 50DF	100.7
		TENN-COP 5E	73.2
		TRIANGLE BRAND COPPER SULFATE	297.0
		ZINC COPOSIL SULFUR DUST	279.2
	ONION DRY ETC	CHAMP FORMULA 2 FLOWABLE	20.0
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	30.0
		NU-COP 50DF	45.8
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	BLUE SHIELD DF	3227.8
		BLUE VIKING COPPER SULFATE STAR GLOW POWDER	9385.2
		CHAMPION WETTABLE POWDER	184.8

Chemical Name	Commodity	Product Name	Lbs AI Applied
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	306.1
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	161.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	2716.7
		HYDROX	1255.1
		KOCIDE 101	5500.9
		KOCIDE 2000	748.9
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	170.9
		KOCIDE DF	10892.4
		NU-COP 50 WP	3480.4
		NU-COP 50DF	5365.4
		NUCOP DF	2045.5
		NUCOP WP	1500.0
		TRIANGLE BRAND COPPER SULFATE	623.7
		TRIANGLE BRAND COPPER SULFATE INSTANT POWDER	1376.1

ALMOND - Total Pound Copper Applied	**15.4**
APPLE - Total Pounds Copper Applied	**1482.8**
CHERRY - Total Pounds Copper Applied	**11698.4**
GRAPES - Total Pounds Copper Applied	**12186.3**
ONION - Total Pounds Copper Applied	**95.8**
WALNUT - Total Pounds Copper Applied	**48941.2**
Total Pounds Copper Applied (2004-2010)	**74419.9**

The Coalition determined in the 2008 Management Plan that copper appears to move to the river by sediments mobilized during the irrigation season. As discussed above, copper is heavily used in the subwatershed with numerous applications being made across numerous sections. Therefore, the Coalition plans to provide information on a watershed basis to growers to review their operation and determine if storm water runoff and irrigation return flows are managed properly, specifically to growers with the potential to drain to the creek. This is consistent with the strategy to address priority A/B constituent exceedances.

Priority D Constituents

Water column toxicity to *C. dubia* and *S. capricornutum* are listed as priority D constituents under the Mokelumne River @ Bruella Rd management plan.

Ceriodaphnia dubia toxicity

Toxicity to *C. dubia* has occurred in this subwatershed five times in the past; September 2004, March and June 2005, and February and March 2006. *C. dubia* toxicity was not associated with any exceedances of pesticides. TIEs were performed on all samples except the March 2006 resample. Results of all TIEs were inconclusive.

Selenastrum capricornutum toxicity

S. capricornutum toxicity occurred seven times from 2004 through 2010; August 2004, March and May 2005, July 2007 and April, May and July 2008. The July 2007 *S. capricornutum* toxicity was associated with a copper exceedance. The Coalition did not analyze for metals prior to 2006 so it is unknown if copper was present in samples associated with the toxic samples experienced before that time. No TIEs

were performed for any of the exceedances. It is clear that the cause of the toxicity is associated with a soluble constituent(s) and preventing storm water and irrigation return flows would be effective in reducing or eliminating *S. capricornutum* toxicity.

The Coalition's strategy for eliminating *S. capricornutum* toxicity involves focusing on copper with individual contacts as well as conduct outreach regarding the retention of storm and irrigation water runoff rather than discharging to drainage canals and creeks. If copper can be prevented from entering waterways, the Coalition believes that *S. capricornutum* toxicity can also be reduced or eliminated. If the Coalition finds that copper exceedances are eliminated but *S. capricornutum* toxicity persists, then additional herbicides will be targeted for outreach and management.

Priority E Constituents

The following priority E constituents are listed under the Mokelumne River management plan: pH, DO, *E. coli,* and DDT. Although these constituents will remain low priority, the Coalition will continue to collect sampling data for these constituents and discuss them during individual contacts and annual grower meetings.

Evaluation

Mokelumne River @ Bruella Rd is a high priority site subwatershed within the SJCDWQC and is in its first year of focused outreach (2011 through 2013).

The Coalition's strategy for the Mokelumne River subwatershed is to focus on providing information on a watershed basis to growers to review their operation and determine if irrigation return flows are managed properly, specifically to growers with parcels that have the potential to drain to the waterway. Almond and walnut growers should be targeted for outreach especially prior to the irrigation season. Outreach includes grower notification, management practice outreach and education, tracking of management practices implementation, and providing information on special studies of management practice efficacy. The Coalition believes that because land use in this subwatershed is predominately orchards, outreach aimed toward relevant management practice implementation will target the largest audience and result in the greatest improvement of water quality.

Individual surveys documenting current management practices and assessing planned implementations will be completed by the end of October 2011. The Coalition will then assess these results and plan the final stages of outreach including re-contacting growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

IX. TERMINOUS TRACT DRAIN @ HWY 12

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority D

- *Hyalella azteca* sediment toxicity

Priority E

- Arsenic
- Dissolved Oxygen
- Specific Conductivity
- Total Dissolved Solids
- *E. coli*
- *Pimephales promelas* water column toxicity
- *Selenastrum capricornutum* water column toxicity

Description of Terminous Tract Drain Site Subwatershed

Terminous Tract Drain @ Highway 12 (9,889 irrigated acres) – This site subwatershed drains all of the acreage north of State Highway 12 and most of the acreage south of the highway on Terminous Tract. This sampling site is located near the confluence of White Slough/Potato Slough and the Mokelumne River. The primary agricultural crops are field crops, turf, grains, and hay (Figure IX-1). This site subwatershed includes two upstream locations (Terminous Tract @ field drain off Glascock Rd and Terminous Tract on Hwy 12 west of Glascock Rd) which were sampled in 2008. Table IX-1 includes the site name, station code and target latitude/longitudes for sites sampled within this subwatershed.

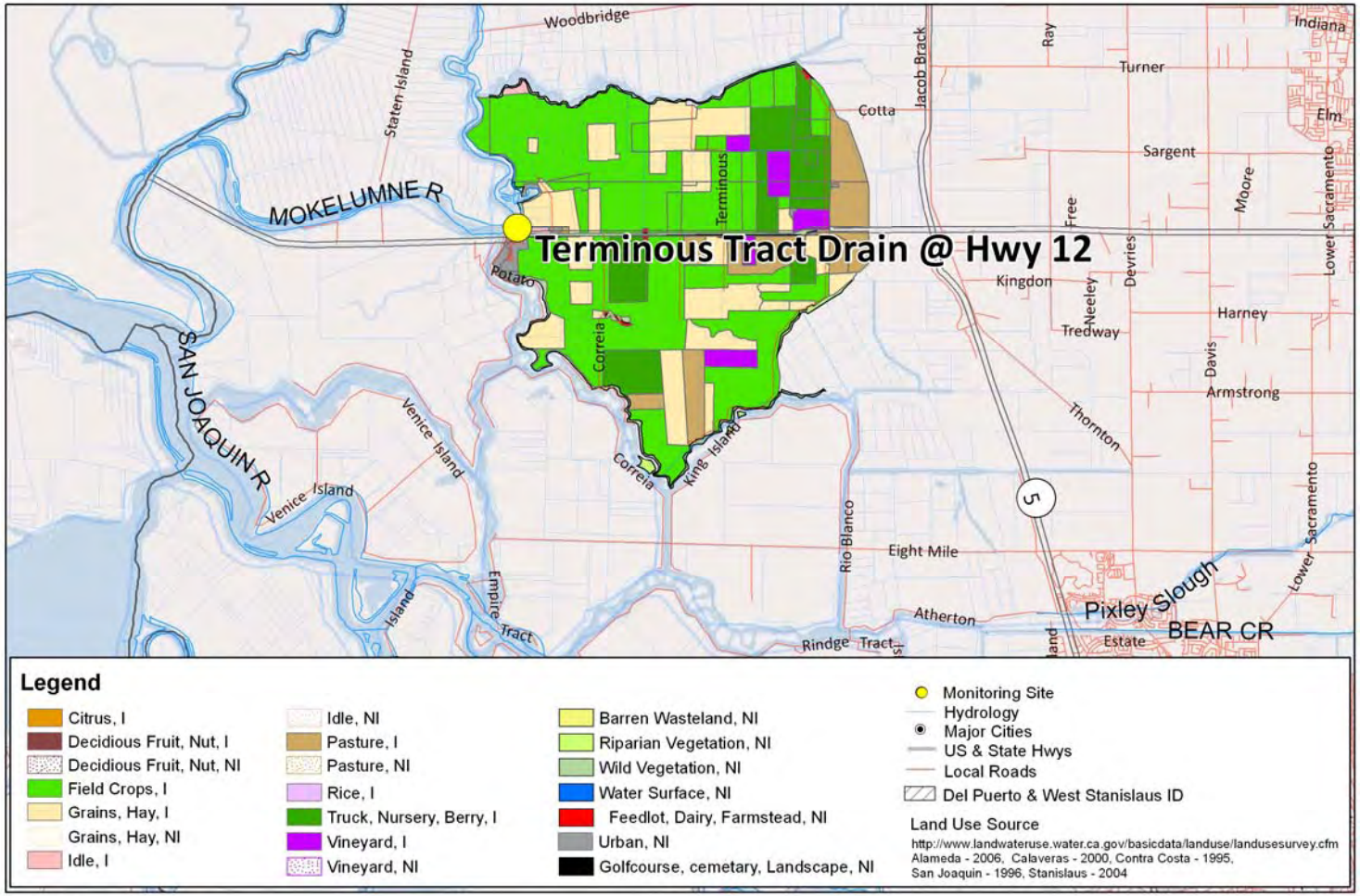
Terminous Tract @ field drain off Glascock Rd (1,471 irrigated acres) – This site drains another small watershed on the Terminous Tract. Located north of the Terminous Tract off Highway 12 site, the primary agricultural crops are field crops, grains, and hay. Monitoring at this site was ceased after the storm season of 2005/2006 (Figure IX-2).

Terminous Tract on Hwy 12 @ west of Guard Rd (1,324 irrigated acres) – located east of the Terminous Tract off Highway 12 site, the site subwatershed drains a small area. Field crops and truck and nursery crops are the primary agricultural activities, and the subwatershed contains a relatively large percentage of its land in pasture. Monitoring at this site was ceased after the storm season of 2005/2006 (Figure IX-2).

Table IX-1.Coordinates of the Terminous Tract Drain site subwatershed sampling location.

Site Name	Station Code	Target Latitude	Target Longitude
Terminous Tract Drain @ Hwy 12	544XTTHWT	38.1166	-121.49360
Terminous Tract off Glascock Rd	544XTTGLR	38.1255	-121.48936
Terminous Tract off Guard Rd	544XTTGUR	38.1167	-121.4211

Figure IX-1. Site subwatershed map of land use for sample site at Terminous Tract Drain @ Hwy 12.



Source of Layers:
Hydrology - NHD hydrodata, http://nhd.usgs.gov/
Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library.
World Shaded Relief, ESRI 2009
NAD 1927

Date Prepared: 1/14/11
SJCDWQC

N
0 1.25 2.5
Miles

Terminous Tract Drain @ Hwy 12

Subwatershed Monitoring History

Monitoring was initiated in the Terminous Tract @ Hwy 12 site subwatershed in the storm season of 2005 and has occurred continuously through 2010 (Tables IX-2).

Terminous Tract @ Hwy 12 is a Core Monitoring location under the new MRPP. This site is being monitored for Assessment Monitoring in 2011 and will return to Core Monitoring in 2012.

Sampling at the two other sites in the Terminous Tract Drain site subwatershed was also initiated in 2005, but the sites were only sampled for three seasons ending with the storm season of 2006. The sites at Glasscock and Guard Roads were monitored in an effort to determine if exceedances could be partitioned to specific subwatersheds. After several monitoring events it was determined that it was not possible to partition the loads and the Glasscock Road and Guard Road sites were no longer sampled.

Monitoring for metals began during the irrigation season of 2006. During sampling at Terminous Tract Drain, exceedances of field and physical parameters, *E. coli*, metals, pesticides, and sediment and water column toxicity occurred. Details on these exceedances are provided in Table IX-5 and discussed in the next section. There was no MPM in 2007 or 2008. Terminous Tract Drain was monitored for Core Monitoring constituents only in 2009. In 2010 MPM was initiated for water toxicity to *S. capricornutum* (April and May) and chlorpyrifos (August and September). There were no exceedances of the WQTL nor were there any toxic samples during MPM in 2010. In 2011, MPM is scheduled to occur at Terminous Tract Drain for chlorpyrifos (August and September) and water column toxicity to *S. capricornutum* (January, February, April and May).

Terminous Tract is not considered an impaired waterbody in the Basin Plan and is not 303d listed, however the Sacramento/San Joaquin River Delta is listed for a number of constituents including chlorpyrifos, DDT, diazinon, group A pesticides, mercury and unknown toxicity.

Table IX-2.Terminous Tract Drain @ Highway 12 sampling events per season and year.

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	2	6	2	3	0	6	3	2	1	6	3
Events not Sampled	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**NA**	**2**	**5**	**2**	**5**	**2**	**6**	**2**	**6**	**2**	**3**	**0**	**6**	**3**	**2**	**1**	**6**	**3**

Table IX-3.Number of analyses performed per analyte in each sampling season and year for the Terminous Tract Drain @ Hwy 12 sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008			2009				2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Field and Physical Parameters																		
NA	Dissolved Oxygen	4	6	3	5	3	7	3	8	2	3		6	3	2	1	6	3
NA	Specific Conductivity	4	6	3	5	3	7	3	8	2	3		6	3	2	1	6	3
NA	pH	4	6	3	5	3	7	3	8	2	3		6	3	2	1	6	3
EPA 110.2	Color	2	5	2	5	3	7	1	6									
EPA 160.1	Dissolved Solids	2	5	2	5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 160.2	Suspended Solids							1		2	3		6	3	2	1	6	3
EPA 180.1	Turbidity	2	5	2	5	3	6	2	6	2	3		6	3	2	1	6	3
EPA 415.1	Total Organic Carbon	2	5	2	6	2	6	2	6	2	3		6	3	2	1	6	3
SM 9223	*E. coli*	2	5	2	6	2	6	2	6	2	3		6	3	2	1	6	3
Walkley-Black	Total Organic Carbon (sediment)																1	
ASTM D422	Grain size (sediment)																1	
EPA 405.1	BOD				1	2	2											
Carbamates																		
EPA 8321A	Aldicarb				5	2	6	1	6						2	1	6	3
EPA 8321A	Carbaryl				5	2	6	1	6						2	1	6	3
EPA 8321A	Carbofuran				5	2	6	1	6						2	1	6	3
EPA 8321A	Diuron				5	2	6	1	6						2	1	6	3
EPA 8321A	Linuron				5	2	6	1	6						2	1	6	3
EPA 8321A	Methamidophos																3	3
EPA 8321A	Methiocarb				5	2	6	1	6						2	1	6	3
EPA 8321A	Methomyl				5	2	6	1	6						2	1	6	3
EPA 8321A	Oxamyl				5	2	6	1	6						2	1	6	3
Organochlorines																		
EPA 8081A	DDD(p,p')				5	2	6	1	6				5	3	2	1	6	3
EPA 8081A	DDE(p,p')				5	2	6	1	6				5	3	2	1	6	3
EPA 8081A	DDT(p,p')				5	2	6	1	6				5	3	2	1	6	3
EPA 8081A	Dicofol				5	2	6	1	6				5	3	2	1	6	3
EPA 8081A	Dieldrin				5	2	6	1	6				5	3	2	1	6	3
EPA 8081A	Endrin				5	2	6	1	6				5	3	2	1	6	3

Method	Analyte	2005		2006		2007		2008			2009				2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Methoxychlor				5	2	6	1	6				5	3	2	1	6	3
Group A Pesticides																		
EPA 8081A	Aldrin												5	3				
EPA 8081A	Chlordane												5	3				
EPA 8081A	Endosulfan I												5	3				
EPA 8081A	Endosulfan II												5	3				
EPA 8081A	HCH, alpha												5	3				
EPA 8081A	HCH, beta												5	3				
EPA 8081A	HCH, delta												5	3				
EPA 8081A	HCH, gamma												5	3				
EPA 8081A	Heptachlor												5	3				
EPA 8081A	Heptachlor epoxide												5	3				
EPA 8081A	Toxaphene												5	3				
Organophosphates																		
EPA 8141A	Azinphos methyl				5	2	6	1	6						2	1	6	3
EPA 8141A	Chlorpyrifos	2	5	2	5	2	6	1	6						2	1	6	3
EPA 8141A	Demeton-s														2	1	6	3
EPA 8141A	Diazinon	2	5	2	5	2	6	1	6						2	1	6	3
EPA 8141A	Dichlorvos														2	1	6	3
EPA 8141A	Dimethoate				5	2	6	1	6						2	1	6	3
EPA 8141A	Disulfoton				5	2	6	1	6						2	1	6	3
EPA 8141A	Malathion				5	2	6	1	6						2	1	6	3
EPA 8141A	Methamidophos				5	2	6	1	6						2	1	3	
EPA 8141A	Methidathion				5	2	6	1	6						2	1	6	3
EPA 8141A	Molinate				5	2	6	1	6									
EPA 8141A	Parathion, Methyl				5	2	6	1	6						2	1	6	3
EPA 8141A	Phorate				5	2	6	1	6						2	1	6	3
EPA 8141A	Phosmet				5	2	6	1	6						2	1	6	3
EPA 8141A	Thiobencarb				5	2	6	1	6									
EPA 8141A	Trifluralin														2	1	6	3
Pyrethroids																		
EPA 8081A	Bifenthrin		1	2	5	2	6											
EPA 8081A	Cyfluthrin, total		1	2	5	2	6											

Method	Analyte	2005		2006		2007		2008			2009				2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Cyhalothrin, lambda, total	2	5	2	5	2	6											
EPA 8081A	Cypermethrin, total	2	5	2	5	2	6											
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	5	2	5	2	6											
EPA 8081A	Permethrin, total	2	5	2	5	2	6											
Triazines																		
EPA 547M	Glyphosate				5	2	6	1	6						2	1	6	3
EPA 549.2M	Paraquat dichloride				5	2	6	1	6						2	1	6	3
EPA 619	Atrazine				5	2	6	1	6						2	1	6	3
EPA 619	Cyanazine				5	2	6	1	6						2	1	6	3
EPA 619	Simazine				5	2	6	1	6						2	1	6	3
Metals (Total)																		
EPA 200.8	Arsenic				5	2	6	1	6						2	1	6	3
EPA 200.8	Boron				5	2	6	1	6						2	1	6	3
EPA 200.8	Cadmium				5	2	6	1	6						2	1	6	3
EPA 200.8	Copper				5	2	6	1	6						2	1	6	3
EPA 200.8	Lead				5	2	6	1	6						2	1	6	3
EPA 200.8	Molybdenum														2	1	6	3
EPA 200.8	Nickel				5	2	6	1	6						2	1	6	3
EPA 200.8	Selenium				5	2	2	1	6						2	1	6	3
EPA 200.8	Zinc				5	2	6	1	6						2	1	6	3
Metals (Dissolved)																		
EPA 200.8	Cadmium														2	1	6	3
EPA 200.8	Copper														2	1	6	3
EPA 200.8	Lead														2	1	6	3
EPA 200.8	Nickel														2	1	6	3
EPA 200.8	Zinc														2	1	6	3
Nutrients																		
SM 2340 C	Hardness as CaCO3				6	2	6	1	6						2	1	6	3
EPA 300.0	Nitrate as N				5	2	6	1	6									
EPA 350.2	Ammonia as N				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 354.1	Nitrite as N				5	2	6	1	6									

Method	Analyte	2005		2006		2007		2008			2009				2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 353.2	Nitrate + Nitrite as N							1		2	3		6	3	2	1	6	3
EPA 365.2	Orthophosphate as P				5	2	6	2	6	2	3		6	3	2	1	6	3
EPA 365.2	Phosphate as P				5	2	6	2	6	2	3		6	3	2	1	6	3
Sediment Pesticides																		
EPA 8270M_ NCI_SIM	Bifenthrin																1	
EPA 8270M_ NCI_SIM	Chlorpyrifos																1	
EPA 8270M_ NCI_SIM	Cyfluthrin																1	
EPA 8270M_ NCI_SIM	Cyhalothrin, lambda																1	
EPA 8270M_ NCI_SIM	Cypermethrin																1	
EPA 8270M_ NCI_SIM	Deltamethrin: Tralomethrin																1	
EPA 8270M_ NCI_SIM	Esfenvalerate/ Fenvalerate																1	
EPA 8270M_ NCI_SIM	Fenpropathrin																1	
EPA 8270M_ NCI_SIM	Permethrin																1	
Toxicity																		
EPA 821/R-02-012	*Ceriodaphnia dubia*	2	5	2	5	2	6	1	6						2	1	6	3
EPA 821/R-02-012	*Pimephales promelas*	4	6	2	5	2	6	1	6						2	1	6	3
EPA 821/R-02-013	*Selenastrum capricornutum*	4	5	2	5	2	6	2	8						2	1	6	3
EPA 600/R-99-064	*Hyalella azteca*		5	1	1	1	1								1		1	

Table IX-4. 2010 Management Plan sampling schedule for chlorpyrifos and *Selenastrum capricornutum* toxicity for the Terminous Tract Drain @ Hwy 12 site subwatershed. "X" indicates constituents sampled.

Site Name	Sample Date	Monitoring Type	Chlorpyrifos	*S. capricornutum*
Terminous Tract Drain @ Hwy 12	13-Apr-10	MPM		X
Terminous Tract Drain @ Hwy 12	11-May-10	MPM		X
Terminous Tract Drain @ Hwy 12	10-Aug-10	MPM	X	
Terminous Tract Drain @ Hwy 12	7-Sept-10	MPM	X	

Exceedance History

Between 2005 and 2010, exceedances of field, organic, and inorganic parameters as well as toxicity have occurred at Terminous Tract Drain @ Hwy 12. These exceedances include DO (49), pH (1), SC (40), TDS (35), *E. coli* (16), arsenic (6), malathion (1), and chlorpyrifos (2). Water column toxicity to *P. promelas* occurred two times and *S. capricornutum* occurred five times, and sediment toxicity to *H. azteca* occurred four times (Table IX-5).

During 2010 exceedances of DO (7), SC (6), TDS (6), *E. coli* (1), and arsenic (2) and sediment toxicity to *H. azteca* also occurred.

All exceedances are listed in Table IX-5 by season and date and are based on WQTL listed in the overall introduction of the SJCDWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table IX-5 for those analytes with two or more exceedances within the last three years.

Table IX-5. All exceedances experienced in samples collected from the previous and current Terminous Tract Drain Coalition monitoring sites between February 2005 and December 2010 (sorted by season and date).
If the water quality trigger limit is based on hardness then the hardness value is shown in parenthesis; otherwise the WQTL used to evaluate the data is listed in the header after the analyte. Upstream sites are italicized.

Station Name	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, none	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	Malathion, ND	*Hyalella azteca*, (% Control)	*Pimephales promelas*, (% Control)	*Selenastrum capricornutum*, (% Control)
Delta Drain- Terminous Tract off Glasscock Rd	Storm	2/16/2005	5.1			470	1600						
Delta Drain- Terminous Tract off Guard Rd	Storm	2/16/2005	6.8		1189	670	900						
Terminous Tract Drain @ Hwy 12	Storm	2/16/2005			950	580	1600						19
Terminous Tract Drain @ Hwy 12	Storm	2/23/2005			1868								
Delta Drain- Terminous Tract off Glasscock Rd	Storm	3/21/2005	6		848	540							
Delta Drain- Terminous Tract off Guard Rd	Storm	3/21/2005			1408	830							
Terminous Tract Drain @ Hwy 12	Storm	3/21/2005	6.3		1705	1000							
Terminous Tract Drain @ Hwy 12	Storm	4/4/2005			1742								
Delta Drain- Terminous Tract off Glasscock Rd	Irrigation	5/17/2005	5.4				240						
Delta Drain- Terminous Tract off Guard Rd	Irrigation	5/17/2005	5.3		1088	660							
Terminous Tract Drain @ Hwy 12	Irrigation	5/17/2005					240						
Delta Drain- Terminous Tract off Guard Rd	Irrigation	6/21/2005	4.6		1099	610							
Terminous Tract Drain @ Hwy 12	Irrigation	6/21/2005	5.2										
Delta Drain- Terminous Tract off Glasscock Rd	Irrigation	7/19/2005	3.4										
Delta Drain- Terminous Tract off Guard Rd	Irrigation	7/19/2005	2.7		809	480							
Terminous Tract Drain @ Hwy 12	Irrigation	7/19/2005	3.7										

Station Name	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, none	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	Malathion, ND	*Hyalella azteca*, (% Control)	*Pimephales promelas*, (% Control)	*Selenastrum capricornutum*, (% Control)
Delta Drain- Terminous Tract off Glasscock Rd	Irrigation	8/16/2005	6				280						
Delta Drain- Terminous Tract off Guard Rd	Irrigation	8/16/2005	4.7		701								
Terminous Tract Drain @ Hwy 12	Irrigation	8/16/2005	4.9										
Delta Drain- Terminous Tract off Glasscock Rd	Irrigation	9/20/2005	4.8								87.5	87.5	
Terminous Tract Drain @ Hwy 12	Irrigation	9/20/2005										87.5	
Delta Drain- Terminous Tract off Glasscock Rd	Storm	2/27/2006			1030	620	500						
Delta Drain- Terminous Tract off Guard Rd	Storm	2/27/2006	6.2		1126	670	240						212500
Terminous Tract Drain @ Hwy 12	Storm	2/27/2006			1781	950	1600						
Delta Drain- Terminous Tract off Guard Rd	Storm	3/10/2006			1090								
Delta Drain- Terminous Tract off Glasscock Rd	Storm	3/15/2006			1091	650							
Delta Drain- Terminous Tract off Guard Rd	Storm	3/15/2006			1119	650							
Terminous Tract Drain @ Hwy 12	Storm	3/15/2006			1720	970							
Delta Drain- Terminous Tract off Glasscock Rd	Storm	4/27/2006	5.9		754						93.75		
Delta Drain- Terminous Tract off Guard Rd	Storm	4/27/2006	5.2		1236						92.5		
Terminous Tract Drain @ Hwy 12	Storm	4/27/2006	6.7		1325								
Terminous Tract Drain @ Hwy 12	Irrigation	5/16/2006	4.6				690	11					
Terminous Tract Drain @ Hwy 12	Irrigation	6/20/2006	4.26			1200	580						
Terminous Tract Drain @ Hwy 12	Irrigation	7/18/2006	2.7										
Terminous Tract Drain @ Hwy 12	Irrigation	8/15/2006	3.6										
Terminous Tract Drain @ Hwy 12	Irrigation	9/19/2006	4.1										

Station Name	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, none	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	Malathion, ND	*Hyalella azteca*, (% Control)	*Pimephales promelas*, (% Control)	*Selenastrum capricornutum*, (% Control)
Terminous Tract Drain @ Hwy 12	Storm	2/11/2007	5.24		873	570	370	11		0.05			
Terminous Tract Drain @ Hwy 12	Storm	2/28/2007			1469	840		12					
Terminous Tract Drain @ Hwy 12	Storm	3/6/2007	6.66		1665								
Terminous Tract Drain @ Hwy 12	Irrigation	5/22/2007	6.58										
Terminous Tract Drain @ Hwy 12	Irrigation	6/12/2007	5.55										
Terminous Tract Drain @ Hwy 12	Irrigation	7/10/2007	4.58										
Terminous Tract Drain @ Hwy 12	Irrigation	8/7/2007	5.58				240						
Terminous Tract Drain @ Hwy 12	Irrigation	8/9/2007	4.8										
Terminous Tract Drain @ Hwy 12	Irrigation	9/4/2007	6.7				330						
Terminous Tract Drain @ Hwy 12	Storm1 NM	1/23/2008			1454	940		11					8
Terminous Tract Drain @ Hwy 12	Storm1 RS	1/30/2008			1479								
Terminous Tract Drain @ Hwy 12	Irrigation1 NM	4/15/2008			727								51
Terminous Tract Drain @ Hwy 12	Irrigation1 RS	4/23/2008			737								
Terminous Tract Drain @ Hwy 12	Irrigation2 NM	5/13/2008	6.96		1003	550							.50
Terminous Tract Drain @ Hwy 12	Irrigation2 RS	5/21/2008			1010								
Terminous Tract Drain @ Hwy 12	Irrigation3 NM	6/10/2008	5.08		751	470							
Terminous Tract Drain @ Hwy 12	Irrigation4 NM	7/15/2008	4.45										
Terminous Tract Drain @ Hwy 12	Irrigation5 NM	8/12/2008	2.56						0.021				
Terminous Tract Drain @ Hwy 12	Irrigation6 NM	9/16/2008	4.71		858	540		11	0.02				
Terminous Tract Drain @ Hwy 12	Fall1	10/14/2008			1047	620							

Station Name	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, none	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	Malathion, ND	*Hyalella azteca*, (% Control)	*Pimephales promelas*, (% Control)	*Selenastrum capricornutum*, (% Control)
Terminous Tract Drain @ Hwy 12	Fall2	11/4/2008			1103	700							
Terminous Tract Drain @ Hwy 12	Winter1	1/13/2009			1010	600							
Terminous Tract Drain @ Hwy 12	Winter2	2/10/2009			1701	990							
Terminous Tract Drain @ Hwy 12	Winter3	3/10/2009		6.31	1898	1200							
Terminous Tract Drain @ Hwy 12	Irrigation1	4/14/2009	6.16		878	510							
Terminous Tract Drain @ Hwy 12	Irrigation2	5/12/2009	6.55										
Terminous Tract Drain @ Hwy 12	Irrigation3	6/9/2009	6.34										
Terminous Tract Drain @ Hwy 12	Irrigation4	7/14/2009	4.49										
Terminous Tract Drain @ Hwy 12	Irrigation5	8/11/2009	4.49				290						
Terminous Tract Drain @ Hwy 12	Fall1	10/6/2009	6.94										
Terminous Tract Drain @ Hwy 12	Fall2	11/10/2009			753								
Terminous Tract Drain @ Hwy 12	Fall3	12/8/2009			1378	770							
Terminous Tract Drain @ Hwy 12	Storm1	1/13/2010	6.69		1242	710							
Terminous Tract Drain @ Hwy 12	Winter1	2/9/2010			1434	800							
Terminous Tract Drain @ Hwy 12	Winter2	3/16/2010			1960	1100							
Terminous Tract Drain @ Hwy 12	Irrigation1	4/13/2010	6.45		1590	850		13					
Terminous Tract Drain @ Hwy 12	Irrigation3	6/8/2010	6.7										
Terminous Tract Drain @ Hwy 12	Irrigation4	7/13/2010	5.83										
Terminous Tract Drain @ Hwy 12	Irrigation5	8/10/2010	5.52										
Terminous Tract Drain @ Hwy 12	Irrigation6	9/7/2010	5.55				2000	11			45		

Station Name	Season	Sample Date	Oxygen, Dissolved, >7 mg/L	pH, none	Specific Conductivity, >700 µS/cm	Dissolved Solids, >450 mg/L	*E. coli*, >235 MPN/100 mL	Arsenic, >10 µg/L	Chlorpyrifos, >0.015 µg/L	Malathion, ND	*Hyalella azteca*, (% Control)	*Pimephales promelas*, (% Control)	*Selenastrum capricornutum*, (% Control)
Terminous Tract Drain @ Hwy 12	Fall	11/9/2010			991	540							
Terminous Tract Drain @ Hwy 12	Fall	12/7/2010	6.21		1151	730							
		Constituent Priority	**E**	**NP**	**E**	**E**	**E**	**E**	**A/B**	**NP**	**D**	**E**	**E**

2007-2010 Management Plan Monitoring Results

Monitoring results from 2007 through 2010, including those from Management Plan Monitoring, are listed in Table IX-6 for the following constituents: chlorpyrifos and water column toxicity to *S. capricornutum.*

2007

Management Plan Monitoring did not occur at this site in 2007.

2008

The Coalition did not conduct additional MPM at this site subwatershed as toxicity to *S. capricornutum* had not occurred since 2006 and toxicity to *P. promelas* had not occurred since 2005. However, during normal monitoring, water toxicity to *S. capricornutum* was experienced three times during 2008 (January, April and May) and chlorpyrifos exceeded the WQTL twice (August and September).

2009

In 2009, MPM did not occur at Terminous Tract Drain @ Hwy 12. All exceedances from normal monitoring are listed in Table IX-5.

2010

In 2010, MPM occurred at Terminous Tract Drain @ Hwy 12 for toxicity to *S. capricornutum* (April and May) and chlorpyrifos (August and September). There were no MPM exceedances in 2010.

2011

Management Plan Monitoring is scheduled to occur at Terminous Tract Drain @ Hwy 12 for water toxicity to *S. capricornutum* (January through April) and chlorpyrifos (August and September).

Table IX-6. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for Terminous Tract Drain @ Hwy 12 site subwatershed between 2007 and 2010. Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (@ Hwy 12)	Date:	4/10/07	5/22/07	6/12/07	7/10/07	8/07/07	9/04/07
	S. capricornutum (% Control)	181	190	811	205	286	301
	Chlorpyrifos ug/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
2008 NM (@ Hwy 12)	Date:	4/15/08	5/13/08	6/10/08	7/15/08	8/12/08	9/16/08
	S. capricornutum (% Control)	**51**	**0.50**	256	285	246	454
	Chlorpyrifos ug/L	<0.003	<0.003	<0.003	<0.003	**0.021**	**0.020**
2010 NM and MPM(@ Hwy 12)	Date:	4/13/10	5/11/10	6/08/10	7/13/10	8/10/10	9/07/10
	S. capricornutum (% Control)	1480	1121	352	687	1092	369
	Chlorpyrifos ug/L	<0.003	<0.003	<0.003	<0.003	<0.003	0.011

Load Calculations

Load calculations are not relevant to the management of priority constituents in this site subwatershed.

Loads were calculated for the chlorpyrifos detections (Table IX-7) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (µg/L).

Table IX-7. Instantaneous load calculations for chlorpyrifos where discharge was measured in the Terminous Tract @ Hwy 12 site subwatershed (sorted by analyte and sample date).

Sample Site	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	03/21/05	9.06	0.012	3.08
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	01/23/08	33.93	0.0047	4.52
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	09/16/08	18.58	0.02	10.52
Terminous Tract Drain @ Hwy 12	Chlorpyrifos	09/07/10	4.07	0.011	1.27

Source Identification

The Coalition considers past and 2010 monitoring results and associated PUR data to addressed source identification. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2006, the Coalition conducted additional upstream monitoring during the months when exceedances historically occurred to better characterize water quality the subwatershed. During 2009, Terminous Tract Drain was sampled for Core Monitoring constituents only. In 2010, the Terminous Tract Drain @ Hwy 12 site was monitored for Assessment Monitoring constituents and MPM constituents (*S. capricornutum* toxicity and chlorpyrifos) were also assessed during months when exceedances occurred in previous years.

While the Terminous Tract Drain subwatershed is a high priority (2011 through 2013), the Coalition plans to actively engage in grower outreach and education to address Terminous Tract Drain management plan's priority constituents. The Coalition will continue to organize general as well as focused meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings and follow up meetings with targeted members will inform growers about management practices as well as assess current and expected implementation of management practices.

Priority A/B Constituents

Chlorpyrifos is the only A/B constituent listed for the Terminous Tract Drain subwatershed management plan.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L two times in this subwatershed in the past. Exceedances of chlorpyrifos were both associated with the late irrigation season of 2008 (Table IX-6). No MPM took place in 2009; however Assessment Monitoring during 2010 did not result in any exceedances of the chlorpyrifos WQTL. During 2011, Terminous Tract Drain is scheduled to be monitored for Core Monitoring constituents and MPM will occur during months of past exceedances.

PUR data were reviewed for the number of applications of chlorpyrifos, amount of active ingredient applied (pounds applied), and acres treated (Table IX-8, Figure IX-2). The greatest chlorpyrifos use occurred in 2007 (550 lbs AI) with the lowest use occurring in 2006 (215 lbs AI). Between 2005 through 2010, the greatest amount of chlorpyrifos use has consistently occurred during the irrigation months (April through September). Exceedances do not always occur during months of the greatest amount of use (Figure IX-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos (Table IX-9). The largest amount of chlorpyrifos was applied to asparagus (1,363 lbs AI), followed by corn (410 lbs AI). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table IX-9).

Table IX-8. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for January 2004 through December 2010 in the Terminous Tract Drain site subwatershed.
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
March, 2005	3	69.5	139
September, 2005	3	337.6	355.6
March, 2006	3	97.7	98
April, 2006	2	23.4	67
May, 2006	2	44.6	144
June, 2006	1	49.4	99
March, 2007	3	91.7	92
September, 2007	9	384.7	400.5
October, 2007	1	74.3	40
July, 2008	2	321.6	315.4
March, 2009	2	67.0	134
April, 2009	2	88.9	83
August, 2009	1	109.7	110
September, 2009	2	98.1	98
August, 2010	8	256.9	254.4
October, 2010	6	176.1	174.4
Summaries by Year			
2005 Total	6	407.1	494.6
2006 Total	8	215.0	408
2007 Total	13	550.8	532.5
2008 Total	2	321.6	315.4
2009 Total	7	363.6	425
2010 Total	14	432.9	428.8
Total	**50**	**2291.1**	**2604.3**

*No chlorpyrifos PUR data reported for 2004.

Figure IX-2. Pounds of chlorpyrifos applied within the Terminous Tract Drain @ Hwy 12 site subwatershed by month for 2004 - 2010. Asterisk (*) denotes months with exceedances. No chlorpyrifos PUR data reported for 2004.

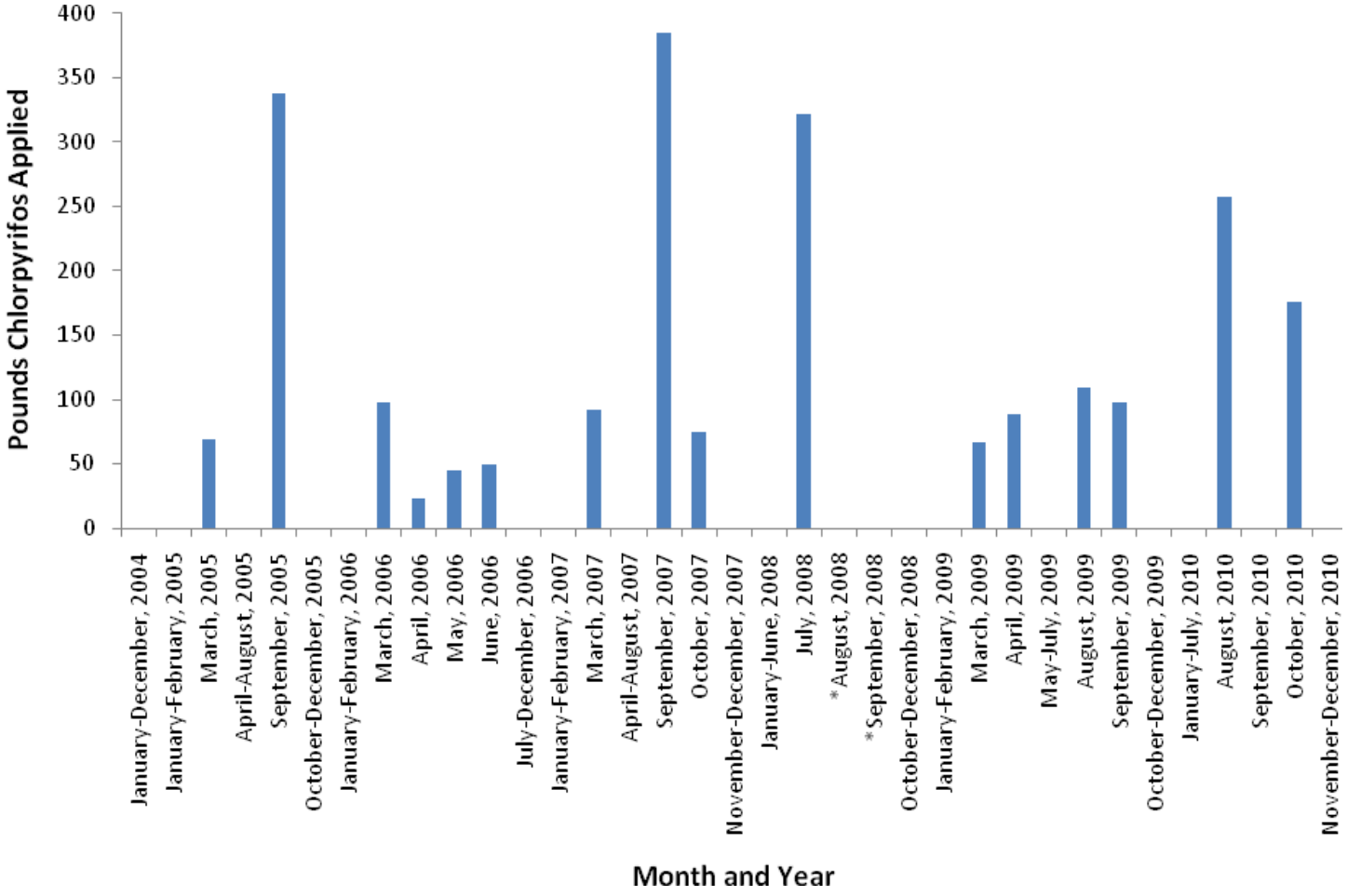


Table IX-9. Total pounds active ingredient (AI) applied for chlorpyrifos based on PUR data from 2004-2010 within the Terminous Tract Drain @ Hwy 12 subwatershed. No chlorpyrifos PUR data reported for 2004.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LORSBAN 4E-HF	189.4
		LORSBAN-4E	159.9
	ASPARAGUS (SPEARS, FERNS, ETC.)	GOVERN 4E INSECTICIDE	432.9
		LORSBAN 4E-HF	611.8
		LORSBAN-4E	318.3
	CORN (FORAGE - FODDER)	GOVERN 4E INSECTICIDE	321.6
		NUFOS 4E	88.9
	GRAPES, WINE	LORSBAN-4E	74.3
	SUGARBEET, GENERAL	LORSBAN 4E-HF	49.4
		LORSBAN-4E	44.6

ALFALFA - Total Pounds Chlorpyrifos Applied	**349.4**
ASPARAGUS - Total Pounds Chlorpyrifos Applied	**1363.0**
CORN - Total Pounds Chlorpyrifos Applied	**410.5**
GRAPES - Total Pounds Chlorpyrifos Applied	**74.3**
SUGARBEET - Total Pounds Chlorpyrifos Applied	**94.0**
Total Pounds Chlorpyrifos Applied (2004-2010)	**2291.1**

Since most of the Terminous Tract Drain @ Hwy 12 subwatershed consists of row crops, the Coalition has determined that management of chlorpyrifos in this watershed should focus on providing information on a targeted basis to growers to encourage the proper management of irrigation tailwater and spray drift. Outreach targeted to specific growers applying chlorpyrifos and/or members farming parcels adjacent to Terminous Tract Drain should result in the greatest improvement of water quality.

Growers are encouraged to review their operation to determine if irrigation return flows are managed properly. Owners operating orchards are instructed to evaluate their applications to minimize spray drift. Growers are targeted for outreach prior to the irrigation season and heavy application periods. Row crop farmers are advised of methods to better manage their irrigation tailwater and storm water runoff, whereas outreach efforts to orchard and vineyard growers focus on encouraging management practices to reduce spray drift and also to improve orchard and vineyard water management.

Since 2007, Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. The Coalition is focusing outreach to growers who have used chlorpyrifos within the last two years and location based on direct drainage.

The Coalition began conducting individual contact meetings with targeted growers during the fall of 2010. A meeting with targeted growers in the Terminous Tract Drain subwatershed was held in January 2011. Although meetings are focusing mainly on chlorpyrifos exceedances, all water quality results are reviewed and discussed including exceedances of arsenic, DO, SC, TDS, *E. coli* and toxicity to *C. dubia, H. azteca,* and *S. capricornutum*. The Coalition contacted 4 targeted growers accounting for 1463 acres

within the subwatershed. All targeted growers have been contacted, thus the Coalition has achieved 100% of initial targeted grower contact.

Grower surveys completed at the meetings, documenting members' current practices and indicating which recommended practices growers anticipated implementing in the upcoming years, will be compiled and assessed by the Coalition. The Coalition is hopeful growers will be able to implement recommended practices during the irrigation season of 2011. Follow up meetings with targeted growers will occur in the fall of 2011 through the winter of 2012 to determine what additional management practices were implemented in 2011 and if additional practices are planned for 2012.

Management Plan Monitoring was conducted in 2010 at Terminous Tract Drain during months when previous exceedances occurred. The Coalition plans to conduct MPM at Terminous Tract Drain @ Hwy 12 from 2011 through 2013 to evaluate improvements in water quality as recommended management practice implementation occurs.

Priority D Constituents

Sediment toxicity to *H. azteca* is listed as priority D constituent under the Terminous Tract Drain @ Hwy 12 Management Plan.

***Hyalella azteca* toxicity**

H. azteca toxicity occurred in the September 2005, April 2006 and September 2010 samples collected from the upstream locations and Highway 12 sample sites. Sediment chemistry analyses were not performed on the 2005 and 2006 toxic samples and the exact toxic constituent and the source(s) of those toxicities are unknown. Additional sediment chemistry analyses were conducted on the Terminous Tract Drain toxic sediment samples from September 2010 sampling and chlorpyrifos and pyrethroids were detected. The PUR data associated with September sediment toxicity were not available for review at the time of this report.

Priority E Constituents

The following priority E constituents are listed under the Terminous Tract Drain management plan: pH, DO, SC, TDS, *E. coli,* and arsenic. Water column toxicity to *P. promelas* and *S. capricornutum* are also listed as priority E constituents. Although these constituents will remain low priority, the Coalition will continue to collect sampling data for these constituents and discuss these constituents and the monitoring results during individual contacts and grower meetings.

Evaluation

Terminous Tract Drain @ Hwy 12 is a third priority site subwatershed within the SJCDWQC and is in its first year of focused outreach (2011 through 2013).

The Coalition's strategy for the Terminous Tract Drain subwatershed is to focus on providing information on a watershed basis to growers to review their operation and determine if irrigation return flows are managed properly, specifically to growers with the potential to drain to the waterway. Almond and walnut growers should be targeted for outreach especially prior to the irrigation season. Outreach includes grower notification, management practice outreach and education, tracking of management practices implementation, and providing information on special studies of management practice

efficacy. The Coalition believes that outreach in this subwatershed should be aimed toward relevant management practice implementation targeting row crop farmers will target the largest audience and result in the greatest improvement of water quality.

Individual grower surveys, documenting current management practice implementations and assessing future planned implementations, are in the process of being filled out and will be completed by the end of October 2011. The Coalition will then assess these results and plan the final stages of outreach including re-contacting growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.