East San Joaquin
WATER QUALITY COALITION
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April 1, 2010

Pamela Creedon
Dania Huggins
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

Dear Ms. Creedon,

The East San Joaquin Water Quality Coalition (ESJWQC) is submitting the Management Plan Update Report which updates the ESJWQC Management Plan approved on November 25, 2008. The report includes information on activities conducted during 2009. The Management Plan update is being submitted to inform the Regional Board of progress made on the management of exceedances within the Coalition region. Included in the report is a status update of constituents and subwatersheds requiring a management plan, an evaluation of the current Management Plan strategy including any updates, a status update of high priority subwatershed performance goals, a summary of newly implemented management practices within 2008 – 2010 high priority site subwatersheds, an evaluation of management practice effectiveness and a status review of TMDL constituents and Basin Plan requirements.

Submitted respectfully,

Parry Klassen
Board Chairman
East San Joaquin Water Quality Coalition

Management Plan Update

East San Joaquin Water Quality Coalition

Submitted on April 1, 2010

Irrigated Lands Regulatory Program

Central Valley Regional Water Quality Control Board

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APPENDIX I. HIGH PRIORITY SITE SUBWATERSHED ANALYSIS (2008 – 2010 AND 2010 – 2012)

List of Acronyms

A	Assessment
AMR	Annual Monitoring Report
APN	Assessor Parcel Number
BMP	Best Management Practice
C	Core
CVRWQCB	Central Valley Regional Water Quality Control Board
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
ESJWQC	East San Joaquin Water Quality Coalition
HCH	Hexachlorocyclohexane
ILRP	Irrigated Land and Regulatory Program
MLJ-LLC	Michael L. Johnson, LLC
MPM	Management Plan Monitoring
MRP	Monitoring and Reporting Program Order No. R5-2008-0005
MRPP	Monitoring and Reporting Program Plan
NA	Not Applicable
NM	Normal Monitoring
PCA	Pesticide Control Advisor
pH	Power of Hydrogen
PUR	Pesticide Use Report
QC	Quality Control
SC	Specific Conductance
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TRS	Township, Range, Section
WQO	Water Quality Objective
WQTL	Water Quality Trigger Limit

List of Units

cfs	cubic feet per second
cm	centimeter
L	Liter
lbs	pounds
mg	milligram
MPN/100mL	most probable number per 100 milliliters
sec	second
µg	microgram
µS	microsiemens

EXECUTIVE SUMMARY

The East San Joaquin Water Quality Coalition (ESJWQC or Coalition) is submitting a Management Plan Update Report on the status and methods used to identify agriculture sources, track implemented management practices, and progress toward meeting its performance goals as outlined in the ESJWQC Management Plan. A Management Plan Update Report is submitted every April 1 to report on the previous year's activities and update management plan implementation schedules and timelines for reporting to the Central Valley Regional Water Quality Control Board (CVRWQCB or Regional Board). This is the second yearly update to the Coalition's Management Plan.

During 2009, monitoring was conducted as outlined in the Coalition's MRPP. In addition, Management Plan Monitoring (MPM) continued during irrigation months (April through September). There were 20 sites monitored between October 2008 and December 2009; of the 20, 11 were monitored for management plan constituents either additionally or as part of assessment monitoring. Based on the prioritization of exceedances, MPM was conducted for *Ceriodaphnia dubia* and *Selenastrum capricornutum* toxicity, copper and chlorpyrifos.

As a result of 2009 monitoring, several new site/constituent specific Management Plans are required including:

- Dissolved Oxygen
  - Duck Slough @ Hwy 99
  - Mootz Drain @ Langworth Rd
- pH
  - Howard Lateral @ Hwy 140
- Specific Conductance (SC) / Total Dissolved Solids (TDS)
  - Dry Creek @ Wellsford Rd
  - Howard Lateral @ Hwy 140
- *E. coli*
  - Howard Lateral @ Hwy 140
  - Mootz Drain @ Langworth Rd
- Ammonia
  - Deadman (Dutchman) Creek @ Gurr Rd
- Nitrate
  - Mustang Creek @ East Ave
- Copper (dissolved and total)
  - Mustang Creek @ East Ave
- Chlorpyrifos
  - Lateral 2 ½ near Keyes Rd
- *C. dubia*
  - Deadman (Dutchman) Creek @ Gurr Rd

The Coalition updated its flow chart of actions based on the monitoring strategy described in the current MRPP which became effective in October 2008. The current monitoring strategy includes a combination of Core and Assessment Monitoring locations with a yearly rotation schedule. Based on this Core and Assessment monitoring strategy, the Management Plan flow charts had to be revised since not all sites were monitored for all constituents and many locations would not be monitored until they were rotated into the monitoring schedule.

Actions in the original flow chart are focused outreach, education and sourcing in Year 1 and Year 2. In the updated flow chart process, a non-high priority site will not have focused outreach, education and sourcing until it becomes high priority; general outreach and education will continue throughout the Coalition region. Therefore, after two years of MPM with continuous exceedances, the Coalition will cease MPM having obtained at least three years of monitoring data and wait till the site becomes high priority to initiate the high priority management plan strategy for monitoring management practice evaluation. Based on this strategy, the Coalition will monitor new management plan sites/constituents during months of past exceedances for at least two years after the initiation of the management plan. This may overlap with assessment monitoring already occurring at that location and therefore there would not be “additional” monitoring.

In the ESJWQC high priority subwatershed, MPM and management practice evaluation strategy, Year 1 refers to the first year that the subwatershed is a high priority site. If there are two years of no exceedances of high priority constituents (either in Year 1 and Year 2 or Year 2 and Year 3), that site/constituent will be removed from an active Management Plan. There will be monitoring for those constituents when the site is rotated into assessment monitoring. MPM may continue into Year 3 if the Coalition determines that an extra year of monitoring is necessary to evaluate improvements in water quality and the effectiveness of newly implemented management practices.

The Coalition prioritized constituents and site subwatersheds to allow for focused source identification, outreach and education. The Coalition prioritized subwatersheds based on the number, frequency and magnitude of chlorpyrifos and diazinon exceedances. Other factors considered include size of the subwatershed and known improvements in management practices that have already been implemented in those areas. Although the Coalition is focusing on chlorpyrifos and diazinon exceedances and associated applications, management practices implemented to help reduce the runoff of these constituents will also reduce the runoff of other pesticides, nutrients, salts and metals.

The Coalition submitted Performance Goals on November 24, 2008 in an amendment to the Management Plan. These goals were developed with coordination with Regional Board staff after evaluation of the effectiveness of the Coalition’s Management Plan strategy.

The Performance Goals are built on the following actions essential to the Management Plan strategy:

1. Determine number/type of management practices currently in place, based on APN associated with baseline survey responses
2. Grower Group Contacts / Individual Contacts
3. Implementation of new management practices
4. Assess number/type of new management practices implemented
5. Evaluate effectiveness of new management practices

For the current high priority sites, the Coalition has completed Performance Measure 1.1 (100% of identified growers contacted) and 1.2 (Contact owners/operators representing at least 1,000 acre of membership acreage in the site subwatershed) of Performance Goal 1 (Individually contact members on adjacent properties to waterways where discharges have been identified from February to August 2009). The acreage in the Prairie Flower Drain watershed is less than the 1,000 acres identified in the Performance Measure because there are very few Coalition members and the majority of the watershed belongs to the Dairy Program. Performance Measure 2.1 (Obtain current management practice information from 100% of targeted growers), Performance Measure 2.2 (Document current management practices of the targeted growers) and Performance Measure 2.3 (Document management practices targeted grower was encouraged to implement) of Performance Goal 2 (Establish current management practices) are complete for all three high priority site subwatersheds. Performance Measure 3.1 (By February 2011, document additional management practices implemented by identified growers) of Performance Goal 3 (Encourage growers to implement additional management practices) is incomplete but is not required to be completed until February 2011. Performance Measure 4.1 (Assess water quality results from Coalition monitoring locations within the priority site subwatersheds) of Performance Goal 4 (Evaluate effectiveness of new practices) is complete to April 1, 2010 and includes a summary for 2009, and Performance Goal 5 (Consult with CVRWQCB at least once during 2008/09) is complete.

The Coalition will submit a full evaluation of current and implemented management practices in the April 2011 Management Plan Update Report for the first high priority subwatersheds. A preliminary analysis of implemented management practices was performed based on survey information obtained from individual contacts and preliminary follow up contacts for the first high priority subwatersheds Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd.

Management practice surveys were divided into checklist subjects including Irrigation Water Management, Storm Drainage, Erosion and Sediment Management, Pest Management and Dormant Spray Management. Responses varied across the three watersheds but a common response was that no dormant sprays were used by respondents in any of the three subwatersheds.

Other compliance issues involve TMDL constituents. The ESJWQC established monitoring and management activities for TMDL constituents as required in the Regional Board's Basin Plan for the Sacramento and San Joaquin River basins.

Chlorpyrifos and Diazinon

The Coalition's Management Plan includes source identification and a means to identify management practices that will need to be implemented in specific areas to achieve expected reductions in chlorpyrifos and diazinon discharges. Improved management practices, including pesticide application practices to address drift, alternative irrigation practices to reduce runoff, and drainage management practices to decrease or reduce the volume of runoff of contaminants have been implemented to meet water quality objectives and load allocations set forth in the Basin Plan. Meetings have been held quarterly with the Regional Water Board to evaluate progress in meeting these reductions, and revisions to the Management Plan will be made if sufficient progress is not being achieved.

Presently, the Coalition broadly monitors chlorpyrifos and diazinon monthly, every year, according to the ESJWQC's Monitoring and Reporting Program (MRP) Plan Core and Assessment strategy (MRP Plan, Tables 8 and 9, Pages 52 - 53) at all Coalition established zones. The monitoring locations in each zone are representative of discharges to the San Joaquin River and Delta. The Coalition attempts to monitor at least two storm events during winter months. Representative monitoring provides information on the wide range of discharges and hydrologic conditions likely to occur in the Delta.

Salt and Boron

The Coalition: (1) participates in ongoing Regional Water Board programs for the management of salt and boron, and (2) implements actions required by the Regional Water Board. Coalition representatives attend CV-SALTS meetings and participate in planning and reviewing studies relevant to the development of a Basin Plan amendment for salt and boron.

Dissolved Oxygen

The Coalition is addressing DO exceedances through the Management Prioritization process and is participating in the DO TMDL Technical Working Group meetings. In general, the Coalition will work to comply with the DO Basin Plan load allocations for oxygen demanding substances by December 2011.

INTRODUCTION

The East San Joaquin Water Quality Coalition (ESJWQC or Coalition) is submitting a Management Plan Update Report on the status and methods used to identify agriculture sources, track implemented management practices, and evaluate performance goals as outlined in the ESJWQC Management Plan. A Management Plan update is submitted every April 1 to report on the previous year's activities, and update management plan implementation schedules and timelines for reporting to the Central Valley Regional Water Quality Control Board (CVRWQCB or Regional Board). Yearly updates allow the Coalition to assess the need to conduct outreach to growers, evaluate information about pesticide use, and obtain water quality data for both irrigation and dormant seasons.

The Management Plan Update Report includes the following:

1. Status of constituents and subwatersheds requiring a management plan
2. Updates to the prioritization process of constituents (if applicable)
3. Status of priority subwatershed performance goals
4. Compliance with TMDL requirements
5. Summary of newly implemented management practices
6. Evaluation of management practice effectiveness

The Coalition has done a detailed analysis of high priority subwatersheds (2008 – 2010 and 2010 – 2012) including monitoring and exceedance histories, sourcing, outreach and management practice tracking that is supplemental to this report and is attached in Appendix I.

Overview of Monitoring

Table 1. October 2008- December 2009 Core (C), Assessment (A) and Management Plan (MPM) Monitoring sites.

Zone	Type	Site Name	Station Code	Latitude	Longitude
1	C*	Dry Creek @ Wellsford Rd	535XDCAWR	37.6602	-120.8743
1	A	Mootz Drain @ Langworth Rd†	535XMDALR	37.70582	-120.89303
1	A	Mootz Drain downstream of Langworth Pond†	535XMDDLP	37.70551	-120.89438
2	C*	Prairie Flower Drain @ Crows Landing	535XPFDCL	37.4422	-121.0024
2	A	Lateral 2 1/2 near Keyes Rd	535LTHNKR	37.54780	-121.09274
3	C*	Highline Canal @ Hwy 99	535XHCHNN	37.41530	-120.75570
3	A	Mustang Creek @ East Ave	535XMCAEA	37.49180	-120.68390
4	C*	Merced River @ Santa Fe Rd	535XMRSFD	37.4271	-120.6721
4	A	Howard Lateral @ Hwy 140	535XHLAHO	37.30790	-120.78200
5	C	Duck Slough @ Gurr Rd	535XDSAGR	37.2142	-120.5596
5	A	Deadman Creek @ Gurr Rd	535XDCAGR	37.19360	-120.56120
6	C	Cottonwood Creek @ Rd 20	545XCCART	36.8686	-120.1818
6	A	Ash Slough @ Ave 21	545XASAAT	37.05450	-120.41580
1	MPM	Dry Creek @ Waterford Rd	535XDCWF	37.65876	-120.77887
1	MPM*	Dry Creek @ Wellsford Rd	535XDCAWR	37.6602	-120.8743
2	MPM	Hilmar Drain @ Central Ave	535XHDACA	37.39060	-120.95820
2	MPM*	Prairie Flower Drain @ Crows Landing	535XPFDCL	37.4422	-121.0024
3	MPM	Dry Creek @ Oakdale Rd	535DCAORD	37.46047	-120.61530
3	MPM*	Highline Canal @ Hwy 99	535XHCHNN	37.41530	-120.75570
3	MPM	Highline Canal @ Lombardy Ave	535XHCALR	37.45560	-120.72070
4	MPM*	Merced River @ Santa Fe Rd	535XMRSFD	37.4271	-120.6721
5	MPM	Deadman Creek @ Hwy 59	535DMCAHF	37.19810	-120.48690
5	MPM	Duck Slough @ Hwy 99	535XDSAHN	37.25010	-120.41000
5	MPM	Miles Creek @ Reilly Rd	535XMCARR	37.25820	-120.47550

C – Core Monitoring site
A – Assessment Monitoring site
MPM – Management Plan Monitoring site
*Core site also sampled as MPM.
†Mootz Drain @ Langworth was approved to be moved downstream to Mootz Drain downstream of Langworth Pond on November 30, 2009. Sampling in the new location began December 8, 2009.

2009 Management Plan Monitoring

This is the second yearly update to the Coalition's Management Plan. In this report, previous year's monitoring data are reviewed and assessed for water quality improvements and exceedances. This update includes an assessment of water quality based on 2009 monitoring results including new exceedances and new site/constituents requiring management plans.

During 2009, monitoring was conducted as outlined in the Coalition's MRPP. In addition, Management Plan sampling continued during irrigation months (April through September). Management Plan Monitoring (MPM) in 2009 involved monitoring for constituents that had exhibited more than one exceedance of the associated water quality trigger limit (WQTL). In some cases, these constituents were already being monitored for under the MRPP monitoring schedule. The Coalition's Annual Monitoring Report (AMR) submitted on March 1, 2010 lists the locations, dates and type of sampling that was conducted during the irrigation season including Management Plan Monitoring (MPM), Normal monitoring (NM) and sediment toxicity. There were 20 sites monitored between October 2008 and December 2009; of the 20, 11 were monitored for management plan constituents either additionally or as part of Assessment Monitoring (Table 1). Based on the prioritization of exceedances, MPM was conducted for *Ceriodaphnia dubia* and *Selenastrum capricornutum* toxicity, copper and chlorpyrifos (Table 2). Results from MPM can be found in Table 3.

Table 2. 2009 Management Plan Monitoring schedule.

Site Name	Year	Month	*C. dubia*	*S. capricornutum*	Copper	Chlorpyrifos
Deadman Creek @ Hwy 59	2009	April		X		
Duck Slough @ Hwy 99	2009	April		X		
Highline Canal @ Hwy 99	2009	April		X		
Hilmar Drain @ Central Ave	2009	April		X		
Miles Creek @ Reilly Rd	2009	April		X		
Prairie Flower Drain @ Crows Landing Rd	2009	April		X		
Duck Slough @ Hwy 99	2009	May				X
Highline Canal @ Hwy 99	2009	May		X		
Highline Canal @ Lombardy Rd	2009	May		X		
Prairie Flower Drain @ Crows Landing Rd	2009	May		X		
Duck Slough @ Hwy 99	2009	June			X	
Dry Creek @ Waterford Rd	2009	July				X
Dry Creek @ Wellsford Rd	2009	July				X
Duck Slough @ Hwy 99	2009	July			X	X
Highline Canal @ Hwy 99	2009	July				X
Highline Canal @ Lombardy Rd	2009	July	X			X
Miles Creek @ Reilly Rd	2009	July			X	X
Deadman Creek @ Hwy 59	2009	August				X
Dry Creek @ Waterford Rd	2009	August				X
Dry Creek @ Wellsford Rd	2009	August				X
Duck Slough @ Hwy 99	2009	August			X	
Highline Canal @ Lombardy Rd	2009	August	X		X	X
Miles Creek @ Reilly Rd	2009	August			X	X
Prairie Flower Drain @ Crows Landing Rd	2009	August				X
Deadman Creek @ Hwy 59	2009	September				X
Duck Slough @ Hwy 99	2009	September			X	X
Hilmar Drain @ Central Ave	2009	September		X		
Miles Creek @ Reilly Rd	2009	September				X
Dry Creek @ Oakdale Rd (upstream of Merced River)	2009	November				X
Merced River @ Santa Fe Dr	2009	November				X
Dry Creek @ Oakdale Rd (upstream of Merced River)	2009	December				X
Merced River @ Santa Fe Dr	2009	December				X

Table 3. 2009 Management Plan Monitoring results.

Sample Site	Sample Date	*C. dubia* (% survival compared to the control)	*S. capricornutum* (% growth compared to the control)	Copper (µg/L)	Chlorpyrifos (µg/L)
Deadman Creek @ Hwy 59	4/21/2009		No toxicity		
Duck Slough @ Hwy 99	4/21/2009		No toxicity		
Highline Canal @ Hwy 99	4/21/2009		No toxicity		
Hilmar Drain @ Central Ave	4/21/2009		No toxicity		
Miles Creek @ Reilly Rd	4/21/2009		No toxicity		
Prairie Flower Drain @ Crows Landing Rd	4/21/2009		No toxicity		
Duck Slough @ Hwy 99	5/19/2009				No exceedance
Highline Canal @ Hwy 99	5/19/2009		No toxicity		
Highline Canal @ Lombardy Rd	5/19/2009		No toxicity		
Prairie Flower Drain @ Crows Landing Rd	5/19/2009		30%		
Duck Slough @ Hwy 99	6/16/2009			No exceedance	
Dry Creek @ Waterford Rd	7/21/2009				No exceedance
Dry Creek @ Wellsford Rd	7/21/2009				No exceedance
Duck Slough @ Hwy 99	7/21/2009			No exceedance	No exceedance
Highline Canal @ Hwy 99	7/21/2009				0.093
Highline Canal @ Lombardy Rd	7/21/2009	No toxicity			No exceedance
Miles Creek @ Reilly Rd	7/21/2009			No exceedance	0.028
Deadman Creek @ Hwy 59	8/18/2009				No exceedance
Dry Creek @ Waterford Rd	8/18/2009				No exceedance
Dry Creek @ Wellsford Rd	8/18/2009				0.027
Duck Slough @ Hwy 99	8/18/2009			No exceedance	
Highline Canal @ Lombardy Rd	8/18/2009	No toxicity		No exceedance	No exceedance
Miles Creek @ Reilly Rd	8/18/2009			No exceedance	No exceedance
Prairie Flower Drain @ Crows Landing Rd	8/18/2009				No exceedance
Deadman Creek @ Hwy 59	9/22/2009				No exceedance
Duck Slough @ Hwy 99	9/22/2009			No exceedance	No exceedance
Hilmar Drain @ Central Ave	9/22/2009		No toxicity		
Miles Creek @ Reilly Rd	9/22/2009				No exceedance
Dry Creek @ Oakdale Ave	11/17/2009				No exceedance
Merced River @ Santa Fe Dr	11/17/2009				No exceedance
Dry Creek @ Oakdale Ave	12/15/2009				No exceedance
Merced River @ Santa Fe Dr	12/15/2009				No exceedance

2004 - 2009 Exceedances

An important aspect of the ESJWQC Management Plan is to maintain yearly updates of exceedances based on the most recent water quality trigger limits (WQTLs). Table 4 provides a tally of exceedances for sites monitored from 2004 through 2009. Sites not included in this tally, as described in the ESJWQC Management Plan submitted on September 30, 2008 include August Drain, Jones Drain and Lone Willow Slough.

Sites monitored as upstream MPM sites in 2008 that experienced exceedances are not included in Table 4 or 5. These sites and associated exceedances were included in the Management Plan Update Report submitted on April 1, 2009 and are referenced in the site subwatershed section of this Management Plan.

Table 5 includes a tally of exceedances experienced since the last update (April 1, 2009) and includes monitoring results from 2009. South Slough @ Quinley Rd is included in this tally; however the Coalition is in discussion with the Regional Board to remove this site from its Monitoring and Reporting Program Plan (MRPP) due to recent information regarding the source and drainage of this water body. In both Tables 4 and 5, cells with blue highlights indicate exceedances that are currently under the ESJWQC Management Plan. In Table 5, green highlights indicate sites/constituents that are included in the ESJWQC Management Plan due to exceedances experienced in 2009.

Table 4. ESJWQC exceedance tally based on results through December 2009.

Sites are listed alphabetically by station name and constituents are listed alphabetically within each of the following groups: field parameters, inorganics, bacteria, metals, pesticides and toxicity. Constituents under a management plan are highlighted.

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Total Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate as N, mg/L	Nitrite as N, mg/L	Nitrate + Nitrite as N, mg/L	*E. coli*, MPN/100 mL	Arsenic, µg/L	Copper Dissolved, µg/L	Copper Total, µg/L	Lead, µg/L	Zinc, µg/L	Aldicarb, µg/L	Carbofuran	Chlorpyrifos, µg/L	Cyanazine, µg/L	DDD (p,p'), µg/L	DDE (p,p'), µg/L	DDT (p,p'), µg/L	Diazinon, µg/L	Dieldrin, µg/L	Dimethoate, µg/L	Diuron, µg/L	HCH, µg/L	Malathion, µg/L	Methidathion	Methoxychlor, µg/L	Methyl parathion, µg/L	Thiobencarb, µg/L	Simazine, µg/L	*C. dubia*, Survival (%)	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell	*H. azteca*, Survival (%)
Ash Slough @ Ave 21	1								3		1	5	2				4																		1	
Bear Creek @ Kibby Rd	2	3							7	1		4					2				1												3		2*	2*
Berenda Slough along Ave 18 1/2	8								2								3								1								1		3	
Black Rascal Creek @ Yosemite Rd	17	2							11			1	2				4																5		1	1
Cottonwood Creek @ Rd 20	14	1							14			12	3				2	1				1			2							1		1	2*	1
Deadman (Dutchman) Creek @ Gurr Rd	20	1	4	4	3				30	10		4					1				1		1				1						2	5	3	
Deadman Creek @ Hwy 59	17								12	5							4		1		1				1							1			3	1
Dry Creek @ Rd 18	3	2							4			21	5	1			3					2			2								1		4	2
Dry Creek @ Wellsford Rd	25	4	1						29			3	1				7								2						1		2		5	2
Duck Slough @ Gurr Rd	3	4	2	1				1	19		1	8	4			1	1														2		3		2	5
Duck Slough @ Hwy 99	2	3							12			11	11				4																1		3	2*
Hatch Drain @ Tuolumne Rd	23		22	12	1	13	1		12	12											1			1					1						10	6
Highline Canal @ Hwy 99	1	14	1	2	2				8			7	7				5								2								4		4	6
Highline Canal @ Lombardy Rd	1	4	1		1				4			5	8	1			5								1		1			1		1	6	2*	4	7
Hilmar Drain @ Central Ave	6	3	37	26	2	12			20			2					1		1	1					3								1		6	4
Howard Lateral @ Hwy 140	1	3	1	1				1	2		1																								1	
Lateral 2 ½ near Keyes Rd		4			1			1	2								1									1									1	1
Livingston Drain @ Robin Ave	1	11				1			2			9	2				4																		4	
Merced River @ Santa Fe	4	1							1			1	2				3									1							5		1	
Miles Creek @ Reilly Rd	10								7			7	5		1		4											1					3		3	3
Mootz Drain @ Langworth Rd	10	1			1				9								2								1										1	
Mootz Drain Downstream of Langworth Pond	1								1																											
Mustang Creek @ East Ave	10		7	4	1			2	7		3						2			3												2	2*		1	1
Prairie Flower Drain @ Crows Landing Rd	14	6	60	45	6	18	1	15	31	1							4							1			1						2	2*	8	6
Silva Drain @ Meadow Dr	17	1			3				13			3	1				6																3	1		4

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Total Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate as N, mg/L	Nitrite as N, mg/L	Nitrate + Nitrite as N, mg/L	*E. coli*, MPN/100 mL	Arsenic, µg/L	Copper Dissolved, µg/L	Copper Total, µg/L	Lead, µg/L	Zinc, µg/L	Aldicarb, µg/L	Carbofuran	Chlorpyrifos, µg/L	Cyanazine, µg/L	DDD (p,p'), µg/L	DDE (p,p'), µg/L	DDT (p,p'), µg/L	Diazinon, µg/L	Dieldrin, µg/L	Dimethoate, µg/L	Diuron, µg/L	HCH, µg/L	Malathion, µg/L	Methidathion	Methoxychlor, µg/L	Methyl parathion, µg/L	Thiobencarb, µg/L	Simazine, µg/L	*C. dubia*, Survival (%)	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell	*H. azteca*, Survival (%)
South Slough @ Quinley Rd	4	2							3			1	1				1						1												1	
Westport Drain @ Vivian Rd	7		19	13		13			7								2																		4	1
Grand Total	**222**	**70**	**155**	**108**	**21**	**57**	**2**	**20**	**272**	**38**	**6**	**104**	**54**	**2**	**1**	**1**	**75**	**1**	**2**	**4**	**5**	**3**	**2**	**2**	**15**	**2**	**3**	**1**	**1**	**1**	**3**	**5**	**44**	**11**	**78**	**55**

All data were evaluated including field QCs. If a field QC has an exceedance, and the associated environmental sample does NOT have an exceedance, that field QC exceedance is included in the tally.

*Not prioritized for Management Plan Monitoring; both toxic samples were from the same sampling event (sample and resample to test for persistence).

Table 5. ESJWQC exceedance tally based on 2009 sampling events.

All sites are listed that have had at least one exceedance. Sites are listed alphabetically by station name and constituents are listed alphabetically within each of the following groups: field parameters, inorganics, bacteria, metals, pesticides and toxicity. Green highlighted cells refer to sites/constituents that require a management plan due to 2009 exceedances; blue highlights refer to sites/constituents already in management plans.

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Total Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate + Nitrite as N, mg/L	E. coli, MPN/100 mL	Arsenic, µg/L	Copper Dissolved, µg/L	Chlorpyrifos, µg/L	DDE (p,p'), µg/L	Diuron, µg/L	*C. dubia*, Survival (%)	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell Count	*H. azteca*, Survival (%)
Ash Slough @ Ave 21	1								1							
Cottonwood Creek @ Rd 20	1						2									
Deadman (Dutchman) Creek @ Gurr Rd	6		3	3	3		9	3					2	3	1	
Dry Creek @ Wellsford Rd	6		1				8			1						
Duck Slough @ Gurr Rd		2	1			1	3		1							
Duck Slough @ Hwy 99	1															
Highline Canal @ Hwy 99		5					1			1						
Hilmar Drain @ Central Ave			2													
Howard Lateral @ Hwy 140	1	3	1	1		1	2		1						1	
Lateral 2 ½ near Keyes Rd		2				1				1					1	1
Merced River @ Santa Fe	2															
Miles Creek @ Reilly Rd	4									1						
Mootz Drain @ Langworth Rd	9				1		8			1		1			1	
Mootz Drain Downstream of Langworth Pond	1						1									
Mustang Creek @ East Ave	2		5	3	1	2	1		3		1					
Prairie Flower Drain @ Crows Landing Rd	1	1	12	12	4	12	6								1	

All data were evaluated including field QCs. If a field QC has an exceedance, and the associated environmental sample does NOT have an exceedance, that field QC exceedance is included in the tally

2009 New Site/Constituents Requiring Management Plans

As a result of 2009 monitoring, several new site/constituent specific Management Plans are required (see green highlights in Table 5). Below is a list of constituents with 2009 exceedances that have triggered a new site/constituent specific management plan:

- Dissolved Oxygen
  - Duck Slough @ Hwy 99
  - Mootz Drain @ Langworth Rd
- pH
  - Howard Lateral @ Hwy 140
- Specific Conductance (SC) / Total Dissolved Solids (TDS)
  - Dry Creek @ Wellsford Rd
  - Howard Lateral @ Hwy 140
- *E. coli*
  - Howard Lateral @ Hwy 140
  - Mootz Drain @ Langworth Rd
- Ammonia
  - Deadman (Dutchman) Creek @ Gurr Rd
- Nitrate
  - Mustang Creek @ East Ave
- Copper (dissolved and total)
  - Mustang Creek @ East Ave
- Chlorpyrifos
  - Lateral 2 ½ near Keyes Rd
- *C. dubia*
  - Deadman (Dutchman) Creek @ Gurr Rd

Management Plan Process

The ESJWQC Management Plan process was first outlined in the ESJWQC Management Plan submitted on September 30, 2008. This process was an outline of specific actions that would be taken by the Coalition based on prioritized exceedances. Actions were placed into a framework of years and tiers and the process was diagramed in a flow chart. The Coalition has updated its flow chart of actions based on the monitoring strategy described in the current MRPP which became effective in October 2008. The current monitoring strategy includes a combination of Core and Assessment Monitoring locations with a yearly rotation schedule. Based on this Core and Assessment monitoring strategy, the Management Plan flow charts had to be revised since not all sites were monitored for all constituents and many locations would not be monitored until they were rotated into the monitoring schedule (see the ESJWQC MRPP for details on the monitoring schedule). Flow chart revisions were discussed with Regional Board staff during a pre-quarterly meeting held on October 7, 2009.

Except for new assessment monitoring locations initiated in October 2008, all other subwatersheds under the ESJWQC Management Plan followed the original Management Plan flow charts requiring additional monitoring in 2007 and upstream monitoring in 2008 during the irrigation season for high priority constituents during months of past exceedances. In 2009, the Coalition was able to utilize source information gained from MPM during its outreach efforts, especially within high priority site subwatersheds. Due to the extensive amount of monitoring conducted within the Coalition region, the Coalition has focused its efforts on documenting changes in management practices and performing outreach at both an individual and grower group level.

Management Plan Monitoring Strategy

The Coalition developed an updated flow chart for its Management Plan Monitoring (MPM) strategy for non-high priority subwatersheds (Figure 1) and high priority subwatersheds (Figure 2).

Figure 1 (non-high priority strategy) is very similar to the flow chart that was submitted in the ESJWQC Management Plan. In the original flow chart, after two years of continuous exceedances the Coalition would enter its third year of MPM and consult with the Regional Board regarding the lack of water quality improvements. Actions in the original flow chart are focused outreach, education and sourcing in Year 1 and Year 2. In the updated flow chart (Figure 1), a non-high priority site will not have focused outreach, education and sourcing until it becomes high priority. Therefore, after two years of MPM with continuous exceedances, the Coalition will cease MPM having obtained at least three years of monitoring data and wait till the site becomes high priority to initiate the high priority management plan strategy for monitoring management practice evaluation (Figure 2).

Based on this strategy, the Coalition will monitor new management plan sites/constituents during months of past exceedances for at least two years after the initiation of the management plan. This may overlap with assessment monitoring already occurring at that location and therefore there would not be “additional” monitoring. For example, if new site X has an exceedance for chlorpyrifos during its first year of assessment monitoring, the site will continue to be monitored the following year for chlorpyrifos per the normal monitoring schedule. This will count as year 1 of MPM (Figure 1). If an exceedance occurs in year 1 of MPM, site X will be monitored for chlorpyrifos the following year even though it will no longer be monitored as an assessment monitoring location (assessment sites rotate every two years). The Coalition selected this strategy for new management plan sites/constituents since outreach and education will continue with all members within the Coalition, not just with those in high priority subwatersheds. It is hoped that growers will take the initiative and implement additional management practices within their watersheds before the subwatershed becomes a high priority site. Therefore, it is possible that Coalition monitoring results will indicate an improvement in water quality which would eliminate the need for extremely costly future individual contacts/interviews. The other benefit of this strategy is that the additional monitoring will help in the assessment of the sources of exceedances (both temporally and geographically) between years.

In the ESJWQC high priority subwatershed, MPM and management practice evaluation strategy (Figure 2), Year 1 refers to the first year that the subwatershed is a high priority site. If there are two years of no exceedances of high priority constituents (either in Year 1 and Year 2 or Year 2 and Year 3), that site/constituent will be removed from an active Management Plan. There will be monitoring for those constituents when the site is rotated into assessment monitoring. MPM may continue into Year 3 if the Coalition determines that an extra year of monitoring is necessary to evaluate improvements in water quality and the effectiveness of newly implemented management practices.

Figure 1. ESJWQC Management Plan Monitoring strategy for new non-high priority subwatersheds.

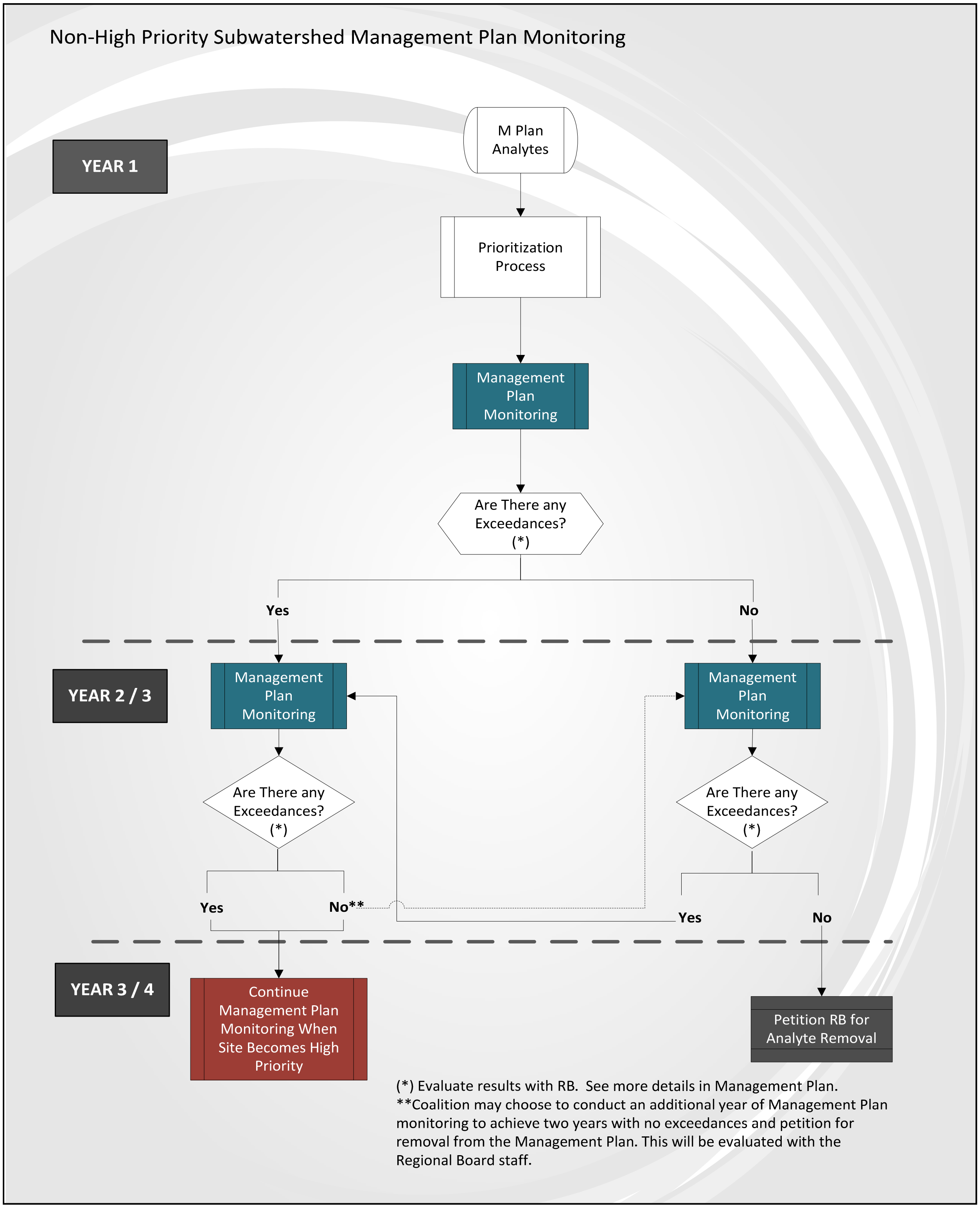
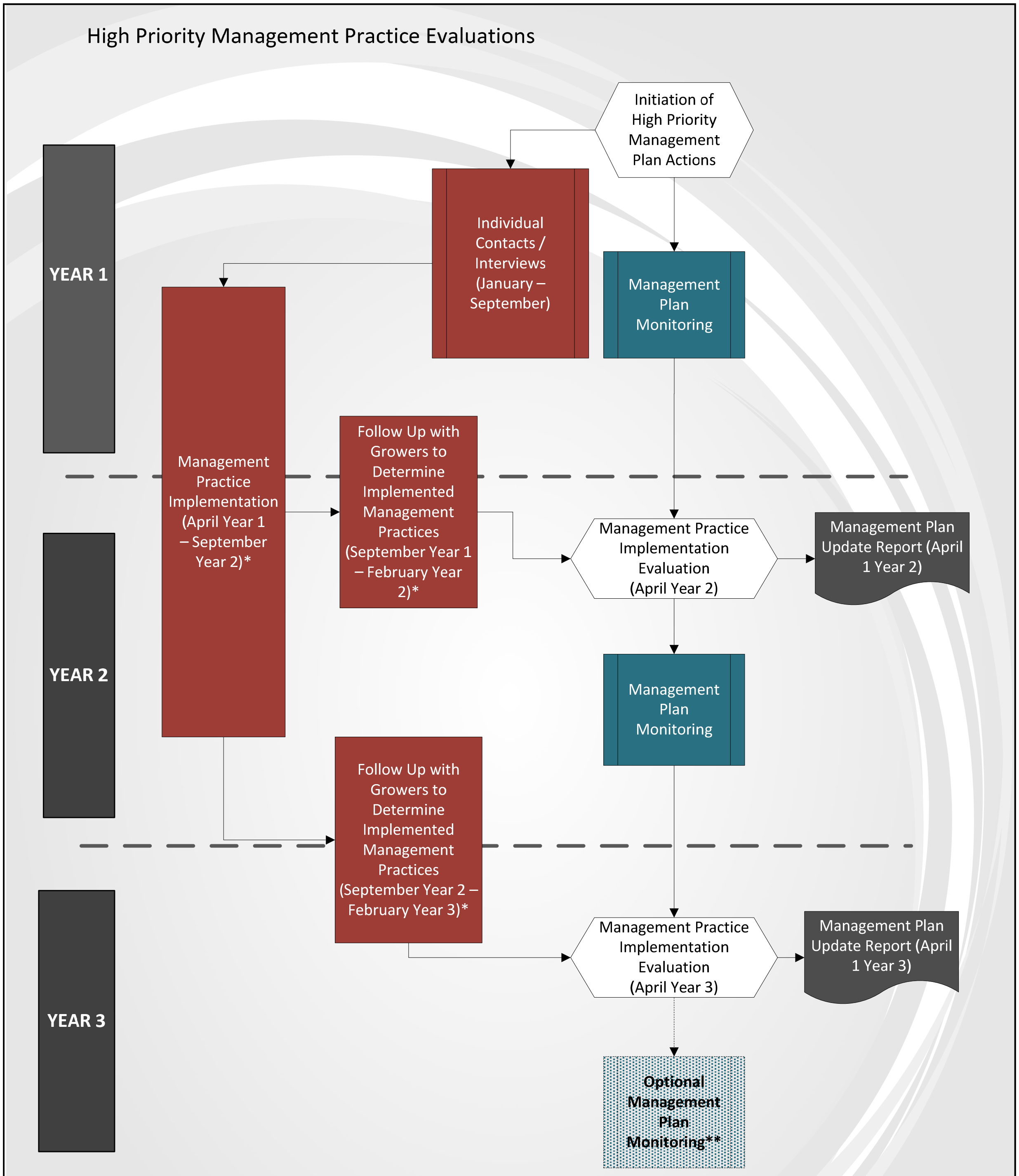


Figure 2. ESJWQC high priority subwatershed Management Plan Monitoring and management practice evaluation strategy.



*Structural management practices may take longer to implement due to cost and time required to install; such cases will be reported to the Regional Board and followed up with individually.

**The Coalition may choose to continue conducting Management Plan Monitoring during the third year if many of the practices were implemented late in the second year requiring an additional year of monitoring to evaluate improvements on water quality; this decision would be discussed with the Regional Board during quarterly meetings.

Management Practice Tracking Strategy

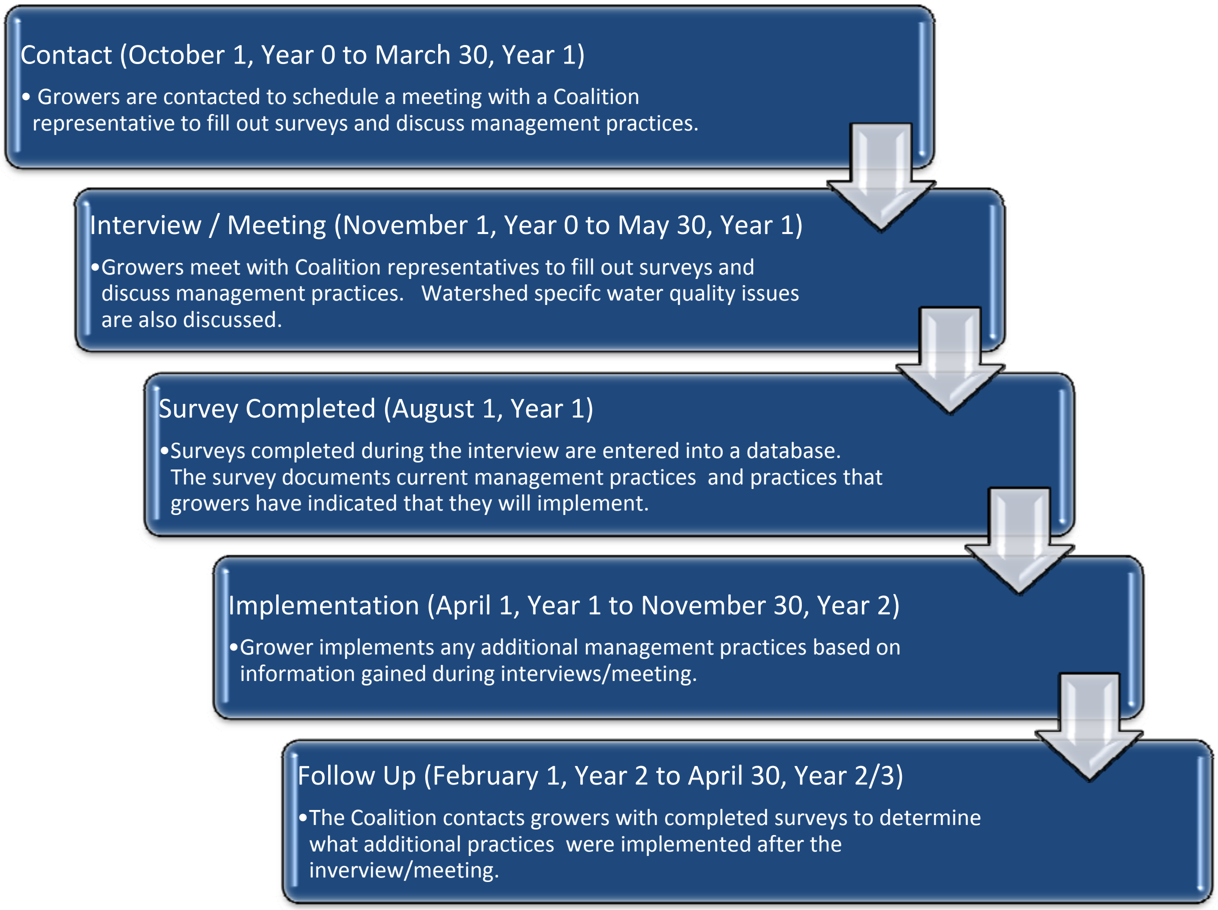
The schedule diagramed in Figure 3 lists a general timeline based on Year 1, 2 and 3 of the flow chart in Figure 2. When a site becomes a high priority site subwatershed, the Coalition makes contacts to individuals within the subwatershed who have the potential for direct drainage and have applied constituents of concern. Contacts occur between October 1 and March 30 of the first year in order to set up meetings and conduct individual contacts/interviews between November 1 and May 30. Individual contacts are used to inform growers of current water quality issues and potential management practices that can be implemented to reduce impairments of water quality due to agricultural inputs.

During the interviews, growers are asked about their current farming operations and surveys are completed which document the grower's current management practices and any recommended management practices. It is anticipated that all surveys will be completed and entered into a database by August 1 of the first year. Implementation is anticipated to occur between April of Year 1 and November of Year 2. It is difficult to predict when implementation will occur since some practices such as structural management practices may take multiple years to implement.

The Coalition conducts follow up surveys with growers between February of Year 2 and April of Year 2. Follow up may be extended to Year 3 depending on information obtained from the growers on when they plan to implement practices; in some cases a third year may be necessary for funds to be available for structural improvements. Growers with surveys from Year 1 are contacted to attend a follow up meeting. At the meeting, hand held interactive devices are checked out to attendees that are then used to answer survey questions included in a power point presentation given by Coalition representatives. For growers that do not attend the meeting, the Coalition follows up with phone calls and completion of follow up survey questions during phone interviews.

The follow up survey documents whether growers implemented new management practices in Year 1; if they did not implement new management practices the survey documents whether or not they plan to implement those practices in Year 2. If the grower indicates that they did not implement any practices nor do they intend to implement additional practices in the next year, the grower is asked why they decided not to implement those practices (i.e. they no longer farm that parcel, no available funds, etc.).

Figure 3. Schedule for Coalition Management Plan strategy activities to document management practices for high priority subwatersheds.



PRIORITIZATION OF EXCEEDANCES

The ESJWQC developed a prioritization process which allows the Coalition to focus on constituents of the greatest concern. These constituents are included in the Management Plan process outlined below in Figure 4. The prioritization process was developed in collaboration with the Regional Board and allows the Coalition to focus on constituents where sourcing is possible (i.e. pesticide use reports) and for which management practices are available. Following the flow chart in Figure 4, a priority level is assigned to a Management Plan constituent for a specific site subwatershed. Priority levels will determine the level of activity for sourcing, outreach and evaluation. The ESWJQC Management Plan includes a detailed description of the prioritization process including tiers and actions.

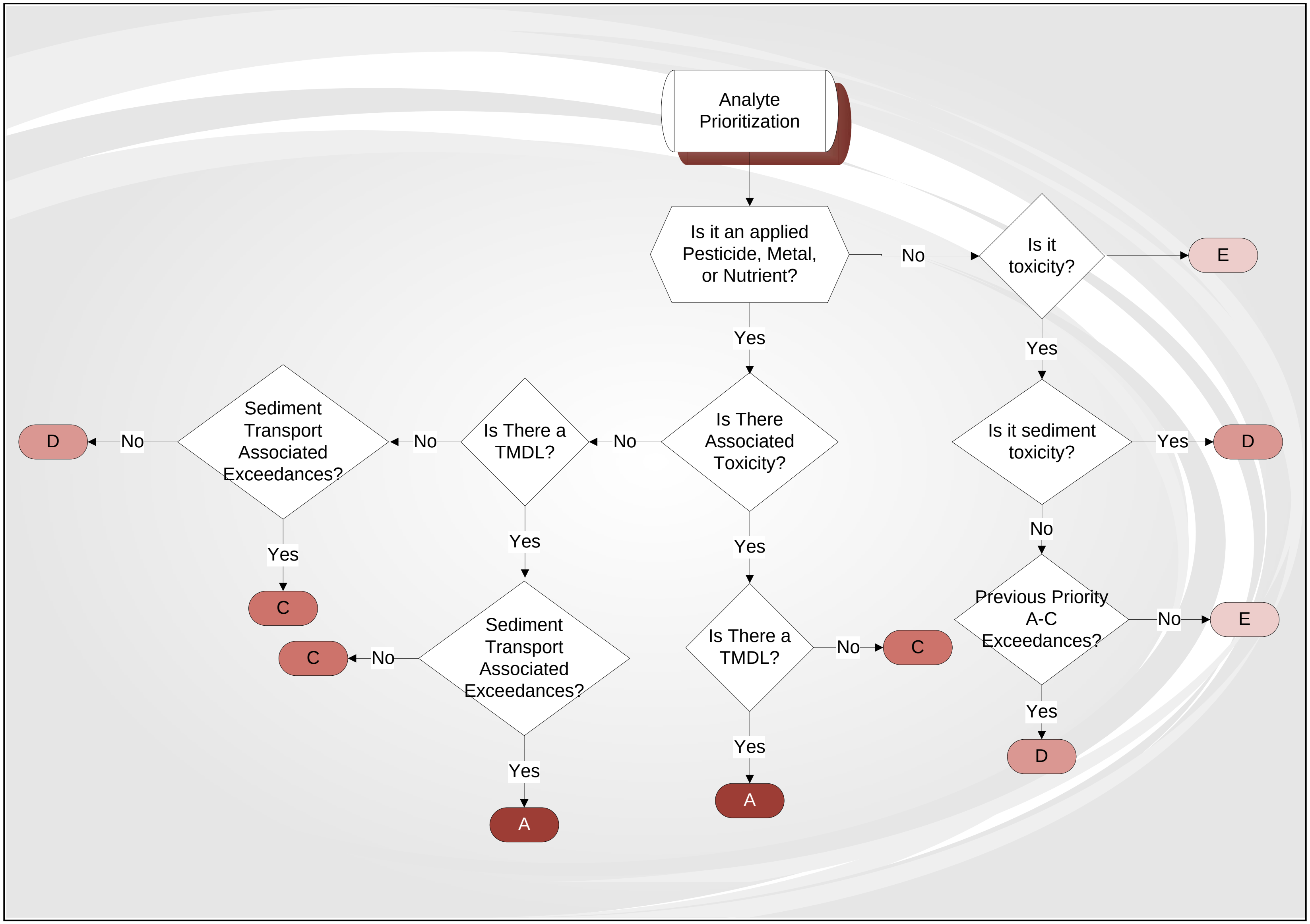
The flow chart included in the Management Plan included a tiered system with specific actions depending on the priority level of the exceedance and the tier in which it is located. The actions included additional and upstream monitoring. Due to changes in the MPM strategies for non-high priority and priority subwatersheds, the actions associated with tiers have been omitted from this flow chart. The MPM and management practice evaluation strategies are documented in Figures 1-3 above.

Sourcing will still be conducted by utilizing pesticide use reports (PUR) and any associated MPM data (may include upstream and/or increased frequency monitoring from previous years). Monitoring will be conducted for priority constituents A through D; priority E constituents will not have MPM except for field parameters which are collected each time monitoring occurs.

Outreach occurs for all constituents however growers using constituents of high priority (i.e. TMDL pesticides such as chlorpyrifos) are targeted for individual contacts. The Coalition will continue to conduct annual meetings and site subwatershed meetings as needed.

The Coalition evaluates management practice information obtained from individual survey contacts including follow up surveys which document newly implemented practices. The Coalition expects that as a direct result of individual contacts and newly implemented practices, downstream water quality will improve. However, it is possible that due to non member actions, there may continue to be downstream water quality impairments. Therefore evaluations of management practices not only assess water quality but also overall changes in practices at a subwatershed level.

Figure 4. ESJWQC prioritization process.



MANAGEMENT PLAN DEVELOPMENT TIMELINES

The Coalition submitted on June 5, 2009 a request to extend completion of actions in its prioritization schedule (originally submitted on November 24, 2008) by a year. A request was sent to the Executive Office on October 23, 2009 to replace Hilmar Drain @ Central Ave with Bear Creek @ Kibby Rd as a high priority site subwatershed in 2010 – 2012. In exchange, Hilmar Drain would become high priority in 2012 – 2014. The schedule is re-evaluated yearly and updated with new monitoring locations and updates in prioritization based on various factors including updated monitoring results and available resources.

There have been new sites added to the Coalition's Management Plan and they have been prioritized for 2015 -2017:

- Lateral 2 ½ near Keyes Rd
- Mootz Drain @ Langworth Rd / Mootz Drain Downstream of Langworth Pond

Howard Lateral @ Hwy 140 was not given a high priority because there have been no exceedances of Priority A-D constituents.

Table 6 provides an updated schedule that includes the approved changes to prioritization years, exchange of Bear Creek and Hilmar Drain and the three new management plan site subwatersheds.

Although South Slough @ Quinley Rd is listed as a high priority subwatershed in 2014 – 2016 the Coalition has submitted documentation to the Regional Board requesting that South Slough be removed from the ESJWQC MRPP. It is anticipated that next year the schedule will be updated with the removal of South Slough from this list.

Mootz Drain @ Langworth Rd was replaced by Mootz Drain Downstream of Langworth Pond which is downstream of Langworth Rd. The original sampling location at Langworth Rd often acted as a sediment or retention pond with little to no flow leaving the pond during summer months. The Coalition began sampling downstream of the pond in December 2009; however, until the downstream location is monitored long enough to determine water quality impairments, all upstream exceedances will be monitored as part of the Mootz Drain Downstream of Langworth Pond site subwatershed MPM.

There are currently 25 site subwatersheds included in the ESJWQC Management Plan that will become high priority sites between 2008 and 2017 (including South Slough @ Quinley Rd) (Table 6).

Table 6. Proposed schedule for addressing each site subwatershed with a detailed, focused management plan approach.

Site Subwatershed Name	Updated year for focused approach
Dry Creek @ Wellsford Rd	2008-2010
Duck Slough @ Hwy 99	2008-2010
Prairie Flower Drain @ Crows Landing Rd	2008-2010
Cottonwood Creek @ Rd 20	2010-2012
Duck Slough @ Gurr Rd	2010-2012
Highline Canal @ Hwy 99	2010-2012
Bear Creek @ Kibby Rd	2010-2012
Ash Slough @ Ave 21	2011-2013
Berenda Slough along Ave 18 1/2	2011-2013
Dry Creek @ Rd 18	2011-2013
Livingston Drain @ Robin Ave	2011-2013
Hilmar Drain @ Central Ave	2012-2014
Black Rascal Creek @ Yosemite Rd	2012-2014
Deadman Creak @ Hwy 59	2012-2014
Deadman Creek (Dutchman) @ Gurr Rd	2012-2014
Hatch Drain @ Tuolumne Rd	2013-2015
Highline Canal @ Lombardy Rd	2013-2015
Merced River @ Santa Fe	2013-2015
Miles Creek @ Reilly Rd	2013-2015
Mustang Creek @ East Ave	2014-2016
Silva Drain @ Meadow Dr	2014-2016
South Slough @ Quinley Rd	2014-2016
Westport Drain @ Vivian Rd	2014-2016
Lateral 2 ½ near Keyes Rd	2015-2017
Mootz Drain Downstream of Langworth Pond*	2015-2017
Re-evaluate All Site Subwatersheds and Revise Schedule	**Annually**

*Mootz Drain Downstream of Langworth Pond will be monitored for all management plan constituents detected at the upstream location, Mootz Drain @ Langworth Rd.

PRIORITY SITE MANAGEMENT

Management Objectives

The Coalition prioritized constituents and site subwatersheds to allow for focused source identification, outreach and education. The Coalition prioritized subwatersheds based on the number, frequency and magnitude of chlorpyrifos and diazinon exceedances. Other factors considered include size of the subwatershed and known improvements in management practices that have already occurred in those areas.

The objective of the prioritization process is to decrease the amount of agricultural inputs that may contribute to downstream impairments. Although the Coalition is focusing on chlorpyrifos and diazinon exceedances and associated applications, management practices implemented to help reduce the runoff of these constituents will also reduce the runoff of other pesticides, nutrients, salts and metals.

The Coalition will monitor for Priority A- D constituents when a site is a high priority subwatershed to evaluate improvements in water quality and the effectiveness of management practices (Figure 2). In addition, if there is a new site subwatershed requiring a management plan that site will be monitored for at least two years for Priority A-D constituents (Figure 1).

2010 Management Plan Monitoring (MPM) Schedule

The ESJWQC will conduct MPM at the following sites; Years 1 and 2 refer to the year that the site has been a high priority site (Figure 2):

Year 2: First Priority (2008 – 2010)

- Dry Creek @ Wellsford
- Duck Slough @ Hwy 99
- Prairie Flower Drain @ Crows Landing

Year 1: Second Priority (2010 – 2012)

- Bear Creek @ Kibby Rd
- Cottonwood Creek @ Rd 20
- Duck Slough @ Gurr Rd
- Highline Canal @ Hwy 99

The above sites will be monitored for priority constituents during months in which exceedances have occurred (Table 7).

Starting in September 2010, sediment toxicity will be added to the MPM schedule for high priority subwatersheds to coincide with the post irrigation sediment sampling period for normal monitoring. Sediment toxicity was omitted from previous monitoring schedules when the Coalition was monitoring at the same locations from year to year. Due to the new MRPP monitoring design, the Coalition has added in MPM for sediment to assess if there has been improvement in sediment quality due to implemented management practices.

Table 7. 2010-2011 Management Plan sampling schedule.

Site Name	Year	Month	*H. azteca*	*C. dubia*	*S. capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Simazine
Cottonwood Creek @ Rd 20	2010	February				X	X	X	X	
Deadman Creek @ Gurr Rd	2010	February			X	X				
Dry Creek @ Wellsford Rd	2010	February			X	X			X	
Duck Slough @ Gurr Rd	2010	February				X				
Highline Canal @ Hwy 99	2010	February			X	X	X		X	
Miles Creek @ East Ave	2010	February					X			X
Mustang Creek @ East Ave	2010	February			X					
Prairie Flower Drain @ Crows Landing Rd	2010	February			X					
Highline Canal @ Hwy 99	2010	March	X							
Cottonwood Creek @ Rd 20	2010	April				X				
Dry Creek @ Wellsford Rd	2010	April				X				
Duck Slough @ Gurr Rd	2010	April					X			
Duck Slough @ Hwy 99	2010	April			X	X				
Highline Canal @ Hwy 99	2010	April			X	X				
Prairie Flower Drain @ Crows Landing Rd	2010	April			X					
Bear Creek @ Kibby Rd	2010	May		X			X			
Cottonwood Creek @ Rd 20	2010	May				X				
Dry Creek @ Wellsford Rd	2010	May								
Duck Slough @ Hwy 99	2010	May					X			
Highline Canal @ Hwy 99	2010	May			X					
Prairie Flower Drain @ Crows Landing Rd	2010	May			X					
Cottonwood Creek @ Rd 20	2010	June				X				
Duck Slough @ Gurr Rd	2010	June				X				
Duck Slough @ Hwy 99	2010	June				X				
Highline Canal @ Hwy 99	2010	June				X				
Bear Creek @ Kibby Rd	2010	July		X			X			
Cottonwood Creek @ Rd 20	2010	July				X				
Dry Creek @ Wellsford Rd	2010	July					X			
Duck Slough @ Gurr Rd	2010	July			X	X	X			
Duck Slough @ Hwy 99	2010	July			X	X	X			
Highline Canal @ Hwy 99	2010	July				X	X			
Bear Creek @ Kibby Rd	2010	August				X				
Cottonwood Creek @ Rd 20	2010	August				X				
Dry Creek @ Wellsford Rd	2010	August					X			
Duck Slough @ Gurr Rd	2010	August								

Site Name	Year	Month	*H. azteca*	*C. dubia*	*S. capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Simazine
Duck Slough @ Hwy 99	2010	August				X				
Highline Canal @ Hwy 99	2010	August				X				
Prairie Flower Drain @ Crows Landing Rd	2010	August					X			
Cottonwood Creek @ Rd 20	2010	September				X				
Dry Creek @ Wellsford Rd	2010	September	X				X			
Duck Slough @ Gurr Rd	2010	September	X		X					
Duck Slough @ Hwy 99	2010	September				X	X			
Highline Canal @ Hwy 99	2010	September	X							
Prairie Flower Drain @ Crows Landing Rd	2010	September	X	X			X			
Bear Creek @ Kibby Rd	2011	January				X				
Cottonwood Creek @ Rd 20	2011	January				X	X		X	
Duck Slough @ Gurr Rd	2011	January				X				
Highline Canal @ Hwy 99	2011	January				X	X		X	
Prairie Flower Drain @ Crows Landing Rd	2011	January			X					
Bear Creek @ Kibby Rd	2011	February				X				
Cottonwood Creek @ Rd 20	2011	February				X	X	X	X	
Dry Creek @ Wellsford Rd	2011	February			X	X			X	
Duck Slough @ Gurr Rd	2011	February		X		X				
Duck Slough @ Hwy 99	2011	February				X				
Highline Canal @ Hwy 99	2011	February				X	X		X	
Prairie Flower Drain @ Crows Landing Rd	2011	February			X					
Dry Creek @ Wellsford Rd	2011	March	X							
Duck Slough @ Gurr Rd	2011	March		X						
Highline Canal @ Hwy 99	2011	March	X							
Prairie Flower Drain @ Crows Landing Rd	2011	March		X						

Performance Goals and Schedules

The Coalition Strategic Plan is outlined in the original Management Plan (submitted on September 30, 2008) Table 18 to meet the following management goal:

"To continue to monitor and analyze the water and sediment quality of ESJWQC site subwatersheds and to facilitate the implementation of management practices by providing outreach and support to growers in order to effectively enhance water quality in the Coalition region."

The Coalition submitted High Priority Site Subwatershed Performance Goals (hereafter referred to as Performance Goals) on November 24, 2008 in an amendment to the Management Plan. These goals were developed with coordination with Regional Board staff after evaluation of the effectiveness of the Coalition's Management Plan strategy.

The Performance Goals are built on the following actions essential to the Management Plan strategy:

1. Determine number/type of management practices currently in place, based on APN associated with baseline survey responses
2. Grower Group Contacts / Individual Contacts
3. Implementation of new management practices
4. Assess number/type of new management practices implemented
5. Evaluate effectiveness of new management practices

The Coalition completed action one listed above and submitted a General Survey Summary Report to the Regional Board on January 30, 2009. The Coalition uses this information when comparing the baseline management practices to current management practice information obtained during grower group / individual contacts.

First Priority Subwatersheds (2008 – 2010)

The amended Performance Goals for the first priority subwatersheds (details and amendments are discussed in detail in the schedule extension request submitted on June 5, 2009 and approved on June 15, 2009) are presented in Table 8. Below each performance goal is an update on the status of the associated measures and outputs.

Table 8. High Priority Performance Goals status for 2008-2010 high priority sites (updated on June 5, 2009 and approved on June 16, 2009). Performance Goals without "Update" are the original performance goals submitted on November 24, 2008 for Dry Creek.

Performance Goal/Performance Measure	Outputs	Status as of April 1, 2010		
		Dry Creek @ Wellsford	Duck Slough @ Hwy 99	Prairie Flower Drain @ Crows Landing Rd
Performance Goal 1 Update: Individually contact members on adjacent properties to waterways where discharges have been identified from February to August 2009.				
Performance Measure 1.1. – 100% of targeted growers contacted.	Report ratio of individual contacts made versus total growers identified with discharges.	22 of 22 (100%)	24 of 24 (100%)	11 of 11 (100%)
Performance Measure 1.2 – Contact owners/operators representing at least 1,000 acre of membership acreage in the site subwatershed.	Report ratio of acreage represented by individual contacts versus total subwatershed acreage.	6,116 of 68,620 (9%)	4,016 of 17,559 (23%)	865 of 3,106 (28%)
Performance Goal 2 Update: Establish current practices by August 15, 2009, on adjacent properties to waterways or where discharges are identified.				
Performance Measure 2.1 – Obtain current management practice information from 100% of targeted growers.	Completed individual contact checklists recorded in an Access database.	22 of 22 (100%)	24 of 24 (100%)	11 of 11 (100%)
Performance Measure 2.2 – Document current management practices of the targeted growers during individual contacts and encourage the adoption of new practices not currently implemented.	Record of management practices used that may reduce agricultural impact on water quality.	22 of 22 (100%)	24 of 24 (100%)	11 of 11 (100%)
Performance Measure 2.3 – Document management practices targeted grower was encouraged to implement.	Summary of management practice evaluations on a site subwatershed level in the Management Plan update (April 2010).	Complete (April 1, 2010)	Complete (April 1, 2010)	Complete (April 1, 2010)
Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.				
Performance Measure 3.1 – By February 2011, document additional management practices implemented by targeted growers.	Summary of management practices implemented as a result of individual contacts.	12 of 22 (55%)	12 of 24 (50%)	6 of 11 (55%)
Performance Goal 4 Update: Evaluate effectiveness of the new management practices implemented during 2009 and 2010.				

Performance Goal/Performance Measure	Outputs	Status as of April 1, 2010		
		Dry Creek @ Wellsford	Duck Slough @ Hwy 99	Prairie Flower Drain @ Crows Landing Rd
Performance Measure 4.1 – Assess water quality results from Coalition monitoring locations within the priority site subwatersheds.	Summary of 2009 and 2010 water quality data from site subwatershed (April 2010 and 2011).	2009 Summary Complete (April 1, 2010)	2009 Summary Complete (April 1, 2010)	2009 Summary Complete (April 1, 2010)
Performance Goal 5: Consult with CVRWQCB at least once during 2008/2009 to discuss Management Plan activities and consider if changes need to be made in Management Plan strategy for high priority waterbodies.				

Table 9. Updated Management Practices survey, outreach, implementation and evaluation tracking schedule based on the table submitted with the ESJWQC schedule extension request on June 5, 2009.

Priority Subwatershed Evaluation of Management Practices	Dry Creek @ Wellsford Rd		Duck Slough @ Hwy 99		Prairie Flower Drain @ Crows Landing Rd	
	2009 Schedule	Status as of April 1, 2010	2009 Schedule	Status as of April 1, 2010	2009 Schedule	Status as of April 1, 2010
1a) Associate baseline survey responses with member APNs.	Completed	Completed	Completed	Completed	Completed	Completed
1b) Determine number/type of management practices currently in place.	Completed	Completed	Completed	Completed	Completed	Completed
2a) Group Grower Contacts	Completed	Completed	Completed	Completed	No grower group contact scheduled	No grower group contact scheduled
2b) Individual Contacts	February – August 15, 2009	Completed	February – September 30, 2009	Completed	February – September 30, 2009	Completed
3) Implementation of new management practices.	October 2009 – April 2010	October 2009 – April 2010	October 2009 – April 2011	October 2009 – April 2011	October 2009 – April 2011	October 2009 – April 2011
4) Assess number/type of new management practices implemented.	October 2009 - February 2010	Complete for 2009	October 2009 - February 2010	Complete for 2009	October 2009 -February 2010	Complete for 2009
5) Evaluate effectiveness of new management practices.	April 2009 - February 2011	Complete for 2009	April 2009 - February 2011	Complete for 2009	April 2009 - February 2011	Complete for 2009

Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified from February to August 2009.

The Coalition identified targeted growers within the high priority subwatersheds by selecting a subset of parcels within the subwatershed that had:

- high potential of drainage directly into the creek
- potential for spray drift to reach the waterway
- grew a crop labeled for chlorpyrifos
- insecticide was applied in the last four years (based on PURs).

Targeted member parcels are selected based on possible direct drainage to the water body (using GIS), crop type and past pesticide use using PUR data. The Coalition may omit members and their associated parcels from the target list if it is determined that the parcel does not drain into the water body, the grower is not currently farming the parcel(s), there is no reported pesticide use, and/or the land is pasture only with no pesticide use.

In Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd there were 22, 24 and 11 targeted members, respectively; all members were contacted between January and August 2009 (Table 8, Table 11 in next section).

Performance Goal 2: Establish current practices August 15, 2009 on adjacent properties to waterways or where discharges are identified.

The Coalition created Individual Contact Packets containing member information (including parcel APN, TRS and crop type), subwatershed water quality trigger exceedances, pesticide applications based on TRS for which the grower may have been responsible and were associated with a water quality trigger limit exceedance, in addition to any known management practice information based on the general survey (an example of a packet was included in the Management Plan Update Report submitted on April 1, 2009). Next, the Coalition contacted the targeted growers to set up individual meetings. Coalition representatives (Parry Klassen and Wayne Zipser) met with the grower, land owner and on occasion the Pest Control Advisor (PCA) on the grower's farm to assess the following: possible drainage from the field to the creek, review farm operating procedures and current management practices. Additional discussions on water quality trigger limit exceedances (mostly focused on chlorpyrifos) and recommendations of additional management practices also took place. These visits typically took around two to three hours per farm. All information was recorded within the Individual Contact Packet which was then entered into an Access database.

In the Management Plan Update Report submitted on April 1, 2009 the Coalition proposed an amended Management Practice tracking schedule (Table 12) which updated the time frames for individual contacts for Dry Creek @ Wellsford (February – April 2009), Duck Slough @ Hwy 99 (April 2009 – April 2010), and Prairie Flower Drain @ Crows Landing Rd (April 2009 – April

2010) (Table 9). The Coalition anticipated that all contacts would be completed within the Dry Creek subwatershed by April 2010; nevertheless, due to difficulties with schedules and the beginning of the farming season, the visits were delayed. This was discussed at the ESJWQC quarterly meeting with Regional Board staff.

The Coalition submitted a schedule extension request letter to the Regional Board Executive Officer on June 5, 2009 which was approved on June 15, 2009 that extended the completion of Performance Goal 2 to August 15, 2009 (originally listed as April 2009).

The Coalition has contacted 100% of the targeted growers and has recorded 100% of management practice information in a Microsoft Access database. A summary of management practice evaluations is included in the section "Summary of Implemented Management Practices" and in the High Priority Subwatershed Analysis Appendix (Appendix I).

The Coalition originally considered hiring a consultant to help in conducting the individual contacts with growers but has concluded that it will be difficult to find a person knowledgeable of the Coalition and water quality issues, with the expertise in management practices, understanding of current farming conditions and who has the time to commit to performing the visits in a timely basis. All of these components have been necessary for gaining the trust of the growers allowing the Coalition representatives to evaluate the property with an eye to potential discharges, openly discuss water quality issues and confer management practices. Both Parry Klassen (Executive Director of the Coalition for Urban/Rural Environmental Stewardship and Chairman of the ESJWQC) and Wayne Zipser (Executive Manager of the Stanislaus County Farm Bureau and Co-Chairman of the ESJWQC) have extensive knowledge of the farming practices within the ESJWQC region and have a history with growers which allows them to communicate effectively with targeted growers. In addition, both Parry and Wayne have been involved with the Coalition since its inception and therefore have a working knowledge of the ILRP requirements, Regional Board enforcement strategies and the history of the Coalition's monitoring strategy.

Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.

The primary objective of the individual contacts is to encourage adoption of practices that will result in a reduction of chlorpyrifos exceedances. Conversely, many of the management practices that will reduce runoff of chlorpyrifos will also result in the reduction of runoff of other constituents (e.g. converting to drip irrigation, spray nozzle calibrations, increased buffer zones). Therefore, during the individual contact interviews all water quality issues are addressed. Each individual contact packet includes a table of downstream water quality exceedances, relevant pesticide use information (not just for chlorpyrifos), and a checklist specific to overall pest management, irrigation water management, dormant spray management and erosion/sediment management. Even though growers are targeted based on chlorpyrifos use, all subwatershed water quality issues are discussed (see Appendix I of the April 2009 Management Plan update for an example of an individual contact packet).

All recommended practices were recorded in addition to current management practice information and has been summarized in the section "Summary of Implemented Management Practices".

The Coalition originally anticipated implementation of new management practices between April 2009 and February 2010 based on the completion of individual and grower group contacts by April 2009. Due to a delay in contacts, the expected time frame of management practice implementation was extended to October 2009 through April 2011 (see the ESJWQC schedule extension letter submitted on June 5, 2009 for details, Table 9).

Performance Goal 4: Evaluate effectiveness of the new management practices implemented during 2009 and 2010.

The Coalition updated its schedule for management practice implementation for all three subwatersheds to extend to April 2011 (approved June 15, 2009). The evaluation of the efficiency of new management practices will be assessed using water quality monitoring results from 2009 and 2010 (Table 9). This will allow the Coalition to have two years of water quality monitoring results (in addition to additional monitoring conducted in 2007 and 2008 in Management Plan subwatersheds) to assess the success of new practices. This will also allow time for the Coalition to determine which practices were implemented (additional contacts with targeted growers) during 2009 and 2010 that may reduce the amount of agricultural runoff. The Coalition will include this evaluation in the Management Plan update due on April 1, 2011. In the interim, an evaluation of the water quality data collected to date in relation to management practice information is included in the section "Evaluation of Management Practice Effectiveness".

Performance Goal 5: Consult with CVRWQCB at least once during 2008/2009 to discuss Management Plan activities and consider if changes need to be made in Management Plan for High Priority waterbodies.

The Coalition met with Regional Board staff to discuss the Management Plan activities for high priority waterbodies including status of individual contacts, survey completion and extension to time lines for completing Performance Goals (Table 10).

Table 10. 2009 Regional Board Quarterly Meeting dates.

Quarterly Meetings	Meeting Date
First Quarter Meeting	February 10, 2009
Second Quarter Meeting	May 5, 2009
Third Quarter Meeting	August 4, 2009
Fourth Pre-Quarterly Meeting	October 7, 2009
Fourth Quarterly Meeting	November 3, 2009

Second Priority Subwatersheds (2010 – 2012)

In the pre-quarterly meeting with Regional Board staff on October 7, 2009 the Coalition proposed new Performance Goals for the next high priority site subwatersheds (Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99 and Bear Creek @ Kibby Rd). The second priority subwatershed performance goals include the following changes from the first priority subwatershed performance goals:

1. Updated Performance Measure 1.2 Output to be specific to the subwatershed acreage with direct drainage.
2. Combined Performance Measure 2.1 and 2.2.
3. Updated Performance Goal 4 – refers to years that the subwatershed is high priority versus specific years.
4. Updated Performance Measure 4.1 outputs to not be year specific.

Performance goals, measures, outputs and completion dates are included in Table 11. The Coalition anticipates using the following performance goals for future priority subwatersheds as they rotate into priority status.

Table 11. Subwatershed specific performance goals for 2010 - 2012 high priority subwatersheds (Cottonwood Creek @ Rd 20, Highline Canal @ Hwy 99, Duck Slough @ Gurr Rd and Bear Creek @ Kibby Rd). Completion deadlines are in bold; if applicable, status updates are in bold; if applicable, status updates are included below completion deadlines.

Performance Goal/Performance Measure	Outputs	Completion Deadline / Status as of April 1, 2010			
		Cottonwood Creek @ Rd 20	Highline Canal @ Hwy 99	Duck Slough @ Gurr Rd	Bear Creek @ Kibby Rd
Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.					
Performance Measure 1.1 – 100% of identified growers contacted to fill out surveys.	Report ratio of individual initial contacts made versus total growers identified to contact.	**May 30, 2010** 25 of 25	**May 30, 2010** 10 of 10	**May 30, 2010** 0 of 6	**May 30, 2010** 0 of 13
Performance Measure 1.2 – Contact owners/operators representing at least 1,000 acre of membership acreage in the site subwatershed (if subwatershed is greater than 800 acres).	Report ratio of acreage represented by individual contacts versus subwatershed acreage determined to have direct drainage.	**Quarterly** 5500 of 9731	**Quarterly** 368 of 1116	**Quarterly** 0 of 5562	**Quarterly** 0 of 2668
Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.					
Performance Measure 2.1 – Document current management practices of 100% of identified growers during individual contacts and encourage the adoption of new practices not currently implemented.	Record in an Access database current management practices used that may reduce agricultural impact on water quality.	**July 30, 2010** 9 of 25	**July 30, 2010** 3 of 10	**July 30, 2010** 0 of 6	**July 30, 2010** 0 of 13
Performance Measure 2.2 – Document management practices that the identified grower were encouraged to implement.	Summary of management practice evaluations on a site subwatershed level in the Management Plan update.	**Aug.30, 2010**	**Aug. 30, 2010**	**Aug. 30, 2010**	**Aug. 30, 2010**
Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.					
Performance Measure 3.1 –Document (e.g. assess number/type) new management practices implemented by identified growers.	Record implemented management practices in an Access database.	**Feb. 28, 2011***	**Feb. 28, 2011***	**Feb. 28, 2011***	**Feb. 28, 2011***
	Summary of management practices implemented as a result of individual contacts.	**April 1, 2011** **April 1, 2012**	**April 1, 2011** **April 1, 2012**	**April 1, 2011** **April 1, 2012**	**April 1, 2011** **April 1, 2012**

Performance Goal/Performance Measure	Outputs	Completion Deadline / Status as of April 1, 2010			
		Cottonwood Creek @ Rd 20	**Highline Canal @ Hwy 99**	**Duck Slough @ Gurr Rd**	**Bear Creek @ Kibby Rd**
Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.					
Performance Measure 4.1 Update – Assess water quality results from Coalition monitoring location within the priority site subwatershed.	Summary of water quality data from management plan monitoring.	**April 1, 2011** **April 1, 2012**	**April 1, 2011** **April 1, 2012**	**April 1, 2011** **April 1, 2012**	**April 1, 2011** **April 1, 2012**
Performance Goal 5: Consult with CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in Management Plan strategy for High Priority waterbodies.					

*Contacts with growers to determine implemented practices will occur between February 1 and April 30; all information obtained by February 28th will be entered into an Access database and included in the following April 1 Management Plan Update Report; any additional information will be reported on during the quarterly meetings.

Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.

Targeted growers in Cottonwood Creek (25 total) were mailed meeting announcements for two conference call meetings (October 21 and October 22, 2009) focused on informing growers of member responsibilities, management plan strategies and to initiate the scheduling of individual contact meetings (Table 13). Following these conference calls, the Coalition sent a mailing to targeted growers in Cottonwood Creek who did not participate in the October conference calls as well as to targeted growers in Highline Canal @ Hwy 99 subwatershed (10 growers) (Table 11 and Table 13). The mailing also informed growers about the Coalition's Management Plan strategy, member responsibilities and requested that growers call the Coalition to schedule meetings for individual interviews. The Coalition has not yet contacted growers in the Duck Slough @ Gurr Rd or Bear Creek subwatersheds in 2010. All initial contacts will be completed by May 30, 2010 (Table 11).

Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.

The Coalition has met with and filled out surveys with nine growers (36% of targeted growers) within the Cottonwood Creek @ Rd 20 subwatershed and three growers (30% of targeted growers) within the Highline Canal @ Hwy 99 subwatershed (Table 11). Surveys document current management practices regarding irrigation practices, storm runoff, pest management and dormant sprays (when applicable). All surveys received to date have been entered an Access database.

Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.

The management practices recommended to growers during the individual interviews have been recorded in the management practice tracking database (36% of Cottonwood Creek targeted growers and 30% of Highline Canal targeted growers) (Table 11).

Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.

The Coalition is conducting MPM in the second high priority sites during 2010 and 2011 to assess water quality improvements. The Coalition will submit an interim evaluation of management practice effectiveness in the 2011 Management Plan Update Report and a final evaluation in the 2012 Management Plan Update Report (Table 11).

Performance Goal 5: Consult with the CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in the Management Plan strategy for high priority waterbodies.

The Coalition will meet with the Regional Board quarterly to discuss Coalition activities in relation to the first high priority subwatersheds and the second high priority subwatersheds. The Coalition has already met with Regional Board staff on February 10, 2010 for its first quarterly meeting.

Table 12. 2010 Regional Board Quarterly Meeting dates (subject to change).

Quarterly Meetings	Meeting Date
First Quarter Meeting	February 10, 2010
Second Quarter Meeting	May 4, 2010
Third Quarter Meeting	August 3, 2010
Fourth Quarterly Meeting	November 2, 2010

Table 13. Priority subwatershed contacts including grower notifications and outreach/education meetings to track management practices.

Priority Site Subwatershed	Date	Category	Details	Who
Dry Creek @ Wellsford	January - August 2009	BMP Outreach and Education / Management Practice Tracking	Individual contact with targeted growers in Dry Creek subwatershed (current management practice evaluation).	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	4-Jun-09	Grower Notification / Management Practice Tracking	Mailing to 25 members in high priority site subwatersheds to notify members that individual meetings are required for 100% of growers near or adjacent to the waterways and members are responsible for scheduling individual contact meetings via provided contact information in mailing. Additionally, an email containing the same information was sent to 13 high priority members on June 1, 2009.	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	23-Jun-09	Grower Notification / Management Practice Tracking	Follow-up mailing to June 4 mailing regarding scheduling individual meetings; sent to all growers who had not yet scheduled an individual meeting urging members to do so and providing in a supplementary Regional Board letter an explanation of the consequences for members and the Coalition if the meetings are not conducted.	Parry Klassen, Wayne Zipser
Prairie Flower Drain	June - September 2009	BMP Outreach and Education / Management Practice Tracking	Individual contact with targeted growers in Prairie Flower Drain subwatershed (current management practice evaluation).	Parry Klassen, Wayne Zipser
Duck Slough @ Hwy 99	May - August 2009	BMP Outreach and Education / Management Practice Tracking	Individual contact with targeted growers in Duck Slough (above Hwy 99) subwatershed (current management practice evaluation).	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	10-Sep-09	Grower Notification / Management Practice Tracking	Mailing to all members who have not responded to Coalition attempts to contact and schedule an individual meeting. Letter informed those members they have been dropped from the ESJWQC Coalition as of August 31, 2009 and must now seek alternative methods of complying with the ILRP.	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	30-Sep-09	Grower Notification / Management Practice Tracking	Individual survey recap and letter mailed to participants in most recent round of individual contact meetings to provide members with a copy for their records and remind them they will be contacted in spring 2010 to regarding the implementation status of recommended management practices.	Parry Klassen, Wayne Zipser

Priority Site Subwatershed	Date	Category	Details	Who
Cottonwood Creek	14-Oct-09	Grower Notification / Management Practice Tracking	Letter mailed to all members with parcels adjacent to Cottonwood Creek announcing two conference call meetings (Oct. 21st @ 11AM and Oct. 22nd @ 4PM) to inform growers about requirements for and initiate the scheduling of individual contact meetings.	Parry Klassen, Wayne Zipser
Cottonwood Creek	21-Oct-09	BMP Outreach and Education / Management Practice Tracking	Conference call meeting to inform growers about the Cottonwood Creek Management Plan, specifically member participation requirements and to initiate the scheduling of individual contact meetings. A total of four members were represented.	Parry Klassen
Cottonwood Creek	22-Oct-09	BMP Outreach and Education / Management Practice Tracking		Parry Klassen
Cottonwood Creek, Highline Canal @ Hwy 99	10-Nov-09	Grower Notification / Management Practice Tracking	Mailing to all targeted Cottonwood Creek members who did not participate in the conference call and to all targeted Highline Canal @ Hwy 99 members to inform growers of the need to schedule individual meetings.	Parry Klassen, Wayne Zipser
Duck Slough @ Hwy 99	9-Feb-10	Grower Notification / Management Practice Tracking	Duck Slough Follow-Up to 2009 Individual Contacts Meeting Announcement: sent to all members who participated in an individual meeting during 2009.	Parry Klassen
Dry Creek @ Wellsford	15-Feb-10	Grower Notification / Management Practice Tracking	Dry Creek Follow-Up to 2009 Individual Contacts Meeting Announcement: sent to all members who participated in an individual meeting during 2009.	Parry Klassen
Duck Slough @ Hwy 99	19-Feb-10	BMP Outreach and Education / Management Practice Tracking	Duck Slough Follow-Up to 2009 Individual Contacts Grower Meeting: 11 members in attendance. By using the Turning Interactive Survey Devices, assessed implementation of management practices since individual contact meetings in 2009.	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford	26-Feb-10	BMP Outreach and Education / Management Practice Tracking	Dry Creek Follow-Up to 2009 Individual Contacts Grower Meeting: 13 members in attendance. By using the Turning Interactive Survey Devices, assessed implementation of management practices since individual contact meetings in 2009.	Parry Klassen, Wayne Zipser

Priority Site Subwatershed	Date	Category	Details	Who
Prairie Flower Drain	4-Mar-10	Grower Notification / Management Practice Tracking	Prairie Flower Drain Follow-Up to 2009 Individual Contacts Meeting Announcement: sent to all members who participated in an individual meeting during 2009.	Parry Klassen
Prairie Flower Drain	19-Mar-10	BMP Outreach and Education / Management Practice Tracking	Prairie Flower Drain Follow-Up to 2009 Individual Contacts Grower Meeting: 3 members in attendance. By using the Turning Interactive Survey Devices, assessed implementation of management practices since individual contact meetings in 2009.	Parry Klassen, Wayne Zipser

SUMMARY OF IMPLEMENTED MANAGEMENT PRACTICES

The Coalition identified eight general classifications of management practices that would be effective at reducing negative impacts of agricultural discharges on water quality including:

1. Reduction in application rates,
2. Spray drift management,
3. Change to low risk products,
4. Polyacrylamide (PAM),
5. Drip or microspray irrigation,
6. Recirculation/tail water return system,
7. Retention pond/holding basin, and
8. Grass waterways or grass filter strips.

The Coalition's Management Plan submitted on September 30, 2008 anticipated that due to Coalition outreach the first four practices would be implemented when necessary, from April to September in 2009 and the second four (structural improvements) the following year by December 2010. Due to delays in contacts and outreach, the Coalition moved the anticipated implementation dates to 2010 (Table 14), originally submitted in the Management Plan Update Report on April 1, 2009).

Table 14. Management Plan implementation schedule for high priority subwatersheds (2008-2010).

Management Practice	Anticipated Implementation Date	Anticipated Evaluation Date
Reduction in application rates	April - September 2010	April 2011
Spray drift management	April - September 2010	April 2011
Switch to low risk products	April - September 2010	April 2011
Polyacrylamide (PAM)	April - September 2010	April 2011
Sprinkler or microspray irrigation	December 2009 - 2010	April 2011
Recirculation/tail water return system	December 2009 - 2010	April 2011
Retention pond/holding basin	December 2009 - 2010	April 2011
Grass waterways or grass filter strips	December 2009 - 2010	April 2011

The Coalition will submit a full evaluation of current and implemented management practices in the April 2011 Management Plan Update Report for the first high priority subwatersheds. The following evaluation is an preliminary analysis based on survey information obtained from individual contacts and preliminary follow up contacts for the first high priority subwatersheds Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd.

Current Management Practices – 2008

Dry Creek @ Wellsford Rd

The Coalition contacted 22 targeted growers within the Dry Creek @ Wellsford Rd subwatershed that were determined to have the potential to drain directly to Dry Creek (including spray drift potential), were currently farming and had reported pesticide use of high priority constituents. The 22 members have farm approximately 6, 116 acres within the Dry Creek subwatershed which includes 68,620 acres.

Dry Creek has little irrigation drainage from parcels directly next to the creek. Of those surveyed, 86% of the acreage had no irrigation runoff. A majority of the acreage farmed by targeted growers was orchards and vineyards with a smaller amount of parcels with a combination of field/row crops and orchards and some pasture (Figure 5). The only irrigation runoff was associated with orchards (Figure 6).

Management practice surveys were divided into checklist subjects including Irrigation Water Management, Storm Drainage, Erosion and Sediment Management, Pest Management and Dormant Spray Management (Table 15). Table 15 lists the management practice survey question, associated answers, number of surveys with a specific answer, the percentage of respondents with a specific answer and the sum of acreage associated with a specific answer.

Most growers in Dry Creek utilize microirrigation and/or sprinklers to irrigate their parcels. Only 1% of the acres for which responses are available are irrigated by surface (flood) techniques. Most growers (86%) irrigate based on actual moisture levels and crop needs rather than on a set schedule.

There is a mixture of growers that have storm drainage when the soil is saturated in late winter (27%) and/or in 100 year storms (36%). Four growers utilize tail water return systems and/or settling ponds to manage storm runoff and over a third of the acreage has no storm drainage. All respondents indicated that they controlled erosion and sediment delivery by some means. Herbicides were applied by most growers with only 14% indicating no applications. However, almost two-thirds of the respondents did not specify the herbicide that they used.

Sixteen respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season and 22 of 22 respondents indicated that they did not use dormant sprays. Over 98% of the acreage was sprayed with equipment that was calibrated prior to each application and the majority took numerous steps to manage their spray drift including adjusting spray nozzles to match the canopy profile (95%), shutting outside nozzles when spraying outer two rows (73%), spraying areas close to waterbodies when the wind is blowing away from them (86%), using air blast applications when wind is between 3-10 mph (73%), and using nozzles that provide the largest effective droplet size to minimize drift (86%).

Table 15. Current management practices utilized by targeted growers within Dry Creek @ Wellsford subwatershed (2009).

Checklist	Question	Answer	Count of Answers	Pct of Respondents	Sum of Associated Acreage
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	16	73%	5191.3
		Recirculation – Tail water return system	3	14%	3050.3
		Use drainage basins (sediment ponds) to capture and retain runoff	3	14%	3046.5
		Use of Polyacrylamide (PAM) to increase water infiltration and reduce furrow erosion	1	5%	2450
	Irrigation System	Microirrigation	13	59%	5445.52
		Not Recorded	1	5%	76
		Sprinkler	8	36%	808.4
		Surface	2	9%	62.5
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	19	86%	5643.12
		Irrigation District Deliveries	1	5%	26.3
		Not Recorded	3	14%	678
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	8	36%	1272.4
		Pump/Drain into waterway & able to control timing	2	9%	3147.2
		Pump/Drain into waterway & unable to control timing	8	36%	1191.8
		Recirculation – Tail water return system	1	5%	26.3
		Settling Pond	3	14%	2498.8
	When do you have storm water draining from your field?	After soil is saturated-late winter	6	27%	2076.5
		No Storm Drainage	4	18%	714.3
		Not Recorded	5	23%	2727.02
		Only in heavy (100 year) storms	8	36%	829.6
Section 3: Erosion & Sediment Management	Sediment management practices:	Constructed wetlands	1	5%	2450
		Grass Row Centers (Orchards, Vineyards)	19	86%	5574.1
		Maintain vegetated filter strips around field perimeter at least 10' wide	16	73%	5558.32
		Vegetation is planted along or allowed to grow along ditches	16	73%	5904.42
	Do you apply herbicides during winter months?	Do not apply	3	14%	160.12
		Glyphosate (Round-Up)	6	27%	3721.2

Checklist	Question	Answer	Count of Answers	Pct of Respondents	Sum of Associated Acreage
		Goal	1	5%	697.2
		Not Recorded	14	64%	2466.1
		Paraquat (Gramaxone)	5	23%	3685
	If waterway crosses or borders pasture, how is livestock managed?	N/A	22	100%	6321.12
		Not Recorded	1	5%	26.3
		Riparian vegetation prevents livestock access to water	1	5%	26.3
		Water not present when livestock is in pasture	1	5%	26.3
		Waterway is fenced	1	5%	26.3
Section 4: Pest Management	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	7	32%	938.72
		Yes	16	73%	5408.7
	How often is spray equipment calibrated?	Never	1	5%	26.3
		Once per year	1	5%	40
		Prior to each application	21	95%	6281.12
	Spray management practices:	Adjust spray nozzles to match crop canopy profile	21	95%	6245.12
		Outside nozzles shut off when spraying outer rows next to sensitive sites	16	73%	5590.42
		Spray areas close to waterbodies when the wind is blowing away from them	19	86%	5978.12
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	16	73%	4953.4
		Use electronic controlled sprayer nozzles	1	5%	2450
		Uses of nozzles that provide largest effective droplet size to minimize drift	19	86%	6048.12
Section 5: Dormant Spray Management	How many acres are sprayed with dormant pesticides?	No Dormant Sprays	22	100%	6321.12

Figure 5. Direct drainage parcels in Dry Creek @ Wellsford subwatershed.

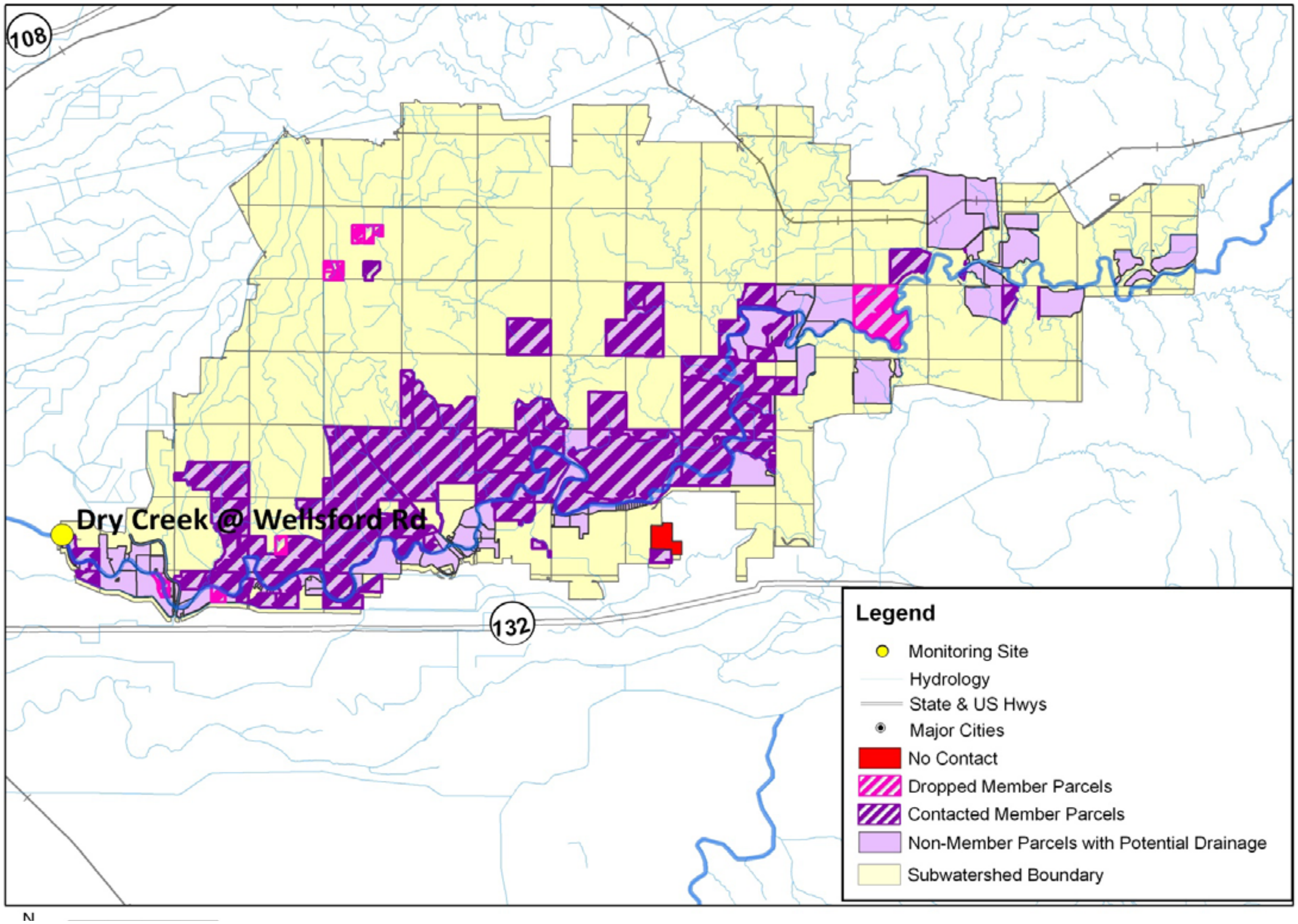
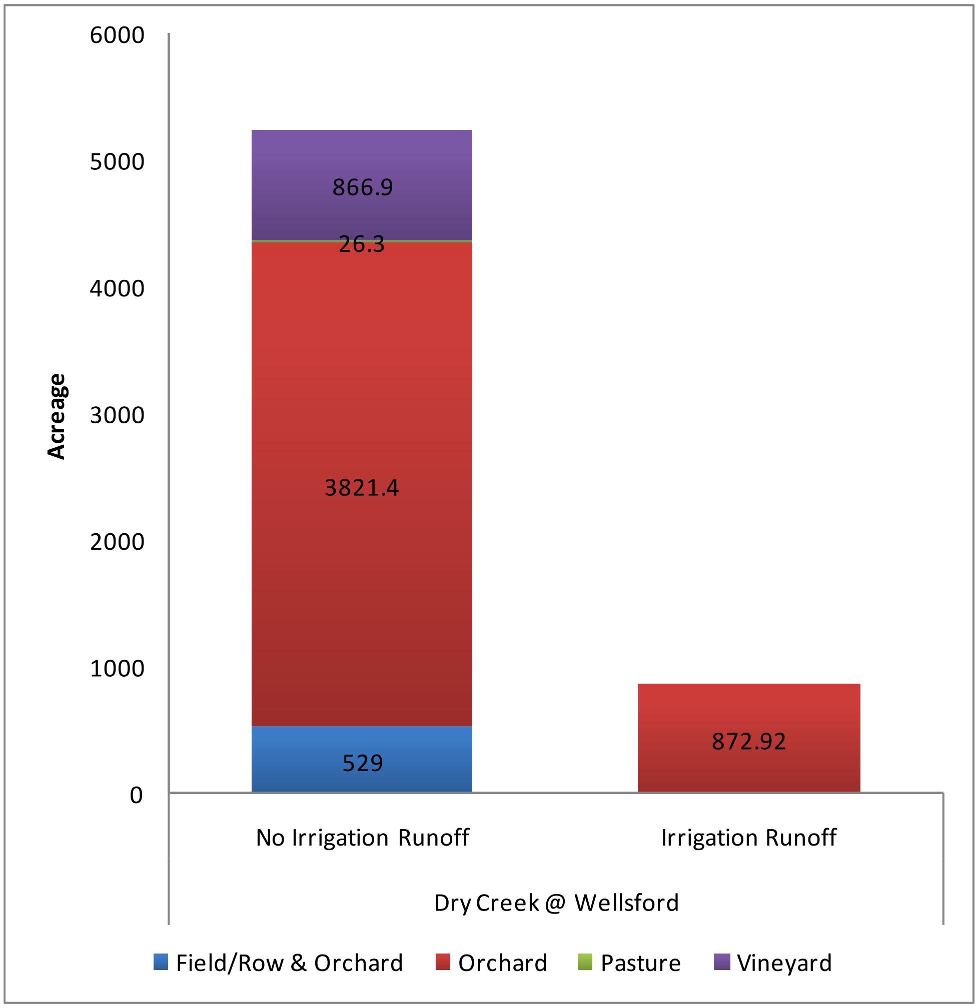


Figure 6. Dry Creek @ Wellsford crop acreage information from member surveys based on crop type and irrigation runoff.



Duck Slough @ Hwy 99

The Coalition contacted 23 targeted growers within the Duck Slough @ Hwy 99 subwatershed that were determined to have the potential to drain directly to Duck Slough (including spray drift potential), were currently farming and had reported pesticide use of high priority constituents. The 23 members have farm approximately 4,017 acres within the Duck Slough subwatershed which includes 17,559 acres (Table 16).

Of those surveyed, 52% of the acreage had irrigation runoff. A majority of the acreage farmed by targeted growers was orchards and field/row crops and some pasture (Figure 7). The only acreage that did not have irrigation runoff was orchard parcels (Figure 8).

In Duck Slough (above Hwy 99) the most common management practices currently utilized by targeted growers are:

- Irrigation Water Management
- Storm Drainage
- Erosion and Sediment Management
- Pest Management
- Dormant Spray Management

Duck Slough has more irrigation and storm water drainage from parcels directly next to the creek than Dry Creek. Of those surveyed in the Duck Slough watershed, 50% of the respondents with slightly over 50% of the acreage used flood irrigation and only 42% used drip or microspray systems. However, 88% used laser leveled fields, 63% used recirculation systems, and 38% used sediment retention ponds to prevent discharges to surface waters.

There is a mixture of growers that have storm drainage when the soil is saturated in late winter (58%) and/or in 100 year storms (29%). Only one respondent indicated that there was no storm water drainage from the property, and 50% of the respondents indicated they pumped storm water to surface waters and could not control the timing. All respondents indicated that they controlled erosion and sediment delivery by some means. Herbicides were applied by most growers with only 4% indicating no applications. However, 88% of the respondents did not specify the herbicide that they used.

Fourteen respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season but 10 respondents indicated that the question was not applicable to their operation. All respondents indicated that they did not use dormant sprays. Only 4% of the acreage was sprayed with equipment that was not calibrated in some way; 75% of the respondents calibrated prior to each application, 13% calibrated once per month, and 13% calibrated once per year. The majority took numerous steps to manage their spray drift including adjusting spray nozzles to match the canopy profile (96%), shutting outside nozzles when spraying outer two rows (75%), spraying areas close to waterbodies when the wind is blowing away from them (88%), using air blast applications when wind is between 3-10 mph (71%), and using nozzles that provide the largest effective droplet size to minimize drift (96%).

Table 16. Current management practices utilized by targeted growers within Duck Slough @ Hwy 99 subwatershed (2008).

Checklist	Question	Answer	Count of Answers	Pct of Respondents	Sum of Associated Acreage
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	21	88%	3438.2
		Recirculation - Tail water return system	15	63%	2181.9
		Use drainage basins (sediment ponds) to capture and retain runoff	9	38%	2072.7
	Irrigation System	Microirrigation	10	42%	2410.3
		Not Recorded	2	8%	62
		Other ______________	2	8%	508
		Surface	12	50%	1264.9
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	23	96%	3878.3
		Not Recorded	2	8%	137.9
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	1	4%	195
		Pump/Drain into waterway & able to control timing	2	8%	249
		Pump/Drain into waterway & unable to control timing	12	50%	1789.3
		Recirculation - Tailwater return system	4	17%	479.9
		Settling Pond	8	33%	1848.8
	When do you have storm water draining from your field?	After soil is saturated-late winter	14	58%	1582
		No Storm Drainage	1	4%	195
		Not Recorded	3	13%	416.9
		Only in heavy (100 year) storms	7	29%	1822.3
Section 3: Erosion & Sediment Management	Sediment management practices:	Grass Row Centers (Orchards,Vineyards)	18	75%	3251.3
		Maintain vegetated filter strips around field perimeter at least 10' wide	11	46%	1398.5
		Vegetation is planted along or allowed to grow along ditches	21	88%	3617.2
	Do you apply herbicides during winter months?	Do not apply	1	4%	55.9
		Glyphosate (Round-Up)	3	13%	384
		Not Recorded	21	88%	3576.3
	If waterway crosses or borders pasture, how is livestock managed?	N/A	24	100%	3821.2
		Not Recorded	1	4%	195
		Riparian vegetation prevents livestock access to water	1	4%	195
		Water not present when livestock is in pasture	1	4%	195

Checklist	Question	Answer	Count of Answers	Pct of Respondents	Sum of Associated Acreage
		Waterway is fenced	1	4%	195
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	23	96%	3789.2
		Outside nozzles shut off when spraying outer rows next to sensitive sites	18	75%	2371.9
		Spray areas close to waterbodies when the wind is blowing away from them	21	88%	3204.7
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	17	71%	2639.5
		Use electronic controlled sprayer nozzles	1	4%	82
		Uses of nozzles that provide largest effective droplet size to minimize drift	23	96%	3800.2
	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	10	42%	1443.3
		No	1	4%	210
		Yes	14	58%	2362.9
	How often is spray equipment calibrated?	N/A	1	4%	195
		Once per month	3	13%	264
		Once per year	3	13%	159
		Prior to each application	18	75%	3398.2
Section 5: Dormant Spray Management	How many acres are sprayed with dormant pesticides?	No Dormant Sprays	25	104%	4016.2

Figure 7. Direct drainage parcels in Duck Slough @ Hwy 99 subwatershed.

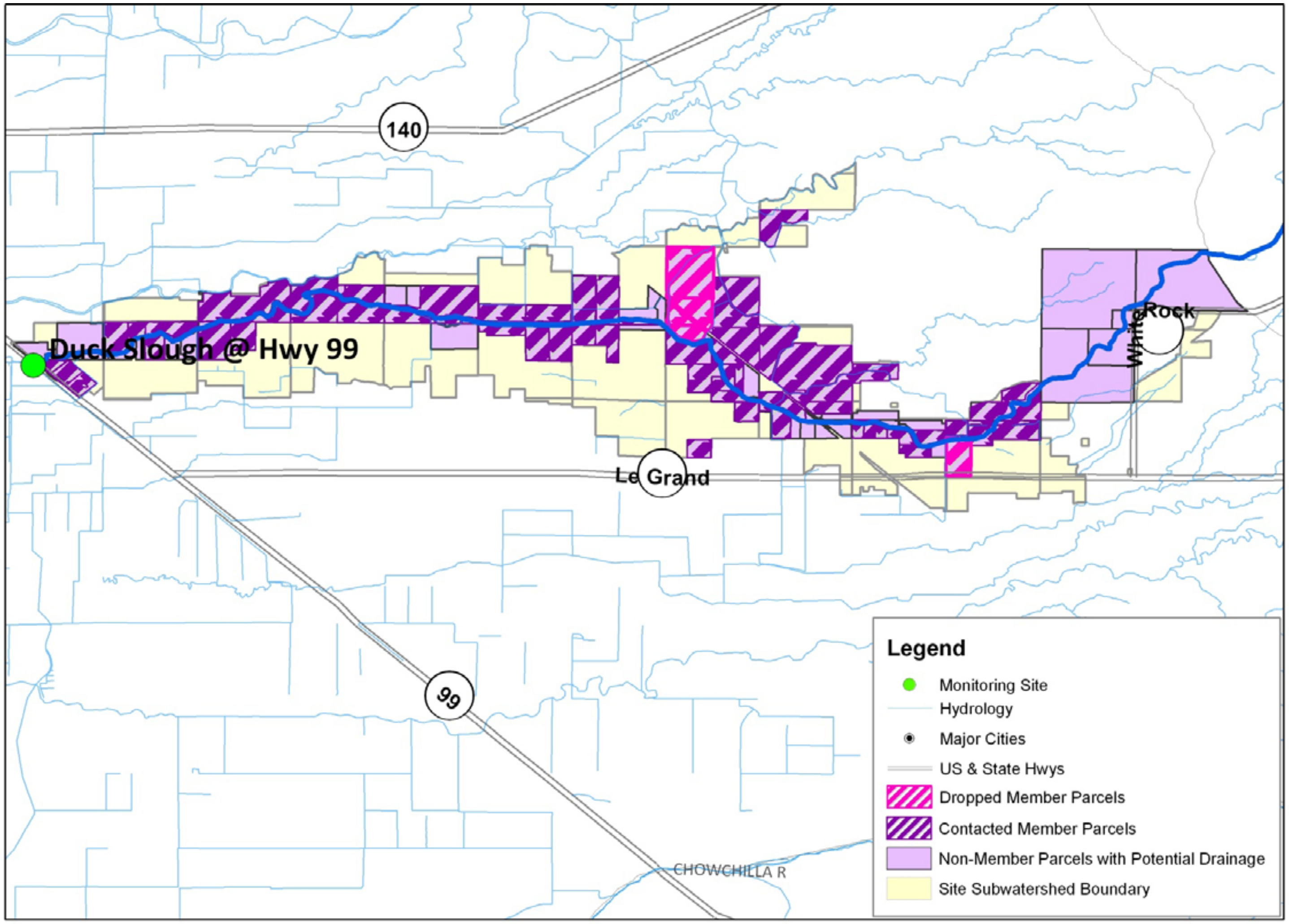
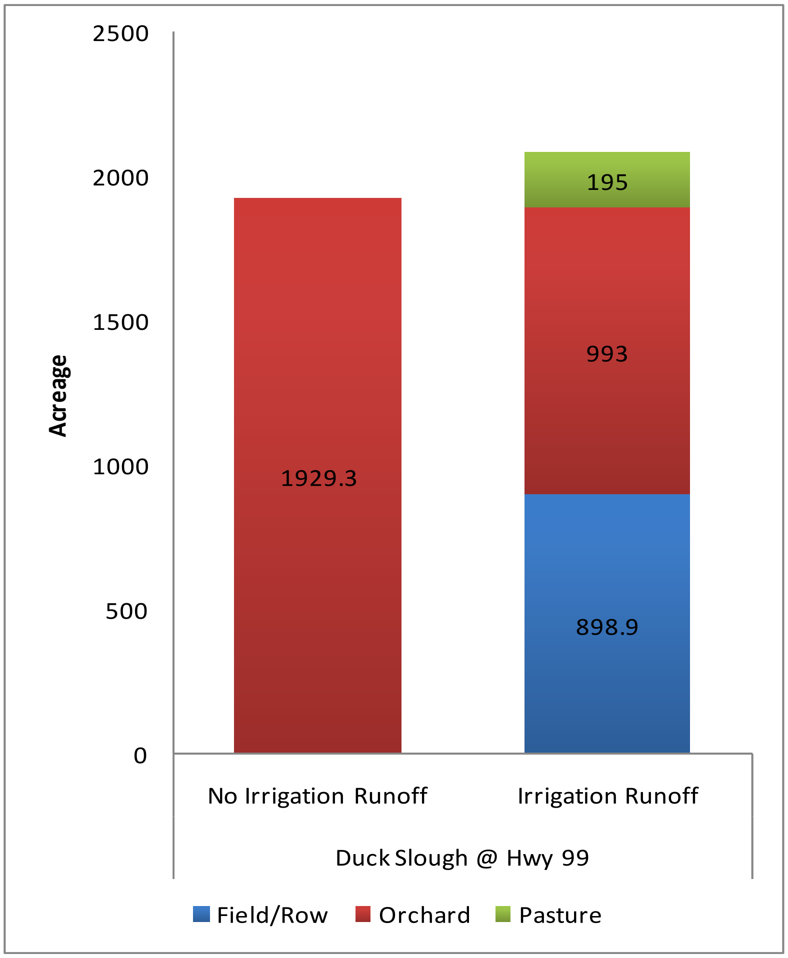


Figure 8. Duck Slough @ Hwy 99 crop acreage information from member surveys based on crop type and irrigation runoff.



Prairie Flower Drain @ Crows Landing Rd

The Coalition contacted 11 targeted growers within the Prairie Flower Drain @ Crows Landing Rd subwatershed that were determined to have the potential to drain directly to the drain, were currently farming and had reported pesticide use of high priority constituents. The 11 members farm approximately 865 acres within the Prairie Flower Drain subwatershed which includes 3,106 acres (Table 17).

Prairie Flower Drain is dominated by field/row crops and dairy acreage. A majority of the parcels farmed by targeted growers were determined to have irrigation drainage (95%, Figure 9 and 10).

Of those surveyed in the Prairie Flower Drain watershed, 82% of the respondents with slightly over 95% of the acreage used flood irrigation and there was no reported use of drip or microspray systems. However, 64% used laser leveled fields, 45% used recirculation systems, 18% used sediment retention ponds and 18% used PAM to reduce furrow erosion and prevent discharges to surface waters. Only 55% of the respondents irrigated based on soil moisture levels and 27% did not respond.

There is a mixture of respondents that have storm drainage when the soil is saturated in late winter (27%) and/or in 100 year storms (9%). Only two respondents (18%) indicated that there was no storm water drainage from the property, and 36% did not respond. 27% of the respondents indicated they pumped storm water to surface waters and could not control the timing and an additional 27% used a settling pond to hold storm water. All respondents indicated that they controlled erosion and sediment delivery by some means. Herbicides use is difficult to determine as 45% indicated no applications and 55% did not respond.

Two respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season and 8 respondents indicated that the question was not applicable to their operation. All respondents indicated that they did not use dormant sprays. All respondents indicated that they calibrated their nozzles prior to each application. The majority took numerous steps to manage their spray drift including adjusting spray nozzles to match the canopy profile (82%), shutting outside nozzles when spraying outer two rows (55%), spraying areas close to waterbodies when the wind is blowing away from them (91%), using air blast applications when wind is between 3-10 mph (36%), and using nozzles that provide the largest effective droplet size to minimize drift (91%).

Table 17. Current management practices utilized by targeted growers within Prairie Flower Drain subwatershed (2008).

Checklist	Question	Answer	Count of Answers	Pct of Respondents	Sum of Associated Acreage
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	7	64%	553.3
		Recirculation – Tail water return system	5	45%	331.9
		Use drainage basins (sediment ponds) to capture and retain runoff	2	18%	76.9
		Use of Polyacrylamide (PAM) to increase water infiltration and reduce furrow erosion	2	18%	76.9
	Irrigation System	Not Recorded	1	9%	39
		Surface	9	82%	780
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	6	55%	286.6
		Irrigation District Deliveries	1	9%	150
		Not Recorded	3	27%	382.4
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	1	9%	45
		Pump/Drain into waterway & unable to control timing	3	27%	347.8
		Settling Pond	3	27%	347.8
	When do you have storm water draining from your field?	After soil is saturated-late winter	3	27%	347.8
		No Storm Drainage	2	18%	195
		Not Recorded	4	36%	236.5
		Only in heavy (100 year) storms	1	9%	39.7
Section 3: Erosion & Sediment Management	Sediment management practices:	Maintain vegetated filter strips around field perimeter at least 10' wide	6	55%	426.2
		Vegetation is planted along or allowed to grow along ditches	8	73%	742.1
	Do you apply herbicides during winter months?	Do not apply	5	45%	355.5
		Not Recorded	6	55%	508.5
	If waterway crosses or borders pasture, how is livestock managed?	N/A	10	91%	819
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	9	82%	743
		Outside nozzles shut off when spraying outer rows next to sensitive sites	6	55%	411.2
		Spray areas close to waterbodies when the wind is blowing away from them	10	91%	819

Checklist	Question	Answer	Count of Answers	Pct of Respondents	Sum of Associated Acreage
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	4	36%	295.5
		Use electronic controlled sprayer nozzles	4	36%	295.5
		Uses of nozzles that provide largest effective droplet size to minimize drift	10	91%	819
	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	8	73%	593
		Yes	2	18%	226
	How often is spray equipment calibrated?	Prior to each application	10	91%	819
Section 5: Dormant Spray Management	How many acres are sprayed with dormant pesticides?	No Dormant Sprays	10	91%	819

Figure 9. Direct drainage parcels in Prairie Flower Drain @ Crows Landing Rd.

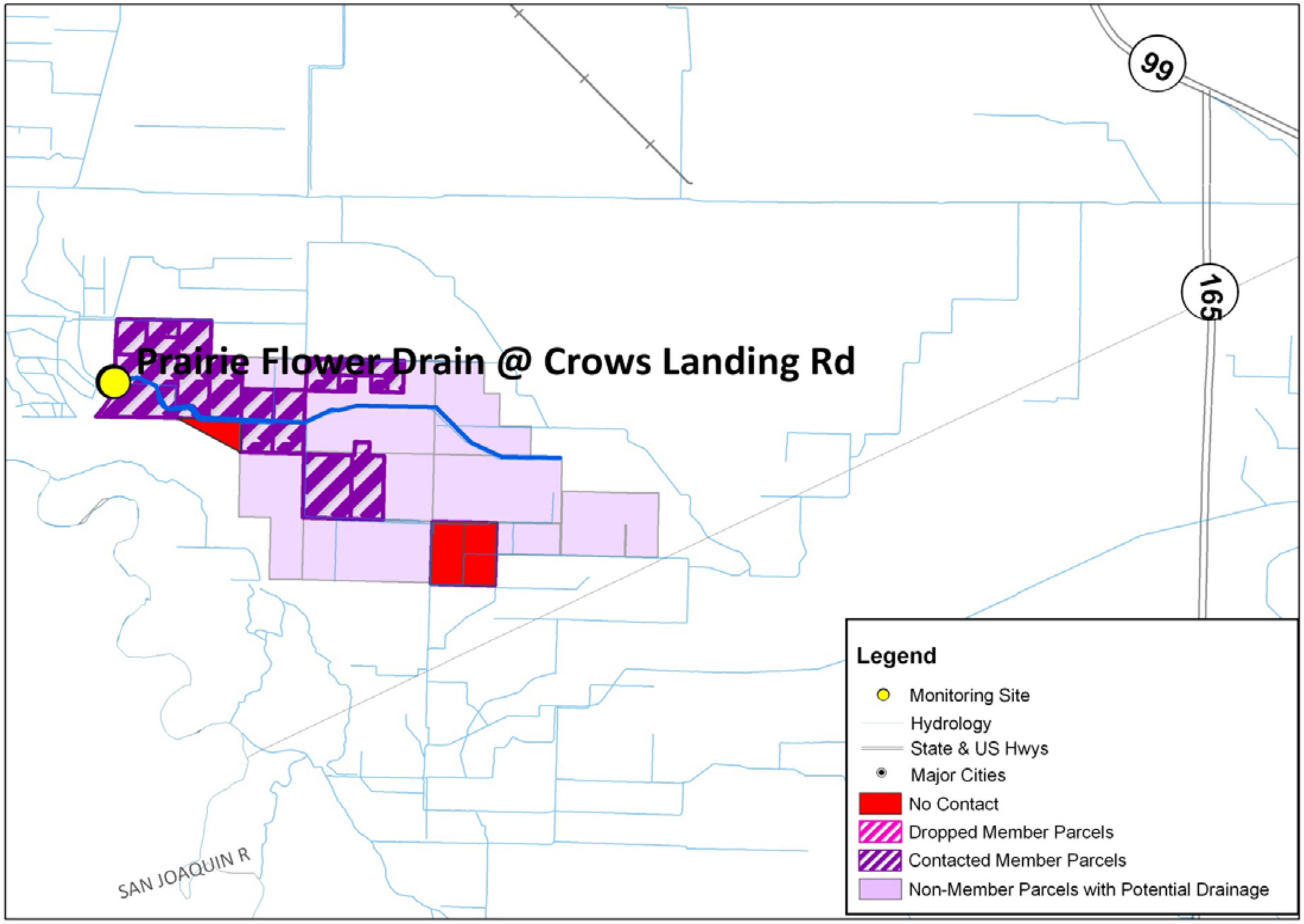
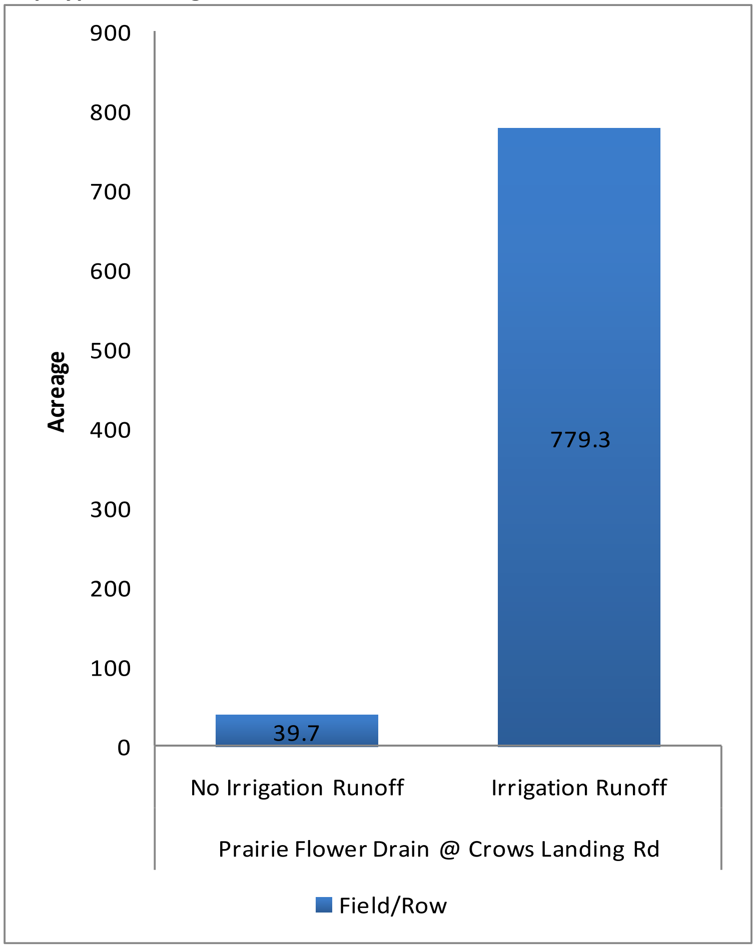


Figure 10. Prairie Flower Drain @ Crows Landing Rd crop acreage information from member surveys based on crop type and irrigation runoff.

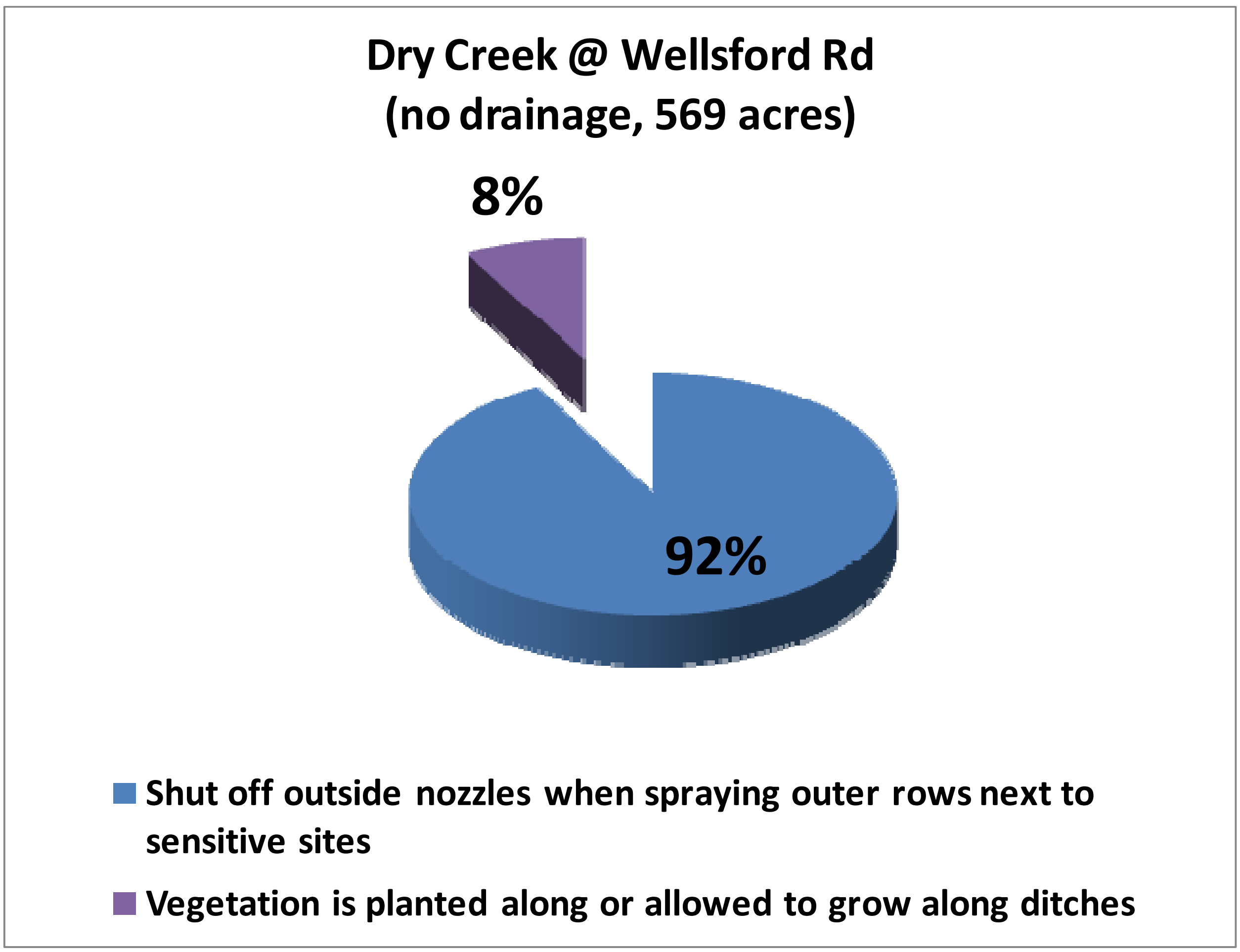


Recommended Management Practices – 2009/2010

Dry Creek @ Wellsford Rd

In Dry Creek, the lack of irrigation drainage suggests that preventing spray drift can eliminate water quality problems. This was also the conclusion of an analysis of chlorpyrifos concentrations and pesticide use which indicated that chlorpyrifos in the water was unlikely to be the result of irrigation runoff. Drift management is especially important in this subwatershed and a majority of the growers were recommended to implement additional spray drift practices such as shutting off outside nozzles when spraying outer rows next to creeks (Figure 11).

Figure 11. Percentage of acreage represented by recommended management practices for Dry Creek @ Wellsford. All members that were recommended to implement additional practices did not have irrigation drainage.



Duck Slough @ Hwy 99

For acreages with irrigation drainage in the Duck Slough (above Highway 99) watershed, a combination of spray drift, pump/drain control of storm drainage, planting of vegetation in ditches and addition of drainage basins/sediment ponds was recommended for growers (Figures 12 and 13). For growers with and without irrigation drainage, a majority of growers were recommended to implement additional spray drift practices such as shutting off outside nozzles when spraying outer rows (Figure 12 and 13). One grower representing 31% of the acreage with recommended practices was encouraged to utilize a drainage basin/sediment pond to reduce irrigation runoff (Figure 12).

Figure 12. Percentage of acreage represented by recommended management practices for Duck Slough @ Hwy 99 for members with irrigation drainage.

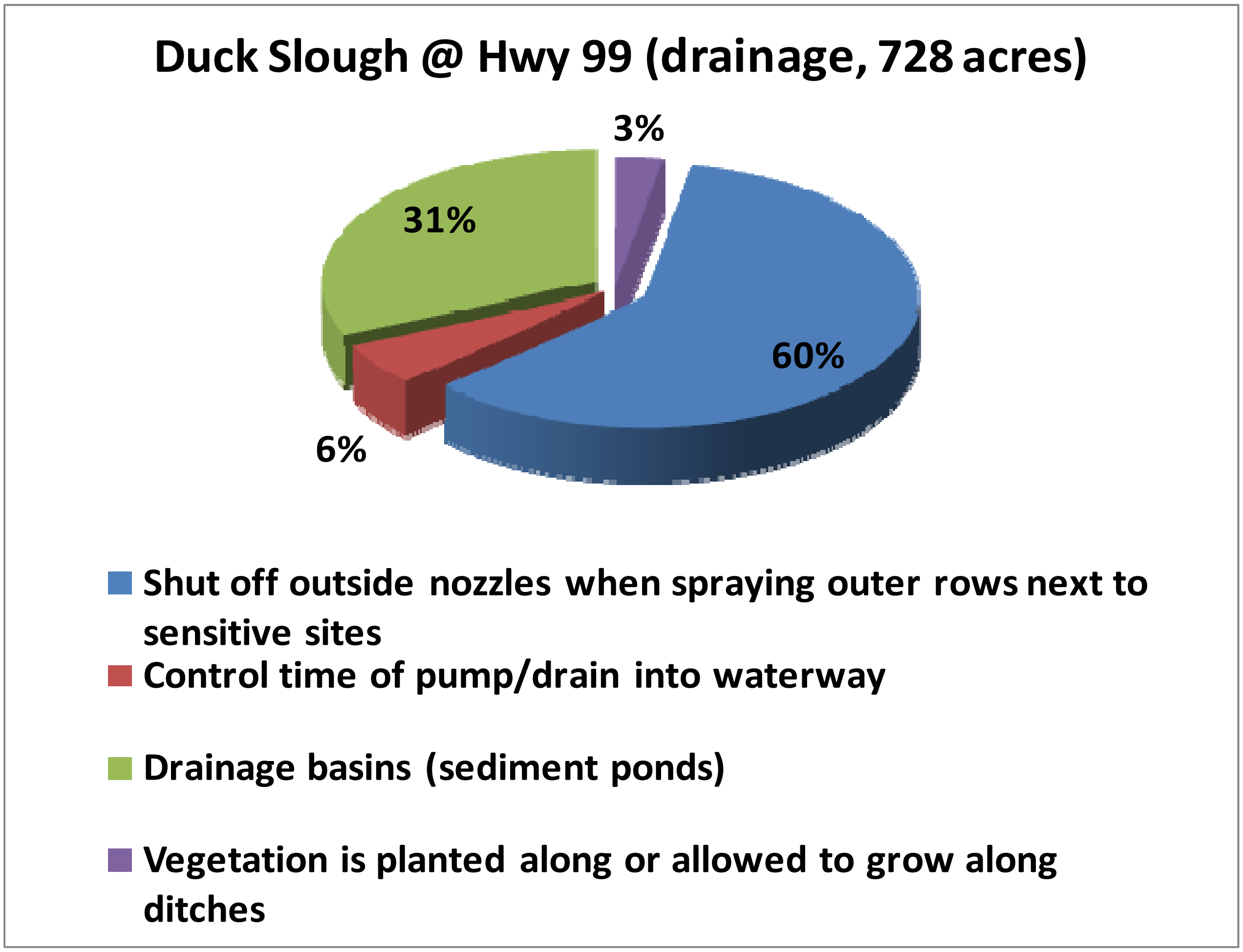
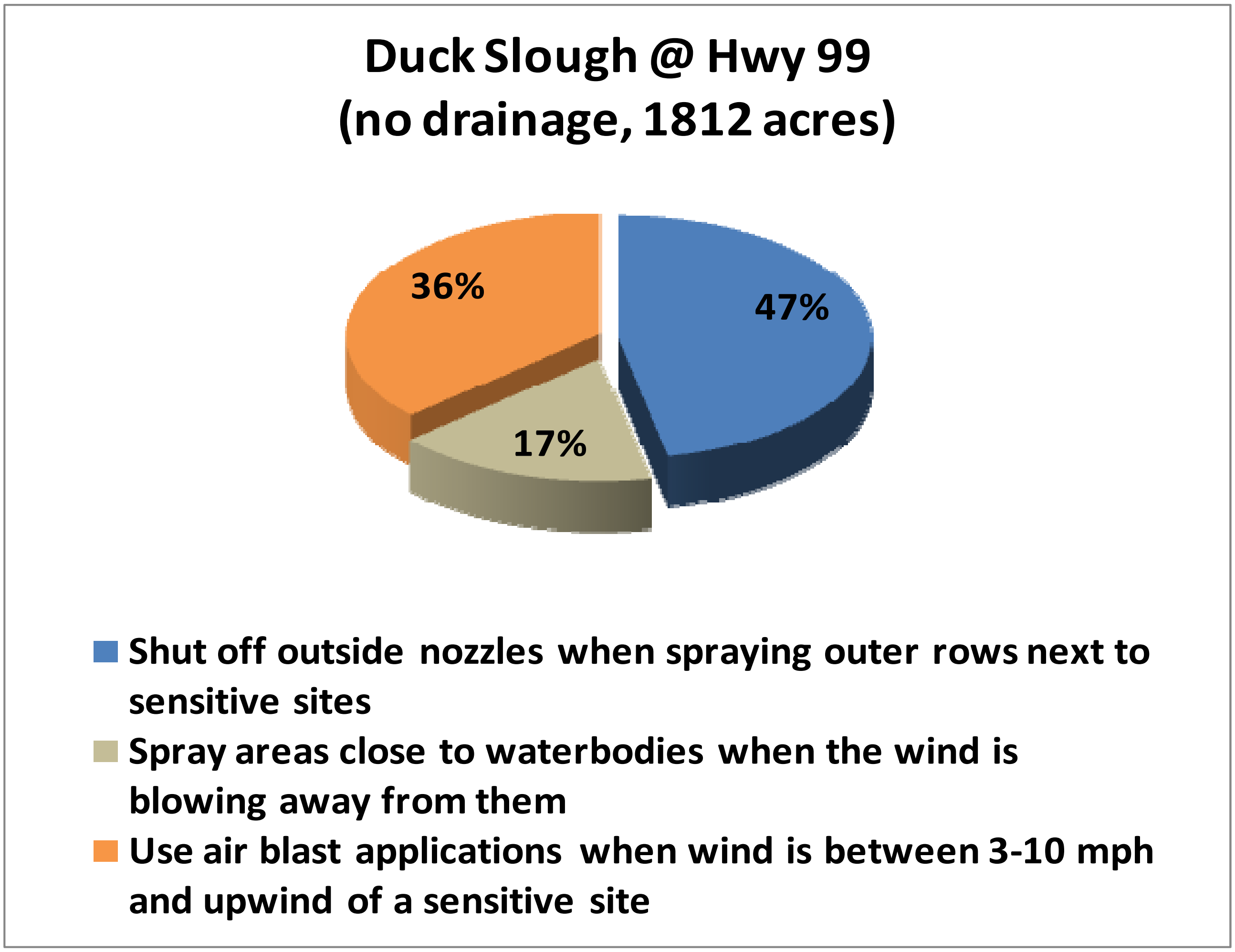


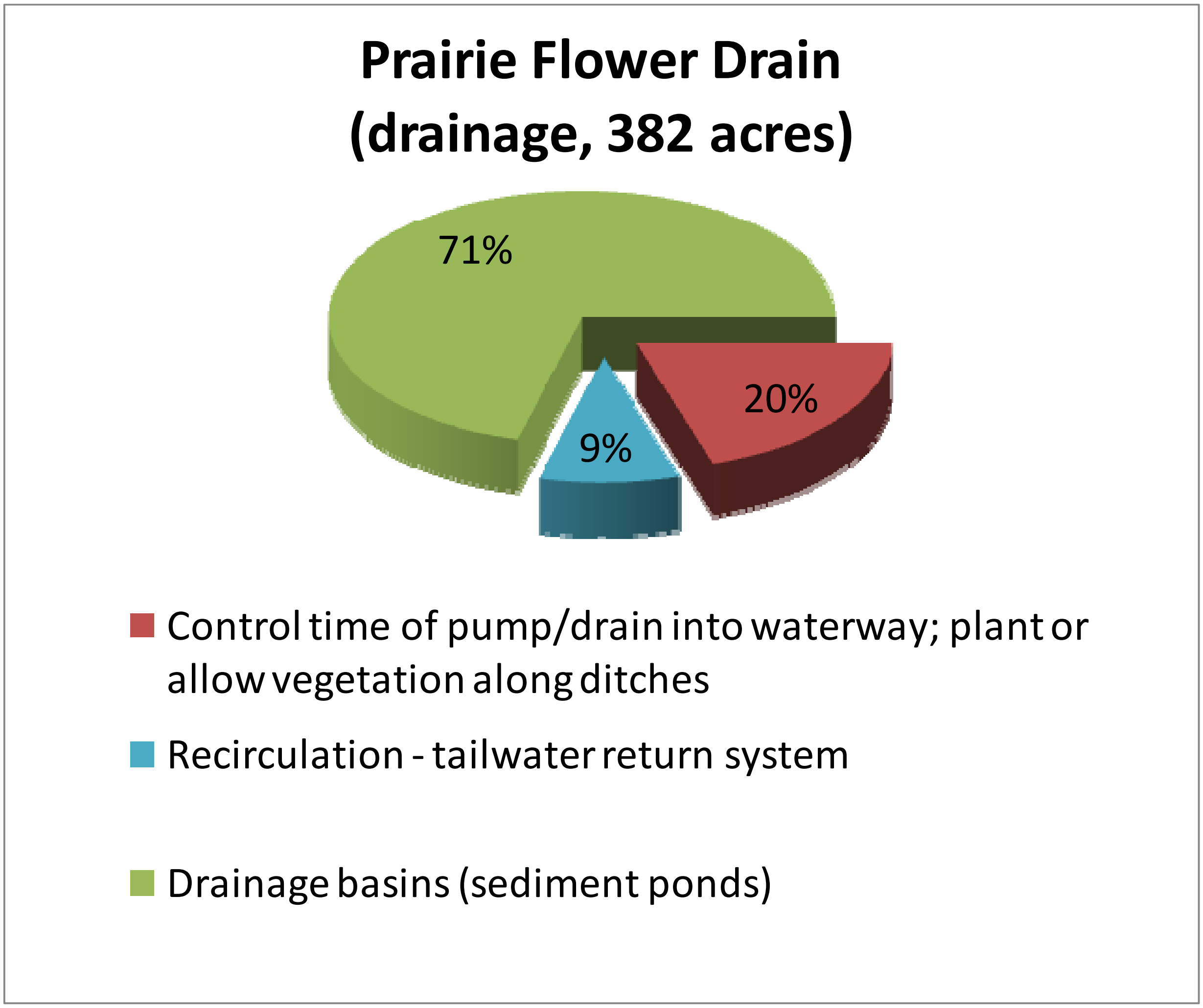
Figure 13. Percentage of acreage represented by recommended management practices for Duck Slough @ Hwy 99 for members without irrigation drainage.



Prairie Flower Drain @ Crows Landing Rd

The management practices recommended to these farmers included controlling the timing of pumping/draining into the waterway, planting vegetation in the ditches and constructing drainage basins/sediment ponds (Figure 14). One grower representing 71% of the acreages with recommended practices was encouraged to utilize a drainage basin (Figure 14).

Figure 14. Percentage of acreage represented by recommended management practices for Prairie Flower Drain. All members that were recommended to implement additional practices have irrigation drainage.



Implemented Management Practices – 2009/2010

Follow up meetings were conducted in 2010 on February 19, February 26 and March 19 for Duck Slough @ Hwy 99, Dry Creek @ Wellsford, and Prairie Flower Drain @ Crows Landing, respectively. The follow up meetings utilized interactive hand held devices to document grower responses based on questions posed in a Power Point presentation. This allowed for anonymous, instantaneous responses at an individual grower level to be conducted in a grower group setting.

There were 21 follow-up questions asked of growers who had filled out surveys in 2009 (Table 18).

Table 18. Targeted grower follow up questions for high priority subwatersheds (2008 -2010).

Targeted Grower Follow Up Questions
01) Did you have irrigation drainage in 2009?
02) Any changes in crop type? (switched from row crops to orchards)?
In 2009, did you implement the following management practices:
03) Laser Leveled Fields
04) Recirculation/ Tail water Return System
05) Drainage Basins/Sediment Ponds To Capture & Retain Runoff
06) Use Polyacrylamide (PAM) to Increase Water Infiltration & Reduce Furrow Erosion
07) Microirrigation
08) Sprinkler
09) Reduce Amount of Water Used in Surface Irrigation
10) Add Constructed Wetlands
11) Grass Row Centers
12) Add Filter Strips Around Field Perimeter At Least 10' Wide
13) Vegetation Allowed to Grow in Drain Ditches
14) Outside Nozzles Are Shut Off When Spraying Outer Rows Next To Sensitive Areas
15) Added control device to discharge (storm drainage)
16) Did you implement new practices based on information from contact with Coalition representatives?
17) Did you implement additional practices not listed on previous slides?
18) Did you wish to receive quarterly water quality information from the Coalition?
19) Would you like to receive additional information regarding NRCS funding for management practice implementation?
20) Is this type of meeting a good way to provide information?
21) Is this approach to solving water quality problems viable in your opinion?

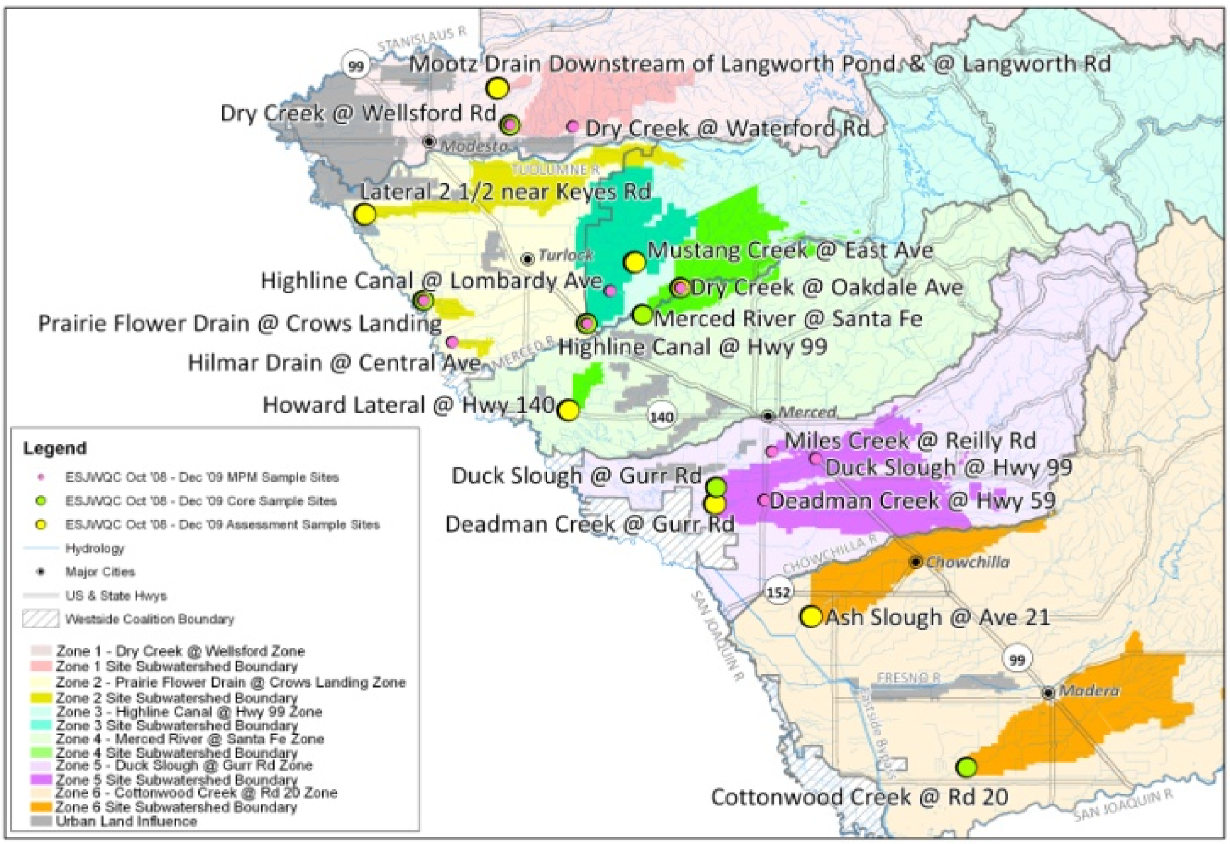
Preliminary responses were positive with 100% of growers responding that yes, this approach to solving water quality problems is viable and that this type of meeting was a good way to provide information (Question 21 and 20, Table 18). Fifty-three percent of growers would like to receive additional information regarding NRCS funding for management practice implementation and overall, 50% of the growers implemented new practices based on information from contacts with Coalition representatives (Question 19 and 16, Table 18). Approximately half of the targeted growers from each subwatershed attended the meetings and participated in answering follow up questions.

The Coalition will conduct additional follow up activities by conducting phone interviews, in person contact and or another luncheon meeting with interactive slides with growers who did not attend the follow up meetings and asking similar questions on the phone. The Coalition anticipates completing follow-up surveys with growers in all three first high priority subwatersheds by June 30, 2010.

EVALUATION OF MANAGEMENT PRACTICE EFFECTIVENESS

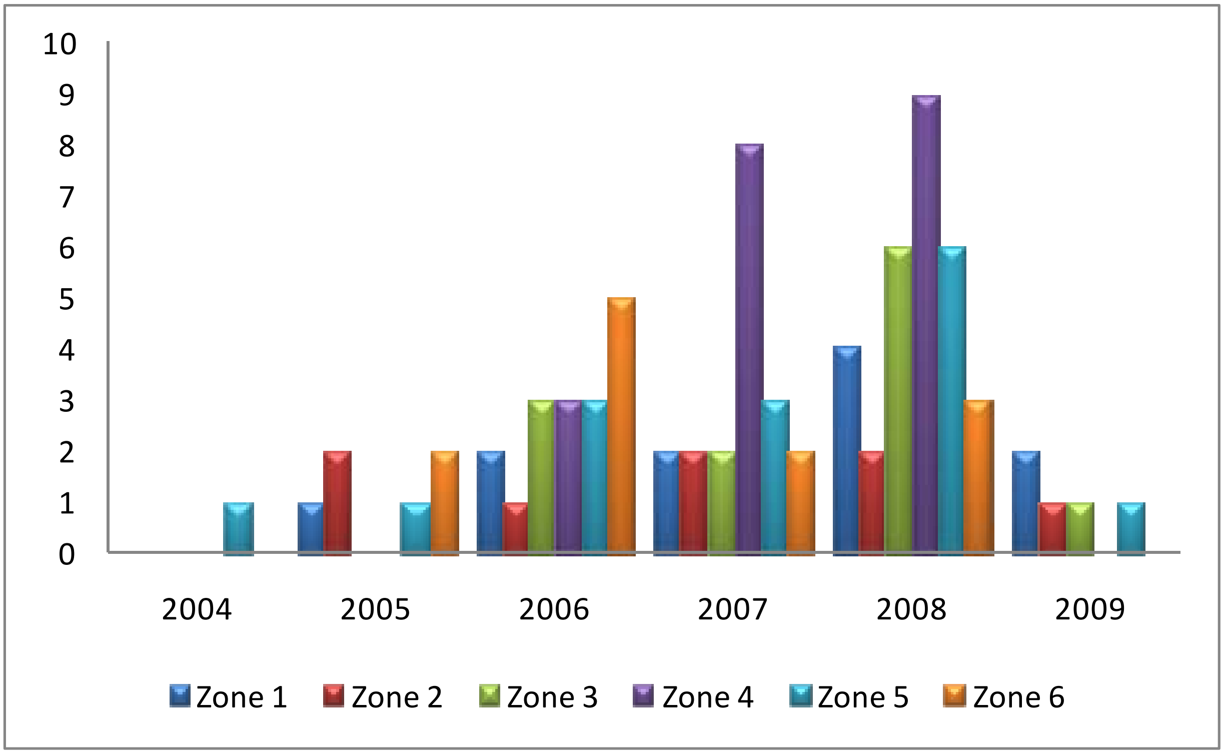
The Coalition is still obtaining management practice implementation information from growers within the first three high priority subwatersheds which are located in Coalition Zones 1, 2 and 5 (see the Coalition's MRPP for Zone descriptions). Management Plan Monitoring was conducted in 2007, 2008 and 2009 to identify sources and evaluate changes in water quality. Despite annual Coalition meetings and management practice mailings, the Coalition continued to have exceedances of high priority constituents such as chlorpyrifos. In 2009, the Coalition initiated individual contacts as part of its Management Plan strategy and conducted farm visits to determine what additional management practices could be implemented within the first three high priority subwatersheds (2008 – 2010).

Figure 15. Monitoring locations sampled during 2009 for core, assessment and Management Plan Monitoring including site subwatershed designation and zone.



The number of chlorpyrifos exceedances within the six Coalition Zones decreased from 2008 to 2009 (Figure 16). The number of exceedances that occurred in 2009 compared to those that occurred in 2008 were reduced from four exceedances to two in Zone 1 (Dry Creek @ Wellsford Zone) and from six exceedances to one in both Zones 2 (Prairie Flower Drain @ Crows Landing Rd Zone) and 5 (Duck Slough @ Gurr Rd Zone)(Figure 16). In addition, one of the exceedances that occurred in 2009 in Zone 1 was in a non contiguous water body that was sampled per ILRP guidelines. It appears that the Management Plan strategy of conducting individual contacts and discussing management practices and water quality issues on grower's farms has had an impact on not only the number of management practices implemented within the priority subwatersheds but also the overall zone water quality in regards to chlorpyrifos exceedances.

Figure 16. Exceedance counts of the chlorpyrifos water quality trigger limit from 2004 - 2009 within the ESJWQC Zones.



The Coalition conducted MPM within 11 site subwatersheds during 2009 plus one upstream location within the same site subwatershed (Dry Creek @ Waterford) (Table1). Of the 20 MPM samples collected for chlorpyrifos analysis, three samples had detections above 0.015 µg/L (15% of the samples collected specifically for MPM) (Table 3). One of the chlorpyrifos exceedances occurred in Dry Creek @ Wellsford but was most likely due to a dairy that had sprayed 120 acres of corn within the time period and also had a discharge of lagoon water resulting in the death of 40-50 oak trees as a result of high ammonia in the water. The other two exceedances occurred in July at Highline Canal @ Hwy 99 (Zone 3) which and Miles Creek @ Reilly Rd (Zone 5). The Coalition will continue to monitor at Dry Creek @ Wellsford and Highline Canal @ Hwy 99 in 2010 during months of past exceedances. MPM will be conducted at Miles Creek when it becomes a high priority subwatershed in 2013.

All copper concentrations from samples collected during 2009 were below exceedance levels (both normal monitoring and MPM). The Coalition will continue to monitor for copper in 2010 during months of past exceedances however it anticipates similar results indicating improved copper management practices.

There was no toxicity to Ceriodaphnia in MPM samples collected in 2009 and one algae toxicity in May (10% of samples collected specifically for MPM, Table 3). The algae toxicity occurred at Prairie Flower Drain @ Crows Landing Rd and will be monitored for again in 2010.

The Coalition will conduct MPM within the first three high priority subwatersheds (2008 – 2010) to obtain water quality results during Year 2 of the Management Plan Monitoring flow chart (Figure 2). In addition, the Coalition will conduct MPM in four second high priority subwatershed (2010 – 2012) which will begin their Year 1 of focused outreach. These sites include Bear Creek @ Kibby Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd and Highline Canal @ Hwy 99. MPM conducted in 2010 will include samples collected for copper, chlorpyrifos, diazinon, diuron and simazine analysis as well as toxicity to *C. dubia, S. capricornutum* and *H. azteca*. The Coalition has already begun individual contacts within Cottonwood Creek and Highline Canal @ Hwy 99 and has surveys for 26% of the targeted growers in Cottonwood Creek and 30% of the targeted growers within Cottonwood Creek. Individual contacts resulting in filled out surveys will be completed by May 30, 2010 allowing for management practice implementation during the summer of 2010.

Status of TMDL Constituents

The ESJWQC has established monitoring and management activities as required in the Regional Board's Basin Plan for the Sacramento and San Joaquin River basins. The Basin Plan sets forth Total Maximum Daily Load (or TMDL) requirements for dischargers and requires that dischargers comply with the monitoring and management criteria defined in the Basin Plan. A narrative concerning each special monitoring constituent has been documented below as an effort by the Coalition to describe how it is meeting the TMDL requirements for Coalition members.

If an exceedance occurs for a TMDL constituent (i.e. chlorpyrifos, diazinon, salt and boron) a management plan is required for that constituent in that site subwatershed regardless of whether there was a second exceedance.

A management plan for a TMDL constituent results in additional focused efforts within subwatersheds. Coalition efforts in all zones include but are not limited to: (1) continued monitoring at periods when peak pesticide use occurs, (2) analysis of Pesticide Use Report (PUR) data, (3) Management Plan Monitoring, (4) holding site subwatershed grower meetings, (5) encouraging and evaluating implementation of management practices, and (6) addressing the seven compliance components described in the Basin Plan in conjunction with dairy operators with irrigated lands and other entities identified as potential sources of discharges. The Coalition addresses toxicity, pesticides, and sediment bound analytes with specific management practices whether or not there is a TMDL.

Intensive outreach and documentation of implemented management practices occur throughout the Coalition, but greater efforts to acquire this information are made at the site subwatersheds that the Coalition has designated as high priority subwatersheds (see Table 6). The Coalition informs growers with irrigated land about water quality and the status of evolving water quality objectives. The Coalition also obtains information on management practices from the growers. Furthermore, the Coalition conducts annual meetings to provide growers with information on management practices that can improve water quality. The Coalition evaluates various management practices and determines their suitability for irrigated land within the Coalition region.

Chlorpyrifos and Diazinon TMDL

The Basin Plan requires that dischargers either individually or as a coalition describe the actions that the discharger will take to reduce chlorpyrifos and diazinon discharges or also meet the applicable allocations by the required compliance date. The Coalition's Management Plan includes source identification and a means to identify management practices that will need to be implemented in specific areas to achieve expected reductions in chlorpyrifos and diazinon discharges. Improved management practices, including pesticide application practices to address drift, alternative irrigation practices to reduce runoff, and drainage management practices to decrease or reduce the volume of runoff of contaminants have been implemented to meet water quality objectives and load allocations set forth in the Basin Plan. Meetings have been held quarterly with the Regional Water Board (Table 10) in order to evaluate progress in meeting these reductions, and revisions to the Management Plan will be made if sufficient progress is not being achieved.

The Coalition is following the development and continued assessment of chlorpyrifos and diazinon TMDLs in the San Joaquin River. The final San Joaquin River Diazinon and Chlorpyrifos Basin Plan Amendment Staff Report was completed in October 2005. Since then, the Regional Water Quality Control Board has been working to develop new amendments to the Basin Plan for the control of discharges of pesticides into selected surface waters in the Sacramento and San Joaquin Valleys, including the Delta. On July 23, 2009, a meeting was held to discuss and update the public on the status of creating a new method to evaluate setting criteria for organophosphate pesticides. The Central Valley Pesticide BPA and TMDL Stakeholder Meeting was held on November 16, 2009 to provide participants with an opportunity to discuss the overall status and schedule of the project, the waterbodies for potential inclusion in the geographic scope of the project, and potential provisions of the Basin Plan Amendment. A similar meeting was held on January 7, 2010, the Central Valley Pesticide TMDL and Basin Plan Amendment Meeting. The Coalition will continue to pay close attention to State and regional action to ensure incorporation of new policies and mandates to meet water quality objectives.

The ESJWQC participated in a TMDL meeting with representatives from the Westside Water Quality Coalition, the San Joaquin County and Delta Water Quality Coalition, and Regional Board Irrigated Lands Regulatory Program staff and TMDL unit staff. It was decided that the Westside Water Quality Coalition and the ESJWQC would split the six San Joaquin River compliance monitoring points such that ESJWQC would sample San Joaquin River @ Vernalis (Airport Way), San Joaquin River @ Maze Rd and San Joaquin River @ Hills Ferry. The Westside Water Quality Coalition will monitor San Joaquin River @ Las Palmas Ave (Patterson), San Joaquin River @ Hwy 65 (Lander Ave) and San Joaquin River @ Sack Dam. Monitoring will occur quarterly and monitoring results will be included in an annual report to include an assessment of results from both Coalitions. The two Coalitions are putting together a memo to submit to the Regional Board by April 15, 2010 the joint strategy for coordinating sampling events and the reporting process including when annual report will be submitted and what monitoring will be addressed.

Presently, the Coalition broadly monitors chlorpyrifos and diazinon monthly, every year, according to the ESJWQC's Monitoring and Reporting Program MRPP Core and Assessment strategy. The monitoring locations in each zone are representative of discharges to the San Joaquin River. The Coalition attempts to monitor at least one storm event during winter months. San Joaquin River TMDL monitoring will occur within the same week as Core and Assessment Monitoring within the six Coalition zones.

Below are the seven Basin Plan monitoring requirements to indicate compliance with the chlorpyrifos and diazinon TMDL.

1. Determine compliance with established water quality objectives and the loading capacity applicable to diazinon and chlorpyrifos in the San Joaquin River.
2. Determine compliance with established load allocations for diazinon and chlorpyrifos
3. Determine the degree of implementation of management practices to reduce off-site movement of diazinon and chlorpyrifos
4. Determine the effectiveness of management practices and strategies to reduce off-site migration of diazinon and chlorpyrifos
5. Determine whether alternatives to diazinon and chlorpyrifos are causing surface water quality impacts
6. Determine whether the discharge causes or contributes to a toxicity impairment due to additive or synergistic effects of multiple pollutants
7. Demonstrate that management practices are achieving the lowest pesticide levels technically and economically achievable

To demonstrate compliance with the Basin Plan water quality objectives and the loading capacity, several agriculturally-influenced tributaries to the San Joaquin River are routinely monitored, as described in the ESJWQC MRPP.

Compliance with chlorpyrifos and diazinon WQO

Table 4 earlier in this document lists all site subwatersheds within the Coalition region that have experienced an exceedance of the chlorpyrifos water quality objective (WQO) of 0.015 µg/L and of the diazinon water quality objective of 0.1 µg/L. From 2004 through 2009, there have been 75 exceedances of the chlorpyrifos WQO across 24 site subwatersheds and three exceedances of the diazinon WQO across two subwatersheds (Table 4). In 2009, there were a total of five exceedances of the chlorpyrifos WQO and no exceedances of the diazinon WQO (Table 5). Chlorpyrifos exceedances occurred in Zone 1 at Dry Creek @ Wellsford Rd and Mootz Drain @ Langworth Rd, in Zone 2 at Lateral 2 ½ near Keyes Rd, in Zone 3 at Highline Canal @ Hwy 99 and in Zone 5 at Miles Creek @ Reilly Rd (Table 19). Three of the five samples were collected as part of the ESJWQC Management Plan monitoring schedule.

Table 19. 2009 chlorpyrifos WQTL exceedances within ESJWQC.

Zone	Station Name	Season	Sample Date	Chlorpyrifos, µg/L
Zone 1	Dry Creek @ Wellsford Rd	Irrigation4, MPM	8/18/2009	0.027
Zone 1	Mootz Drain @ Langworth Rd	Irrigation3	6/16/2009	0.033
Zone 2	Lateral 2 1/2 near Keyes Rd	Irrigation4	7/21/2009	0.049
Zone 3	Highline Canal @ Hwy 99	Irrigation4, MPM	7/21/2009	0.093
Zone 5	Miles Creek @ Reilly Rd	Irrigation4, MPM	7/21/2009	0.028
			Environmental Exceedances	**2**
			Non Contiguous Water Body Exceedances	**0**
			Management Plan Monitoring Exceedances[1]	**3**
			TOTAL Exceedances	**5**

[1] Refers to Management Plan Monitoring for specific constituents at Assessment, Core, and/or MPM locations.

Compliance with established load allocations for chlorpyrifos and diazinon

Load allocations for nonpoint source discharges, including agricultural discharges, are based on the following equation for discharges to Sacramento-San Joaquin Delta Waterways:

$$S = \frac{C_D}{WQO_D} + \frac{C_c}{WQO_c} \leq 1.0$$

Where

C_D = diazinon concentration in µg/L
C_C = chlorpyrifos concentration in µg/L
WQO_D = diazinon water quality objective; 0.1 µg/L
WQO_C = chlorpyrifos water quality objective; 0.015 µg/L

The Coalition reviewed all data collected from 2004 through 2009 to determine load allocation compliance based on the above formula (Table 20), Table 21 indicates compliance based on 2004-2009 and 2009 only.

Table 20. TMDL load calculations for diazinon and chlorpyrifos runoff in the San Joaquin River for nonpoint source discharges.

Zone	Station Name	Sample Date	Grouping	Chlorpyrifos	Diazinon	Load	Load Compliance
1	Dry Creek @ Wellsford Rd	15/Feb/2005	Storm1		0.011	0.11	Compliant
1	Dry Creek @ Wellsford Rd	17/Aug/2005	Irrigation4	0.024		1.60	Out of compliance
1	Dry Creek @ Wellsford Rd	13/Jul/2006	Irrigation3	0.026		1.73	Out of compliance
1	Dry Creek @ Wellsford Rd	10/Aug/2006	Irrigation4	0.024		1.60	Out of compliance
1	Dry Creek @ Wellsford Rd	11/Feb/2007	Storm1		0.034	0.34	Compliant
1	Dry Creek @ Wellsford Rd	15/May/2007	Irrigation2	0.011		0.73	Compliant
1	Dry Creek @ Wellsford Rd	17/Jul/2007	Irrigation4	0.021		1.40	Out of compliance
1	Dry Creek @ Wellsford Rd	11/Sep/2007	Irrigation6	0.043		2.87	Out of compliance
1	Dry Creek @ Wellsford Rd	22/Jul/2008	Irrigation4	0.03		2.00	Out of compliance
1	Dry Creek @ Wellsford Rd	21/Jul/2009	Irrigation4, MPM	0.013		0.87	Compliant
1	Dry Creek @ Wellsford Rd	18/Aug/2009	Irrigation5, MPM	0.027		1.80	Out of compliance
1	Dry Creek at Waterford	22/Jul/2008	Irrigation4, MPM	0.02		1.33	Out of compliance
1	Dry Creek at Waterford	19/Aug/2008	Irrigation5, MPM	0.023		1.53	Out of compliance
1	Mootz Drain @ Langworth Rd	16/Jun/2009	Irrigation3	0.033		2.20	Out of compliance
1	Mootz Drain @ Langworth Rd	16/Dec/2008	Non Contiguous, Storm3	0.017	0.013	1.26	Out of compliance
2	Hatch Drain @ Tuolumne Rd	24/Jan/2008	Storm1		0.037	0.37	Compliant
2	Lateral 2 1/2 near Keys Rd	21/Jul/2009	Irrigation4	0.049		3.27	Out of compliance
2	Hilmar Drain @ Central Ave	13/Jul/2006	Irrigation3	0.016		1.07	Out of compliance
2	Hilmar Drain @ Central Ave	17/Jul/2007	Irrigation4	0.015		1.00	Compliant
2	Prairie Flower Drain @ Crows Landing Rd	13/Jul/2005	Irrigation3		0.013	0.13	Compliant
2	Prairie Flower Drain @ Crows Landing Rd	17/Aug/2005	Irrigation4	0.029		1.93	Out of compliance
2	Prairie Flower Drain @ Crows Landing Rd	21/Sep/2005	Irrigation5	0.018		1.20	Out of compliance
2	Prairie Flower Drain @ Crows Landing Rd	13/Jul/2006	Irrigation3	0.014		0.93	Compliant
2	Prairie Flower Drain @ Crows Landing Rd	17/Jul/2007	Irrigation4	0.009		0.60	Compliant
2	Prairie Flower Drain @ Crows Landing Rd	28/Aug/2007	Irrigation5, MPM	0.094		6.27	Out of compliance
2	Prairie Flower Drain @ Crows Landing Rd	24/Jan/2008	Storm1		0.026	0.26	Compliant
2	Prairie Flower Drain @ Crows Landing Rd	19/Aug/2008	Irrigation5	0.024		1.60	Out of compliance
2	Westport Drain @ Vivian Rd	17/Jul/2007	Irrigation4	0.018		1.20	Out of compliance
2	Westport Drain @ Vivian Rd	24/Jan/2008	Storm1		0.031	0.31	Compliant
2	Westport Drain @ Vivian Rd	22/Jul/2008	Irrigation4	0.016		1.07	Out of compliance
3	Highline Canal @ Hwy 99	01/Mar/2006	Storm1	0.021	0.048	1.88	Out of compliance

Zone	Station Name	Sample Date	Grouping	Chlorpyrifos	Diazinon	Load	Load Compliance
3	Highline Canal @ Hwy 99	12/Jul/2006	Irrigation3	0.012		0.80	Compliant
3	Highline Canal @ Hwy 99	17/Jul/2007	Irrigation4	0.017		1.13	Out of compliance
3	Highline Canal @ Hwy 99	24/Jan/2008	Storm1	0.019	0.04	1.67	Out of compliance
3	Highline Canal @ Hwy 99	26/Feb/2008	Storm2	0.0076		0.51	Compliant
3	Highline Canal @ Hwy 99	22/Jul/2008	Irrigation4	0.021		1.40	Out of compliance
3	Highline Canal @ Lombardy Rd	15/Feb/2005	Storm1	0.01	0.098	1.65	Out of compliance
3	Highline Canal @ Lombardy Rd	13/Jul/2005	Irrigation3	0.011		0.73	Compliant
3	Highline Canal @ Lombardy Rd	01/Mar/2006	Storm1	0.027	0.03	2.10	Out of compliance
3	Highline Canal @ Lombardy Rd	16/Mar/2006	Storm2	0.018		1.20	Out of compliance
3	Highline Canal @ Lombardy Rd	17/Jul/2007	Irrigation4	0.017		1.13	Out of compliance
3	Highline Canal @ Lombardy Rd	24/Jan/2008	Storm1	0.028	0.043	2.30	Out of compliance
3	Highline Canal @ Lombardy Rd	26/Feb/2008	Storm2	0.015		1.00	Compliant
3	Highline Canal @ Lombardy Rd	22/Jul/2008	Irrigation4	0.013		0.87	Compliant
3	Highline Canal @ Lombardy Rd	23/Sep/2008	Irrigation6	0.015		1.00	Compliant
3	Highline Canal @ Hwy 99	21/Jul/2009	Irrigation4, MPM	0.093		6.20	Out of compliance
3	Mustang Creek @ East Ave	18/May/2006	Irrigation1	0.012		0.80	Compliant
3	Mustang Creek @ East Ave	10/Aug/2006	Irrigation4	0.015		1.00	Compliant
3	Mustang Creek @ East Ave	24/Jan/2008	Storm1	0.067	0.065	5.12	Out of compliance
3	Mustang Creek @ East Ave	26/Feb/2008	Storm2	0.028		1.87	Out of compliance
4	Bear Creek @ Kibby Rd	17/May/2006	Irrigation1	0.52		34.67	Out of compliance
4	Bear Creek @ Kibby Rd	24/Jul/2007	Irrigation4	0.049		3.27	Out of compliance
4	Bear Creek @ Kibby Rd	25/Feb/2008	Storm2	0.008		0.53	Compliant
4	Black Rascal Creek @ Yosemite Rd	18/May/2006	Irrigation1	0.033		2.20	Out of compliance
4	Black Rascal Creek @ Yosemite Rd	12/Feb/2007	Storm1		0.028	0.28	Compliant
4	Black Rascal Creek @ Yosemite Rd	24/Jul/2007	Irrigation4	3.7		246.67	Out of compliance
4	Black Rascal Creek @ Yosemite Rd	21/Aug/2007	Irrigation5	0.12		8.00	Out of compliance
4	Black Rascal Creek @ Yosemite Rd	18/Sep/2007	Irrigation6	0.031		2.07	Out of compliance
4	Black Rascal Creek @ Yosemite Rd	25/Feb/2008	Storm2	0.0057		0.38	Compliant
4	Black Rascal Creek @ Yosemite Rd	29/Apr/2008	Irrigation1	0.0078		0.52	Compliant
4	Livingston Drain @ Robin Ave	17/Jul/2007	Irrigation4	0.011		0.73	Compliant
4	Livingston Drain @ Robin Ave	14/Aug/2007	Irrigation5	0.016		1.07	Out of compliance
4	Livingston Drain @ Robin Ave	24/Jan/2008	Storm1	0.02	0.078	2.11	Out of compliance

Zone	Station Name	Sample Date	Grouping	Chlorpyrifos	Diazinon	Load	Load Compliance
4	Livingston Drain @ Robin Ave	26/Feb/2008	Storm2		0.068	0.68	Compliant
4	Livingston Drain @ Robin Ave	17/Jun/2008	Irrigation3	0.015		1.00	Compliant
4	Livingston Drain @ Robin Ave	22/Jul/2008	Irrigation4	0.025		1.67	Out of compliance
4	Livingston Drain @ Robin Ave	23/Sep/2008	Irrigation6	0.0051		0.34	Compliant
4	Merced River @ Santa Fe	12/Jul/2006	Irrigation3	0.011		0.73	Compliant
4	Merced River @ Santa Fe	17/Jul/2007	Irrigation4	0.018		1.20	Out of compliance
4	Merced River @ Santa Fe	24/Jan/2008	Storm1	0.59	0.01	39.43	Out of compliance
4	Merced River @ Santa Fe	26/Feb/2008	Storm2	0.011		0.73	Compliant
4	Merced River @ Santa Fe	11/Nov/2008	Fall2	0.1		6.67	Out of compliance
4	Merced River @ Santa Fe	20/Jan/2009	Winter1		0.018	0.18	Compliant
4	Merced River @ Santa Fe	07/Feb/2009	Storm1		0.0086	0.09	Compliant
4	Silva Drain @ Meadow Dr	13/Jul/2006	Irrigation3	0.015		1.00	Compliant
4	Silva Drain @ Meadow Dr	09/Aug/2006	Irrigation4	0.14		9.33	Out of compliance
4	Silva Drain @ Meadow Dr	13/Sep/2006	Irrigation5	0.013		0.87	Compliant
4	Silva Drain @ Meadow Dr	17/Jul/2007	Irrigation4	0.031		2.07	Out of compliance
4	Silva Drain @ Meadow Dr	31/Jul/2007	Irrigation4, MPM	0.006		0.40	Compliant
4	Silva Drain @ Meadow Dr	28/Aug/2007	Irrigation5, MPM	0.055		3.67	Out of compliance
4	Silva Drain @ Meadow Dr	22/Apr/2008	Irrigation1		0.0086	0.09	Compliant
4	Silva Drain @ Meadow Dr	22/Jul/2008	Irrigation4	0.43		28.67	Out of compliance
4	Silva Drain @ Meadow Dr	05/Aug/2008	Irrigation5, MPM	0.021		1.40	Out of compliance
4	Silva Drain @ Meadow Dr	19/Aug/2008	Irrigation5	0.023		1.53	Out of compliance
4	Silva Drain @ Meadow Dr	23/Sep/2008	Irrigation6	0.0051		0.34	Compliant
4	South Slough @ Quinley Rd	24/Jul/2007	Irrigation4	0.006		0.40	Compliant
4	South Slough @ Quinley Rd	29/Jul/2008	Irrigation4	0.029		1.93	Out of compliance
5	Deadman Creek (Dutchman) @ Gurr Rd	08/Aug/2006	Irrigation4	0.014		0.93	Compliant
5	Deadman Creek (Dutchman) @ Gurr Rd	12/Sep/2006	Irrigation5	0.027		1.80	Out of compliance
5	Deadman Creek (Dutchman) @ Gurr Rd	24/Jul/2007	Irrigation4	0.005		0.33	Compliant
5	Deadman Creek (Dutchman) @ Gurr Rd	25/Feb/2008	Storm2	0.0037		0.25	Compliant
5	Deadman Creek (Dutchman) @ Gurr Rd	29/Jul/2008	Irrigation4	0.0067		0.45	Compliant
5	Deadman Creek @ Hwy 59	12/Sep/2006	Irrigation5	0.059		3.93	Out of compliance
5	Deadman Creek @ Hwy 59	21/Aug/2007	Irrigation5	0.038		2.53	Out of compliance
5	Deadman Creek @ Hwy 59	25/Jan/2008	Storm1	0.012	0.021	1.01	Out of compliance

Zone	Station Name	Sample Date	Grouping	Chlorpyrifos	Diazinon	Load	Load Compliance
5	Deadman Creek @ Hwy 59	05/Aug/2008	Irrigation5, MPM	0.14		9.33	Out of compliance
5	Deadman Creek @ Hwy 59	26/Aug/2008	Irrigation5	0.015		1.00	Compliant
5	Deadman Creek @ Hwy 59	09/Sep/2008	Irrigation6, MPM	0.069		4.60	Out of compliance
5	Deadman Creek @ Hwy 59	30/Sep/2008	Irrigation6	0.015		1.00	Compliant
5	Duck Slough @ Gurr Rd	29/Sep/2004	Irrigation6		0.02	0.20	Compliant
5	Duck Slough @ Gurr Rd	08/Aug/2006	Irrigation4	0.014		0.93	Compliant
5	Duck Slough @ Gurr Rd	24/Jul/2007	Irrigation4	0.007		0.47	Compliant
5	Duck Slough @ Gurr Rd	31/Jul/2007	Irrigation4, MPM	0.007		0.47	Compliant
5	Duck Slough @ Gurr Rd	18/Sep/2007	Irrigation6	0.009		0.60	Compliant
5	Duck Slough @ Gurr Rd	25/Feb/2008	Storm2	0.0062		0.41	Compliant
5	Duck Slough @ Gurr Rd	29/Jul/2008	Irrigation4	0.011		0.73	Compliant
5	Duck Slough @ Hwy 99	12/Jul/2005	Irrigation3	0.026		1.73	Out of compliance
5	Duck Slough @ Hwy 99	17/May/2006	Irrigation1	0.27		18.00	Out of compliance
5	Duck Slough @ Hwy 99	24/Jul/2007	Irrigation4	0.011		0.73	Compliant
5	Duck Slough @ Hwy 99	31/Jul/2007	Irrigation4, MPM	0.042		2.80	Out of compliance
5	Duck Slough @ Hwy 99	25/Feb/2008	Storm2	0.0035		0.23	Compliant
5	Duck Slough @ Hwy 99	29/Jul/2008	Irrigation4	0.0067		0.45	Compliant
5	Duck Slough @ Hwy 99	30/Sep/2008	Irrigation6	0.034		2.27	Out of compliance
5	Duck Slough @ Whealan Rd	29/Jul/2008	Irrigation4, MPM	0.0081		0.54	Compliant
5	Miles Creek @ Reilly Rd	24/Jul/2007	Irrigation4	0.01		0.67	Compliant
5	Miles Creek @ Reilly Rd	18/Sep/2007	Irrigation6	0.03		2.00	Out of compliance
5	Miles Creek @ Reilly Rd	25/Jan/2008	Storm1		0.019	0.19	Compliant
5	Miles Creek @ Reilly Rd	25/Feb/2008	Storm2	0.0053		0.35	Compliant
5	Miles Creek @ Reilly Rd	29/Jul/2008	Irrigation4	0.021		1.40	Out of compliance
5	Miles Creek @ Reilly Rd	26/Aug/2008	Irrigation5	0.042		2.80	Out of compliance
5	Duck Slough @ Gurr Rd	20/Jan/2009	Winter1	0.012	0.033	1.13	Out of compliance
5	Miles Creek @ Reilly Rd	21/Jul/2009	Irrigation4, MPM	0.028		1.87	Out of compliance
6	Ash Slough @ Ave 21	12/Jul/2005	Irrigation3	0.018		1.20	Out of compliance
6	Ash Slough @ Ave 21	16/Aug/2005	Irrigation4	0.046		3.07	Out of compliance
6	Ash Slough @ Ave 21	28/Feb/2006	Storm1	0.016		1.07	Out of compliance
6	Ash Slough @ Ave 21	15/Mar/2006	Storm2	0.029		1.93	Out of compliance
6	Berenda Slough along Ave 18 1/2	11/Jul/2006	Irrigation3	0.043		2.87	Out of compliance

Zone	Station Name	Sample Date	Grouping	Chlorpyrifos	Diazinon	Load	Load Compliance
6	Berenda Slough along Ave 18 1/2	12/Sep/2006	Irrigation5	0.14		9.33	Out of compliance
6	Berenda Slough along Ave 18 1/2	24/Jul/2007	Irrigation4	0.028		1.87	Out of compliance
6	Cottonwood Creek @ Rd 20	12/Jul/2005	Irrigation3	0.012		0.80	Compliant
6	Cottonwood Creek @ Rd 20	28/Feb/2006	Storm1		0.02	0.20	Compliant
6	Cottonwood Creek @ Rd 20	15/Mar/2006	Storm2	0.011		0.73	Compliant
6	Cottonwood Creek @ Rd 20	11/Jul/2006	Irrigation3	0.014		0.93	Compliant
6	Cottonwood Creek @ Rd 20	24/Jul/2007	Irrigation4	0.007		0.47	Compliant
6	Cottonwood Creek @ Rd 20	21/Aug/2007	Irrigation5	0.011		0.73	Compliant
6	Cottonwood Creek @ Rd 20	25/Jan/2008	Storm1	0.019	0.06	1.87	Out of compliance
6	Cottonwood Creek @ Rd 20	25/Feb/2008	Storm2	0.036	0.24	4.80	Out of compliance
6	Dry Creek @ Rd 18	11/Jul/2006	Irrigation3	0.077		5.13	Out of compliance
6	Dry Creek @ Rd 18	11/Feb/2007	Storm1	0.014	0.13	2.23	Out of compliance
6	Dry Creek @ Rd 18	24/Apr/2007	Irrigation1	0.017		1.13	Out of compliance
6	Dry Creek @ Rd 18	24/Jul/2007	Irrigation4	0.008		0.53	Compliant
6	Dry Creek @ Rd 18	25/Jan/2008	Storm1	0.01	0.049	1.16	Out of compliance
6	Dry Creek @ Rd 18	25/Feb/2008	Storm2	0.034	0.24	4.67	Out of compliance

Table 21. ESJWQC zone load allocation compliance - tally of compliant load calculations for all data collected from 2004 - 2009 and 2009 only.

ESJWQC Zone	Sample Date Year(s)	Compliant	Out of Compliance
Zone 1	2004 -2009	4	11
Zone 2	2004 -2009	7	8
Zone 3	2004 -2009	8	12
Zone 4	2004 -2009	18	19
Zone 5	2004 -2009	20	15
Zone 6	2004 -2009	7	14
Zone 1	2009	1	2
Zone 2	2009	0	1
Zone 3	2009	0	1
Zone 4	2009	2	0
Zone 5	2009	0	2
Zone 6	2009	0	0

Implementation of management practices to reduce off-site movement of diazinon and chlorpyrifos

The report "General Survey Summary Report" submitted by the ESJWQC to the Regional Board on January 30, 2009 assessed management practices utilized by growers within the Coalition region. Based on 2008 membership information, current surveys represent 261,826 acres (3,328 parcels) within the Coalition area (47% of enrolled acreage).

Survey summaries were provided for the following subwatersheds:

1. Ash Slough @ Ave 21
2. Bear Creek @ Kibby Rd
3. Black Rascal Creek @ Yosemite Ave
4. Brenda Slough along Ave 18
5. Cottonwood Creek @ Rd 20
6. Deadman Creek @ Gurr Rd (includes Deadman Creek @ Hwy 59)
7. Deadman Creek @ Hwy 59
8. Dry Creek @ Rd 18
9. Dry Creek @ Wellsford Rd
10. Duck Slough @ Hwy 99
11. Duck Slough @ Gurr Rd (includes Duck Slough @ Hwy 99)
12. Hatch Drain @ Tuolumne Rd
13. Highline Canal @ Hwy 99 (includes Highline Canal @ Lombardy)
14. Highline Canal @ Lombardy

15. Hilmar Drain @ Central Ave
16. Jones Drain @ Oakdale Rd
17. Livingston Drain @ Robin Ave
18. Miles Creek @ Reilly Rd
19. Merced R @ Santa Fe Dr
20. Mustang Creek @ East Ave
21. Prairie Flower Drain @ Crows Landing Rd
22. Silva Drain @ Meadow Dr
23. South Slough @ Quinley Rd
24. Westport Drain @ Vivian Rd

Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing are currently high priority subwatersheds. Members with the potential for direct drainage and past use of chlorpyrifos and/or diazinon were met with on their properties to review downstream water quality results and management practices that can be implemented to reduce agricultural drainage. Completed surveys document current management practices and any additional management practices that growers intend to implement. An assessment of current and newly implemented management practices is included in earlier sections of this report (Summary of Implemented Management Practices and Evaluation of Management Practice Effectiveness).

Current management practices, newly implemented practices and an evaluation of management practice effectiveness will be conducted within subwatersheds as they become high priority (see Table 6 in this report).

Alternatives to diazinon and chlorpyrifos surface water quality impacts

Alternatives to chlorpyrifos and diazinon depend on the commodity and the registration of alternative products. For many commodities, alternative products include pyrethroid pesticides. These are considered “safe” alternatives because of their low mammalian toxicity. However, recent research has demonstrated that they can be very toxic to aquatic organisms at extremely low concentrations. These products have very high K_{oc} values and tend to bind to sediment and can be moved to surface waters during irrigation or rainfall events. The high K_{oc} values make these products difficult to detect in water as they are seldom found in the dissolved phase. During the early years of the ILRP, the Coalition analyzed for pyrethroids with no detections. The Coalition does monitor for sediment toxicity and if there is a toxic sample that meets the threshold for additional analysis, the Coalition is required to analyze the sediment for pyrethroids and chlorpyrifos. To date, no toxic samples have met the threshold and no analyses have been performed. There may be additional products that qualify as organic (e.g. citrus oils) but the Coalition does not track or recommend their use because their efficacy relative to synthetic pesticides is low.

The Coalition collects information on pesticide use and provides this information to the Regional Board as part of the ESJWQC Annual Monitoring Report. In addition, the Coalition address toxicity, pesticides, and sediment bound analytes with specific management practices when conducting outreach and education whether or not there is a TMDL. Growers are made aware that switching pesticides may lead to other water quality concerns.

Toxicity impairment due to additive or synergistic effects of multiple pollutants

Loads were calculated to evaluate the additive effect of chlorpyrifos and diazinon concentrations from 2004 through 2009 (Table 20).

The ESJWQC MRPP discusses additivity and synergistic effects on page 82. Toxicity monitoring will also be conducted at Assessment sample locations which will assist in the evaluation of additive or synergistic effects of multiple pollutants.

Although there were multiple toxicities that occurred in 2009, none were sourced to organophosphates. Of the TIE's initiated, one concluded pyrethroids were the cause of *C. dubia* mortality, one concluded that cationic chemicals and ammonia were the cause of *S. capricornutum* lack of growth, and three concluded that ammonia was the cause of *P. promelas* mortality.

Demonstrate that management practices are achieving the lowest pesticide levels technically and economically achievable

An evaluation of management practices and their effectiveness will be performed on high priority subwatersheds per the ESJWQC Management Plan strategy outlined in Figures 1 and 2.

Salt and Boron TMDL

The Regional Board has at least two programs currently operating to deal with this issue. One is the ongoing project of creating a San Joaquin River at Vernalis Salinity and Boron TMDL Basin Plan Amendment. The other is the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) which was established in July 2008 to facilitate and fund efforts needed for the efficient management of salinity in the Central Valley. The Regional Board and State Water Board have initiated this comprehensive effort to address salinity problems in California's Central Valley and adopt long-term solutions that will lead to improved water quality and economic sustainability.

The Coalition: (1) participates in ongoing Regional Water Board programs for the management of salt and boron, and (2) implements actions required by the Regional Water Board. Coalition representatives attend CV-SALTS meetings and participate in planning and reviewing studies relevant to the development of a Basin Plan amendment for salt and boron (Table 22).

An initial CEQA scoping workshop was held in May 2005 and the San Joaquin River at Vernalis Salinity and Boron Total Maximum Daily Loads (TMDL) Basin Plan Amendment was adopted with EPA approval in October 2006, but there have been new developments in the project since then including a revised geological scope, an increased cooperation between the State and the Regional Boards, and an effort to coordinate with CV-SALTS. On March 30, 2009, a CEQA Scoping Meeting for the Salt and Boron TMDL in the San Joaquin and Sacramento Rivers was held to discuss the Proposed Basin Plan Amendment to establish new salinity and boron water quality objectives in the Lower San Joaquin River upstream of Vernalis and a TMDL to implement the salinity and boron water quality objectives. Currently, the State and Central Valley Water Boards plan to coordinate with the CV-SALTS Technical Advisory Committee. CV-SALTS and the Central Valley Salinity Coalition continue to provide and educate the public through information and resources available on their website, www.cvsalinity.org, and by hosting meetings open to the public to move forward in the management of salt and boron. These meetings included the CV-SALTS Technical Advisory Committee's series of meetings to discuss the Reclamation Draft Compliance Monitoring and Evaluation Plan, the Basin Plan Training for nearly 70 CV-SALTS participants on September 3, 2009, and the Annual Salinity Leadership Group Meeting (formally the Salinity Policy Group) on September 24, 2009 (Table 22).

Table 22. CV-SALTS meetings from 2006 through December 2009. The Coalition began attending meetings in 2009.

Constituent / Organization	Meeting Date	Meeting Title
Boron & Salt / CV-SALTS	30-Nov-06	The Central Valley Salinity Policy Group Meeting
Boron & Salt / CV-SALTS	11-Mar-08	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	30-Oct-08	The Central Valley Salinity Policy Group Meeting
Boron & Salt / CV-SALTS	13-Jan-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	13-Jan-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	2-Feb-09	Emergency Executive Committee Meeting
Boron & Salt / CV-SALTS	5-Feb-09	Salt Sources Work Plan Subcommittee
Boron & Salt / CV-SALTS	18-Feb-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	18-Feb-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	9-Mar-09	Economic and Technical Advisory Sub-Committee Meeting
Boron & Salt / CV-SALTS	18-Mar-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	18-Mar-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	14-Apr-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	17-Apr-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	4-May-09	Coordinating Committee Meeting
Boron & Salt / CV-SALTS	13-May-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	13-May-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	14-May-09	Technical Workshop - Policy Workshop Lessons from Santa Ana
Boron & Salt / CV-SALTS	28-May-09	Staff Workshop to Discuss Technical Reports
Boron & Salt / CV-SALTS	2-Jun-09	Technical Workshop - Salt Nitrate Pilot Study Selection
Boron & Salt / CV-SALTS	17-Jun-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	17-Jun-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	30-Jun-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	14-Jul-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	14-Jul-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	28-Jul-09	Technical Advisory Committee: Reclamation Draft Compliance Monitoring and Evaluation Plan (Meeting 1)
Boron & Salt / CV-SALTS	4-Aug-09	Technical Advisory Committee: Reclamation Draft Compliance Monitoring and Evaluation Plan (Meeting 2)
Boron & Salt / CV-SALTS	17-Aug-09	Technical Advisory Committee: Reclamation Draft Compliance Monitoring and Evaluation Plan (Meeting 3)
Boron & Salt / CV-SALTS	19-Aug-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	19-Aug-09	Executive Committee and Outreach/Education Committee Meeting
Boron & Salt / CV-SALTS	24-Aug-09	Technical Advisory Committee: Reclamation Draft Compliance Monitoring and Evaluation Plan (Meeting 4)
Boron & Salt / CV-SALTS	3-Sep-09	Special Basin Planning Training Meeting
Boron & Salt / CV-SALTS	16-Sep-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	16-Sep-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	24-Sep-09	Salinity Leadership Group Annual Meeting
Boron & Salt / CV-SALTS	28-Sep-09	Workshop - Multi-State Salinity Coalition
Boron & Salt / CV-SALTS	29-Oct-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	29-Oct-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	5-Nov-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	17-Nov-09	Beneficial Use and Objective Scope Meeting
Boron & Salt / CV-SALTS	19-Nov-09	Economic and Technical Advisory Committee Meeting

Constituent / Organization	Meeting Date	Meeting Title
Boron & Salt / CV-SALTS	19-Nov-09	Executive Committee Meeting
Boron & Salt / CV-SALTS	7-Dec-09	Draft Salt and Nitrate Source Pilot Report Presentation
Boron & Salt / CV-SALTS	16-Dec-09	Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	16-Dec-09	Executive Committee Meeting

Dissolved Oxygen

To demonstrate compliance with the Basin Plan and "The Control Program for Factors Contributing to the Dissolved Oxygen (DO) Impairment in the Stockton Deep Water Ship Channel", agriculturally-influenced tributaries to the San Joaquin River are routinely monitored, as described in the Coalition's MRPP and Management Plan. The Coalition is addressing DO exceedances through the Management Prioritization process (ESJWQC Management Plan submitted August 25, 2008). In addition, the Coalition is participating in the DO TMDL Technical Working Group meetings (http://www.sjrdotmdl.org/meetings.html) including two meetings that occurred in 2010. In general, the Coalition will work to comply with the DO Basin Plan load allocations for oxygen demanding substances by December 2011.

The Coalition conducted a special study to determine if Biological Oxygen Demand (BOD) was the cause of low DO in several water bodies. The results of this study were included in: (1) Appendix VIII of the December 30, 2007 Semi Annual Monitoring Report and (2) Site Subwatershed Management Plans (Management Plan submitted on August 25, 2008, Pages 147-342). Future studies will be conducted as required by the Regional Water Board.

SITE SUBWATERSHED MANAGEMENT PLAN UPDATE

Below are brief descriptions of all site subwatersheds (both high and low priority subwatersheds) within the ESJWQC Management Plan as of April 1, 2010. Further analysis of high priority site subwatersheds (2008 -2010 and 2010 – 2012) is included in Appendix I.

Ash Slough @ Ave 21

As an assessment site, Ash Slough @ Ave 21 is scheduled to be sampled once per month in 2010 for all constituents. In both 2007 and 2008, Ash Slough was scheduled for additional monitoring of chlorpyrifos (2 additional samples each year) and for copper (5 additional samples each year); however the site was dry at every visit after September 12, 2006 except for May 19, 2009. Chlorpyrifos and copper were analyzed as part of normal Assessment Monitoring in 2009 and will be analyzed for as part of normal Assessment Monitoring in 2010.

Bear Creek @ Kibby Rd

Bear Creek @ Kibby Rd is scheduled to be an assessment site in 2025 and 2026 and became a high priority site subwatershed in 2010. Water quality data from this location includes two exceedances of the chlorpyrifos WQTL (one in 2006 and one in 2007), four exceedances of the copper WQTL (one in 2007 and three in 2008), three samples toxic to *Ceriodaphnia dubia* (one in 2005, 2006, and 2007), toxicity to *Selenastrum capricornutum* and *Hyalella azteca* in 2008 (both toxicities were persistent a week later). Toxicity to *C. dubia* and chlorpyrifos WQTL will be monitored during May and July 2010, and only copper will be monitored in August 2010and January/February 2011.

Berenda Slough along Ave 18 ½

Berenda Slough along Ave 18 ½ will be an assessment site in 2011 and 2012. Water quality impairments include toxicity to *S. capricornutum* (a single event which was persistent a week later), three exceedances of the chlorpyrifos WQTL, and toxicity to *C. dubia*. In 2008, upstream MPM was conducted for *S. capricornutum* and chlorpyrifos resulting in no exceedances or toxicity. However, it should be noted that this location was dry for all events except for one. With no new exceedances recorded in 2008, no MPM was scheduled for 2009/2010. All constituents will be sampled at this location starting 2011.

Black Rascal Creek @ Yosemite Rd

Black Rascal Creek @ Yosemite Rd is scheduled to be an assessment site in 2027 and 2028. Water and sediment quality data include toxicity to *C. dubia* in 2007 including two months in which toxicity was persistent one week later, four exceedances of the chlorpyrifos WQTL (three in 2007 and one in 2006), single toxicities to *S. capricornutum* and *H. azteca* in 2008, one exceedance of the copper WQTL in 2008, and two exceedances of the lead WQTL in 2008. The chlorpyrifos exceedance (associated with *C. dubia* toxicity) in 2007 was believed to be an isolated incident and appears to have been resolved after contacting the grower and discussing management practices and downstream water quality issues. For 2008, in addition to normal monitoring, four samples were collected for chlorpyrifos analysis and three samples were collected for analysis of toxicity to *C. dubia* during months of past exceedances however no additional exceedances/toxicity occurred. Black Rascal Creek will become a high priority site subwatershed in 2012; MPM monitoring will be conducted in 2012 and 2013.

Cottonwood Creek @ Rd 20

As a core site, Cottonwood Creek @ Rd 20 is monitored for a limited suite of constituents each month (see the ESJWQC MRPP for a list of core monitoring constituents). In addition to the core monitoring constituents; the Coalition monitors for *Pimephales promelas*, *S. capricornutum* and *H. azteca* toxicity due to a toxicity result from one of these species in the past. Exceedances of the copper WQTL (based on total copper) occurred in 12 samples since 2006 (four in 2008) and two exceedances of the chlorpyrifos WQTL occurred in 2008. Additional MPM was conducted three times in 2007 and in 2008 five copper samples were collected upstream at Hwy 145 in an attempt to further identify copper sources. One of upstream samples contained an exceedance level of copper, but no corresponding amount was detected at the downstream locations (Cottonwood Creek @ Rd 20). During 2008, the Rd 20 site recorded an additional exceedance of the copper WQTL that was not detected at the upstream site on Hwy 145. Based on the additional and upstream MPM it has been determined that copper is a problem throughout the entire Cottonwood Creek subwatershed and is not specific to a few months. Therefore, additional sampling was not necessary to further identify sources. Cottonwood Creek was monitored as a Core Monitoring location in 2009 and MPM will occur during 2010 and 2011. MPM for chlorpyrifos, copper, diuron and diazinon will occur in February 2010; copper will be monitored from April through September in 2010. Cottonwood Creek @ Rd 20 will be monitored monthly for all assessment constituents in 2011 and 2012 based on the MRPP rotation schedule.

Deadman Creek @ Gurr Rd

As an assessment site, Deadman Creek @ Gurr Rd was sampled once per month in 2009 and 2010 for all constituents. Deadman Creek @ Gurr Rd was monitored under the ESJWQC Management Plan in 2008 for copper (two additional samples) and *P. promelas* (two additional samples). The 2008 monitoring schedule was based on four exceedances of the copper WQTL between 2007 and 2008 and two samples testing toxic to *P. promelas*, one in 2006 and the second in 2007. In early 2008, a second sample was toxic to *S. capricornutum*, and in 2006 a single exceedance of the chlorpyrifos WQTL was recorded. Since all Management Plan constituents are monitored monthly at this site (see Table 13 in the MRPP) the Coalition did not conduct any additional MPM in 2009. This site will become a high priority subwatershed in 2012 and MPM will be conducted at that time.

Deadman Creek @ Hwy 59

Deadman Creek @ Hwy 59 will be an assessment site in 2011 and 2012. Toxicity to *S. capricornutum* occurred twice in 2008, as well as a resample indicating that the toxicity was persistent one week later. In 2008, additional MPM for chlorpyrifos occurred and both samples contained exceedance levels of chlorpyrifos. As a result of these past exceedances, during the irrigation season of 2009 samples were to be collected for *S. capricornutum* toxicity and chlorpyrifos, however, the site was dry during all MPM sampling events. Deadman Creek @ Hwy 59 will become a high priority site subwatershed in 2012 and MPM will be conducted at that time.

Dry Creek @ Road 18

Dry Creek @ Rd 18 will be an assessment site in 2013 and 2014. In 2007 and 2008 extensive MPM was conducted to address persistent exceedances of the copper WQTL, including five additional samples in 2007 and eight upstream samples in 2008. In 2008, upstream MPM was also conducted for chlorpyrifos; no exceedances occurred during the irrigation season of 2008. Copper persists at a generally stable concentration in the water and exceedances of the WQTL (total copper) have been recorded at every visit where metals were analyzed, both at the Rd 18 site and at upstream sites (21 exceedances at Rd 18, six at Rd 22, and one at Rd 28 ½). Dry Creek @ Rd 18 becomes a high priority site subwatershed in 2011 and MPM will be conducted at that time.

Duck Slough @ Gurr Rd

Duck Slough @ Gurr Rd is a core site and therefore a limited suite of constituents are monitored for monthly. As per Table 13 in the MRPP several additional constituents are monitored including organophosphates and metals. Additional MPM conducted in 2007 for chlorpyrifos, thiobencarb, and copper; only copper was detected above the WQTL in 2007. In 2007 a second sample was toxic to *S. capricornutum* and therefore upstream MPM was conducted in 2008 for copper and *S. capricornutum* toxicity. There were no exceedances of the copper WQTL and samples collected for *S. capricornutum* were non toxic in 2008. Duck Slough was monitored for organophosphates (chlorpyrifos), carbamates and metals (total and dissolved) every month in 2009 due to past single exceedances as explained in the ESJWQC MRPP. Exceedances in 2009 consisted of: pH, SC, *E. coli*, nitrate + nitrite, and dissolved copper. Duck Slough is scheduled for MPM (second high priority site subwatershed 2010-2012) during 2010 for chlorpyrifos, copper, *S. capricornutum* toxicity, and *H. azteca* sediment toxicity.

Hatch Drain @ Tuolumne Rd

Hatch Drain @ Tuolumne Rd will be an assessment site in 2025 and 2026. It was a new site in 2007 and in 2008 six samples were toxic to *S. capricornutum*. In 2007 and 2008 three samples were toxic to *H. azteca*. The Coalition will monitor for toxicity to *S. capricornutum* in 2010 to determine if *S. capricornutum* toxicity continues to be a problem within this subwatershed. *H. azteca* toxicity is not a high priority constituent under the ESJWQC Management Plan. MPM will be conducted in 2013 and 2014 when this site become a high priority site subwatershed.

Highline Canal @ Hwy 99

Highline Canal @ Hwy 99 is a core site and therefore limited constituents are monitored until this site undergoes assessment monitoring. In 2007 additional MPM was conducted for toxicity to *C. dubia*; no toxicity to *C. dubia* occurred in 2007. In 2008, no upstream MPM was conducted since Highline Canal @ Lombardy Rd (upstream of Hwy 99) was also sampled during the same events. However, due to additional exceedances in 2007, additional MPM was conducted again in 2008 for copper and chlorpyrifos and for toxicity to *C. dubia*; exceedances of WQTLs occurred in 2008 for chlorpyrifos and copper. In addition, three samples collected in 2008 caused toxicity to *S. capricornutum*. Therefore; monitoring at Highline Canal @ Hwy 99 in 2009 included *S. capricornutum* (April and May) and chlorpyrifos (July) during months of past exceedances. The MPM samples collected for chlorpyrifos in July 2009 resulted in an exceedance of the WQTL. Highline Canal @ Hwy 99 is a high priority site subwatershed starting 2010 and is scheduled for MPM in 2010 for copper, chlorpyrifos, diuron and toxicity to *S. capricornutum*. As with the Lombardy Rd site upstream of Hwy 99, water quality in the Highline Canal continues to be an issue since inputs to the canal are not well documented and may include groundwater seeping through the sandy bed of the canal.

Highline Canal @ Lombardy Rd

Highline Canal @ Lombardy Rd will be an assessment site in 2011 and 2012. This location is currently under a management plan for toxicity to *S. capricornutum* and *C. dubia* and exceedances of the chlorpyrifos and copper WQTLs. Additional MPM was conducted in 2007 for toxicity to *C. dubia* and *S. capricornutum*; no samples were toxic. As a result of additional exceedances, additional MPM was conducted for chlorpyrifos and copper in 2008 as well as *C. dubia* and *S. capricornutum*; exceedances of the WQTLs occurred in 2008 for chlorpyrifos and copper and there was toxicity to *C. dubia*. During the irrigation season of 2009 and the storm season of 2010, Highline Canal @ Lombardy Rd was monitored for toxicity to *S. capricornutum* and *C. dubia*, copper and chlorpyrifos. Due to a typo, the monitoring schedule included in the Management Plan update (April 1, 2009) did not include chlorpyrifos MPM in July and August; however both of these months included monitoring for chlorpyrifos. Samples collected from 2009 MPM events resulted in no exceedances. All constituents will be monitored for monthly in 2011 and 2012. This site will become high priority in 2013 and MPM will be scheduled for 2013 and 2014. As with the Hwy 99 site downstream of Lombardy Rd, water quality in the Highline Canal continues to be an issue since inputs to the canal are not well documented and may include groundwater seeping in through the sandy bed of the canal.

Hilmar Drain @ Central Ave

Hilmar Drain @ Central Ave is scheduled to become an assessment site in 2021 and 2022. Monitoring at this location resulted in five samples that were toxic to *S. capricornutum* (three in 2008) including several that were persistent, three exceedances of the diuron WQTL including one in 2008, two exceedances of the copper WQTL (one in 2007 and one in 2006) as well as a single exceedance of the chlorpyrifos WQTL and toxicity to *C. dubia* in 2006 and 2005, respectively. This site was not under a management plan until 2008. Additional MPM for diuron was conducted in 2008; there was a single exceedance of the diuron WQTL in 2008. Upstream MPM was conducted to further identify sources of nitrate, ammonia, copper and the cause(s) of toxicity to algae. This subwatershed has dairies upstream and the Coalition attempted to use water quality monitoring during July 2008 to assess whether dairies were an issue. Exceedances of the ammonia and copper WQTLs did not occur again in 2008 however exceedances of the nitrate WQTL occurred at the Hilmar Drain @ Central Ave site (three exceedances) and at the upstream Mitchell Ave site (one exceedance). The Coalition determined that extra sampling conducted in 2008 aided in determining sources of water quality problems and will focus on outreach efforts to encourage growers to implement new management practices. To assess overall water quality, the Coalition monitored for toxicity to *S. capricornutum* during months of past exceedances in 2009. All samples collected were found to be non toxic. Hilmar Drain @ Central Ave has been re-prioritized and will become a high priority subwatershed in 2012; MPM monitoring will be conducted in 2012 and 2013.

Howard Lateral @ Hwy 140

This site was added to the Coalition's MRPP in October 2008 and was first monitored as an assessment site in 2009. As of April 1, 2010, Howard Lateral @ Hwy 140 requires a management plan for pH, SC, TDS and *E. coli.* Howard Lateral will continue to be monitored as an assessment site monthly in 2010 for all constituents.

Lateral 2 1/2 near Keyes Rd

This site was added to the Coalition's MRPP in October 2008 and was first monitored as an assessment site in 2009. As of April 1, 2010, Lateral 2 ½ near Keyes Rd requires a management plan for pH and chlorpyrifos. Lateral 2 ½ near Keyes Rd will continue to be monitored as an assessment site monthly in 2010 for all constituents.

Livingston Drain @ Robin Ave

Livingston Drain @ Robin Ave will be monitored as an assessment site in 2023 and 2024. Additional MPM occurred at Livingston Drain @ Robin Ave in 2008 during its first year under a management plan for copper; five exceedances of the copper WQTL occurred in 2008. In addition to copper; water samples collected from Livingston Drain in 2008 contained exceedance levels of chlorpyrifos, lead and three samples caused toxicity to *S. capricornutum*. Livingston Drain @ Robin Ave will become a high priority site subwatershed in 2011 and MPM will occur in 2011 and 2012.

Merced River @ Santa Fe Dr

Merced River @ Santa Fe Dr is a Core Monitoring location and will rotate into assessment monitoring in 2011. The high load associated with one of the three prior exceedances of the chlorpyrifos WQTL and the concomitant toxicity to *C. dubia* (the third since 2004) initiated an effort to source the chlorpyrifos including a review of pesticide use reports and meetings with growers in the subwatershed. Based on information gained from these efforts, the Coalition decided to collect upstream samples in 2009 during months of past chlorpyrifos exceedances in the Merced River; the Coalition also collected samples for chlorpyrifos at the downstream location during the same events. It is believed that chlorpyrifos is entering the Merced River via Dry Creek several miles upstream. Since toxicity to *C. dubia* was associated with chlorpyrifos in the water column, the Coalition is focusing its efforts in further identifying the sources of the chlorpyrifos which will aid in future outreach within this large subwatershed. In 2009, there were no exceedances of the chlorpyrifos WQTL in the Merced River during MPM in November and December. Dry Creek @ Oakdale was dry during both of those months. MPM was also conducted in January 2010 for both Merced River and Dry Creek @ Oakdale and there were no detections of chlorpyrifos in samples from either subwatershed. Merced River becomes a high priority subwatershed in 2013; MPM will be conducted at that time.

Miles Creek @ Reilly Rd

Miles Creek @ Reilly Rd is scheduled to be an assessment site in 2015 and 2016. Miles Creek @ Reilly Rd was a new site in May 2007 and required a management plan as of 2009. In 2008, toxicity occurred for the second time to *S. capricornutum* and *C. dubia* and exceedances of WQTLs occurred twice for chlorpyrifos and four times for copper. During the irrigation season of 2009 and the storm season of 2010, Miles Creek was monitored for *S. capricornutum*, *C. dubia*, copper, and chlorpyrifos. July 2009 MPM for chlorpyrifos resulted in an exceedance of the WQTL. Miles Creek will become a high priority site subwatershed in 2013; MPM will be conducted in 2013 and 2014 followed by Assessment Monitoring in 2015 and 2016.

***Mootz Drain @ Langworth Rd /* Mootz Drain downstream of Langworth Pond**

Mootz Drain @ Langworth Rd was first sampled in January 2009 as an Assessment Monitoring location. The Coalition received approval to move this location downstream of the pond where the original site was located. Starting in December 2009, Mootz Drain downstream of Langworth Pond replace Mootz Drain @ Langworth Rd and better characterizes discharges from upstream agriculture since the pond upstream can act as a sediment pond and retain both water and sediment when water flows are low or nonexistent. The Mootz Drain subwatershed requires a management plan for DO, *E. coli*, and chlorpyrifos. The Coalition will continue to monitor Mootz Drain downstream of Langworth Pond for all Assessment Monitoring constituents in 2010. This subwatershed will become a high priority subwatershed in 2015 and MPM will be conducted at that time.

Mustang Creek @ East Ave

Mustang Creek @ East Ave was monitored for all Assessment Monitoring constituents in 2009 and will be monitored for all constituents in 2010. Mustang Creek requires a management plan for DO, SC/TDS, nitrate, copper, chlorpyrifos, DDE, simazine and thiobencarb. Although there have been two samples toxic to *C. dubia,* a management plan is not required since the exceedance occurred as part of the same event (original sample and resample one week later to test for persistence). During 2009 monitoring, exceedances of DO, SC, TDS, nitrate + nitrite, ammonia, *E. coli*, copper and DDE were experienced. There were no toxic samples in 2009 and no exceedances of the chlorpyrifos or simazine WQTLs. Mustang Creek will become a high priority subwatershed in 2014 and MPM will be conducted at that time.

Silva Drain @ Meadow Dr

Silva Drain is an assessment site scheduled for monitoring in 2029. Silva Drain requires a management plan for *C. dubia,* copper, and chlorpyrifos. Additional MPM was conducted for chlorpyrifos in 2007 and 2008 during months of past exceedances; since Silva Drain is such a small subwatershed upstream sampling was not conducted. Silva Drain will become a high priority site subwatershed in 2014 and MPM will be conducted in 2014 and 2015.

Westport Drain @ Vivian Rd

Westport Drain @ Vivian Rd will be an assessment site in 2027 and 2028. It was a new site in 2007 and monitoring in 2007 and 2008 resulted in a single exceedance of the chlorpyrifos WQTL and a single *S. capricornutum* toxicity. In 2008 another exceedance of the chlorpyrifos WQTL occurred and two more samples were toxic to *S. capricornutum*. A single sediment sample was toxic to *H. azteca*. Westport Drain will become a high priority site subwatershed in 2014 and MPM will be conducted in 2014 and 2015.

Appendix I

High Priority Site Subwatershed Analysis

(2008-2010 and 2010-2012)

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I. DRY CREEK @ WELLSFORD RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper
- Diuron

Priority D

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

Priority E

- Dissolved Oxygen
- *E. coli*
- pH
- Specific Conductance

Description of Dry Creek at Wellsford Rd Site Subwatershed

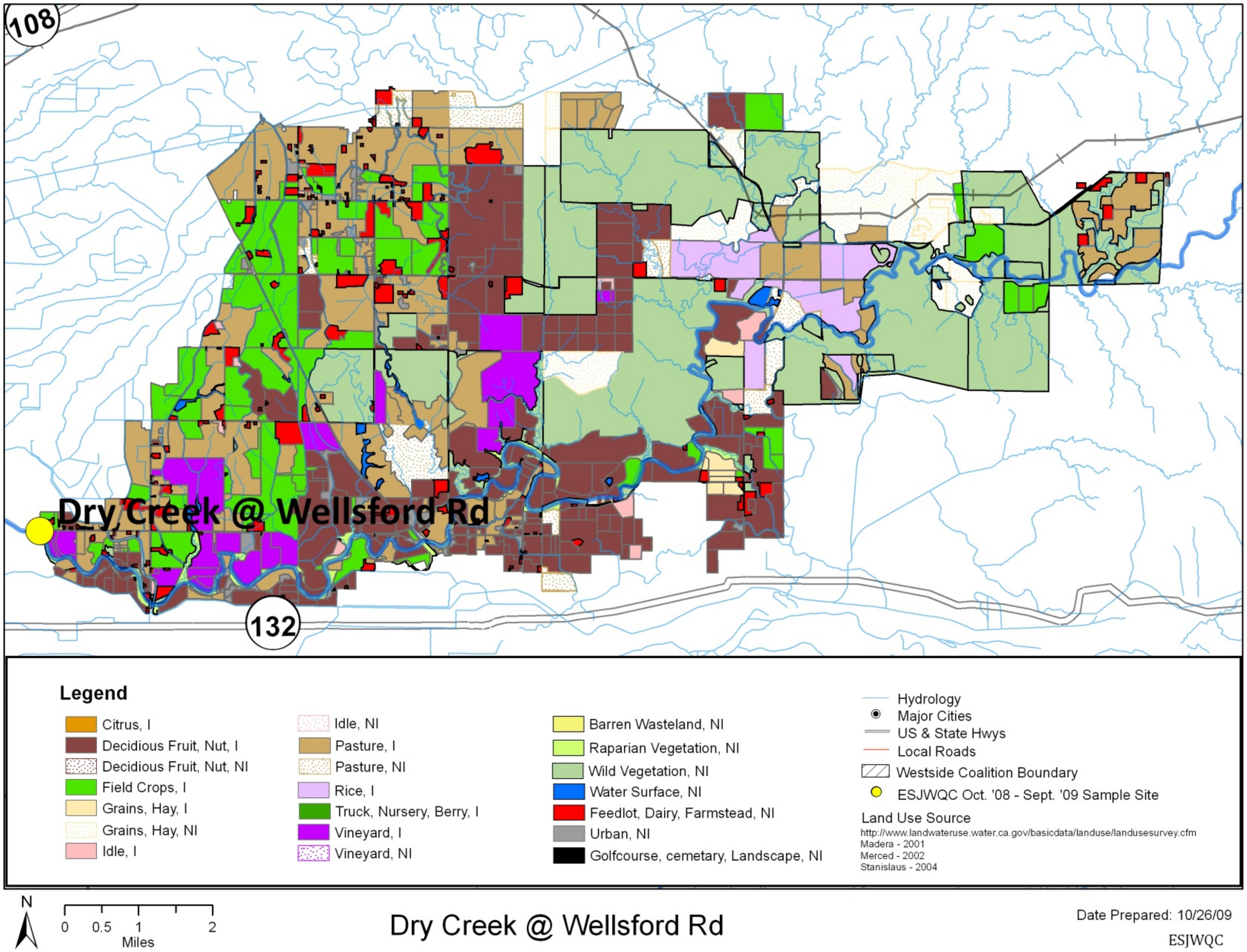
Dry Creek @ Wellsford Road (23,331 irrigated acres) – This site subwatershed is in the northern part of the Coalition region and drains a combination of field crops, deciduous nuts, and vineyards (Figure I-1). Dry Creek originates to the east of Modesto and drains into the Tuolumne River. This site subwatershed samples Dry Creek at the furthest downstream location that collects agricultural drainage prior to flowing through the urban areas of Modesto. Dairies are located upstream of this site and the town of Waterford may contribute an urban signal. This site subwatershed includes an upstream location (Dry Creek @ Waterford Rd) which was sampled in 2008 and 2009. Table I-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

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

Station Name	Station Code	Target Latitude	Target Longitude
Dry Creek @ Waterford[U] Rd	535XDCAWF	37.65876	-120.77887
Dry Creek @ Wellsford Rd*	535XDCAWR	37.6602	-120.8743

*Original ESJWQC sampling site
[U]Upstream sites

Figure I-1. Site subwatershed map of land use for the Dry Creek @ Wellsford Rd sample site.



Subwatershed Monitoring History

Monitoring within the Dry Creek site subwatershed at Dry Creek @ Wellsford Rd was initiated in 2005 and has continued uninterrupted through 2009 (Table I-2). Dry Creek @ Wellsford Rd will remain a Core Monitoring location under the current MRPP through 2010. In 2011 this site will be monitored as an Assessment site. The constituents sampled at this location from 2005-2009 are listed in Table I-3. A summary and discussion of exceedances are provided in the next section (Table I-7).

Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and has included both additional sampling at Dry Creek @ Wellsford Road and upstream monitoring at Dry Creek @ Waterford Rd for chlorpyrifos and toxicity to *Ceriodaphnia* (Table I-4, Table I-5, Table I-6).

Dry Creek is considered an impaired water body and is included on the proposed 2008 Central Valley Basin Plan 303d list for chlorpyrifos, diazinon, *E. coli*, and unknown toxicity. Agriculture is listed as the potential source for the impairment caused by chlorpyrifos and diazinon.

Table I-2. Dry Creek @ Wellsford Rd sampling events per season and year.

	2004	2005		2006		2007		2008			2009			
	Irrigation	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Fall**	**Winter**	**Storm**	**Irrigation**	**Fall**
Events Sampled	NA	2	5	2	5	2	6	3	6	2	2	2	6	3
Events Not Sampled	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	NA	2	5	2	5	2	6	3	6	2	2	0	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 Dry Creek @ Wellsford 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			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm	Winter	Irrigation	Fall
Field and Physical Parameters														
EPA 110.2	Color	2	5	2	5	2	6	2	6					
EPA 160.1	Dissolved Solids	2	5	2	5	2	6	3	6	2	2	2	6	2
EPA 160.2	Suspended Solids							1		2	2	2	6	2
EPA 180.1	Turbidity	2	5	2	5	2	6	3	6	2	2	2	6	2
EPA 405.1	BOD				1	2	2							
EPA 415.1	Total Organic Carbon	2	5	2	5	2	6	3	6	2	2	2	6	2
SM 9223	E. coli	2	5	2	5	2	6	3	6	2	2	2	6	2
NA	Dissolved Oxygen	2	5	3	5	3	10	7	8	2	2	2	6	2
NA	Specific Conductivity	2	5	3	5	3	10	7	8	2	2	2	6	2
NA	pH	2	5	3	5	3	10	7	8	2	2	2	6	2
Carbamates														
EPA 8321A	Aldicarb				5	2	6	2	6					
EPA 8321A	Carbaryl				5	2	6	2	6					
EPA 8321A	Carbofuran				5	2	6	2	6					
EPA 8321A	Diuron				5	2	6	2	6					
EPA 8321A	Linuron				5	2	6	2	6					
EPA 8321A	Methiocarb				5	2	6	2	6					
EPA 8321A	Methomyl				5	2	6	2	6					
EPA 8321A	Oxamyl				5	2	6	2	6					
Organochlorines														
EPA 8081A	DDD(p,p')				5	2	6	2	6					
EPA 8081A	DDE(p,p')				5	2	6	2	6					
EPA 8081A	DDT(p,p')				5	2	6	2	6					
EPA 8081A	Dicofol				5	2	6	2	6					

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm	Winter	Irrigation	Fall
EPA 8081A	Dieldrin				5	2	6	2	6					
EPA 8081A	Endrin				5	2	6	2	6					
EPA 8081A	Methoxychlor				5	2	6	2	6					
Organophosphates														
EPA 8141A	Azinphos methyl				5	2	7	2	6					
EPA 8141A	Chlorpyrifos	2	5	2	5	2	8	2	6				2	
EPA 8141A	Diazinon	2	5	2	5	2	7	2	6					
EPA 8141A	Dimethoate	2	5	2	5	2	7	2	6					
EPA 8141A	Disulfoton				5	2	7	2	6					
EPA 8141A	Malathion				5	2	7	2	6					
EPA 8141A	Methamidophos				5	2	6	2	6					
EPA 8141A	Methidathion				5	2	7	2	6					
EPA 8141A	Molinate				5	2	7	2	6					
EPA 8141A	Parathion, Methyl				5	2	7	2	6					
EPA 8141A	Phorate				5	2	7	2	6					
EPA 8141A	Phosmet				5	2	7	2	6					
EPA 8141A	Thiobencarb				5	2	7	2	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	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	2	6					
EPA 549.2M	Paraquat dichloride				5	2	6	2	6					

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm	Winter	Irrigation	Fall
EPA 619	Atrazine				5	2	6	2	6					
EPA 619	Cyanazine				5	2	6	2	6					
EPA 619	Simazine				5	2	6	2	6					
Metals (Total)														
EPA 200.8	Arsenic				5	2	6	2	6					
EPA 200.8	Boron				5	2	6	2	6					
EPA 200.8	Cadmium				5	2	6	2	6					
EPA 200.8	Copper				5	2	6	2	6					
EPA 200.8	Lead				5	2	6	2	6		1			
EPA 200.8	Nickel				5	2	6	2	6					
EPA 200.8	Selenium				5	2	2	2	6					
EPA 200.8	Zinc				5	2	6	2	6					
Metals (Dissolved)														
EPA 200.8	Cadmium													
EPA 200.8	Copper													
EPA 200.8	Lead										1			
EPA 200.8	Nickel													
EPA 200.8	Zinc													
Nutrients														
SM 2340 C	Hardness as CaCO3				5	2	6	2	6		1			
EPA 300.0	Nitrate as N				5	2	6	2	6					
EPA 350.2	Ammonia as N				5	2	6	3	6	2	2	2	6	2
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	3	6	2	1	2	1	
EPA 354.1	Nitrite as N				5	2	6	2	6					
EPA 353.2	Nitrate + Nitrite as N							1		2	2	2	6	2
EPA 365.2	Orthophosphate as P				5	2	6	3	6	2	1	3	1	
EPA 365.2	Phosphate as P				5	2	6	3	6	2	2	2	6	2
Toxicity														

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm	Winter	Irrigation	Fall
EPA 821-02-012	Ceriodaphnia dubia	2	5	2	6	2	7	2	6					
EPA 821-02-012	Pimephales promelas	2	5	2	5	2	6	2	6					
EPA 821-02-013	Selenastrum capricornutum	2	5	2	5	2	6	4	6					
EPA 600/R-99-064	Hyalella azteca		1	1	1	1	1	2	2					

NA - Not applicable

Table I-4. Dry Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and *Ceriodaphnia dubia*. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	*Ceriodaphnia dubia*
Dry Creek @ Wellsford Rd	31-Jul-07	A	**X**	
Dry Creek @ Wellsford Rd	28-Aug-07	A	**X**	
Dry Creek @ Wellsford Rd	25-Sep-07	A		**X**

Table I-5. Dry Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos and *Ceriodaphnia dubia*. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	*Ceriodaphnia dubia*
Dry Creek @ Waterford Rd	22-Jul-08	U	**X**	
Dry Creek @ Waterford Rd	19-Aug-08	U	**X**	
Dry Creek @ Waterford Rd	23-Sep-08	U	**X**	**X**

Table I-6. Dry Creek site subwatershed. 2009 Management Plan Monitoring (MPM) and upstream (U) sampling schedule for chlorpyrifos. "X" indicates the site, month and analyte sampled.

Site Name	Date	Type	Chlorpyrifos
Dry Creek @ Waterford Rd	21-Jul-09	U	**X**
Dry Creek @ Wellsford Rd	21-Jul-09	MPM	**X**
Dry Creek @ Waterford Rd	18-Aug-09	U	**X**
Dry Creek @ Wellsford Rd	18-Aug-09	MPM	**X**

Exceedance History

Ambient water monitoring within the Dry Creek subwatershed was initiated in the 2005 storm sampling season at the site at Wellsford Rd. Dry Creek @ Wellsford Rd samples collected from 2005-2009 have experienced exceedances WQTL for field parameters, *E. coli,* pesticides, and metals (Table I-7). Toxicity in the water column to *Ceriodaphnia dubia,* and *Selenastrum capricornutum,* and sediment toxicity to *Hyalella azteca,* has also occurred (Table I-7). Exceedances in this subwatershed, including the upstream site, include DO (28), pH (4), SC (1), *E. coli* (29)*,*chlorpyrifos (9), diuron (2), thiobencarb (1), copper (3), and lead (1). Water column toxicity to *Ceriodaphnia dubia* occurred twice, *Selenastrum capricornutum* toxicity occurred five times and sediment toxicity to *Hyalella azteca* occurred twice.

In 2009, exceedances included DO (7), SC (1), *E. coli* (8), and chlorpyrifos (1).

All exceedances are listed in Table I-7 by season and date and are based on WQTLs listed in the introduction of the ESJWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table I-7 and is determined using the ESJWQC Management Plan prioritization process flow chart (Figure 4). Specific conductance is now under a management plan following the exceedance during the 2009 sampling season. Additionally, *Ceriodaphnia dubia* water column toxicity is no longer prioritized because the only two toxic samples were collected over three years ago.

Table I-7. All exceedances experienced in samples collected from locations within the Dry Creek site subwatershed from February 2005 through December 2009 (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, 6.5-8.5 units	Specific Conductivity, 700 µS/cm	*E. coli*, 235 MPN/100 mL	Copper,Total, 1,300 µg/L	Lead, Total, 15 µg/L	Chlorpyrifos, 0.015 µg/L	Diuron, 2 µg/L	Thiobencarb, 0 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Dry Creek @ Wellsford Rd	Storm	2/15/2005										80		
Dry Creek @ Wellsford Rd	Storm	3/22/2005		8.96		900								
Dry Creek @ Wellsford Rd	Irrigation	5/11/2005		6.26										
Dry Creek @ Wellsford Rd	Irrigation	6/15/2005	5.9			240								
Dry Creek @ Wellsford Rd	Irrigation	7/13/2005	5.7											
Dry Creek @ Wellsford Rd	Irrigation	8/17/2005		9.18		900			0.024					
Dry Creek @ Wellsford Rd	Irrigation	9/21/2005	6.98			500								
Dry Creek @ Wellsford Rd	Storm	3/1/2006				300								
Dry Creek @ Wellsford Rd	Storm	3/16/2006				1600								
Dry Creek @ Wellsford Rd	Irrigation	5/18/2006				280								
Dry Creek @ Wellsford Rd	Irrigation	6/15/2006	6.08											
Dry Creek @ Wellsford Rd	Irrigation	7/13/2006	6.69						0.026					
Dry Creek @ Wellsford Rd	Irrigation	8/10/2006							0.024					
Dry Creek @ Wellsford Rd	Irrigation	9/14/2006				310					0.1	70		
Dry Creek @ Wellsford Rd	Storm	2/11/2007	6.17			290				37				508000
Dry Creek @ Wellsford Rd	Storm	2/22/2007												220000
Dry Creek @ Wellsford Rd	Storm	2/28/2007				2400	8.4 (7.2)			4				298750
Dry Creek @ Wellsford Rd	Storm	3/7/2007												826000
Dry Creek @ Wellsford Rd	Irrigation	4/17/2007					5.1 (5.0)							

Station Name	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	Copper,Total, 1,300 µg/L	Lead, Total, 15 µg/L	Chlorpyrifos, 0.015 µg/L	Diuron, 2 µg/L	Thiobencarb, 0 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Dry Creek @ Wellsford Rd	Irrigation	6/19/2007	5.77											
Dry Creek @ Wellsford Rd	Irrigation	7/17/2007	6.64						0.021					
Dry Creek @ Wellsford Rd	Irrigation	7/31/2007	6.91											
Dry Creek @ Wellsford Rd	Irrigation	8/14/2007	6.58			440								
Dry Creek @ Wellsford Rd	Irrigation	9/11/2007	6.5			420			0.043					
Dry Creek @ Wellsford Rd	Storm	1/24/2008				>2400								
Dry Creek @ Wellsford Rd	Storm	2/25/2008				>2400	11 (6.0)	1.8 (1.7)						494753
Dry Creek @ Wellsford Rd	Sediment	3/4/2008											88	
Dry Creek @ Wellsford Rd	Irrigation	4/22/2008				>2400								
Dry Creek @ Wellsford Rd	Irrigation	5/20/2008	5.67			330								
Dry Creek @ Wellsford Rd	Irrigation	6/17/2008	6.31			>2400								
Dry Creek @ Waterford Rd	*Irrigation*	*7/22/2008*	*6.08*						*0.02*					
Dry Creek @ Wellsford Rd	Irrigation	7/22/2008	6.67			>2400			0.03					
Dry Creek @ Waterford Rd	*Irrigation*	*8/19/2008*	*5.93*						*0.023*					
Dry Creek @ Wellsford Rd	Irrigation	8/19/2008	6.85			580								
Dry Creek @ Wellsford Rd	Sediment	8/28/2008	6.64										71	
Dry Creek @ Wellsford Rd	Irrigation	9/23/2008				290								
Dry Creek @ Wellsford Rd	Irrigation	10/2/2008	5.83											
Dry Creek @ Wellsford Rd	Fall	10/21/2008	4.91			550								
Dry Creek @ Wellsford Rd	Fall	12/16/2008	2.77	8.68										
Dry Creek @ Wellsford Rd	Winter	1/20/2009	5.1		707									

Station Name	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	Copper,Total, 1,300 µg/L	Lead, Total, 15 µg/L	Chlorpyrifos, 0.015 µg/L	Diuron, 2 µg/L	Thiobencarb, 0 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Dry Creek @ Wellsford Rd	Winter	3/17/2009				250								
Dry Creek @ Wellsford Rd	Irrigation	5/19/2009	6.24			260								
Dry Creek @ Wellsford Rd	Irrigation	6/16/2009				1600								
Dry Creek @ Waterford Rd	*Irrigation*	*7/21/2009*	*6.89*											
Dry Creek @ Wellsford Rd	Irrigation	7/21/2009	5.9			270								
Dry Creek @ Wellsford Rd	Irrigation	8/18/2009				410			0.027					
Dry Creek @ Wellsford Rd	Fall	10/20/2009	4.04			490								
Dry Creek @ Wellsford Rd	Fall	11/17/2009	3.04			730								
Dry Creek @ Wellsford Rd	Storm	12/15/2009	6.65			820								
Constituent Priority			**E**	**E**	**E**	**E**	**C**	**NP**	**A/B**	**C**	**NP[1]**	**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

NP[1] - Not Prioritized; thiobencarb is used only by rice and therefore all exceedances are turned over to the Rice Coalition.

2007 - 2009 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table I-8.

2007

Dry Creek was monitored monthly for chlorpyrifos and toxicity to *Ceriodaphnia* during 2007. Additional monitoring also occurred for chlorpyrifos in July and August and for toxicity to *Ceriodaphnia* in September. No toxicity to *Ceriodaphnia* occurred in 2007. Chlorpyrifos exceeded the WQTL of 0.015µg/L during normal monitoring sampling in July and September 2007. Additional samples had no detectable levels of chlorpyrifos (<0.003 µg/L, Table I-8).

2008

In 2008, upstream MPM occurred at Dry Creek @ Waterford Road for chlorpyrifos during July, August, and September and for toxicity to *Ceriodaphnia* during September (Table I-8). Normal monitoring occurred at Dry Creek @ Wellsford Rd for these constituents monthly in 2008. Again, no toxicity to *Ceriodaphnia* occurred in 2008 (Table I-8). Chlorpyrifos exceeded the WQTL during normal monitoring in July (0.03 µg/L) and during upstream monitoring in July and August 2008 (0.02 and 0.023 µg/L, respectively, Table I-8).

2009

Although upstream monitoring is typically scheduled for one season only, the Coalition continued to monitor the Dry Creek upstream site (Dry Creek @ Waterford Rd) during the 2009 irrigation season because chlorpyrifos exceedances were inconsistent at the normal monitoring and upstream locations in 2008 (Table I-8, August 19, 2008). During 2009 monitoring there was a chlorpyrifos detection of 0.013 µg/L at Dry Creek @ Wellsford Rd in samples collected in July and an exceedance of 0.027 µg/L of chlorpyrifos in samples collected in August. Management Plan Monitoring samples collected from Dry Creek @ Waterford Rd during July and August 2009 had no detections of chlorpyrifos.

Management Plan Monitoring for copper, chlorpyrifos, and *Hyalella* toxicity are planned for the 2010 irrigation season. Management Plan Monitoring during February and March 2011 will also occur for copper, diuron and toxicity to *Selenastrum* and *Hyalella*.

Table I-8. **Dry Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for chlorpyrifos and *Ceriodaphnia* from the 2007-2008 irrigation seasons, and NM and MPM for chlorpyrifos for the irrigation seasons of 2009. Exceedance values are in bold.**

	Month:	April	May	June	July	August	September
2007 NM (@ Wellsford Rd)	Date	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/11/07
	Chlorpyrifos (µg/L)	<0.003	0.011	<0.003	**0.021**	<0.003	**0.043**
	C. dubia toxicity (% Control)	100	100	100	100	100	100
2007 MPM A (@ Wellsford Rd)	Date	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA
	C. dubia toxicity (% Control)	NA	NA	NA	NA	NA	100
2008 NM (@ Wellsford Rd)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	**0.03**	<0.003	<0.003
	C. dubia toxicity (% Control)	100	100	100	100	100	100
2008 MPM US (@ Waterford Rd)	Date	NA	NA	NA	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	NA	NA	NA	**0.02**	**0.023**	<0.003
	C. dubia toxicity (% Control)	NA	NA	NA	NA	NA	100
2009 MPM (@ Wellsford Rd)	Date	NA	NA	NA	7/21/09	8/18/09	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	0.013	**0.027**	NA
2009 MPM US (@ Waterford Rd)	Date	NA	NA	NA	7/21/09	8/18/09	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA

NA - Not Applicable; this site was not sampled during this month.

Load Calculations

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

Load = Discharge (cfs) X 28.317L X Concentration (milligram/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 samples were collected.

Table I-9. Dry Creek @ Wellsford and Dry Creek @ Waterford. Instantaneous load calculations for chlorpyrifos, copper and diuron where discharge was measured (sorted by analyte, site and date). Upstream site is italicized.

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Dry Creek @ Wellsford Rd	Chlorpyrifos	17-Aug-05	0	0.024	0
Dry Creek @ Wellsford Rd	Chlorpyrifos	13-Jul-06	123.91	0.026	91.23
Dry Creek @ Wellsford Rd	Chlorpyrifos	15-May-07	51.13	0.011	15.93
Dry Creek @ Wellsford Rd	Chlorpyrifos	17-Jul-07	68.57	0.021	40.78
Dry Creek @ Wellsford Rd	Chlorpyrifos	11-Sep-07	61.02	0.043	74.30
Dry Creek @ Wellsford Rd	Chlorpyrifos	22-Jul-08	63.22	0.03	53.71
Dry Creek @ Wellsford Rd	Chlorpyrifos	21-Jul-09	71.26	0.013	26.23
Dry Creek @ Wellsford Rd	Chlorpyrifos	18-Aug-09	47.07	0.027	35.99
Dry Creek at Waterford	*Chlorpyrifos*	*19-Aug-08*	*24.24*	*0.023*	*15.79*
Dry Creek @ Wellsford Rd	Copper	13-Jul-06	123.91	3.1	10877.15
Dry Creek @ Wellsford Rd	Copper	17-Apr-07	30.71	5.1	4435.04
Dry Creek @ Wellsford Rd	Copper	15-May-07	51.13	6.1	8831.87
Dry Creek @ Wellsford Rd	Copper	19-Jun-07	32.21	5.9	5381.33
Dry Creek @ Wellsford Rd	Copper	17-Jul-07	68.57	3.9	7572.62
Dry Creek @ Wellsford Rd	Copper	14-Aug-07	65.83	5.3	9879.77
Dry Creek @ Wellsford Rd	Copper	11-Sep-07	61.02	3.3	5702.08
Dry Creek @ Wellsford Rd	Copper	22-Apr-08	39.8	4.7	5296.98
Dry Creek @ Wellsford Rd	Copper	20-May-08	38.3	3.8	4121.26
Dry Creek @ Wellsford Rd	Copper	17-Jun-08	38.94	3.7	4079.86
Dry Creek @ Wellsford Rd	Copper	22-Jul-08	63.22	3.2	5728.64
Dry Creek @ Wellsford Rd	Copper	19-Aug-08	52.75	5.3	7916.73
Dry Creek @ Wellsford Rd	Copper	23-Sep-08	33.48	2.3	2180.52
Dry Creek @ Wellsford Rd	Diuron	17-Apr-07	30.71	0.29	252.19
Dry Creek @ Wellsford Rd	Diuron	22-Apr-08	39.8	0.2	225.40

Source Identification and Outreach

The Coalition addressed source identification in the 2009 Management Plan Update. The Coalition focuses its efforts on applied pesticides, and PUR data are reviewed to determine the most frequent crop type and timing associated with applications. The Coalition conducted additional and upstream MPM during the months when exceedances occurred in the past to better characterize water quality the subwatershed. Throughout 2009, the Coalition actively engaged in grower outreach and education to address Dry Creek Management Plan's highest priority constituents. This outreach included general surveys used to determine initial management practice utilization, followed by grower meetings and mailings to educate growers about additional management practices and their importance in achieving acceptable water quality, and lastly individual grower meetings to continue to inform growers about management practices as well as to assess expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent under the Dry Creek Management Plan.

Chlorpyrifos

Nine exceedances of the chlorpyrifos WQTL of 0.015 µg/L occurred during the latter months of irrigation seasons in samples collected between 2005 and 2009 (Table I-7), including one exceedance in August of 2009. The Coalition used a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources.

PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds active ingredient (AI) applied and acres treated (Table I-10, Figure I-2). The greatest amount of chlorpyrifos use occurred in 2005 (9,997 lbs) with the lowest amount of use occurring in 2008 (4,326 lbs, Table I-10, Figure I-2). The greatest chlorpyrifos use has occurred consistently in the month of July; however in 2009 the largest amount of chlorpyrifos was applied in May (Table I-10, Figure I-2). Exceedances often occur in the late summer (Figure I-2). The most recent chlorpyrifos applications preceding the 2009 August chlorpyrifos exceedances occurred in July 2009.

The Coalition also used PUR data to determine which crops receive the most applications of chlorpyrifos. The highest application rates are associated with almond/walnut orchards, corn, oranges, and grapes (Table I-11). The largest amount of chlorpyrifos applied from 2005 through 2009 was to almonds (15,958.278 lbs) followed by walnuts (12,287 lbs, Table I-11). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table I-11).

Table I-10. Number of chlorpyrifos applications, pounds AI applied, and acres treated by month for January 2005 through December 2009 in the Dry Creek @ Wellsford 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
January, 2005	1	152.5	75
February, 2005	3	175.9	94
March, 2005	3	120.9	111
April, 2005	6	464.6	521.5
May, 2005	22	2617.1	2022.41
June, 2005	15	1970.3	1244
July, 2005	50	3923.3	2312
August, 2005	16	569.8	425.75
September, 2005	1	2.0	0.75
February, 2006	1	8.0	83
March, 2006	4	98.1	60.5
May, 2006	27	2881.3	1842.41
June, 2006	14	842.4	538.9
July, 2006	55	3042.9	2625
August, 2006	27	852.8	475
September, 2006	5	123.9	62.5
October, 2006	3	137.4	73.91
December, 2006	1	29.9	15
March, 2007	1	10.2	23
April, 2007	7	139.6	260.4
May, 2007	23	2486.1	1598.9
June, 2007	24	887.9	597
July, 2007	40	2585.9	1611.2
August, 2007	11	414.7	207.75
September, 2007	1	11.6	11
October, 2007	1	117.6	63.3
November, 2007	4	247.4	133.15
January, 2008	1	29.9	14
May, 2008	20	840.6	595
June, 2008	14	858.9	714
July, 2008	41	2012.0	1565.61
August, 2008	10	499.4	350
September, 2008	2	85.6	48
March, 2009	4	381.2	202.98
April, 2009	6	389.9	164.4
May, 2009	19	1355.6	668.5
June, 2009	9	798.2	701

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
July, 2009	22	1049.7	611.65
August, 2009	7	294.9	290.75
September, 2009	4	122.5	70.75
November, 2009	3	487.4	259.52
Summaries by Year			
2005 Total	117	9996.5	6806.41
2006 Total	137	8016.6	5776.22
2007 Total	112	6901.1	4505.7
2008 Total	88	4326.4	3286.61
2009 Total	74	4879.6	2969.55
Total	**528**	**34,120.2**	**23,344.49**

Figure I-2. Pounds of chlorpyrifos applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

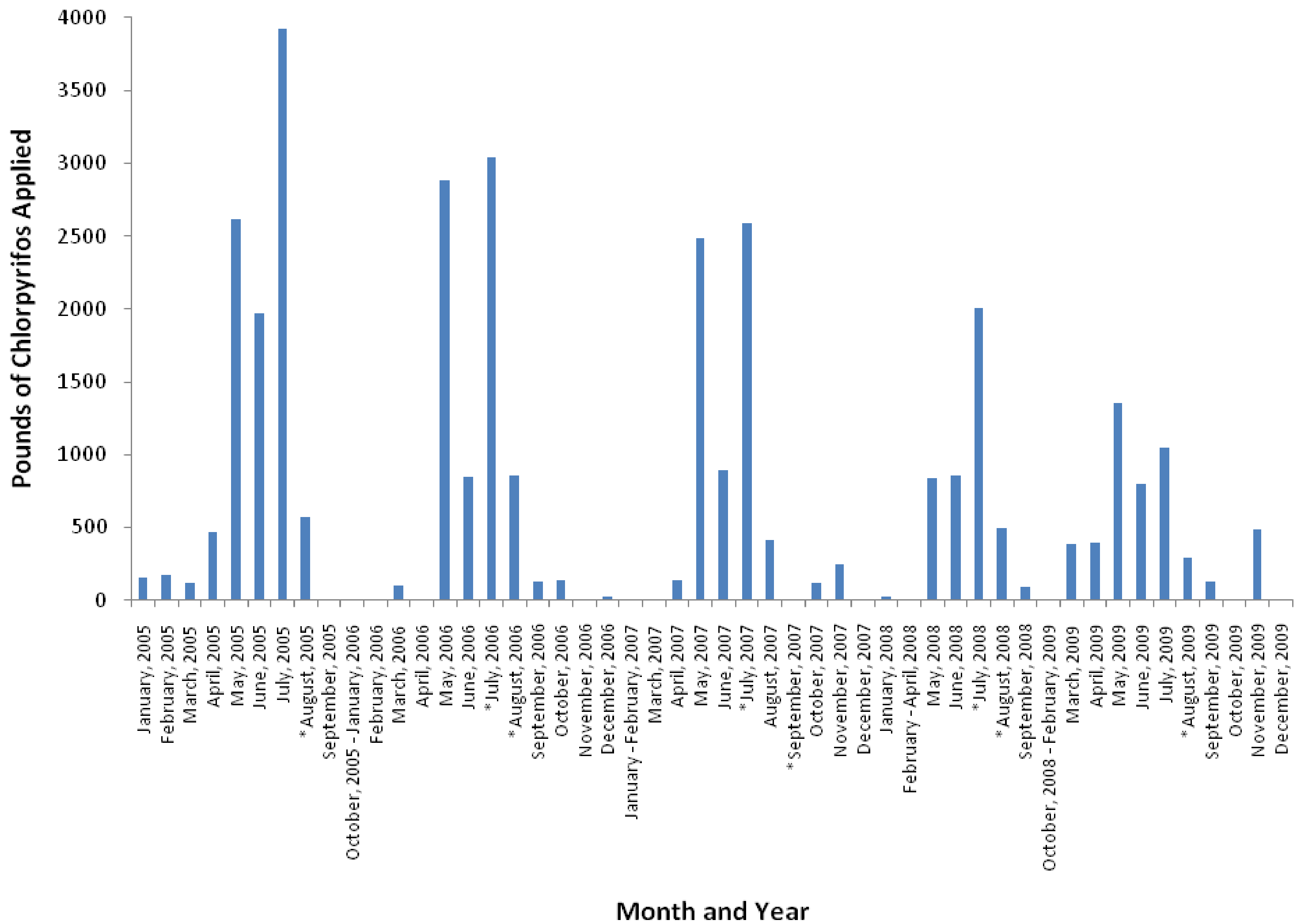


Table I-11. Total pounds of AI for chlorpyrifos based on PUR data from 2005-2009 within the Dry Creek @ Wellsford Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA	NUFOS 4E	10.168
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	NUFOS 4E	11.225
	ALMOND	CHLORPYRIFOS 4E AG	382.772
		GOVERN 4E INSECTICIDE	890.849
		LORSBAN 4E INSECTICIDE	596.842
		LORSBAN 4E-HF	1439.236
		LORSBAN ADVANCED	478.890
		LORSBAN-4E	10633.721
		NUFOS 4E	1487.487
		WARHAWK	48.482
	APPLE	LORSBAN 4E-HF	3.520
	APRICOT	LORSBAN 4E-HF	8.972
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	1031.400
		LORSBAN 4E-HF	442.863
		LORSBAN-4E	111.917
	CORN FOR/FOD	GOVERN 4E INSECTICIDE	547.317
		LORSBAN 15G GRANULAR INSECTICIDE	104.544
		LORSBAN 4E-HF	45.604
		LORSBAN ADVANCED	94.745
		LORSBAN-4E	308.153
		NUFOS 15G	618.000
		NUFOS 4E	96.959
		WARHAWK	542.711
	GRAPES, WINE	LORSBAN 4E-HF	98.137
		LORSBAN ADVANCED	868.574
		LORSBAN-4E	548.892
	N-OUTDR CONTAINER/FLD GRWN PLANTS	LORSBAN 75WG	90.000
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	LORSBAN-4E	244.121
	OP-DEC. TREE	LORSBAN 15G GRANULAR INSECTICIDE	1.125
		LORSBAN 75WG	46.140
	WALNUT	CHLORPYRIFOS 4E AG	84.435
		GOVERN 4E INSECTICIDE	40.401
		LORSBAN 4E INSECTICIDE	240.034

Chemical Name	Commodity	Product Name	Lbs AI Applied
		LORSBAN 4E-HF	666.949
		LORSBAN ADVANCED	362.454
		LORSBAN-4E	2453.534
		NUFOS 4E	1502.210
		WARHAWK	101.003
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	1047.698
		LORSBAN 4E INSECTICIDE	300.195
		LORSBAN 4E-HF	1584.866
		LORSBAN-4E	3579.714
		NUFOS 4E	323.331

ALFALFA – Total Pounds Chlorpyrifos Applied	21.393
ALMOND – Total Pounds Chlorpyrifos Applied	15958.278
APPLE– Total Pounds Chlorpyrifos Applied	3.520
APRICOT – Total Pounds Chlorpyrifos Applied	8.972
CORN – Total Pounds Chlorpyrifos Applied	3944.212
GRAPES – Total Pounds Chlorpyrifos Applied	1515.603
N-OUTDOOR PLANTS – Total Pounds Chlorpyrifos Applied	334.121
OP-DEC. TREE – Total Pounds Chlorpyrifos Applied	47.265
WALNUT – Total Pounds Chlorpyrifos Applied	12286.824
Total pounds chlorpyrifos applied (2005 - 2009)	**34,120.189**

In the 2009 Management Plan Update, the Coalition determined the most probable source of chlorpyrifos in the Dry Creek waterway was spray drift from adjacent orchards, particularly during the months July and August. Consequently, outreach efforts focus on encouraging management practices aimed at reducing spray drift.

The results from the general surveys administered to all members in the subwatershed are summarized in the ESJWQC General Survey Summary Report submitted January 30, 2009 and were used as a starting point to evaluate management practice implementation within the subwatershed. The general survey assessed practices in use from May 17, 2007 to December 31, 2008. The Coalition noted that management practices specific to spray application and orchard and vineyard water management are not widely implemented across the Coalition region within the subwatershed. For example, out of survey responses, members representing 64 parcels, which accounts for 4,372 acres in the subwatershed, indicated they perform sprayer calibrations. Thus, of the 23,331 irrigated acres in the Dry Creek subwatershed, 19% of acres receive applications from currently calibrated sprayers. Fewer members indicated they allow grass to grow in the center rows of orchards and/or vineyards; grass center rows were present in only 3,678 acres, or 16%, in the subwatershed. And very few growers maintain native buffers along streams and waterways, representing only 92 acres. When assessing the percentages of management practices utilized in the watershed, the Coalition understands that not all management practices are applicable or even necessary for all irrigated acres. Thus, the Coalition designed outreach to affect an increase in relevant and effective management practices in parcels adjacent to the creek which should result in the greatest improvement in water quality.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of this report. Prior to the 2009 irrigation season, several group grower meetings were held for members in the Dry Creek subwatershed to make them aware of the current issues and concerns specific to pesticide applications in the upcoming irrigation season and relevant management practices to protect and improve water quality in Dry Creek. The meetings also allowed the Coalition to update members on the strategy and status of the Dry Creek Management Plan.

Additionally, to gain more information about potential sources of discharge into the Dry Creek @ Wellsford Rd site subwatershed, the Stanislaus County Agricultural Commissioner's staff walked the waterway in November 2007 and documented all drains using GPS and digital photos. The Coalition mapped the drains and used this information to further assess possible sources of water quality impairments and to compile a list of growers targeted for outreach.The Coalition notified individuals owning the parcels where drains were found and conducted a joint meeting with the Stanislaus County Agriculture Commissioner in June 2008.

The Coalition then turned its attention to individual contacts. Targeted growers were selected based on their potential to drain or drift to the creek. Of the 16,111 acres in Dry Creek that have the potential to drain directly or indirectly to the creek, 6,658 acres are owned and operated by Coalition members. The Coalition eventually developed a list of 22 targeted members that represented 6,116 acres that have the potential to discharge to the creek. Individual meetings occurred starting in January, 2009 and continued through August, 2009. Coalition representatives met with growers on their property to discuss the Dry Creek Management Plan and offer management practice recommendations specific to the parcel and land owner/operator. This gave the Coalition a chance to better assess currently used management practices as well as planned management practice implementation. Individual contacts focused mainly on chlorpyrifos exceedances however all water quality results were reviewed and discussed including exceedances of copper, diuron, *E. coli*, DO, SC, and pH, and toxicity to *Selenastrum* and *Hyalella*. To date, the Coalition has contacted all 22 targeted members, which represents 6,116 acres or 9% of the total subwatershed acreage. The final targeted member acreage is less than the potential to drain acreage (members) due to parcels/members being dropped from the original targeted list because the acres were 1) not currently farmed, 2) were pasture with no pesticide use, 3) determined not to drain or have the potential to drift to the creek, or 4) there was no reported pesticide use. The Coalition plans to contact targeted members in the spring of 2010 to determine if the owners' planned management practices have been implemented, and will continue to conduct outreach on a grower group level and monitor the creek to assess water quality.

Priority C Constituents

Water samples from Dry Creek @ Wellsford Rd had exceedances for copper and diuron priority C constituents.

Copper

Copper has exceeded the hardness-based WQTL three times in this subwatershed from 2005 through 2009. 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 are reviewed for the number of monthly copper applications, pounds active ingredient (AI) applied, and acres treated (Table I-12, Figure I-3). The greatest amount of copper was applied in 2005 (30,342 lbs) and the lowest amount applied in 2008 (8,934 lbs) and 2009 (11,286 lbs, Table I-12, Figure I-3). In 2007, 2008, and 2009 the greatest amount of copper use occurred in April whereas in 2004 the greatest use occurred in January and in 2005 during May (Table I-12, Figure I-3). Exceedances do not always coincide with the greatest use of copper (Figure I-3).

The largest amount of copper applied was associated with almond, peach, and walnut orchards, rice fields, and vineyards/grapes (Table I-13). The largest amount of copper from 2005 through 2009 was applied to almond (38,517 lbs), followed by walnuts (46,224.6 lbs, Table I-13). The most common product containing copper used within this subwatershed was DuPont Kocide and Kocide (Table I-13).

Table I-12. Number of copper applications, total pounds AI applied and total acres treated by month for January 2005 through December 2009 in the Dry Creek @ Wellsford 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, 2005	29	8069.7	1338.41
February, 2005	51	3809.9	1905.25
March, 2005	38	4863.3	1340.5
April, 2005	47	6703.1	2099.3
May, 2005	25	2986.1	721.7
June, 2005	3	161.6	72
July, 2005	1	0.5	10
August, 2005	2	84.3	35.12
September, 2005	1	15.0	10
November, 2005	2	2404.9	605
December, 2005	8	1243.9	343
January, 2006	29	3714.1	916
February, 2006	48	3098.8	1844.5
March, 2006	8	454.7	503

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
April, 2006	51	4937.9	1196.88
May, 2006	47	8561.3	1671.75
June, 2006	3	803.6	126
August, 2006	2	49.5	22
November, 2006	4	177.8	57.5
December, 2006	4	353.9	51
January, 2007	20	6954.0	1517.2
February, 2007	46	2299.5	1562
March, 2007	27	3154.5	940
April, 2007	62	7496.8	2287
May, 2007	10	1491.9	224.75
June, 2007	3	938.1	100
July, 2007	4	344.0	86
August, 2007	2	48.0	12
October, 2007	1	32.3	3
November, 2007	5	1714.7	435
December, 2007	5	203.0	59
January, 2008	10	1927.3	501.5
February, 2008	34	1614.1	1134
March, 2008	13	1124.8	674
April, 2008	29	4146.7	1254
May, 2008	3	39.5	25
November, 2008	2	29.5	12
December, 2008	2	53.0	13.5
January, 2009	13	2352.2	577.28
February, 2009	29	851.6	682
March, 2009	1	7.3	18
April, 2009	40	4388.2	1166
May, 2009	17	3274.5	738.5
June, 2009	3	194.2	102.75
November, 2009	4	140.7	21
December, 2009	2	77.3	13.5
Summaries by Year			
2005 Total	207	30342.2	8480.28
2006 Total	196	22151.6	6388.63
2007 Total	185	24676.8	7225.95
2008 Total	93	8934.9	3614
2009 Total	109	11286.2	3319.03
Total	**790**	**97,391.6**	**29,027.89**

Figure I-3. Pounds of copper applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

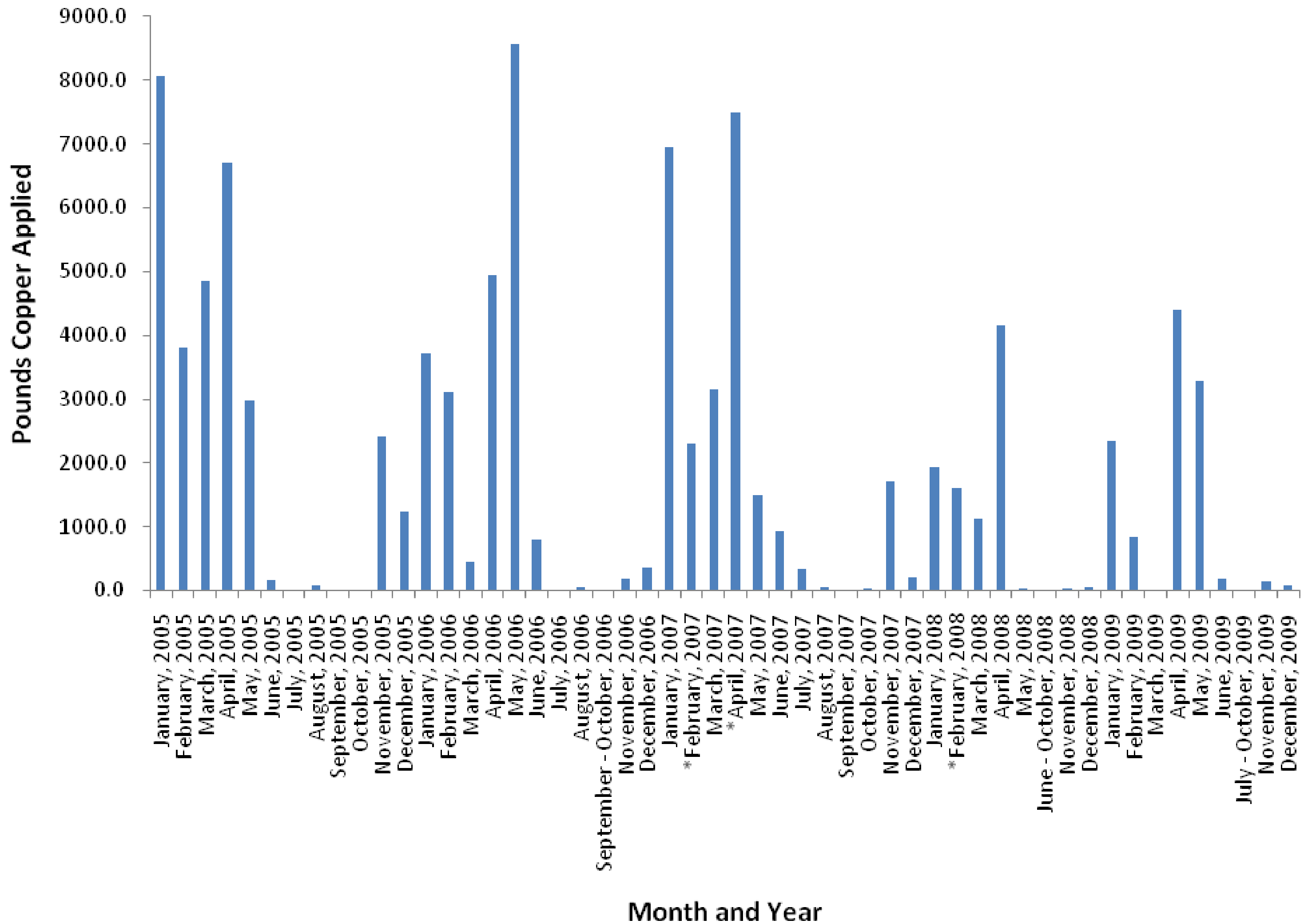


Table I-13. Total pounds of AI for copper based on PUR data from 2005-2009 within the Dry Creek @ Wellsford Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALMOND	BASIC COPPER 53	5399.800
		BASICOP	628.050
		CHAMP FORMULA 2 FLOWABLE	7109.926
		CHAMPION WETTABLE POWDER	610.957
		CUPROFIX ULTRA 40 DISPERSS	127.625
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1910.976
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	27.016
		HYDROX	4864.860
		KOCIDE 101	3328.156
		KOCIDE 2000	2040.694
		KOCIDE DF	1796.257
		NORDOX	49.350
		NORDOX 75 WG	5907.777
		NU-COP 50DF	4602.290
		NUCOP DF	112.500
		NUTRA-SPRAY ZN12-MN2-CU10	0.463
	APRICOT	NU-COP 50DF	6.160
		TRIANGLE BRAND COPPER SULFATE	89.100
	CHERRY	CHAMPION WETTABLE POWDER	107.800
		KOCIDE 101	57.750
	GRAPES, WINE	BRITZ COPPER SULFUR 15-25 DUST	690.800
		CHAMP FORMULA 2 FLOWABLE	979.388
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	42.997
		KOCIDE 2000	82.228
		KOCIDE DF	58.391
		NU-COP 3L	35.817
	NECTARINE	CHAMPION WETTABLE POWDER	492.800
		KOCIDE 101	154.000
	N-OUTDR CONTAINER/FLD GRWN PLANTS	KOCIDE 101	140.140
		KOCIDE DF	92.100
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	CHAMP FORMULA 2 FLOWABLE	386.446
	OLIVE	CUPROFIX ULTRA 40 DISPERSS	2.666
	OP-DEC. TREE	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	51.648
		KOCIDE DF	29.472
	PEACH	BASIC COPPER 53	73.500

Chemical Name	Commodity	Product Name	Lbs AI Applied
		CHAMPION WETTABLE POWDER	554.400
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	7.263
		HYDROX	161.700
		KOCIDE 101	16.170
		KOCIDE 2000	33.894
		KOCIDE DF	299.632
		NORDOX 75 WG	149.929
		NU-COP 50 WP	164.780
	PEACH PROCESSNG	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	10.491
		KOCIDE DF	34.384
		NORDOX 75 WG	74.168
	PISTACHIO	CUPROFIX ULTRA 40 DISPERSS	582.736
	PLUM	CHAMPION WETTABLE POWDER	138.600
		NORDOX 75 WG	11.410
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	CHAMPION WETTABLE POWDER	46.200
	RICE	BLUE VIKING COPPER SULFATE STAR SHINE CRYSTAL	910.800
		CHIPCO COPPER SULFATE CRYSTALS	2346.300
		KOCIDE COPPER SULFATE STAR SHINE CRYSTALS	782.100
	RICE (ALL OR UNSPEC)	CHIPCO COPPER SULFATE CRYSTALS	2752.200
	WALNUT	CHAMP FLOWABLE	55.726
		CHAMP FORMULA 2 FLOWABLE	1042.754
		CHAMPION WETTABLE POWDER	1663.200
		CUPROFIX ULTRA 40 DISPERSS	255.960
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	528.306
		DUPONT KOCIDE 101 FUNGICIDE/BACTERICIDE	123.200
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	5116.929
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	395.538
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	92.100
		HYDROX	677.600
		KENTAN DF	208.420
		KOCIDE 101	458.920
		KOCIDE 2000	3727.802
		KOCIDE DF	1274.050

Chemical Name	Commodity	Product Name	Lbs AI Applied
		NORDOX 75 WG	1254.305
		NU-COP 50 WP	281.820
		NU-COP 50DF	4392.080
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHAMP FLOWABLE	23.713
		CHAMP FORMULA 2 FLOWABLE	1604.720
		CHAMPION WETTABLE POWDER	308.000
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	309.888
		HYDROX	229.460
		KOCIDE 101	4965.214
		KOCIDE 2000	4136.822
		KOCIDE DF	11514.624
		NORDOX	450.072
		NORDOX 75 WG	46.145
		NU-COP 50DF	1087.240

ALMOND - Total Pounds Copper Applied	38516.694
APRICOT – Total Pounds Copper Applied	95.260
CHERRY – Total Pounds Copper Applied	165.550
GRAPES – Total Pounds Copper Applied	1889.621
NECTARINE – Total Pounds Copper Applied	646.800
N-OUTDOOR PLANTS – Total Pounds Copper Applied	618.686
OLIVE – Total Pounds Copper Applied	2.666
OP-DEC. TREE – Total Pounds Copper Applied	81.120
PEACH – Total Pounds Copper Applied	1580.311
PISTACHIO – Total Pounds Copper Applied	582.736
PLUM – Total Pounds Copper Applied	196.210
RICE – Total Pounds Copper Applied	6791.400
WALNUT – Total Pounds Copper Applied	46224.608
Total pounds copper applied (2005 - 2009)	**97,391.663**

In the 2009 Management Plan Update, the Coalition determined future outreach should focus on providing information to specific growers located adjacent to Dry Creek to encourage the retention of water and sediment on the fields, especially during the dormant season. This coincides with the Coalition's management plan strategy outlined above under the chlorpyrifos outreach section. Orchard and vineyard operators will be advised to consider management practices to prevent copper from entering the waterway with runoff when applicable. Storm runoff management relevant to copper applications will also be discussed to prevent the winter exceedances.

Diuron

Diuron is a soluble herbicide applied in the Dry Creek watershed primarily in the months of October – May. The largest amount of diuron used was in 2006 (1,063 lbs) and the least amount used was in 2008 (160 lbs, Table I-14). The month with the largest amount AI applied varied from year to year with large applications in January and November 2006, January 2007, April 2008, and November 2009 (Table I-14, Figure I-4). The highest application rates and largest amount of diuron applied from 2005 through 2009 are associated with walnuts and grapes (including wine and raisin, Table I-15).

There are only two applications associated with the two storm 2007 exceedances within one month of sampling. A third application occurred approximately five weeks prior to the first exceedance and a fourth application occurred approximately seven weeks prior to the first exceedance. Diuron did not exceed the WQTL (2 µg/L) during 2008 monitoring. Dry Creek was sampled as a Core site during 2009, and diuron was not monitored as a part of 2009 MPM.

Table I-14. Number of diuron applications, total pounds AI applied and total acres treated by month for January 2005-December 2009 in the Dry Creek @ Wellsford 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, 2005	2	40.5	42
February, 2005	1	9.8	6
March, 2005	1	40.2	25.76
April, 2005	3	72.4	70
June, 2005	1	34.2	17.5
November, 2005	3	36.1	47
January, 2006	2	348.1	338.5
February, 2006	3	93.0	38
May, 2006	2	41.8	33
June, 2006	1	233.9	320
November, 2006	4	336.3	430
December, 2006	1	10.1	7
January, 2007	2	220.4	156
February, 2007	1	29.3	40
November, 2007	1	215.6	275
December, 2007	6	128.1	409
February, 2008	2	9.0	11.3
March, 2008	1	7.7	24
April, 2008	1	58.5	40
July, 2008	4	39.6	39
August, 2008	2	28.4	26
October, 2008	1	17.0	42.5

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
January, 2009	3	16.0	40
February, 2009	1	4.0	5
November, 2009	5	237.8	795
December, 2009	1	53.8	185
Summaries by Year			
2005 Total	11	233.1	208.26
2006 Total	13	1063.2	1166.5
2007 Total	10	593.4	880
2008 Total	11	160.2	182.8
2009 Total	10	311.6	1025
Total	**55**	**2,361.5**	**3,462.6**

Figure I-4. Pounds of diuron applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

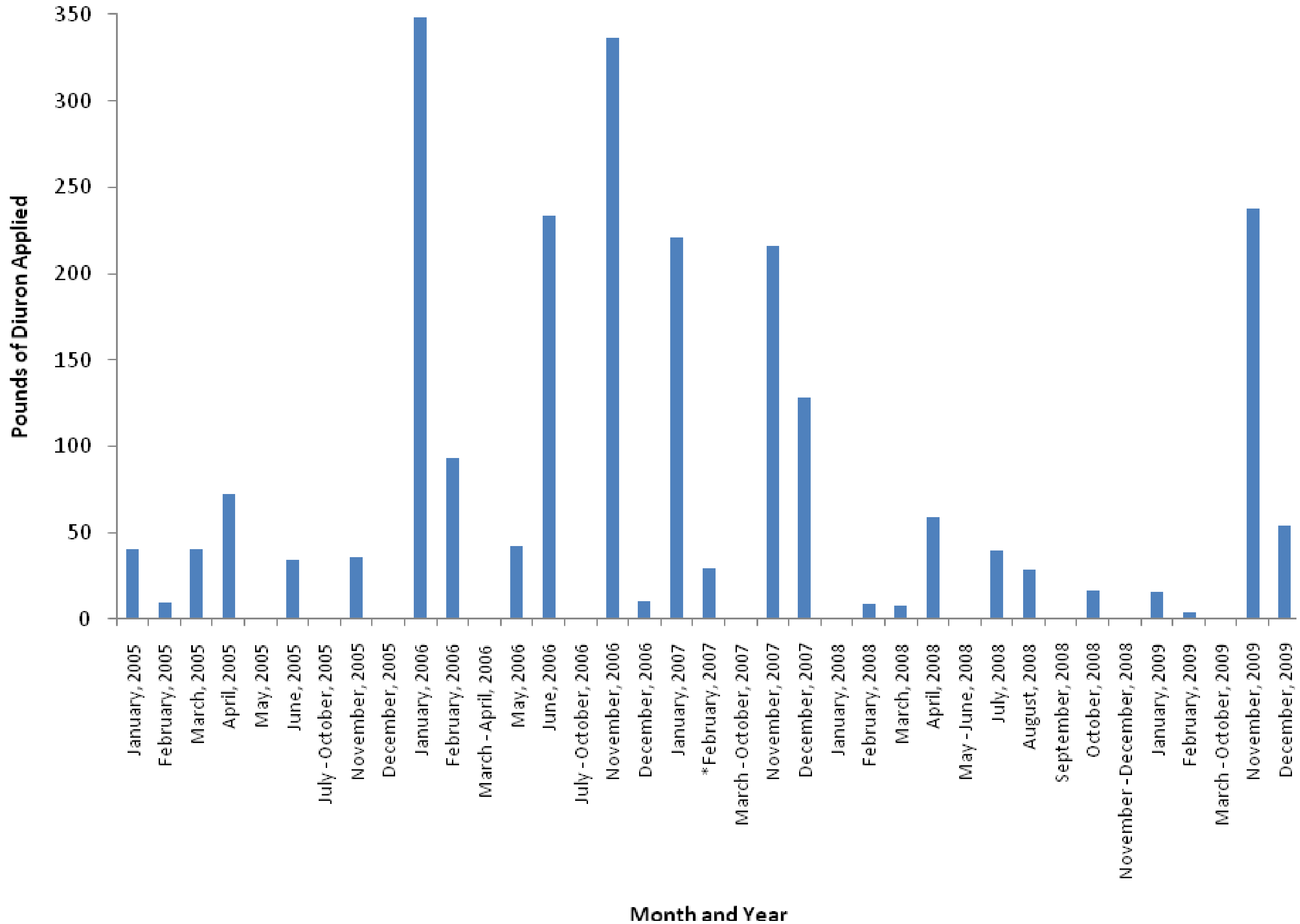


Table I-15. Total pounds of AI for diuron based on PUR data from 2005-2009 within the Dry Creek @ Wellsford Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	10.136
	GRAPES, WINE	DIREX 4L	371.521
		DIURON 4L	215.550
		DUPONT DIREX 4L HERBICIDE	412.721
	PASTURES (ALL OR UNSPEC)	DIREX 4L	19.006
	WALNUT	DIREX 4L	376.219
		DUPONT DIREX 4L HERBICIDE	55.377
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	900.881

ALFALFA – Total Pounds Diuron Applied	10.136
GRAPES – Total Pounds Diuron Applied	999.793
PASTURES – Total Pounds Diuron Applied	19.006
WALNUT – Total Pounds Diuron Applied	1332.477
Total pounds diuron applied (2005 - 2009)	**2,361.411**

Priority D Constituents

Water column toxicity to *Selenastrum capricornutum* and sediment toxicity to *Hyalella azteca* are listed as priority D constituents under the Dry Creek @ Wellsford Rd Site Subwatershed Management Plan.

Selenastrum capricornutum toxicity

Selenastrum toxicity was not monitored during 2009 sampling at Dry Creek*.* *Selenastrum* toxicity occurred once during the 2008 storm season and was associated with an exceedance of copper. The two are closely tied as copper is used as an algaecide as well as a fungicide.

The Coalition's strategy for eliminating *Selenastrum* toxicity involves focusing on copper and diuron with individual contacts as well as conducting outreach regarding the retention of storm water runoff rather than discharging to drainage canals and creeks. If these two constituents can be prevented from entering storm water during the winter rainy season, the Coalition believes that *Selenastrum* toxicity can also be reduced or eliminated. If the Coalition finds that diuron and copper exceedances are eliminated and *Selenastrum* toxicity persists, then additional herbicides will be targeted for outreach and management.

Hyalella azteca toxicity

As a result of 2008 monitoring, *Hyalella azteca* was listed as a Priority D constituent in the Dry Creek site subwatershed. Both the 2008 storm and irrigation seasons experienced a single toxicity each. Sediment monitoring was not conducted at Dry Creek during 2009.

The Coalition has begun to conduct management plan monitoring 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. Management Plan Monitoring is scheduled for this site in 2010 and 2011.

Priority E Constituents

The following priority E constituents are listed under the Dry Creek @ Wellsford Rd Site Subwatershed Management Plan: DO, *E. coli*, pH, SC.

Several DO and *E. coli* exceedances occurred throughout 2009 sampling. There were no pH exceedances. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

This subwatershed is one of the first three priority site subwatersheds within the ESJWQC 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 Dry Creek subwatershed has been to target growers adjacent to the waterway that have the potential to discharge or drift. Outreach includes grower notification, management practice outreach and education, tracking of management practices implementation, and providing information to growers on studies of management practice efficacy. The Coalition believes that because land use in this subwatershed is predominately orchards and vineyards, outreach aimed toward orchard and vineyard 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 implementation and assess future implementations have been completed and returned representing 100% of targeted growers. The Coalition is now in the process of assessing these results and planning the final stages of outreach.

Both the acres treated and pounds of chlorpyrifos applied have decreased overall since 2005, which may be a result of many factors including educating growers about alternative products. Usage has decreased in July and August, when the largest number of exceedances have occurred. Despite this, chlorpyrifos exceeded the WQTL in Dry Creek in August 2009 although the exceedance was traced to a non member dairy. Management Plan Monitoring in 2010 will further indicate if a change in management practices as a result of individual contacts has resulted in long-term improvements to downstream water quality.

II. DUCK SLOUGH @ HIGHWAY 99

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper

Priority D

- *Selenastrum capricornutum* water column toxicity

Priority E

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

Description of Duck Slough @ Hwy 99 Site Subwatershed

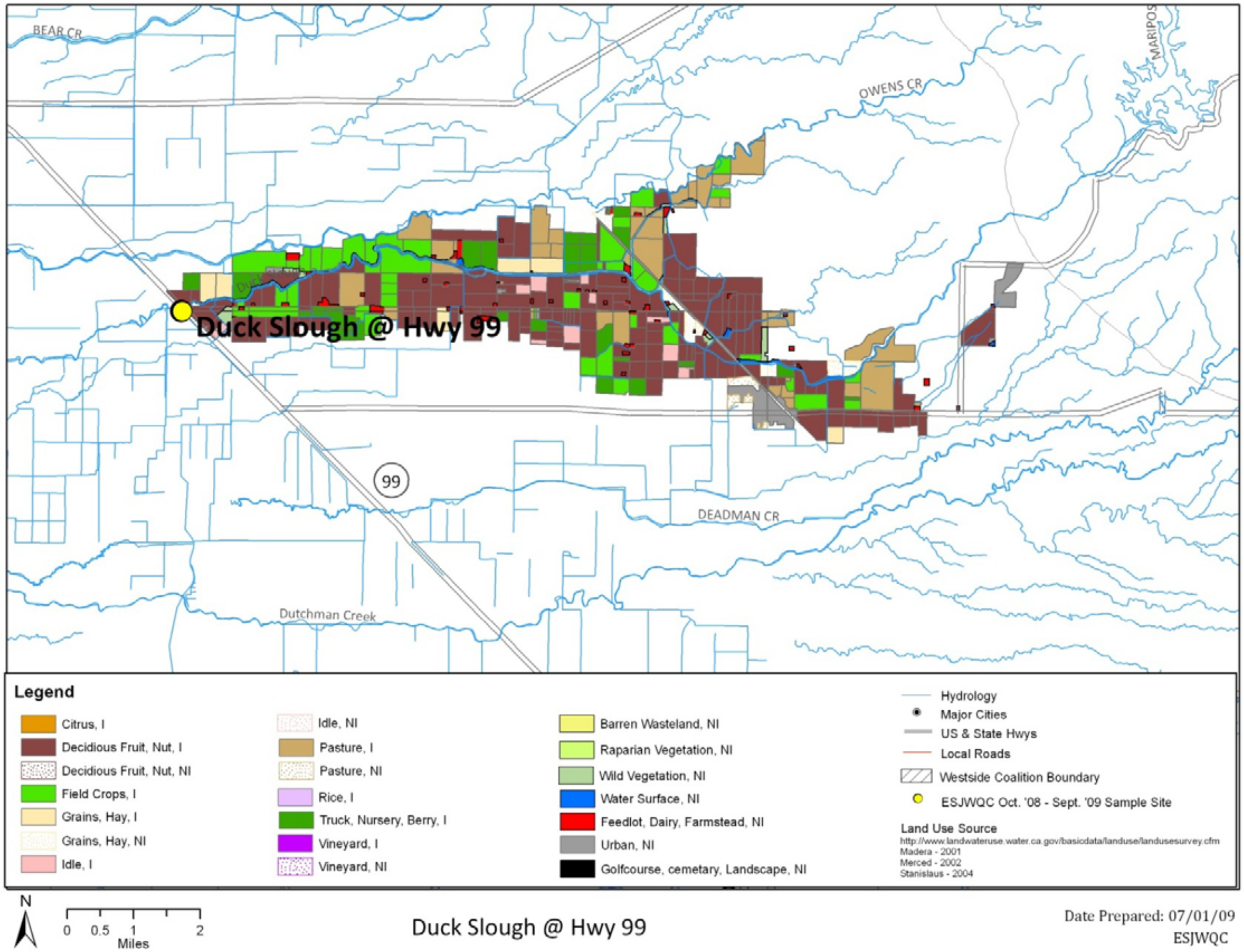
Duck Slough @ Hwy 99 (10,695 irrigated acres) – This site subwatershed is located upstream of the Duck Slough @ Gurr Road site and was selected to determine relative contribution of water quality impairments from the upstream portion of the Duck Slough subwatershed. Duck Slough originates in the Sierra foothills and flows west eventually joining with Deadman Creek in the western portion of the Coalition region. The monitoring site is located just east of Highway 99, south of Planada and Merced. Irrigated agriculture in this site subwatershed is primarily deciduous nuts, with truck crops and irrigated pasture the next most common land uses (Figure II-1). This site subwatershed includes an upstream location (Duck Slough @ Whealan Rd) which was sampled in 2008. Table II-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

Table II-1. Coordinates of the Duck Slough site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Duck Slough @ Hwy 99*	535XDSAHN	37.2501	-120.4100
Duck Slough @ Whealan Rd [U]	535XDSAWH	37.26149	-120.34325

*Original ESJWQC sampling site
[U] Upstream sites

Figure II-1. Site subwatershed map of land use for the Duck Slough @ Hwy 99 sample site.



Subwatershed Monitoring History

Monitoring at Duck Slough began in the storm season of 2005 at Duck Slough @ Highway 99 and continued throughout the storm and irrigation seasons from 2006 through 2008 (Table II-2). Starting in October 2008, Duck Slough @ Hwy 99 was removed from the monitoring schedule except for MPM events which occurred during the irrigation season of 2009 (Table II-2). As of October 2008, Duck Slough @ Hwy 99 became an Assessment site and will be monitored again for normal monitoring in 2013 and 2014. The constituents sampled at this location from 2005-2009 are listed in Table II-3.

Management Plan Monitoring occurred at Duck Slough @ Hwy 99 in 2007, 2008 and 2009 for copper and chlorpyrifos and for *S. capricornutum* toxicity in 2009 only (Table II-4, Table II-5, and Table II-6). Duck Slough was monitored twice a month in 2007, at additional upstream locations in 2008 and monitored in 2009 during months of past exceedances.

Duck Slough is listed as an impaired waterbody on the proposed 2008 Central Valley Basin Plan 303d list for chlorpyrifos, *E. coli*, sediment toxicity and unknown toxicity. Agriculture is listed as the potential source for the impairment caused by chlorpyrifos; all other impairments have unknown sources.

Table II-2. Duck Slough @ Hwy 99 sampling events per season and year.

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

NA indicates that 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 Duck Slough @ Hwy 99 sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

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

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 8081A	Endrin				5	2	6	2	6					
EPA 8081A	Methoxychlor				5	2	6	2	6					
Organophosphates														
EPA 8141A	Azinphos methyl				5	2	7	2	6					
EPA 8141A	Chlorpyrifos	2	5	2	5	2	7	2	6				3	
EPA 8141A	Diazinon	2	5	2	5	2	7	2	6					
EPA 8141A	Dimethoate				5	2	7	2	6					
EPA 8141A	Disulfoton				5	2	7	2	6					
EPA 8141A	Malathion				5	2	7	2	6					
EPA 8141A	Methamidophos				5	2	6	2	6					
EPA 8141A	Methidathion				5	2	7	2	6					
EPA 8141A	Molinate				5	2	7	2	6					
EPA 8141A	Parathion, Methyl				5	2	7	2	6					
EPA 8141A	Phorate				5	2	7	2	6					
EPA 8141A	Phosmet				5	2	7	2	6					
EPA 8141A	Thiobencarb				5	2	7	2	6					
Pyrethroids														
EPA 8081A	Bifenthrin			2	5	2	6							
EPA 8081A	Cyfluthrin, total			2	5	2	6							
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	2	6					
EPA 549.2M	Paraquat dichloride				5	2	6	2	6					
EPA 619	Atrazine				5	2	6	2	6					

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*	Winter*	Storm*	Irrigation	Fall*
EPA 619	Cyanazine				5	2	6	2	6					
EPA 619	Simazine				5	2	6	2	6					
Metals (Total)														
EPA 200.8	Arsenic				5	2	6	2	6					
EPA 200.8	Boron				5	2	6	2	6					
EPA 200.8	Cadmium				5	2	6	2	6					
EPA 200.8	Copper				5	2	8	2	6				4	
EPA 200.8	Lead				5	2	6	2	6					
EPA 200.8	Nickel				5	2	6	2	6					
EPA 200.8	Selenium				5	2	2	2	6					
EPA 200.8	Zinc				5	2	6	2	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				5	2	8	2	6				4	
EPA 300.0	Nitrate as N				5	2	6	2	6					
EPA 350.2	Ammonia as N				5	2	6	2	6					
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	2	6					
EPA 354.1	Nitrite as N				5	2	6	2	6					
EPA 353.2	Nitrate + Nitrite as N													
EPA 365.2	Orthophosphate as P				5	2	6	2	6					
EPA 365.2	Phosphate as P				5	2	6	2	6					
Toxicity														
EPA 821/R-02-012	Ceriodaphnia dubia	2	5	2	6	2	7	2	6					

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	**Irrigation**	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Storm**	**Irrigation**	**Fall***	**Winter***	**Storm***	**Irrigation**	**Fall***
EPA 821/R-02-012	Pimephales promelas	2	5	2	5	2	7	2	6					
EPA 821/R-02-013	Selenastrum capricornutum	2	7	2	5	2	7	2	7				1	
EPA 600/R-99-064	Hyalella azteca			1	1	1	1	1	2					

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

Table II-4. Duck Slough site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and copper. "X" indicates the site, month, and analyte sampled.

Sample site	Date	Type	Chlorpyrifos	Copper
Duck Slough @ Hwy 99	24-Jul-07	A	x	
Duck Slough @ Hwy 99	21-Aug-07	A		x
Duck Slough @ Hwy 99	18-Sep-07	A		x

Table II-5. Duck Slough site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos and copper. X indicates the site, month and analyte sampled.

Station Name	Date	Type	Chlorpyrifos	Copper
Duck Slough @ Whealan Rd	29-Apr-08	U		X
Duck Slough @ Whealan Rd	27-May-08	U	X	
Duck Slough @ Whealan Rd	24-Jun-08	U		X
Duck Slough @ Whealan Rd	29-Jul-08	U	X	X
Duck Slough @ Whealan Rd	26-Aug-08	U		X
Duck Slough @ Whealan Rd	30-Sep-08	U		X

Table II-6. Duck Slough site subwatershed. 2009 Management Plan sampling schedule for chlorpyrifos, copper and *Selenastrum capricornutum* toxicity. "X" indicates the site, month and analyte sampled.

Site Name	Sample Date	*S. capricornutum*	Copper	Chlorpyrifos
Duck Slough @ Hwy 99	21-Apr-09	X		
Duck Slough @ Hwy 99	19-May-09			X
Duck Slough @ Hwy 99	16-Jun-09		X	
Duck Slough @ Hwy 99	21-Jul-09		X	X
Duck Slough @ Hwy 99	18-Aug-09		X	
Duck Slough @ Hwy 99	22-Sep-09		X	X

Exceedance History

Sampling at Duck Slough @ Hwy 99 resulted in exceedances of field and physical parameters, *E. coli,* metals, and chlorpyrifos. Toxicity in the water column to *Ceriodaphnia dubia* and *Selenastrum capricornutum* and in the sediment to *Hyalella azteca* also occurred at this monitoring site (Table II-7). During ambient water monitoring at Duck Slough @ Hwy 99 (including upstream sampling at Duck Slough @ Whealan Rd), exceedances of numerous field, physical, inorganic and organic parameters occurred including DO (2), pH (3), and *E. coli* (12, Table II-7). Exceedances of the chlorpyrifos (4), copper (14), and lead (11) WQTL have occurred. Samples taken from Duck Slough have also resulted in water column toxicity to *Ceriodaphnia* once and to *Selenastrum* three times. Sediment toxicity to *Hyalella* occurred twice, both during the 2008 irrigation season (Table II-7).

In 2009 there was one exceedance of the DO WQTL that occurred in June at Duck Slough @ Hwy 99 during the MPM irrigation season.

All exceedances are listed in Table II-7 by season and date and are based on WQTLs listed in the introduction of the ESJWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table II-7 and is determined using the ESJWQC Management Plan prioritization process flow chart (Figure 4). Dissolved oxygen is now under a management plan following the exceedance during the 2009 sampling season. *Selenastrum capricornutum* and *Hyalella azteca* toxicity are listed as priority level D since a review of past exceedances.

Table II-7. All exceedances experienced in samples collected from locations within the Duck Slough site subwatershed between July 2004 and December 2009 (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.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	*E. coli*, 235 MPN/100 mL	Copper,Total, 1,300 µg/L	Lead, Total, 15 µg/L	Chlorpyrifos, 0.015 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Duck Slough @ Hwy 99	Storm	3/21/2005			1600						
Duck Slough @ Hwy 99	Irrigation	5/10/2005			1600						
Duck Slough @ Hwy 99	Irrigation	7/12/2005						0.026			1320000
Duck Slough @ Hwy 99	Storm	3/15/2006			900						
Duck Slough @ Hwy 99	Irrigation	5/17/2006		8.57	280		5.2 (3.02)	0.27	0		
Duck Slough @ Hwy 99	Irrigation	6/14/2006			260						
Duck Slough @ Hwy 99	Irrigation	8/8/2006				3.4 (2.4)	2.3 (0.41)				
Duck Slough @ Hwy 99	Irrigation	9/13/2006	6.72		340	19 (5.0)	24 (1.25)				
Duck Slough @ Hwy 99	Storm	2/12/2007			2400	31 (10.1)	15 (3.59)				
Duck Slough @ Hwy 99	Storm	2/28/2007			2400						
Duck Slough @ Hwy 99	Irrigation	4/24/2007				4.1 (3.7)	1.5 (0.81)				
Duck Slough @ Hwy 99	Irrigation	6/26/2007				3.0 (2.4)	0.68 (0.41)				
Duck Slough @ Hwy 99	Irrigation	7/24/2007				3.5 (3.0)	0.64 (0.57)				
Duck Slough @ Hwy 99	Irrigation	7/31/2007		8.8				0.042			
Duck Slough @ Hwy 99	Irrigation	8/21/2007				5.5 (3.3)	1.1 (0.69)				
Duck Slough @ Hwy 99	Irrigation	8/28/2007				3.1 (2.4)					
Duck Slough @ Hwy 99	Irrigation	9/18/2007			610	6.9 (2.8)	1.8 (0.52)				
Duck Slough @ Hwy 99	Storm	1/25/2008			>2400						
Duck Slough @ Hwy 99	Storm	2/25/2008			>2400	9.9 (8.0)					
Duck Slough @ Hwy 99	Sediment	3/4/2008		8.65							

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	*E. coli*, 235 MPN/100 mL	Copper,Total, 1,300 µg/L	Lead, Total, 15 µg/L	Chlorpyrifos, 0.015 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Duck Slough @ Hwy 99	Irrigation	4/29/2008			280						937637
Duck Slough @ Hwy 99	Irrigation	5/7/2008									18219
Duck Slough @ Whealan Rd	*Irrigation*	*6/24/2008*				*73 (5.0)*					
Duck Slough @ Hwy 99	Irrigation	7/29/2008				2.7 (2.6)	0.69 (0.5)				
Duck Slough @ Hwy 99	Irrigation	8/26/2008					0.72 (0.69)				
Duck Slough @ Whealan Rd	*Irrigation*	*8/26/2008*				*3.4 (1.9)*					
Duck Slough @ Hwy 99	Sediment	8/28/2008								84	
Duck Slough @ Hwy 99	Irrigation	9/30/2008						0.034			
Duck Slough @ Whealan Rd	*Irrigation*	*9/30/2008*				*3.7 (1.3)*					
Duck Slough @ Hwy 99	Sediment	10/2/2008								87	
Duck Slough @ Hwy 99	Irrigation	6/16/2009	6.78								
Constituent Priority			**E**	**E**	**E**	**C**	**E**	**A/B**	**NP**	**NP[1]**	**D**

NP- Not prioritized. Fewer than two exceedances for this constituent at this site within three years and 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).

2007 - 2009 Management Plan Monitoring Results

Management Plan monitoring results are included in Table II-8 for chlorpyrifos, copper and *S. capricornutum* for the years from 2007 through 2009.

2007

In 2007, Duck Slough @ Hwy 99 was monitored monthly for chlorpyrifos and copper from April through September. Additional monitoring was conducted in July for chlorpyrifos and in August for copper. Chlorpyrifos was detected in samples collected during normal monitoring below the WQTL (0.011 µg/L), samples collected one week later on July 31, 2007 exceeded the WQTL (0.42 µg/L, Table II-8).

Copper exceedances (based on total copper) occurred in samples collected in 2007 during all months from February – September (except for May) including additional samples collected on August 28, 2007 (Table II-8).

2008

In accordance with the 2008 upstream MPM schedule, Duck Slough @ Whealan Road was monitored for chlorpyrifos during May and July 2008 and for copper during April, June, July, August, and September 2008 (previous section, Table II-5). Chlorpyrifos was detected at both Hwy 99 and Whealan Rd during July monitoring and exceeded the chlorpyrifos WQTL at Duck Slough @ Highway 99 during September monitoring.

Copper exceedances occurred once during normal monitoring in July and three times at the upstream site during June, August, and September (based on total copper, Table II-8).

2009

Duck Slough @ Hwy 99 was monitored for chlorpyrifos during May, July, and September 2009 during MPM; normal monitoring did not occur in this subwatershed during 2009. There were no exceedances or detections of chlorpyrifos in samples collected from Duck Slough during 2009.

There were also no exceedances of the copper WQTL in 2009 MPM samples analyzed for total and dissolved copper collected from June through September 2009. This was the first year that both total and dissolved copper were analyzed. In previous years, the WQTL was based on total copper which used hardness to determine the concentration considered toxic. In 2009 the determination was based on the dissolved fraction only.

Toxicity to *S. capricornutum* was also part of 2009 MPM; the sample collected in April 2009 was not toxic.

Management Plan Monitoring for copper, chlorpyrifos, and *Selenastrum* toxicity are planned for the 2010 irrigation season. Management Plan Monitoring during February 2011 will also occur for copper.

Table II-8. Duck Slough site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007), and 'US' indicates upstream MPM for chlorpyrifos (2008), copper (2007-2009 irrigation seasons) and *Selenastrum* (2009). Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (@ Hwy 99)	Date	4/24/07	5/29/07	6/26/07	7/24/07	8/21/07	9/18/07
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	0.011	<0.003	<0.003
	Copper (µg/L)	**4.1**	<0.06	**3**	**3.5**	**5.5**	**6.9**
2007 MPM A (@ Hwy 99)	Date	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA*	NA	**0.42**	NA	NA
	Copper (µg/L)	NA	NA	NA	NA	**3.1**	2.5
2008 NM (@ Hwy 99)	Date	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.0026	0.0067	<0.003	**0.034**
	Copper (µg/L)	3.3	2.4	2.9	**2.7**	3	3.8
2008 MPM US (@ Whealan Rd)	Date	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Chlorpyrifos (µg/L)	NA	<0.003	NA	0.0081	NA	NA
	Copper (µg/L)	3.5	NA	**73**	3	**3.4**	**3.7**
2009 MPM (@ Hwy 99)	Date	4/21/09	5/19/09	6/16/09	7/21/09	8/18/09	9/22/09
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	NA	<0.003
	Copper, total (µg/L)	NA	NA	2.3	2.5	2.4	2.7
	Copper, dissolved (µg/L)	NA	NA	0.61	0.7	0.61	0.25
	S. capricornutum toxicity (% Control)	222	NA	NA	NA	NA	NA

*Additional monitoring was initiated in June 2007; therefore no sample was collected for scheduled May additional monitoring.
NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads were calculated for the chlorpyrifos and copper detections (Table II-9) based on the following formula:

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

Because very few discharge measurements have been taken at the Duck Slough @ Hwy 99 site since it is usually too deep to wade, only exceedances and/or detections that occurred when discharge was taken during an event are shown in Table II-9.

Table II-9. Duck Slough site subwatershed. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured (sorted by analyte, site and date). Upstream site is in italics.

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Duck Slough @ Whealan Rd	*Chlorpyrifos*	*29-Jul-08*	*18.73*	*0.0081*	*4.30*
Duck Slough @ Hwy 99	Copper	12-Jul-06	58.3	2.7	4457.38
Duck Slough @ Hwy 99	Copper	18-Sep-07	0	6.9	0
Duck Slough @ Whealan Rd	*Copper*	*29-Apr-08*	*5.73*	*3.5*	*567.90*
Duck Slough @ Whealan Rd	*Copper*	*24-Jun-08*	*22.15*	*73*	*45787.17*
Duck Slough @ Whealan Rd	*Copper*	*29-Jul-08*	*18.73*	*3*	*1591.13*
Duck Slough @ Whealan Rd	*Copper*	*26-Aug-08*	*21.6*	*3.4*	*2079.60*
Duck Slough @ Whealan Rd	*Copper*	*30-Sep-08*	*7.56*	*3.7*	*792.08*

Source Identification and Outreach

Priority A/B Constituents

The only priority A/B constituent under the Duck Slough Management Plan is chlorpyrifos.

Chlorpyrifos

Chlorpyrifos exceeded the WQTL of 0.015 µg/L four times in this subwatershed from 2005 through 2008 (May, twice in July and September); there were no exceedances during 2009 (Table II-7).

PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds active ingredient (AI) applied, and acres treated (Table II-10, Figure II-2). The greatest amount of chlorpyrifos applied was in 2005 (4,790 lbs) with the lowest amount applied in 2007 (662 lbs, Table II-10, Figure II-2). In 2005, the greatest chlorpyrifos use occurred in July whereas in 2006, 2008 and 2009 the greatest use occurred in May and in 2007 during March (Table II-10, Figure II-2). Not all exceedances occurred during months of greatest use (Figure II-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos. The highest application rates are associated with almonds and alfalfa (Table II-11). The largest amount of chlorpyrifos applied from 2005 through 2009 was to almonds (5,851 lbs) followed by corn (1,593 lbs, Table II-11). The most common product used within this subwatershed containing chlorpyrifos was Lorsban (Table II-11).

Table II-10. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for January 2005 through December 2009 in the Duck Slough @ Hwy 99 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
January, 2005	4	76.9	38.1
March, 2005	14	408.7	695
June, 2005	2	50.0	30
July, 2005	17	4226.8	812
September, 2005	1	28.0	14
January, 2006	6	119.7	59
March, 2006	3	56.1	151
May, 2006	13	706.5	433
June, 2006	1	137.6	69
July, 2006	5	570.2	508
August, 2006	5	199.9	136
September, 2006	2	145.6	80
January, 2007	2	29.9	15
March, 2007	15	370.0	433.81
April, 2007	3	28.8	57.42
June, 2007	1	19.9	10
July, 2007	1	10.2	10
August, 2007	4	204.0	261.33
March, 2008	15	290.4	347.53
May, 2008	8	674.8	442
June, 2008	1	10.2	8
July, 2008	6	261.8	522.9
August, 2008	7	264.0	426.5
March, 2009	1	57.5	136
May, 2009	4	825.9	632

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
July, 2009	2	70.1	140
September, 2009	2	25.9	103.4
Summaries by Year			
2005 Total	38	4790.4	1589.1
2006 Total	35	1935.5	1436
2007 Total	26	662.8	787.56
2008 Total	37	1501.2	1746.93
2009 Total	9	979.4	1011.4
Total	**145**	**9,869.3**	**6,570.99**

Figure II-2. Pounds of chlorpyrifos applied within the Duck Slough @ Hwy 99 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

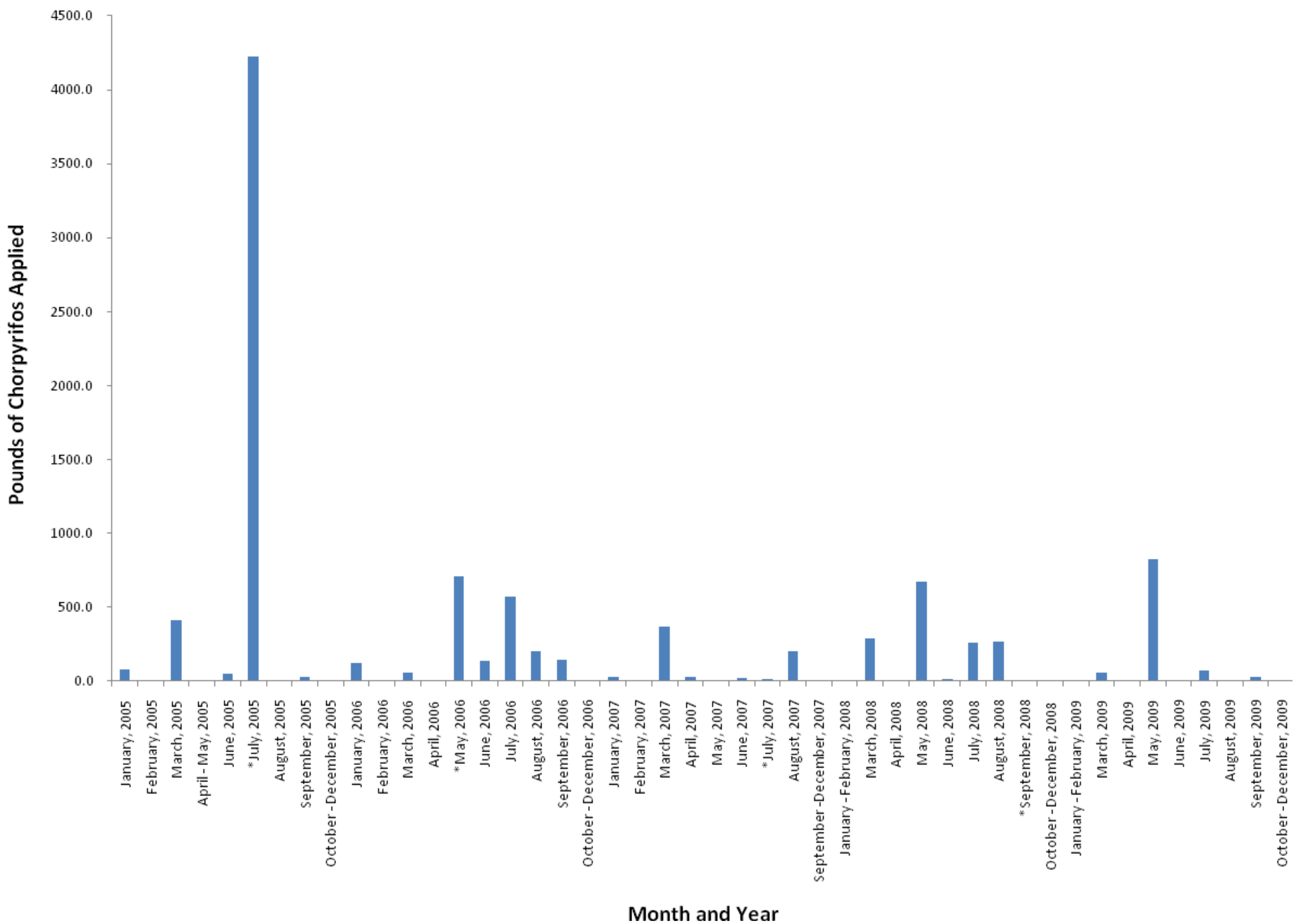


Table II-11. Total pounds AI for chlorpyrifos based on PUR data from 2005-2009 within the Duck Slough @ Hwy 99 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA	COBALT	57.529
		GOVERN 4E INSECTICIDE	184.604
		LOCK-ON INSECTICIDE	397.255
		LORSBAN 4E-HF	320.676
		LORSBAN-4E	42.404
		NUFOS 4E	51.855
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LORSBAN 4E INSECTICIDE	63.921
		LORSBAN 4E-HF	337.449
		LORSBAN 4E-HF INSECTICIDE	63.435
	ALMOND	CHLORPYRIFOS 4E AG	84.746
		GOVERN 4E INSECTICIDE	498.956
		LORSBAN 4E INSECTICIDE	175.710
		LORSBAN 4E-HF	1072.692
		LORSBAN-4E	3619.113
		NUFOS 4E	20.335
		WHIRLWIND	379.940
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	10.089
	CORN FOR/FOD	CHLORPYRIFOS 4E AG	121.754
		LORSBAN 15G GRANULAR INSECTICIDE	1451.281
		NUFOS 4E	10.168
	PEACH	CHLORPYRIFOS 4E AG	76.877
		LORSBAN 4E-HF	121.625
	WALNUT	GOVERN 4E INSECTICIDE	15.150
		LORSBAN-4E	406.509
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	LORSBAN 4E-HF	71.779
		LORSBAN-4E	213.393

ALFALFA - Total Pounds Chlorpyrifos Applied	1519.127
ALMOND – Total Pounds Chlorpyrifos Applied	5851.493
CORN – Total Pounds Chlorpyrifos Applied	1593.291
PEACH – Total Pounds Chlorpyrifos Applied	198.502
WALNUT – Total Pounds Chlorpyrifos Applied	706.831
Total pounds chlorpyrifos applied (2005 - 2009)	**9,869.245**

Previous analyses conducted by the Coalition in the 2009 Management Plan Update suggested 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. Also, TRS' with applications associated with past chlorpyrifos exceedances are close to and/or adjacent to Duck Slough suggesting that drift could play a major role in generating the exceedances and should be one of the subjects of focused outreach. The analysis concluded that outreach should target specific growers applying chlorpyrifos and/or members farming parcels adjacent to the creek. 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. Although approximately 38% of the member acreage utilize grass orchard or vineyard row centers and approximately 31% of the member acreage utilizes recirculation and/or tailwater return systems, the Coalition anticipates that targeted outreach will increase the use of these practices and other irrigation water management practices (see the ESJWQC General Survey Summary Report submitted on January 30, 2009 for details on the management practices within this subwatershed).

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of the Management Plan Update Report. The Coalition focused outreach to growers applying chlorpyrifos and those owning parcels with the potential to drain or drift to the creek. Prior to the 2009 irrigation season, several group grower meetings were held for members in the Duck Slough subwatershed to make them aware of the current issues and concerns specific to pesticide applications, and relevant management practices to protect and improve water quality in Duck Slough. The meetings also allowed the Coalition to update members on the strategy and status of the Duck Slough Management Plan.

Beginning in May 2009 and continuing through August 2009, the Coalition conducted individual meetings with targeted members. Targeted members were determined by considering a grower's chlorpyrifos use and if a grower's parcels had the potential to drain or drift to the creek. Of the 10,695 irrigated acres in the Duck Slough @ Hwy 99 subwatershed, 5,767 acres have the potential to drain or drift to the waterway and 4,440 of those acres are owned and operated by Coalition members. The Coalition eventually developed a list of 24 targeted members that represented 4,016 acres that have the potential to discharge to the creek. Coalition representatives then met with growers on their property to discuss the Duck Slough Management Plan and offer management practice recommendations specific to the land owner. Current management practices were assessed by Coalition representatives and additional management practices were discussed and encouraged. Individual contacts focused mainly on chlorpyrifos exceedances however all water quality results were reviewed and discussed including copper, *E. coli*, DO, lead, and pH, and toxicity to *Selenastrum*. To date, the Coalition has contacted all its targeted members, representing 4,016 acres or 23% of the acreage in the subwatershed. The Coalition re-contacted previously visited members via a group grower meeting held on February 19, 2010. Using the Coalition's Interactive Survey Devices, growers were polled to determine what additional management practices were implemented in 2009 and if additional practices are planned for 2010. The Coalition will continue to monitor the creek to assess water quality in 2010.

Priority C Constituents

Copper

Copper has exceeded the hardness based WQTL numerous times in this subwatershed from 2005 through 2009 based on results from total copper analysis; however there were no exceedances during 2009 (Table II-7).

PUR data are reviewed for the number of monthly copper applications, pounds active ingredient (AI) applied, and acres treated (Table II-12, Figure II-3). The amount of copper applied within the subwatershed has generally decreased. The greatest amount of copper applied was in 2005 (5,753.6 lbs) and the lowest amount applied was in 2009 (2,789.8 lbs). The greatest use occurred in January for 2005 and 2006; in 2008 and 2009 the greatest use occurred in December (Table II-12, Figure II-3) indicating winter season use is the most common. Not all exceedances occurred during months of the greatest use, and interestingly several exceedances occurred in later irrigation season months that had few or no reported applications (Figure II-3).

The largest applications were associated with almonds, nectarines, peaches, tomatoes, and walnuts (Table II-13). The largest amount of copper applied from 2005 through 2009 was to walnuts (4,948.881 lbs) followed by almonds (4,620.083 lbs) (Table II-13). The most common products containing copper used within this subwatershed were Kocide and Dupont Kocide (Table II-13).

Table II-12. Number of copper applications, total pounds applied and total acres treated by month for January 2005-December 2009 in the Duck Slough @ Hwy 99 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, 2005	12	1568.7	376.1
February, 2005	5	514.8	159.7
March, 2005	3	369.9	81
April, 2005	26	1363.2	483.25
May, 2005	10	497.1	214.5
August, 2005	3	139.8	127.8
September, 2005	2	82.4	74.7
October, 2005	1	25.8	21
November, 2005	1	69.1	45
December, 2005	5	1122.8	153
January, 2006	12	1872.3	321
February, 2006	9	814.0	251
March, 2006	4	288.0	360
April, 2006	12	1038.3	263.5
May, 2006	9	935.4	367

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
August, 2006	1	113.0	103
December, 2006	2	539.0	70
January, 2007	9	1502.7	223
February, 2007	8	533.7	280
March, 2007	3	309.2	115
April, 2007	10	422.9	147.5
May, 2007	1	8.3	33
December, 2007	5	247.0	88
January, 2008	6	826.5	136
February, 2008	2	650.3	42
April, 2008	1	27.7	15
May, 2008	5	318.9	165.5
June, 2008	1	17.9	25.84
November, 2008	1	166.0	60
December, 2008	3	901.0	100
January, 2009	2	847.7	102
February, 2009	1	35.6	58
April, 2009	12	596.1	294.5
May, 2009	6	303.2	170.5
August, 2009	1	69.3	30
November, 2009	1	77.0	10
December, 2009	4	861.0	73
Summaries by Year			
2005 Total	68	5753.6	1736.05
2006 Total	49	5600.0	1735.5
2007 Total	36	3023.9	886.5
2008 Total	19	2908.1	544.34
2009 Total	27	2789.8	738
Total	**199**	**20,075.4**	**5,640.39**

Figure II-3. Pounds of copper applied within the Duck Slough @ Hwy 99 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

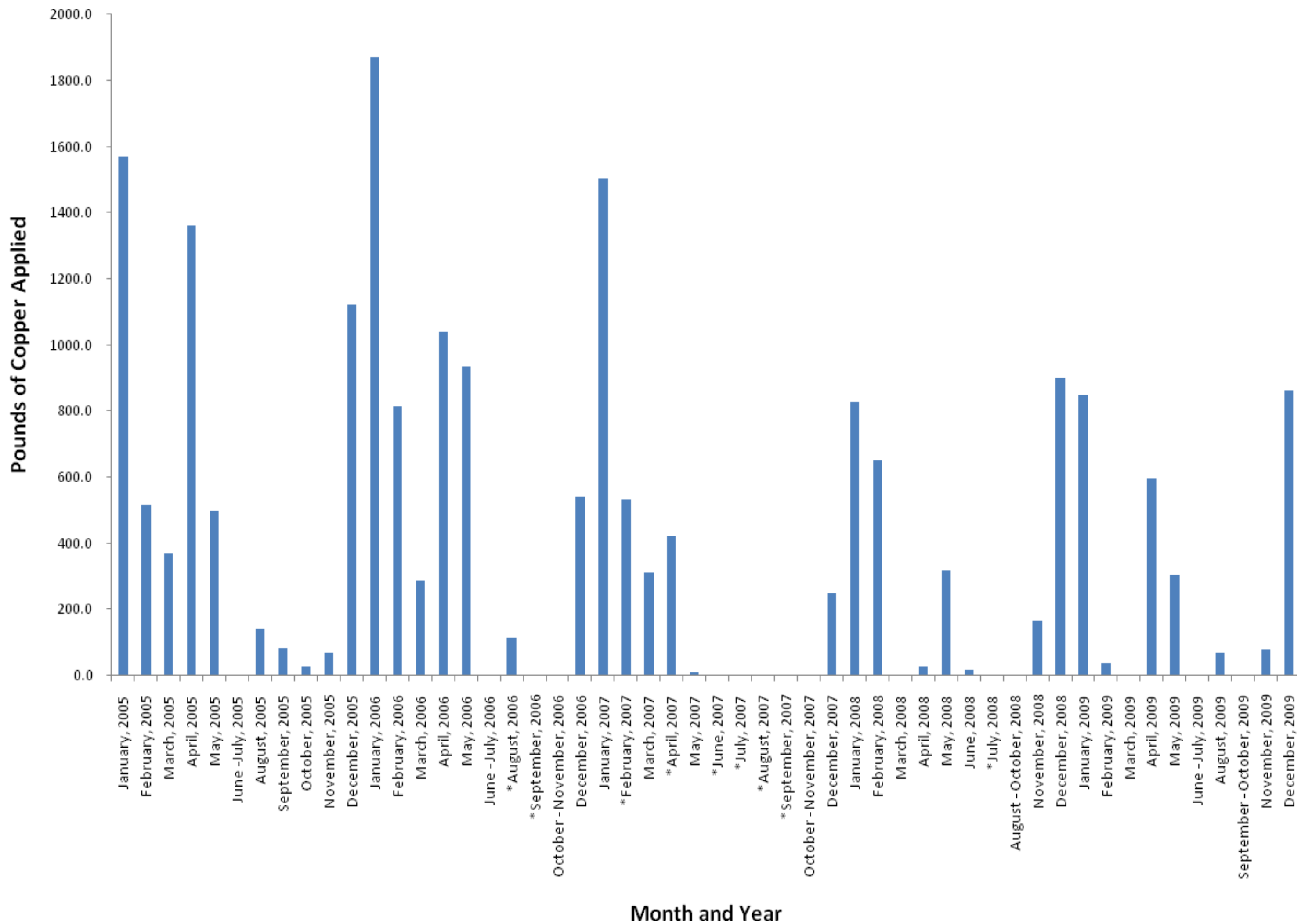


Table II-13. Total pounds AI for copper based on PUR data from 2005-2009 within the Duck Slough @ Hwy 99 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 2000	63.753
	ALMOND	BASIC COPPER 53	220.500
		COOKE BLUESTONE	8.250
		CUPROFIX ULTRA 40 DISPERSS	602.217
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	117.822
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	59.008
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	35.612
		KOCIDE 101	887.040
		KOCIDE 2000	228.650
		KOCIDE DF	853.460
		NORDOX 75 WG	1607.524
	APRICOT	BASIC COPPER 53	58.800
		KOCIDE 2000	118.360
		KOCIDE DF	122.800
	CHERRY	NU-COP 50DF	154.000
	NECTARINE	BASIC COPPER 53	98.000
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	27.660
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	42.368
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	23.050
		KOCIDE 101	1155.000
		KOCIDE 2000	201.750
	N-OUTDOOR PLANT	BASIC COPPER 53	1519.000
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	331.920
	N-OUTDR CONTAINER/FLD GRWN PLANTS	DUPONT GX-569 FUNGICIDE/BACTERICIDE	53.430
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	165.960
		KOCIDE 101	473.550
	PEACH	BASIC COPPER 53	2528.400
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	172.160
		KOCIDE 101	154.000
		KOCIDE DF	761.974
	PEPPERS (FRUITING VEGETABLE), (BELL, CHILI, ETC.)	KOCIDE 101	121.275
		KOCIDE DF	27.016

Chemical Name	Commodity	Product Name	Lbs AI Applied
	PISTACHIO (PISTACHE NUT)	CUPROFIX DISPERSS DRY FLOWABLE FUNGICIDE/BACTERCIDE FOR TURF AND ORNAMENTAL USE	8.303
	PLUM	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	80.700
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	KOCIDE 101	154.000
	PRUNE	NORDOX 75 WG	519.173
	TOMATO	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	19.368
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	43.449
		KOCIDE 101	422.153
		KOCIDE 2000	669.390
		KOCIDE DF	78.899
	TOMATO PROCESSING	CHAMPION WETTABLE POWDER	69.300
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	67.541
	WALNUT	DUPONT GX-569 FUNGICIDE/BACTERICIDE	212.982
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	648.828
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	355.431
		KOCIDE 101	309.232
		KOCIDE 2000	350.238
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	167.453
		KOCIDE 101	1188.880
		KOCIDE 2000	1168.267
		KOP-HYDROXIDE 50W	396.550
		NORDOX 75 WG	151.020

ALFALFA – Total Pounds Copper Applied	63.753
ALMOND – Total Pounds Copper Applied	4,620.083
APRICOT – Total Pounds Copper Applied	299.960
CHERRY – Total Pounds Copper Applied	154.000
NECTARINE – Total Pounds Copper Applied	1,547.828
N-OUTDOOR PLANTS – Total Pounds Copper Applied	2543.86
PEACH – Total Pounds Copper Applied	3,616.534
PEPPERS – Total Pounds Copper Applied	148.291
PISTACHIO– Total Pounds Copper Applied	8.303
PLUM (INCLUES PRUNES) – Total Pounds Copper Applied	753.873
TOMATO – Total Pounds Copper Applied	1370.1

Chemical Name	Commodity	Product Name	Lbs AI Applied
		WALNUT – Total Pounds Copper Applied	4,948.881
		Total pounds copper applied (2005 - 2009)	**20,075.465**

Previous analyses conducted by the Coalition and reported in the 2009 Management Plan Update suggested that a small number of applications in the watershed are responsible for past copper exceedances, most likely through irrigation runoff as most copper applications are specified as ground. The Coalition has thus focused its outreach to target specific growers with the potential to discharge to the creek, which coincides with the outreach strategy for chlorpyrifos. Growers should be encouraged to review their operation to determine if irrigation return flows are managed properly, particularly in the irrigation months when copper exceedances are common. Orchard operators are advised to consider storm runoff relevant to copper applications to prevent the winter exceedances of copper. No copper exceedances occurred in 2009 during the months when this site was sampled. Individual contacts that occurred within this subwatershed are described under the chlorpyrifos outreach section above and included discussions of copper exceedances and the above management practices.

Priority D Constituents

Water column toxicity to *Selenastrum capricornutum* and sediment toxicity to *Hyalella azteca* are listed as priority D Constituents under the Duck Slough @ Hwy 99 Site Subwatershed Management Plan.

Selenastrum capricornutum toxicity

Toxicity to *Selenastrum* occurred in July 2005 and in April 2008 and was persistent in the resample collected in May 2008. Although there were not any copper exceedances associated with toxicity, the Coalition elected to list water column toxicity to *Selenastrum* and *Hyalella azteca* sediment toxicity as a priority D constituent because of the high frequency of copper exceedances at this site. There was no toxicity associated with the MPM sample collected in April 2009.

The Coalition's strategy for eliminating *Selenastrum* toxicity is to focus 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 *Selenastrum* toxicity can also be reduced or eliminated. If the Coalition finds that copper exceedances are eliminated but *Selenastrum* toxicity persists, then additional herbicides will be targeted for outreach and management.

Priority E Constituents

Priority E constituents include pH, DO, *E. coli,* 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 annual grower meetings.

Evaluation

Duck Slough @ Hwy 99 is one of the first three priority site subwatersheds within the ESJWQC and is in its second year of focused outreach (2008-2010). The Coalition's strategy for the Duck Slough subwatershed has been to target growers along or adjacent to the waterway that have the potential to discharge. Focus has been on both aerial application and tailwater retention management practices. 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 to document current management practices and assess planned implementations have been completed by 100% of targeted growers. The Coalition is now in the process of assessing these results and planning the final stages of outreach including re-contacting growers to identify newly implemented practices.

The amount of chlorpyrifos applied as well as the acreage treated with chlorpyrifos products has decreased since 2005. Results of Management Plan Monitoring conducted in 2009 included no exceedances of chlorpyrifos or copper and no toxicity to *S. capricornutum* indicating improved water quality. Management Plan Monitoring in 2010 will indicate if a change in management practices as a result of individual contacts has resulted in long-term improvements to downstream water quality.

III. Prairie Flower Drain

Management Plan Constituents

Priority A/B
- Chlorpyrifos

Priority D
- Nitrate / Nitrate + Nitrite
- *Ceriodaphnia dubia* water column toxicity
- *Hyalella azteca* sediment toxicity

Priority E
- Ammonia
- Dissolved Oxygen
- pH
- Specific Conductivity
- Total Dissolved Solids
- *E. coli*
- *Selenastrum capricornutum* water column toxicity

Description of Prairie Flower Drain @ Crows Landing Rd Site Subwatershed

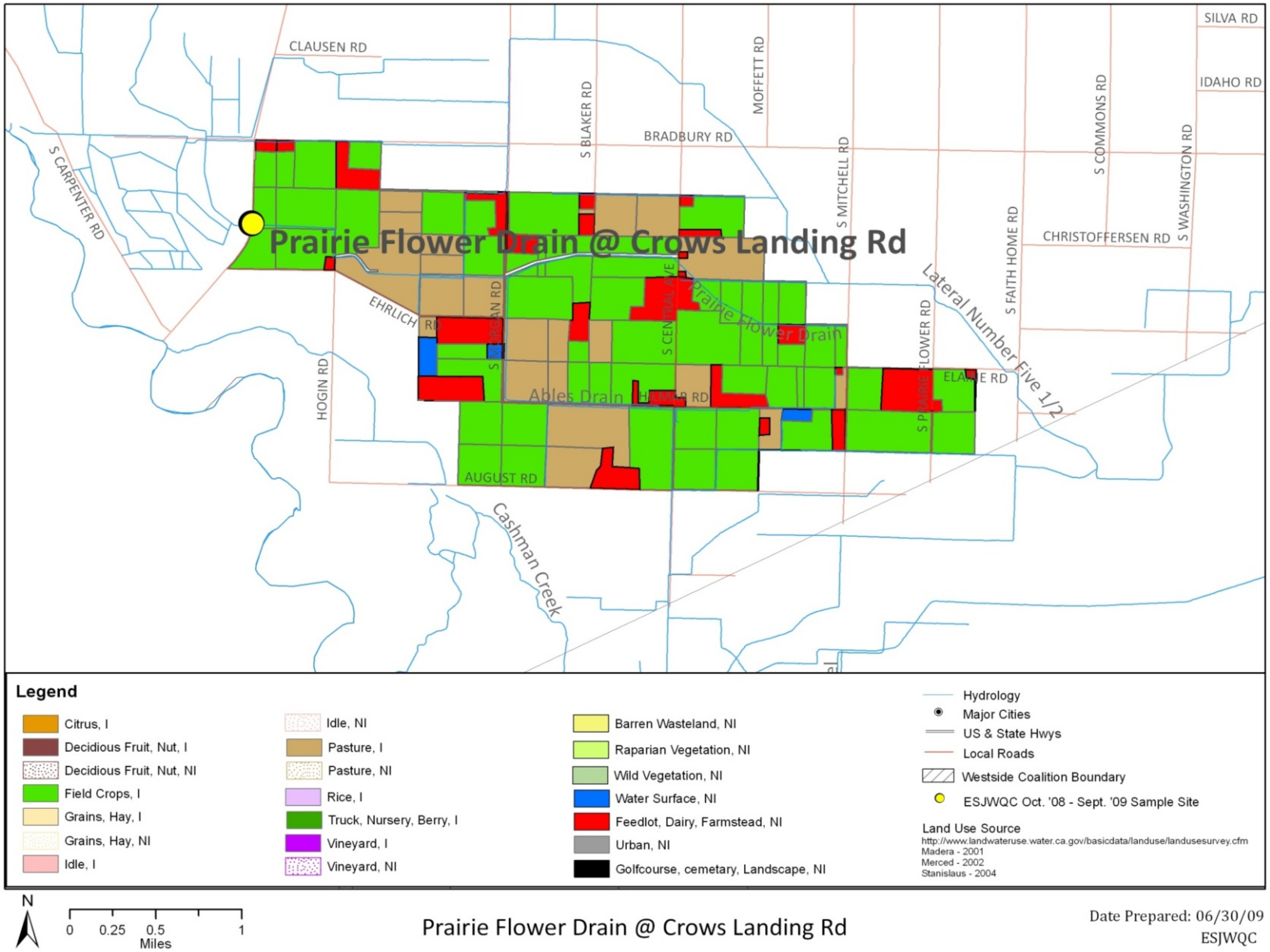
Prairie Flower Drain @ Crows Landing Rd (3,611 irrigated acres) – Relative to other drains in the western portion of the Coalition region, Prairie Flower Drain is longer and appears to drain mostly irrigated agriculture. Dairies and feedlots are ubiquitous in this part of the Coalition region and this drain may receive runoff from several dairies immediately upstream. Upstream agriculture is field crops (Figure III-1). Many of the drains in the eastern part of the Coalition region, including Prairie Flower Drain, were constructed to intercept shallow ground water and lower the water table sufficiently to allow agriculture. Consequently, agriculture in the watershed tends to be dominated by shallow rooted field crops. This site subwatershed includes an upstream location (Prairie Flower Drain @ Morgan Rd) which was sampled in 2008. Table III-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

Table III-1. Coordinates of the Prairie Flower Drain site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Prairie Flower Drain @ Crows Landing Road*	535XPFDCL	37.4422	-121.00236
Prairie Flower Drain @ Morgan Rd[U]	535XPFDMR	37.437875	-120.97566

* Original ESJWQC sampling site
[U] Upstream sites

Figure III-1. Site subwatershed map of land use for the Prairie Flower Drain @ Crows Landing Rd sample site.



Subwatershed Monitoring History

Ambient monitoring began at Prairie Flower Drain @ Crows Landing Rd during the storm season of 2005 and continued uninterrupted through 2009 (Table III-2). Specific information on the analysis conducted across each of the monitoring seasons is provided below (Table III-3). Prairie Flower Drain @ Crows Landing Rd will remain a Core Monitoring location under the new MRPP through 2010. In 2011 this site will be monitored as an Assessment site.

Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season. Additional monitoring for chlorpyrifos and toxicity to *Pimephales promelas* occurred in 2007 (Table III-4). Upstream monitoring at Prairie Flower Drain @Morgan Rd occurred for chlorpyrifos, nitrate, and toxicity to *Ceriodaphnia* and *Pimephales* in 2008 (Table III-5). Management Plan Monitoring for 2009 occurred at Prairie Flower Drain @ Crows Landing Rd for chlorpyrifos and toxicity to *Selenastrum* (Table III-6).

Prairie Flower Drain is not considered impaired under the proposed Basin Plan and is not listed on the 303d list. However the section of the San Joaquin River which receives water from Prairie Flower Drain is listed as impaired for BHC-alpha, boron, chlorpyrifos, DDE, DDT, SC, Group A pesticides, mercury, water temperature, and unknown toxicity.

Table III-2. Prairie Flower Drain @ Crows Landing Rd sampling events per season and year

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

NA indicates that this site was not sampled during this season/year.

Table III-3. Number of analyses performed per analyte in each sampling season and year for the Prairie Flower Drain @ Crows Landing 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			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Field and Physical Parameters														
EPA 110.2	Color	2	5	2	5	3	6	2	6					
EPA 160.1	Dissolved Solids	2	5	2	5	2	6	3	6	2	2	2	6	2
EPA 160.2	Suspended Solids							1		2	2	2	6	2
EPA 180.1	Turbidity	2	5	2	5	2	6	3	6	2	2	2	6	2
EPA 405.1	BOD				1	2	2							
EPA 415.1	Total Organic Carbon	2	5	2	5	2	6	3	6	2	2	2	6	2
SM 9223 B	E. coli	2	5	2	5	2	6	3	6	2	2	2	6	2
NA	Dissolved Oxygen	2	5	4	6	3	13	5	10	2	2	3	6	2
NA	Specific Conductivity	2	5	4	6	3	13	5	10	2	2	3	6	2
NA	pH	2	5	4	6	3	13	5	10	2	2	3	6	2
Carbamates														
EPA 8321A	Aldicarb				5	2	6	2	6					
EPA 8321A	Carbaryl				5	2	6	2	6					
EPA 8321A	Carbofuran				5	2	6	2	6					
EPA 8321A	Diuron				5	2	6	2	6					
EPA 8321A	Linuron				5	2	6	2	6					
EPA 8321A	Methiocarb				5	2	6	2	6					
EPA 8321A	Methomyl				5	2	6	2	6					
EPA 8321A	Oxamyl				5	2	6	2	6					
Organochlorines														
EPA 8081A	DDD(p,p')				5	2	6	2	6					
EPA 8081A	DDE(p,p')				5	2	6	2	6					
EPA 8081A	DDT(p,p')				5	2	6	2	6					
EPA 8081A	Dicofol				5	2	6	2	6					
EPA 8081A	Dieldrin				5	2	6	2	6					

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Endrin				5	2	6	2	6					
EPA 8081A	Methoxychlor				5	2	6	2	6					
Organophosphates														
EPA 8141A	Azinphos methyl				5	2	6	2	6					
EPA 8141A	Chlorpyrifos	2	5	2	5	2	8	2	6				1	
EPA 8141A	Diazinon	2	5	2	5	2	6	2	6					
EPA 8141A	Dimethoate				5	2	6	2	6					
EPA 8141A	Disulfoton				5	2	6	2	6					
EPA 8141A	Malathion				5	2	6	2	6					
EPA 8141A	Methamidophos				5	2	6	2	6					
EPA 8141A	Methidathion				5	2	6	2	6					
EPA 8141A	Molinate				5	2	6	2	6					
EPA 8141A	Parathion, Methyl				5	2	6	2	6					
EPA 8141A	Phorate				5	2	6	2	6					
EPA 8141A	Phosmet				5	2	6	2	6					
EPA 8141A	Thiobencarb				5	2	6	2	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	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	2	6					
EPA 549.2M	Paraquat dichloride				5	2	6	2	6					
EPA 619	Atrazine				5	2	6	2	6					
EPA 619	Cyanazine				5	2	6	2	6					

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 619	Simazine				5	2	6	2	6					
Metals (Total)														
EPA 200.8	Arsenic				5	2	6	2	6					
EPA 200.8	Boron				5	2	6	2	6					
EPA 200.8	Cadmium				5	2	6	2	6					
EPA 200.8	Copper				5	2	6	2	6					
EPA 200.8	Lead				5	2	6	2	6					
EPA 200.8	Nickel				5	2	6	2	6					
EPA 200.8	Selenium				5	2	2	2	6					
EPA 200.8	Zinc				5	2	6	2	6					
Metals (Dissolved)														
EPA 200.8	Cadmium													
EPA 200.8	Copper													
EPA 200.8	Lead													
EPA 200.8	Nickel													
EPA 200.8	Zinc													
Nutrients														
SM 2340 C	Hardness as CaCO3				5	2	6	2	6					
EPA 300.0	Nitrate as N				5	2	6	2	6					
EPA 350.2	Ammonia as N				5	2	6	3	6	2	2	2	6	2
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	3	6	2	2	1	1	
EPA 354.1	Nitrite as N				5	2	6	2	6					
EPA 353.2	Nitrate + Nitrite as N							1		2	2	2	6	2
EPA 365.2	Orthophosphate as P				5	2	6	3	6	2	2	1	1	
EPA 365.2	Phosphate as P				5	2	6	3	6	2	2	2	6	2
Toxicity														
EPA 821/R-02-012	Ceriodaphnia dubia	2	5	3	5	2	8	2	6					
EPA 821/R-02-012	Pimephales promelas	2	5	2	6	2	8	2	6					

Method	Analyte	2005		2006		2007		2008			2009			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 821/R-02-013	Selenastrum capricornutum	2	5	2	5	2	8	4	8				2	
EPA 600/R-99-064	Hyalella azteca		5	1	1	1	3	1	2					

Table III-4. Prairie Flower Drain @ Crows Landing Rd. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and *Pimephales* toxicity. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	*Pimephales promelas*
Prairie Flower @ Crows Landing Rd	31-Jul-07	A		X
Prairie Flower @ Crows Landing Rd	28-Aug-07	A	X	
Prairie Flower @ Crows Landing Rd	25-Sep-07	A	X	

Table III-5. Prairie Flower Drain site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos, nitrate, *Ceriodaphnia* toxicity, and *Pimephales* toxicity. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	Nitrate	*Ceriodaphnia dubia*	*Pimephales promelas*
Prairie Flower @ Morgan Rd	22-Apr-08	U		X		
Prairie Flower @ Morgan Rd	20-May-08	U		X		
Prairie Flower @ Morgan Rd	17-Jun-08	U		X		
Prairie Flower @ Morgan Rd	22-Jul-08	U		X		X
Prairie Flower @ Morgan Rd	19-Aug-08	U	X	X		
Prairie Flower @ Morgan Rd	23-Sep-08	U	X	X	X	

Table III-6. Prairie Flower Drain site subwatershed. 2009 Management Plan sampling schedule for chlorpyrifos and *Selenastrum capricornutum* toxicity. "X" indicates the site, month and analyte sampled.

Site Name	Sample Date	*Selenastrum capricornutum*	Chlorpyrifos
Prairie Flower Drain @ Crows Landing Rd	21-Apr-09	X	
Prairie Flower Drain @ Crows Landing Rd	19-May-09	X	
Prairie Flower Drain @ Crows Landing Rd	18-Aug-09		X

Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli,* nutrients, metals, pesticides, and water column and sediment toxicity occurred in the Prairie Flower Drain site subwatershed (Table III-7). Samples collected over the entire five years of monitoring at the Prairie Flower Drain sample site resulted in exceedances including DO (19), pH (6), SC (66), TDS (45), *E. coli* (31), nitrate (23), nitrite (1), nitrate + nitrite (15), ammonia (6), chlorpyrifos (4), and one each of arsenic, dimethoate, and malathion. Toxicity has occurred twice to *Ceriodaphnia dubia,* eight times to *Selenastrum capricornutum* and twice to *Pimephales promelas*. Sediment toxicity to *Hyalella azteca* has occurred six times.

During 2009, exceedances detected at the normal monitoring and upstream MPM sites included specific conductivity (12), TDS (12), *E. coli* (6), ammonia (4), and nitrate + nitrite (12). One water sample tested toxic *Selenastrum capricornutum*.

All exceedances are listed in Table III-7 by season and date and are based on water quality trigger limits (WQTL) listed in the introduction to the ESJWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table III-7 and is determined using the ESJWQC Management Plan prioritization process flow chart (Figure 4).

Table III-7. All exceedances experienced in samples collected from locations within the Prairie Flower Drain site subwatershed between February 2005 and December 2009 (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.

Station Name	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	Ammonia, 1.5 mg/L	Nitrate as N, 10 mg/L	Nitrite as N, 1 mg/L	Nitrate + Nitrite as N, 10 mg/L	Arsenic, 10 µg/L	Chlorpyrifos, 0.015 µg/L	Dimethoate, µ1 g/L	Malathion, 0 µg/L	*C. dubia*, Survival (%)	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell Count	*H. azteca*, Survival (%)
Prairie Flower Drain @ Crows Landing Rd	Storm	2/15/2005			2561	1600													
Prairie Flower Drain @ Crows Landing Rd	Storm	3/22/2005	6.5		2568	1600	1600												
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/11/2005			3168	1600	500												
Prairie Flower Drain @ Crows Landing Rd	Irrigation	6/15/2005			1705	1300	300												
Prairie Flower Drain @ Crows Landing Rd	Irrigation	7/13/2005	3.2		1723	1100	1600												
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/17/2005			1779	990	1600						0.029						
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/21/2005	5.22		791	460	500						0.018						83.8
Prairie Flower Drain @ Crows Landing Rd	Storm	3/1/2006			2419	1600	900												
Prairie Flower Drain @ Crows Landing Rd	Storm	3/16/2006		8.77	2728	1600	300									75			
Prairie Flower Drain @ Crows Landing Rd	Storm	3/24/2006			2782														
Prairie Flower Drain @ Crows Landing Rd	Storm	5/2/2006			2724														88.75
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/18/2006			2958	1700	550												
Prairie Flower Drain @ Crows Landing Rd	Irrigation	6/15/2006			2660	1700	1300		21										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	7/13/2006	5.45	8.85	1560	720	790	18									8		
Prairie Flower Drain @ Crows Landing Rd	Irrigation	7/20/2006	6.41		1950												70		
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/10/2006			2302	1800	820		17	1.1									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/14/2006	6.01		1276	760	2400		11										
Prairie Flower Drain @ Crows Landing Rd	Storm	2/11/2007		6.12	2659	1600	2400		24										
Prairie Flower Drain @ Crows Landing Rd	Storm	3/1/2007		8.57	2592	1500			42										

Station Name	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	Ammonia, 1.5 mg/L	Nitrate as N, 10 mg/L	Nitrite as N, 1 mg/L	Nitrate + Nitrite as N, 10 mg/L	Arsenic, 10 µg/L	Chlorpyrifos, 0.015 µg/L	Dimethoate, µ1 g/L	Malathion, 0 µg/L	*C. dubia*, Survival (%)	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell Count	*H. azteca*, Survival (%)
Prairie Flower Drain @ Crows Landing Rd	Storm	3/7/2007			4798														
Prairie Flower Drain @ Crows Landing Rd	Irrigation	4/17/2007			2127	1700			25										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/15/2007	5.59		2473	1500	920		32									1071154	
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/23/2007			2390														
Prairie Flower Drain @ Crows Landing Rd	Irrigation	6/19/2007		8.54	2304	1500			41			12							
Prairie Flower Drain @ Crows Landing Rd	Irrigation	7/17/2007	4.3		1067	730			13										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/14/2007			1126	700	260		16										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/16/2007			2562														58
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/28/2007	3.64		1015								0.094						
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/11/2007	7.86		1097	540	2400									0			16
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/18/2007			2262														
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/25/2007			2489														
Prairie Flower Drain @ Crows Landing Rd	Storm	1/24/2008			2371	1500	1100		23									797608	
Prairie Flower Drain @ Crows Landing Rd	Storm	1/30/2008			2944														
Prairie Flower Drain @ Crows Landing Rd	Storm	2/26/2008			2722	1600			28									442649	
Prairie Flower Drain @ Crows Landing Rd	Sediment	3/4/2008			2639														
Prairie Flower Drain @ Crows Landing Rd	Irrigation	4/22/2008			2548	1700	370		23									403571	
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*4/22/2008*	*3.29*		*2574*				*35*										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	4/29/2008	5.44		1739													517549	
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/20/2008			2526	1600	610		26									771556	
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*5/20/2008*	*1.17*		*2026*				*22*										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/27/2008			2273													215568	

Station Name	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	Ammonia, 1.5 mg/L	Nitrate as N, 10 mg/L	Nitrite as N, 1 mg/L	Nitrate + Nitrite as N, 10 mg/L	Arsenic, 10 µg/L	Chlorpyrifos, 0.015 µg/L	Dimethoate, µ1 g/L	Malathion, 0 µg/L	*C. dubia*, Survival (%)	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell Count	*H. azteca*, Survival (%)
Prairie Flower Drain @ Crows Landing Rd	Irrigation	6/17/2008			2049	1200	1300	2.1	19										
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*6/17/2008*			*2893*				*30*										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	7/22/2008	2.51		1012	620	250		11					2.7					
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*7/22/2008*	*2.76*		*1417*														
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/19/2008	4.93		956	610	440		13				0.024		0.12				
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*8/19/2008*	*3.63*		*1300*				*20*										
Prairie Flower Drain @ Crows Landing Rd	Sediment	8/28/2008			1114														87
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/23/2008			2525	1800			33										
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*9/23/2008*	*3.3*		*2675*				*29*										
Prairie Flower Drain @ Crows Landing Rd	Sediment	10/2/2008			2449														83
Prairie Flower Drain @ Crows Landing Rd	Fall	10/21/2008			1742	1100	370				27								
Prairie Flower Drain @ Crows Landing Rd	Fall	11/11/2008			2151	1500					39								
Prairie Flower Drain @ Crows Landing Rd	Fall	12/16/2008			2298	2900	1300				40								
Prairie Flower Drain @ Crows Landing Rd	Winter	1/20/2009			2414	1500					43								
Prairie Flower Drain @ Crows Landing Rd	Storm	2/7/2009			2255	1300					31								
Prairie Flower Drain @ Crows Landing Rd	Winter	3/17/2009		8.74	2394	1400					34								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	4/21/2009			2223	1400	410				24								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/19/2009	4.78		2066	1200	>2400	3.2			20							266798	
Prairie Flower Drain @ Crows Landing Rd	Irrigation	6/16/2009			2417	1400		1.3			22								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	7/21/2009			1366	820		1.8			14								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/18/2009			1984	1200					22								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/22/2009			2171	1400	1300				35								

Station Name	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	Ammonia, 1.5 mg/L	Nitrate as N, 10 mg/L	Nitrite as N, 1 mg/L	Nitrate + Nitrite as N, 10 mg/L	Arsenic, 10 µg/L	Chlorpyrifos, 0.015 µg/L	Dimethoate, µ1 g/L	Malathion, 0 µg/L	*C. dubia*, Survival (%)	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell Count	*H. azteca*, Survival (%)
Prairie Flower Drain @ Crows Landing Rd	Fall	10/20/2009			2459	1400	1300				25								
Prairie Flower Drain @ Crows Landing Rd	Fall	11/17/2009			2415	1500	>2400	8.8			36								
Prairie Flower Drain @ Crows Landing Rd	Storm	12/15/2009			2695	1600	2000				36								
Constituent Priority			**E**	**E**	**E**	**E**	**E**	**E**	**D**	**NP**	**D**	**NP**	**A/B**	**NP**	**NP**	**D**	**NP[1]**	**E**	**D**

NP- Not prioritized. Fewer than two exceedances for this constituent at this site within three years and 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).

2007 - 2009 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table III-8 for chlorpyrifos, nitrate, and toxicity to *Ceriodaphnia dubia* and *Pimephales promelas* from 2007 through 2009. The 2009 MPM results also include *Selenastrum capricornutum.*

2007

In 2007, MPM was implemented at the Prairie Flower Drain monitoring site for chlorpyrifos and *Pimephales promelas* toxicity. The site was monitored monthly for chlorpyrifos and *Pimephales promelas* toxicity. Additional MPM occurred for *Pimephales* toxicity in July and for chlorpyrifos in August and September of 2007 (Table III-8). In August, the normal monitoring sample did not contain chlorpyrifos above the detection limit however the additional sample (collected two weeks later) contained 0.094µg/L of chlorpyrifos. No toxicity to *Pimephales* occurred in the samples collected in 2007.

2008

Upstream MPM for chlorpyrifos, nitrate, and toxicity to *Ceriodaphnia dubia* and *Pimephales promelas* occurred during the 2008 irrigation season at Prairie Flower Drain @ Morgan Road. Table III-8 provides monitoring results for chlorpyrifos, nitrate, *Ceriodaphnia*, and *Pimephales* toxicity from all sampling events during the 2008 irrigation season. Chlorpyrifos exceeded the WQTL once on August 19, 2008 during normal monitoring (0.024 µg/L). With the exception of July upstream MPM, nitrate exceedances were experienced during every sampling event in 2008 at both monitoring locations. No samples were toxic to *Ceriodaphnia* or *Pimephales* during the 2008 irrigation season.

2009

Management Plan Monitoring at Prairie Flower Drain @ Crows Landing Rd for chlorpyrifos resulted in no detections in 2009. Monitoring for *Selenastrum* toxicity in April and May resulted in toxic samples in May. A TIE was initiated on May 27, 2009 and it was concluded that cationic chemical(s) and ammonia were reported as the cause of toxicity to *Selenastrum*.

Management Plan Monitoring for chlorpyrifos, *Ceriodaphnia* toxicity, *Selenastrum* toxicity and *Hyalella* toxicity are planned for the 2010 irrigation season. Management Plan Monitoring during February and March 2011 will also occur for *Ceriodaphnia* and *Selenastrum* toxicity.

Table III-8. Prairie Flower Drain site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007), 'US' indicates upstream MPM for chlorpyrifos (2008-2009), nitrate, *Ceriodaphnia*, and *Pimephales* from the 2007-2008 irrigation seasons, and MPM for *Selenastrum* (2009). Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (@ Crows Landing Rd)	Date	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/25/07
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	0.009	<0.003	<0.003
	Nitrate (mg/L)	**25**	**41**	**32**	**13**	**16**	9.8
	C. dubia toxicity (% Control)	100	90	95	100	100	**0**
	P. promelas toxicity (% Control)	97.5	100	100	97.5	100	100
2007 MPM A (@ Crows Landing Rd)	Date	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	**0.094**	<0.003
	P. promelas toxicity (% Control)	NA	NA	NA	100	NA	NA
2008 NM (@ Crows Landing Rd)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	**0.024**	<0.003
	Nitrate (mg/L)	**23**	**26**	**19**	**11**	**13**	**33**
	C. dubia toxicity (% Control)	100	95	100	95	100	95
	P. promelas toxicity (% Control)	100	100	100	100	100	100
2008 MPM US (@ Morgan Rd)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	<0.003	<0.003
	Nitrate (mg/L)	**35**	**22**	**30**	0.053	**20**	**29**
	C. dubia toxicity (% Control)	NA	NA	NA	NA	NA	100
	P. promelas toxicity (% Control)	NA	NA	NA	100	NA	NA
2009 MPM (@ Crows Landing Rd)	Date	4/21/09	5/19/09	NA	NA	8/18/09	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	<0.003	NA
	S. capricornutum toxicity (% Control)	248	**30**	NA	NA	NA	NA

NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed (Table III-9) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (milligram/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-9. Prairie Flower Drain site subwatershed. Instantaneous load calculations for chlorpyrifos where discharge was measured (sorted by analyte, site and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	17-Aug-05	0	0.029	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	21-Sep-05	0	0.018	0

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Prairie Flower Drain @ Crows Landing Rd*	Chlorpyrifos	21-Sep-05	0	0.018	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	13-Jul-06	0	0.014	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	17-Jul-07	2.32	0.009	0.591259
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	19-Aug-08	4.67	0.024	3.173769

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent under the Prairie Flower Management Plan.

Chlorpyrifos

The WQTL for chlorpyrifos was exceeded four times at this site, once during the month of September (2005) and three times during the month of August (2005, 2007, 2008, Table III-7). There were no exceedances during 2009 MPM.

The number of chlorpyrifos applications, amount of chlorpyrifos applied, and acres treated decreased dramatically in 2009 when compared to 2005 and 2008 levels, in particular for the month of July during which most applications occur (Table III-10 and Figure III-2). The greatest use of chlorpyrifos occurred in 2008 (740 lbs) with the lowest use was in 2009 (239 lbs, Table III-10). Exceedances do not always occur in months with the highest applications (Figure III-2).

Only two crops receive applications of chlorpyrifos in the subwatershed, alfalfa and corn, with corn receiving the most pounds of active ingredient applied (1,600 lbs) and alfalfa receiving (475 lbs, Table III-11).

Table III-10. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Prairie Flower Drain @ Crows Landing Road 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	1	61.0	120
July, 2005	5	256.6	312
August, 2005	8	415.7	485
March, 2006	1	19.9	40
July, 2006	4	194.2	191
August, 2006	3	147.4	207
May, 2008	2	212.1	140
July, 2008	6	437.8	561
August, 2008	4	90.5	89
March, 2009	1	76.3	150

Month/Year*	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
July, 2009	2	142.3	140
August, 2009	1	20.3	20
Summaries by Year			
2005 Total	14	733.3	917
2006 Total	8	361.5	438
2008 Total	12	740.4	790
2009 Total	4	238.9	310
Total	**38**	**2,074.2**	**2,455**

*No applications of chlorpyrifos reported for 2007.

Figure III-2. Pounds of chlorpyrifos added within the Prairie Flower Drain @ Crows Landing Rd site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances. No use of chlorpyrifos was reported for 2007.

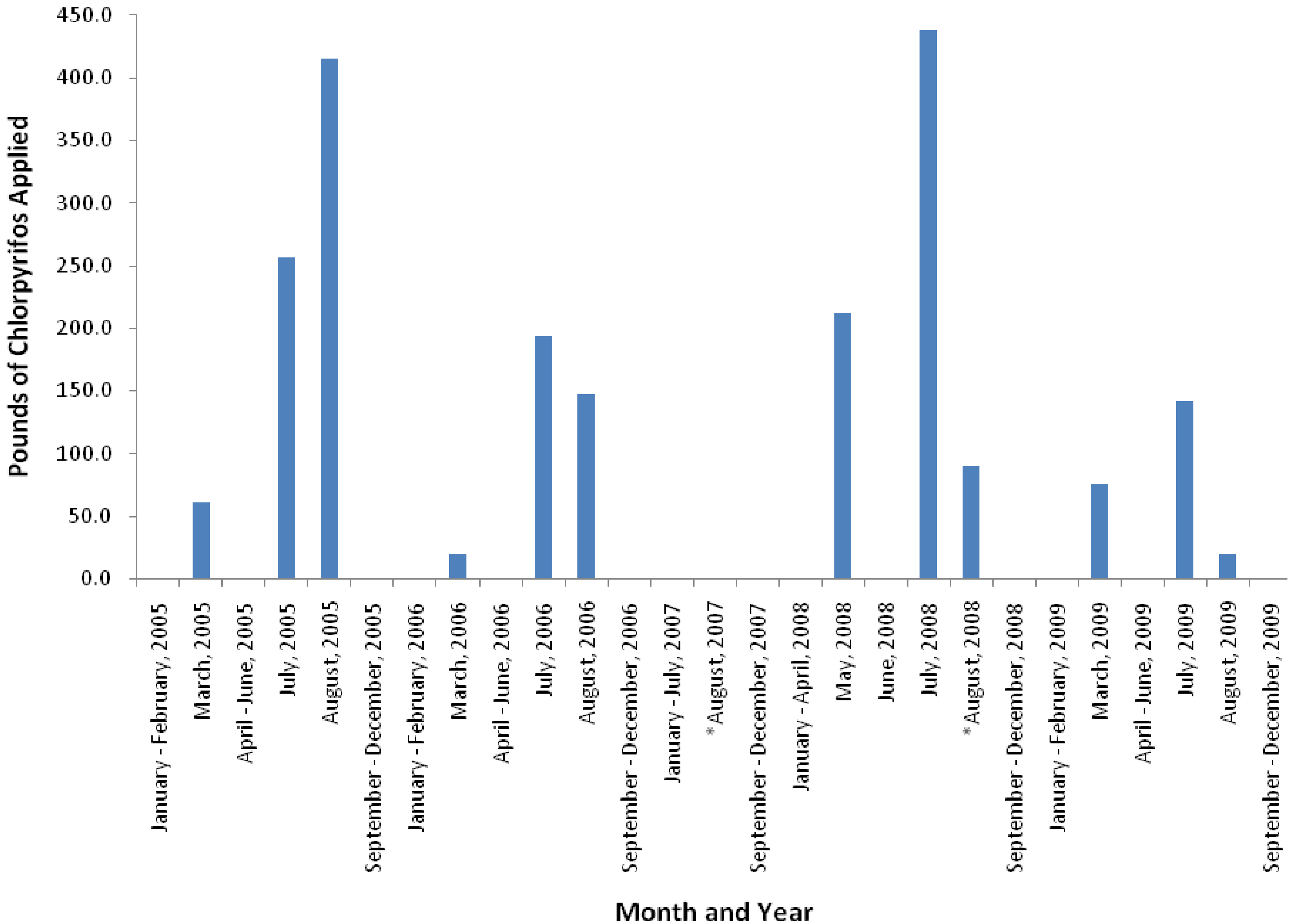


Table III-11. Total pounds AI for chlorpyrifos based on PUR data from 2005-2009 within the Prairie Flower Drain @ Crows Landing Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS*	ALFALFA	LOCK-ON INSECTICIDE	128.689
		NUFOS 4E	76.257
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	188.778
		LORSBAN 4E-HF	19.939
		NUFOS 4E	61.006
	CORN FOR/FOD	GOVERN 4E INSECTICIDE	212.107
		NUFOS 4E	562.271
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	93.817
		LORSBAN-4E	46.014
		NUFOS 4E	685.300
		ALFALFA – Total Pounds Chlorpyrifos Applied	474.669
		CORN – Total Pounds Chlorpyrifos Applied	1599.508
		Total pounds chlorpyrifos applied (2005 - 2009)	**2,074.177**

*No applications of chlorpyrifos reported for 2007.

In the 2009 Management Plan Update, the Coalition determined the most probable sources of chlorpyrifos in the Prairie Flower Drain were runoff from row crops recently receiving chlorpyrifos applications. Unfortunately, of the areas associated with exceedances in 2008, Coalition members own only a small portion of the acreage (2009 Management Plan Update). A large amount of the acreage is owned and farmed by dairies and it is assumed that the land not covered by the Coalition is part of the dairy program. This pattern of ownership suggests that it may be difficult to improve water quality in this site subwatershed. It is difficult to receive cooperation from nonmembers as well as track implementation of management practices on nonmember land.

The results from the general surveys administered to all members in the subwatershed are summarized in the ESJWQC General Survey Summary Report submitted January 30, 2009. The results were used as a starting point to evaluate management practice implementation within the subwatershed. The survey assessed practices used in the period from May 17, 2007 to December 2009. The Coalition noted that irrigation water is actively managed by members in this subwatershed. Growers accounting for a combined 48% of acreage indicated either use of recirculation tailwater return systems or restriction of water flow. However, growers accounting for 35% of the acreage represented in the response indicated that they used no practices to reduce runoff. Using this information, the Coalition designed outreach to affect an increase in relevant and effective management practice implementation in member parcels.

Coalition outreach since 2007 has included grower meetings and the mailing/ distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of this report. Prior to the 2009 irrigation season, several group grower meetings were held for members in the Prairie Flower Drain subwatershed to make them aware of the current issues and concerns specific to pesticide applications in the upcoming irrigation season and relevant management practices to protect and improve water quality in the waterway. The meetings also allowed the Coalition to update members on the strategy and status of the Prairie Flower Drain Management Plan.

The Coalition then turned its attention to individual contacts. Targeted growers were selected based on their crop type, pesticide usage, and potential to drain to the creek. Of the 3,106 acres in Prairie Flower Drain subwatershed that have the potential to drain directly to the creek, 900 acres are owned and operated by Coalition members. The Coalition produced a final list of 11 target members representing 865 acres in the subwatershed. Individual meetings occurred starting in June, 2009 and continued through September, 2009. Coalition representatives met with growers on their property to discuss the Prairie Flower Drain Management Plan and offer management practice recommendations specific to the land owner. This also gave the Coalition a chance to better assess currently implemented management practices as well as future planned management practice implementation. Individual contacts focused mainly on chlorpyrifos exceedances however all water quality results were reviewed and discussed including nitrate, ammonia, *E. coli*, DO, SC, TDS, and pH exceedances and toxicity to *Ceriodaphnia, Selenastrum,* and *Hyalella*. To date, the Coalition has contacted all its targeted members, which encompasses 865 acres or 28% of the total subwatershed acreage. The Coalition plans to contact target members in the spring of 2010 to determine if owner's planned future management practices have been implemented, and will continue to conduct outreach on a grower group level and monitor the creek to assess water quality.

Priority D Constituents

Prairie Flower Drain is listed for nitrate / nitrate + nitrite, sediment toxicity to *Hyalella azteca* and water toxicity *Ceriodaphnia dubia* as priority D constituents. The Coalition replaced separate analysis of nitrate and nitrite with the combined analysis of nitrate + nitrite starting in October 2008. Exceedances of the nitrate WQTL, either of separately measured nitrate or of combined nitrate + nitrite analysis, have occurred during every sample event.

Nitrate + Nitrite / nitrate

There were 12 additional exceedances of the nitrate WQTL in the Prairie Flower Drain site subwatershed in 2009. Sources of nitrate are discussed in the introduction of the ESJWQC Management Plan submitted in September, 2006 and include fertilizer applications and dairy manure waste. Prairie Flower Drain subwatershed contains approximately 443 acres of confined animal operations most of which are dairies. In addition, nitrate contamination of ground water is common in the region, and Prairie Flower Drain intercepts shallow ground water. It is not clear if the nitrates are originating with recent applications of dairy waste that may be reaching surface waters, or from past contamination of ground water which is being intercepted by the drain. The Coalition does not have the capabilities to track fertilizer applications and therefore cannot determine the exact source of the nitrate exceedances. In 2008, exceedances occurred during every sampling event and during upstream sampling at Morgan Rd in all months except July. Exceedances prior to 2008 occurred in most of the months of the year including February, March, May, June, July, August, and September. It is unlikely that applications of manure would occur in every month, indicating that ground water and/or dairy discharge are most likely both sources.

Ceriodaphnia toxicity

Toxicity to *Ceriodaphnia* was not monitored during 2009. *Ceriodaphnia* toxicity occurred once during March 2006 and once during September 2007. The 2007 toxicity was associated with an exceedance of chlorpyrifos in August 2007. Due to this correlation, the Coalition's strategy for eliminating *Ceriodaphnia* toxicity will involve focusing on chlorpyrifos. If chlorpyrifos can be prevented from entering waterways throughout the irrigation season, the Coalition believes that *Ceriodaphnia* toxicity can also be reduced or eliminated.

Hyalella toxicity

Sediment toxicity to *Hyalella* has occurred during September 2005 and May 2006. It occurred most recently on August 28, 2008 and also in the resample collected on October 2, 2008. Both samples had survival greater than 80% compared to the control. Toxicity to *Hyalella* was not monitored during 2009.

The Coalition conducted management plan sampling for sediment toxicities. 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. Management Plan Monitoring is scheduled for this site in 2010.

Priority E Constituents

The following priority E constituents are listed under the Prairie Flower Drain management plan: ammonia, DO, pH, SC, dissolved solids, *E. coli,* and water column toxicity to *Selenastrum capricornutum.* Exceedances of ammonia, DO, pH, SC, TDS, and *E. coli* continued in 2009. Toxicity to *Selenastrum* has occurred several times at the site, usually in the winter or early irrigation months, but is never associated with an herbicide or metal exceedance. Toxicity to *Selenastrum* occurred once during May of 2009 MPM, and was again not associated with an herbicide or metal exceedance. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

The Prairie Flower Drain subwatershed is one of the first three priority site subwatersheds within the ESJWQC 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 Prairie Flower Drain subwatershed has been to target growers who farm row crops and have the potential to discharge. Outreach includes grower notification, management practice 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 row crops, outreach should continue to focus on management practices that restrict runoff. Growers who farm alfalfa and corn should be targeted.

Individual surveys to document current management practices and assess planned implementations have been completed representing 100% of targeted growers. The Coalition is now in the process of evaluating these results and planning the final stages of outreach.

Acres treated with and pounds applied of chlorpyrifos decreased overall since 2005. A decrease was seen between 2008 usage and 2009 usage, which may further demonstrate that recent Coalition outreach has had an impact. Additionally, usage decreased in July and August, when the most exceedances have occurred. Also encouraging was the absence of chlorpyrifos exceedances and detections during 2009 Management Plan sampling. Management Plan Monitoring in 2010 will indicate if a change in management practices as a result of individual contacts results in long-term improvements to water quality.

IV. BEAR CREEK @ KIBBY RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper

Priority D

- *Ceriodaphnia dubia* water column toxicity

Priority E

- Dissolved Oxygen
- pH
- *E. coli*

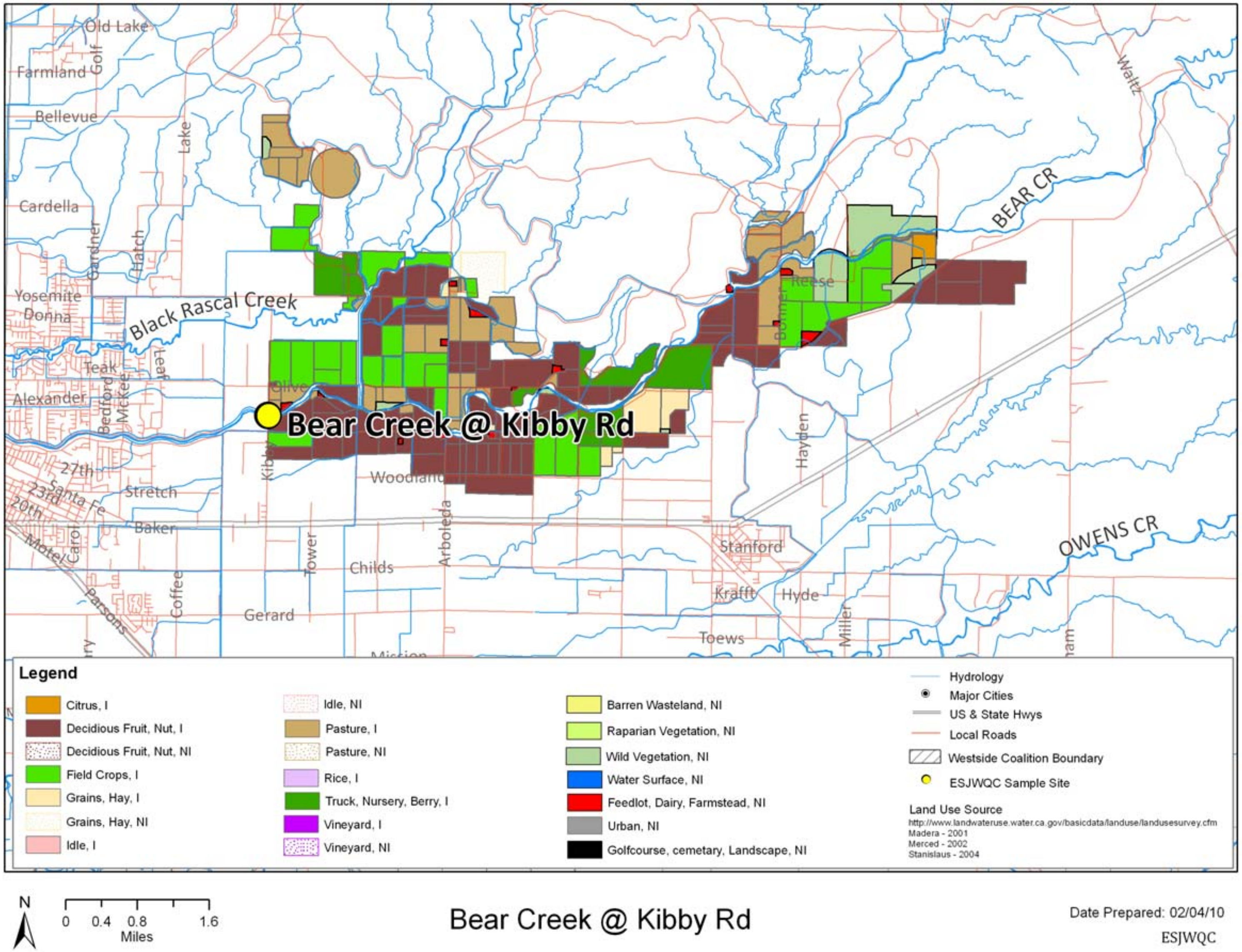
Description of Bear Creek @ Kibby Rd Site Subwatershed

Bear Creek @ Kibby Road (7, 298 irrigated acres) – This site subwatershed drains an eastern portion of the Coalition region in Merced County. Bear Creek originates in the foothills of the Sierras with Burn's Creek as one of the major tributaries. Bear Creek drains to the east just north of the towns of Planada, through Merced and eventually to the San Joaquin River. The primary irrigated agriculture in the site subwatershed includes deciduous nuts, field crops, truck crops, and irrigated pasture (Figure IV-1). Table IV-1 includes the station name, station code and target latitude/longitudes for the site sampled within this subwatershed.

Table IV-1. Coordinates of the Bear Creek site subwatershed sampling location.

Station Name	Station Code	Target Latitude	Target Longitude
Bear Creek @ Kibby Rd	535XBCAKR	37.3128	-120.4138

Figure IV-1. Site subwatershed map of land use for the Bear Creek @ Kibby Rd sample site.



Subwatershed Monitoring History

Ambient water monitoring conducted at Bear Creek @ Kibby Road was initiated during the storm season of 2005 continuing through fall season of 2008 (Table IV-2). Starting in October 2008, Bear Creek @ Kibby Rd was removed from the monitoring schedule and became an Assessment site under the current MRPP. It is scheduled for Assessment monitoring in 2025-2026. The constituents sampled at this location from 2005-2008 are listed in Table IV-3.

Management Plan Monitoring for the Coalition at Bear Creek @ Kibby Rd occurred in May and July of 2008 and included additional sampling for chlorpyrifos and *Ceriodaphnia dubia* toxicity (Table IV-4). The Coalition will conduct MPM for chlorpyrifos and *Ceriodaphnia dubia* toxicity again starting May 2010. There were no samples collected from this site during 2009. Included in this section is a summary and of exceedances experienced at this site (Table IV-5).

Bear Creek is scheduled as a high priority site starting in 2010. Bear Creek is listed as an impaired waterbody for *E. coli* and unknown toxicity in the proposed 2008 Central Valley Basin Plan 303d list.

Table IV-2. Bear Creek @ Kibby Rd sampling events per season and year.

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

NA indicates that 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 Bear Creek @ Kibby Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
Field and Physical Parameters										
EPA 110.2	Color	1	5	2	5	2	6	2	6	
EPA 160.1	Dissolved Solids	1	5	2	5	2	6	2	6	
EPA 180.1	Turbidity	1	5	2	5	2	6	2	6	
EPA 405.1	BOD				1	2	2			
EPA 415.1	Total Organic Carbon	1	5	2	5	2	6	2	6	
SM 9223	E. coli	1	5	2	5	2	6	2	6	
NA	Dissolved Oxygen	1	6	3	6	3	7	3	11	
NA	Specific Conductivity	1	6	3	6	3	7	3	11	
NA	pH	1	6	3	6	3	7	3	11	
Carbamates										
EPA 8321A	Aldicarb				5	2	6	2	6	
EPA 8321A	Carbaryl				5	2	6	2	6	
EPA 8321A	Carbofuran				5	2	6	2	6	
EPA 8321A	Diuron				5	2	6	2	6	
EPA 8321A	Linuron				5	2	6	2	6	
EPA 8321A	Methiocarb				5	2	6	2	6	
EPA 8321A	Methomyl				5	2	6	2	6	
EPA 8321A	Oxamyl				5	2	6	2	6	
Organochlorines										
EPA 8081A	DDD (p,p')				5	2	6	2	6	
EPA 8081A	DDE (p,p')				5	2	6	2	6	
EPA 8081A	DDT (p,p')				5	2	6	2	6	
EPA 8081A	Dicofol				5	2	6	2	6	
EPA 8081A	Dieldrin				5	2	6	2	6	
EPA 8081A	Endrin				5	2	6	2	6	

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 8081A	Methoxychlor				5	2	6	2	6	
Organophosphates										
EPA 8141A	Azinphos methyl				5	2	6	2	6	
EPA 8141A	Chlorpyrifos	1	5	2	5	2	6	2	8	
EPA 8141A	Diazinon				5	2	6	2	6	
EPA 8141A	Dimethoate				5	2	6	2	6	
EPA 8141A	Disulfoton				5	2	6	2	6	
EPA 8141A	Malathion				5	2	6	2	6	
EPA 8141A	Methamidophos				5	2	6	2	6	
EPA 8141A	Methidathion				5	2	6	2	6	
EPA 8141A	Molinate				5	2	6	2	6	
EPA 8141A	Parathion, Methyl				5	2	6	2	6	
EPA 8141A	Phorate				5	2	6	2	6	
EPA 8141A	Phosmet				5	2	6	2	6	
EPA 8141A	Thiobencarb				5	2	6	2	6	
Pyrethroids										
EPA 8081A	Bifenthrin		1	2	5	2	6			
EPA 8081A	Cyfluthrin, total		1	2	5	2	6			
EPA 8081A	Cyhalothrin, lambda, total	1	5	2	5	2	6			
EPA 8081A	Cypermethrin, total	1	5	2	5	2	6			
EPA 8081A	Esfenvalerate/ Fenvalerate, total	1	5	2	5	2	6			
EPA 8081A	Permethrin, total	1	5	2	5	2	6			
Triazines										
EPA 547M	Glyphosate				5	2	6	2	6	
EPA 549.2M	Paraquat dichloride				5	2	6	2	6	
EPA 619	Atrazine				5	2	6	2	6	
EPA 619	Cyanazine				5	2	6	2	6	

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall*
EPA 619	Simazine				5	2	6	2	6	
Metals (Total)										
EPA 200.8	Arsenic				5	2	6	2	6	
EPA 200.8	Boron				5	2	6	2	6	
EPA 200.8	Cadmium				5	2	6	2	6	
EPA 200.8	Copper				5	2	6	2	6	
EPA 200.8	Lead				5	2	6	2	6	
EPA 200.8	Nickel				5	2	6	2	6	
EPA 200.8	Selenium				5	2	2	2	6	
EPA 200.8	Zinc				5	2	6	2	6	
Nutrients										
SM 2340 C	Hardness as CaCO3				5	2	6	2	6	
EPA 300.0	Nitrate as N				5	2	6	2	6	
EPA 350.2	Ammonia as N				5	2	6	2	6	
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	2	6	
EPA 354.1	Nitrite as N				5	2	6	2	6	
EPA 353.2	Nitrate + Nitrite as N									
EPA 365.2	Orthophosphate as P				5	2	6	2	6	
EPA 365.2	Phosphate as P				5	2	6	2	6	
Toxicity										
EPA 821/R-02-012	Ceriodaphnia dubia	1	6	2	6	2	8	2	8	
EPA 821/R-02-012	Pimephales promelas	1	6	2	5	2	7	2	6	
EPA 821/R-02-013	Selenastrum capricornutum	1	6	2	5	2	7		7	
EPA 600/R-99-064	Hyalella azteca		5	1	1	1	1	1	2	

Table IV-4. Bear Creek @ Kibby Rd site subwatershed. 2008 Management Plan additional (A) sampling schedule for chlorpyrifos and *Ceriodaphnia*. "X" indicates the site, month, and analyte sampled.

Sample Site	Month	Type	Chlorpyrifos	*Ceriodaphnia dubia*
Bear Creek @ Kibby Rd	7-May-08	A	**X**	**X**
Bear Creek @ Kibby Rd	8-Jul-08	A	**X**	**X**

Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli,* nutrients, metals, pesticides, and water column and sediment toxicity occurred within the Bear Creek site subwatershed (Table IV-5). During ambient water monitoring several exceedances occurred, including DO 92), pH (3), *E. coli* (7), arsenic (1), copper (4), chlorpyrifos (2), and DDT (1). Water column toxicity occurred three times to *Ceriodaphnia dubia* and twice to *Selenastrum capricornutum* including a resample to initial toxicity. Sediment toxicity to *Hyalella azteca* has occurred twice.

All exceedances are listed in Table IV-5 by season and date and are based on WQTL listed in the introduction to the ESJWQC Management Plan. Using the ESJWQC Management Plan prioritization process flow chart (Figure 4), priorities were assigned to management plan constituents and are listed in the bottom row of Table IV-5. The highest priority constituents in the Bear Creek subwatershed are chlorpyrifos (A), copper (C), and toxicity to *Ceriodaphnia* and *Hyalella* (D).

Table IV-5. All exceedances experienced in samples collected from locations within the Bear Creek site subwatershed between March 2005 and October 2008 (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.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	*E. coli*, 235 MPN/100 mL	Arsenic, 10 µg/L	Copper ,Total, 1,300 µg/L	Chlorpyrifos, 0.015 µg/L	DDT (p,p'), 0.00059 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Bear Creek @ Kibby Rd	Storm	3/21/2005	4.4		1600							
Bear Creek @ Kibby Rd	Irrigation	5/10/2005			280					5		
Bear Creek @ Kibby Rd	Storm	3/15/2006			1600							
Bear Creek @ Kibby Rd	Irrigation	5/17/2006						0.52		0		
Bear Creek @ Kibby Rd	Irrigation	6/13/2006	6.99	8.69								
Bear Creek @ Kibby Rd	Storm	2/12/2007			2400		12 (9.3)		0.0091			
Bear Creek @ Kibby Rd	Storm	3/1/2007			1300							
Bear Creek @ Kibby Rd	Irrigation	7/24/2007						0.049		0		
Bear Creek @ Kibby Rd	Irrigation	8/21/2007		8.69								
Bear Creek @ Kibby Rd	Storm	1/24/2008			2400		8.6 (7.7)					
Bear Creek @ Kibby Rd	Storm	2/25/2008			>2400		7.2 (6.4)					
Bear Creek @ Kibby Rd	Sediment	3/4/2008		8.72								
Bear Creek @ Kibby Rd	Irrigation	4/29/2008										42100
Bear Creek @ Kibby Rd	Irrigation	5/7/2008										735734
Bear Creek @ Kibby Rd	Irrigation	6/24/2008				17						

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	*E. coli*, 235 MPN/100 mL	Arsenic, 10 µg/L	Copper ,Total, 1,300 µg/L	Chlorpyrifos, 0.015 µg/L	DDT (p,p'), 0.00059 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Bear Creek @ Kibby Rd	Irrigation	7/29/2008										
Bear Creek @ Kibby Rd	Irrigation	8/26/2008					7.1 (2.4)					
Bear Creek @ Kibby Rd	Sediment	8/28/2008									90	
Bear Creek @ Kibby Rd	Sediment	10/2/2008									88	
Constituent Priority			**E**	**E**	**E**	**NP**	**C**	**A/B**	**NP**	**D**	**NP[1]**	**NP[1]**

NP- Not prioritized. Fewer than two exceedances for this constituent at this site within three years and 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).

2008 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table IV-6 for chlorpyrifos and toxicity to *Ceriodaphnia* for 2008; MPM did not occur for either during 2009. Toxicity to *Ceriodaphnia* occurred in May of 2005 and 2006, and in July of 2007. The 2006 and 2007 toxicities both coincided with an exceedance of chlorpyrifos (Table IV-5).

2008

In 2008, Bear Creek @ Kibby Rd was monitored monthly for chlorpyrifos and *Ceriodaphnia dubia* toxicity from April through September plus additional monitoring conducted in May and July (Table IV-6). Both normal monitoring and MPM for chlorpyrifos indicated no detections for any of the irrigation months in 2008, and there were no toxic samples to *Ceriodaphnia*. Copper concentrations exceeded the WQTL based on hardness three times during 2008 normal monitoring (January, February, and August) and was added to the Bear Creek Management Plan.

2009

Bear Creek @ Kibby Rd was not scheduled for 2009 MPM.

Management Plan Monitoring for chlorpyrifos, copper, and *Ceriodaphnia dubia* toxicity will be conducted during the 2010 irrigation season. Copper is also scheduled for MPM during January and February 2011.

Table IV-6. Bear Creek @ Kibby Rd site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for chlorpyrifos and *Ceriodaphnia* from the 2008 irrigation season. Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2008 NM (@ Kibby Rd)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
	C. dubia toxicity (% Control)	100	100	100	100	100	100
2008 MPM (@ Kibby Rd)	Date	NA	5/07/08	NA	7/08/08	NA	NA
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	NA	NA
	C. dubia toxicity (% Control)	NA	100	NA	95	NA	NA

NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed (Table IV-7) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (milligram/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 IV-7. Bear Creek site subwatershed. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured (sorted by analyte, site and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Bear Creek @ Kibby Rd*	Copper	17-Apr-07	29.13	2	1649.748
Bear Creek @ Kibby Rd	Copper	17-Apr-07	29.13	2.1	1732.236
Bear Creek @ Kibby Rd	Copper	21-Aug-07	56.1	1.6	2541.734
Bear Creek @ Kibby Rd	Copper	18-Sep-07	51.02	1.7	2456.047
Bear Creek @ Kibby Rd	Copper	29-Apr-08	113.34	1.1	3530.394
Bear Creek @ Kibby Rd	Copper	27-May-08	147.77	1.4	5858.164
Bear Creek @ Kibby Rd	Copper	26-Aug-08	94.9	7.1	19079.71
Bear Creek @ Kibby Rd	Copper	30-Sep-08	33.1	1.3	1218.481

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent listed under the Bear Creek Management Plan.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L two times in this subwatershed from 2006 through 2008 (May, 2006 and July, 2007). Chlorpyrifos was omitted from the monitoring schedule in October 2008 when the Coalition began monitoring under a new MRPP. Starting in May 2010, chlorpyrifos will be monitored as a part of MPM. The Coalition uses a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources.

PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds active ingredient (AI) applied, and acres treated (Table IV-8, Figure IV-2). The amount of chlorpyrifos applied within the subwatershed decreased in 2009 significantly (328 lbs), however the amount applied in 2008 was the greatest amount of chlorpyrifos use (1,817 lb) (Table IV-8, Figure IV-2). The months with the greatest amount of chlorpyrifos use from 2005 through 2009 were May, June, and July (Table IV-8, Figure IV-2). Exceedances occurred during months of the greatest amount of use (Figure IV-2).

The Coalition also uses PUR data to assess which crops receive the most applications of chlorpyrifos. The highest application rates and largest amount of chlorpyrifos applied are associated with almond and walnut orchards (Table IV-9). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table IV-9).

Table IV-8. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Bear Creek @ Kibby 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, 2005	1	39.6	99
May, 2005	5	347.0	178
June, 2005	2	49.9	25
July, 2005	2	70.0	35
August, 2005	1	55.8	30
September, 2005	1	18.8	10
May, 2006	11	980.6	520
June, 2006	4	154.9	78
July, 2006	3	403.6	200
August, 2006	1	111.4	61
May, 2007	9	363.3	196
June, 2007	1	29.9	15
July, 2007	5	518.7	264
February, 2008	3	492.5	265
May, 2008	2	40.0	20
June, 2008	18	729.1	485
July, 2008	6	458.4	352
August, 2008	2	97.4	106
May, 2009	3	134.8	165
July, 2009	2	193.4	103
Summaries by Year			
2005 Total	12	581.0	377
2006 Total	19	1650.5	859
2007 Total	15	912.0	475
2008 Total	31	1817.4	1228
2009 Total	5	328.2	268
Total	**82**	**5,289.1**	**3,207**

Figure IV-2. Pounds of chlorpyrifos applied within the Bear Creek site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

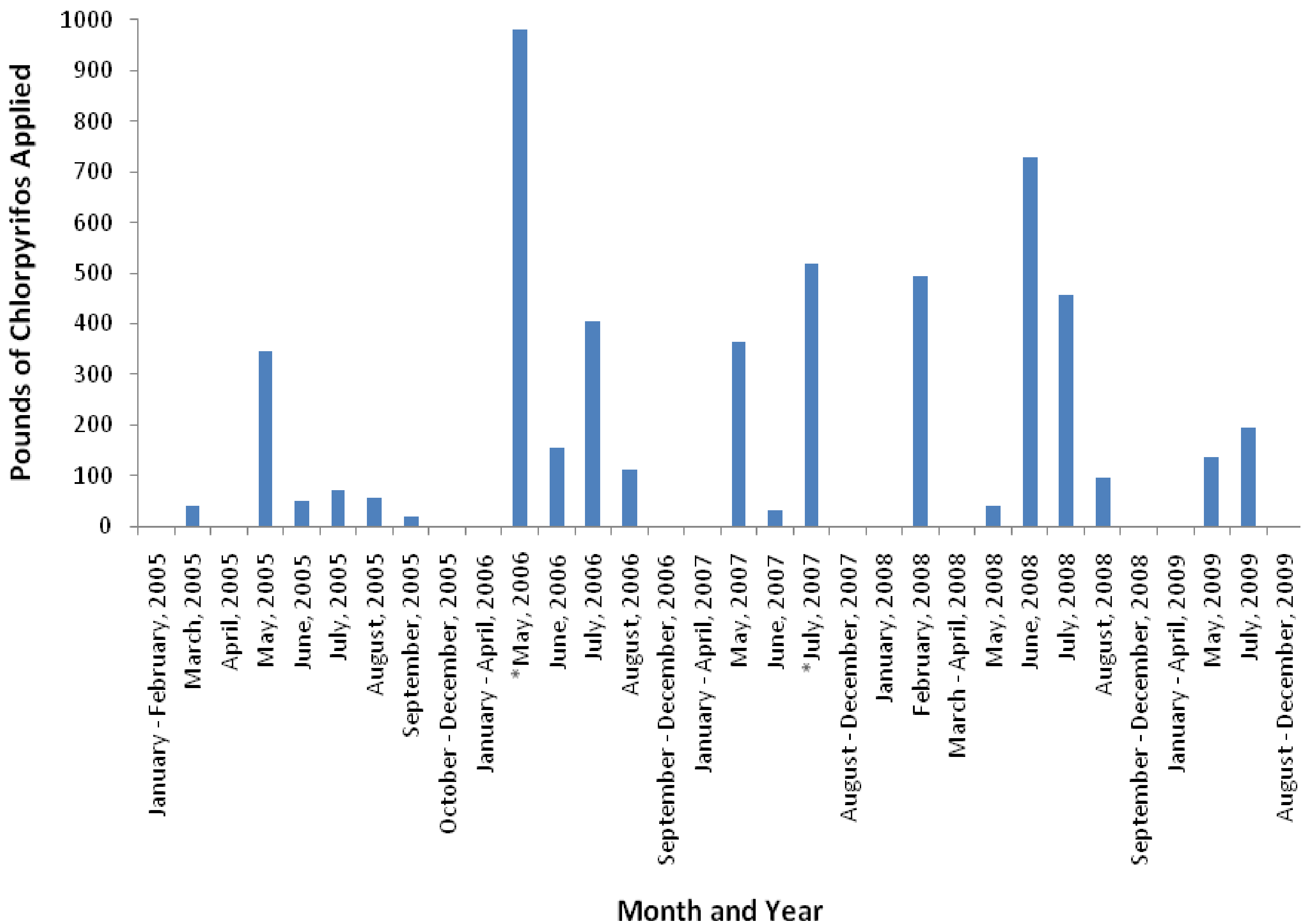


Table IV-9. Total pounds AI for chlorpyrifos based on PUR data from 2005-2009 within the Bear Creek @ Kibby Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	CHLORPYRIFOS 4E AG	39.629
	ALMOND	GOVERN 4E INSECTICIDE	997.913
		LORSBAN 4E INSECTICIDE	80.113
		LORSBAN 4E-HF	517.405
		LORSBAN-4E	843.047
	CORN FOR/FOD	NUFOS 4E	623.114
		SAURUS	134.764
	PEACH	LORSBAN-4E	157.962
	WALNUT	CHLORPYRIFOS 4E AG	11.258
		LORSBAN 4E-HF	149.539
		LORSBAN ADVANCED	193.434
		LORSBAN-4E	666.940
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	46.908
		LORSBAN 4E INSECTICIDE	40.006
		LORSBAN 4E-HF	356.900
		LORSBAN-4E	430.168

ALFALFA – Total Pounds Chlorpyrifos Applied	39.629
ALMOND – Total Pounds Chlorpyrifos Applied	2438.477
CORN – Total Pounds Chlorpyrifos Applied	757.878
PEACH – Total Pounds Chlorpyrifos Applied	157.962
WALNUT – Total Pounds Chlorpyrifos Applied	1895.153
Total pounds chlorpyrifos applied (2005 - 2009)	**5,289.100**

Based on results from general management practice surveys, approximately 61% of the member acreage indicates no runoff occurs and 32% of the member acreage uses micro and/or drip irrigation. Exceedances of the WQTL occurred in months with the highest application rates, thus the Coalition suspects a combination of spray drift and irrigation water runoff are the cause of chlorpyrifos in the waterways. Growers should be encouraged to review their operation to determine if irrigation return flows are managed properly. Owners operating orchards should evaluate their aerial applications to minimize spray drift.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of the Management Plan Update Report. The Coalition has begun the process of contacting growers, conducting individual meetings, and compiling individual surveys for Bear Creek. The Coalition focused outreach to growers owning parcels with the potential to drain to the creek and those applying chlorpyrifos. Using these criteria, a list of 13 targeted growers was created. Individual meetings are currently being scheduled and will be completed by the end of May 2010. Individual contacts will focus mainly on chlorpyrifos exceedances however all water quality results will be reviewed and discussed including copper, DO, *E. coli*, and pH WQTLs exceedances as well as toxicity to *Ceriodaphnia dubia*.

The Coalition will compile and analyze the surveys by the end of August 2010. Based on the exact timing of each individual meeting and/or a grower's resources, some owners will not be able to implement recommended management practices until the 2011 irrigation season. In addition, long term structural BMPs (e.g. sediment ponds) will most likely take longer than two years to implement and will require additional tracking to document their implementation. The Coalition will follow up with growers between February and April of 2011 to determine what practices were implemented during the first irrigation year. Growers who have not already been contacted or have indicated that they have not yet implemented practices during the first year will be contacted from February to April of 2012 to determine what practices were implemented during the dormant season and/or the second irrigation year. To evaluate the management practice process, the Coalition will monitor for high priority constituents during months of past exceedances in 2010 and 2011. Depending on when additional management practices are implemented, the Coalition may monitor through 2012 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or are have the potential for spray drift will affect downstream water quality by the end of the second year as a high priority site subwatershed.

The effectiveness of the management practices will be determined through the monitoring of water quality in the years following implementation. However, due to the presence of dairies and nonmembers in the subwatersheds, implementation of management practices by only coalition members may not result in improved water quality. If water quality fails to improve, the Coalition will identify parcels from dairies and nonmembers that could contribute to the exceedances and provide that information to the Regional Board.

Priority C Constituents

Copper

Copper exceeded the hardness based WQTL four times in this subwatershed from 2005 through 2008. Copper exceedances occurred once during the 2007 storm season, twice during the 2008 storm season and once in the 2008 irrigation season in July. Bear Creek was not scheduled for 2009 normal monitoring, but copper will be assessed again during 2010 MPM.

PUR data are reviewed for the number of monthly copper applications, pounds active ingredient (AI) applied, and acres treated (Table IV-10, Figure IV-3). The amount of copper applied within the subwatershed decreased annually from 2005 through 2008, but the amount of copper applied in 2009 increased by 200 lbs compared to 2008 (Table IV-10, Figure IV-3). The months of January, February, April and May indicate the greatest amount of copper use 2005 through 2009 (Table IV-10, Figure IV-3). Not all exceedances occurred during months of the greatest amount of use (Figure IV-3).

The Coalition also used PUR data to assess which crops receive the most applications of copper. The largest amount of copper applied from 2005 through 2009 was associated with almond, peach, and walnut orchards (Table IV-11). The most common products containing copper used within this subwatershed were DuPont Kocide and Kocide (Table IV-11).

Table IV-10. Number of copper applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Bear Creek @ Kibby Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
January, 2005	2	1178.9	175
February, 2005	3	307.2	121
March, 2005	4	818.6	174
April, 2005	8	1748.0	325.5
May, 2005	8	1762.6	603
November, 2005	1	26.9	40
January, 2006	6	2290.7	493
February, 2006	4	1212.1	244
March, 2006	2	51.9	95
April, 2006	11	1614.5	499
May, 2006	3	323.8	186
June, 2006	2	142.0	88
October, 2006	2	150.6	140
January, 2007	3	1111.0	275
February, 2007	1	729.9	116.91
March, 2007	7	965.3	242
April, 2007	12	1772.9	374
February, 2008	3	2752.6	291.91
March, 2008	8	809.7	320
April, 2008	8	815.6	260
October, 2008	1	67.5	80
January, 2009	3	2709.1	291.91
February, 2009	1	62.9	15
March, 2009	1	122.7	38
April, 2009	2	1562.2	128
May, 2009	1	91.5	34
September, 2009	2	132.8	177.8
Summaries by Year			
2005 Total	26	5842.2	1438.5
2006 Total	30	5785.7	1745
2007 Total	23	4579.1	1007.91
2008 Total	20	4445.4	951.91
2009 Total	10	4681.1	684.71
Total	**109**	**25,333.5**	**5,828.03**

Figure IV-3. Pounds of copper applied within the Bear Creek @ Kibby Rd site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

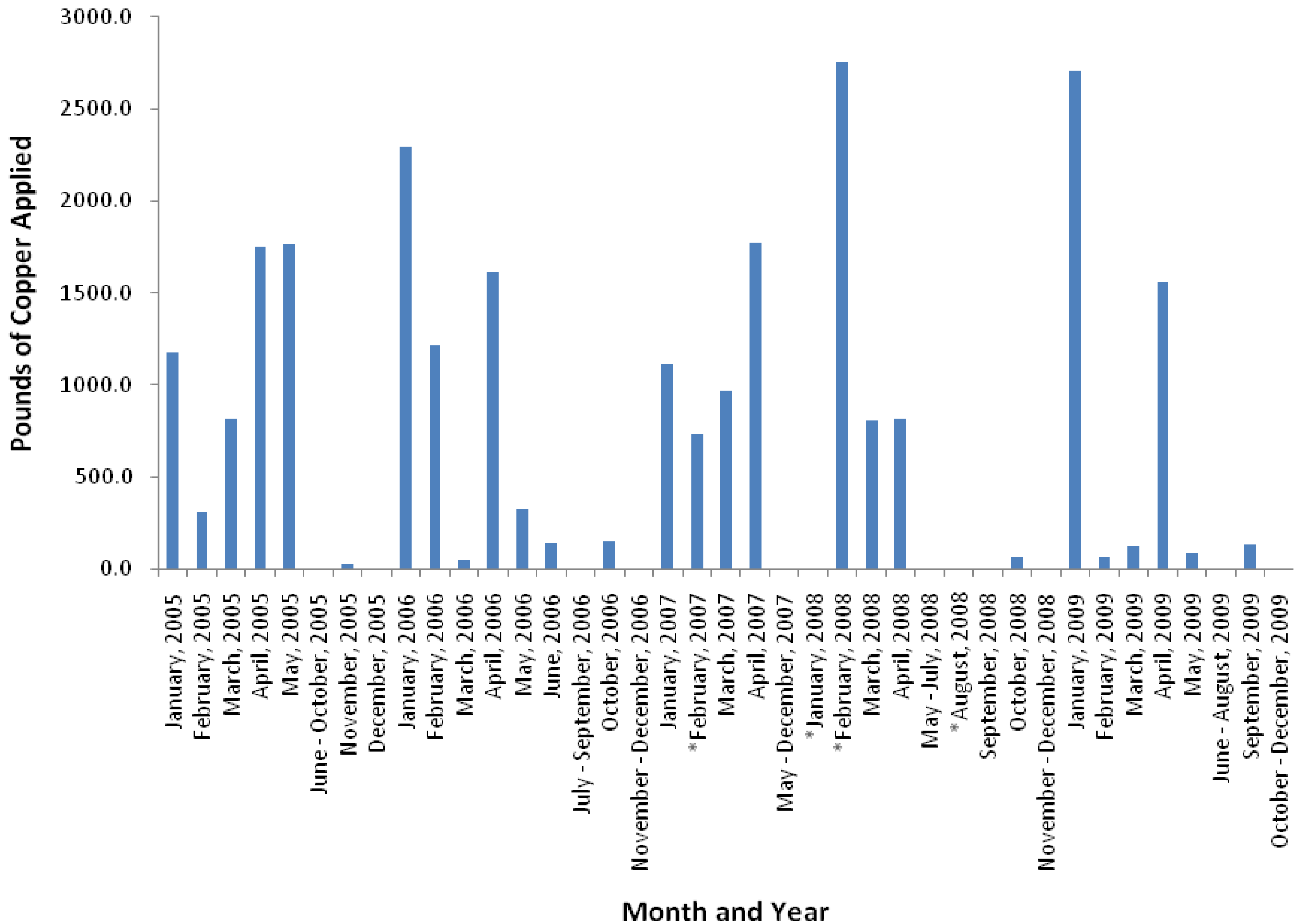


Table IV-11. Total pounds AI for chopper based on PUR data from 2005-2009 within the Bear Creek @ Kibby Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 2000	48.420
	ALMOND	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1533.300
		KOCIDE 101	61.600
		KOCIDE 2000	798.930
		KOCIDE DF	337.700
		NORDOX 75 WG	62.925
	PEACH	BASIC COPPER 53	3528.000
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	895.770
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	517.242
		KOCIDE DF	2409.950
		NORDOX	395.928
		NORDOX 75 WG	2146.313
	PRUNE	NORDOX 75 WG	1141.040
	TOMATO	CHAMP FLOWABLE	3.459
		CHAMP FORMULA 2 FLOWABLE	155.832
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	142.032
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	132.786
		KOCIDE 2000	896.308
	WALNUT	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	536.924
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	103.725
		HYDROX	542.080
		KOCIDE 2000	364.495
		KOCIDE DF	24.560
		NU-COP 50DF	3150.840
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	KOCIDE 101	323.400
		KOCIDE 2000	1310.030
		KOCIDE DF	1036.432
		NORDOX	21.150
		NORDOX 75 WG	41.950
		NU-COP 50DF	2670.360

Chemical Name	Commodity	Product Name	Lbs AI Applied
		ALFALFA – Total Pounds Copper Applied	48.420
		ALMOND – Total Pounds Copper Applied	2794.455
		PEACH – Total Pounds Copper Applied	9893.203
		PLUMS (INCLUDING PRUNES) – Total Pounds Copper Applied	1141.040
		TOMATO– Total Pounds Copper Applied	1330.418
		WALNUT – Total Pounds Copper Applied	10125.946
		Total pounds copper applied (2005 - 2009)	**25,333.482**

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts. Orchard and vineyard operators will be advised to consider irrigation water retention and 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 are described under the chlorpyrifos outreach section above and will include discussions of copper exceedances and the above management practices.

Priority D Constituents

The Bear Creek Management Plan includes *Ceriodaphnia* toxicity and sediment toxicity to *Hyalella azteca* as priority D constituents. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Ceriodaphnia toxicity

Toxicity to *Ceriodaphnia* has occurred in May of 2005 and 2006, and in July of 2007. The 2006 and 2007 toxicities both coincided with an exceedance of chlorpyrifos. Due to this correlation, the Coalition's strategy for eliminating *Ceriodaphnia* toxicity will involve focusing on chlorpyrifos. If chlorpyrifos can be prevented from entering waterways throughout the irrigation season, the Coalition believes that *Ceriodaphnia* toxicity can also be reduced or eliminated.

Priority E Constituents

The Bear Creek Management Plan includes DO, *E. coli*, and pH. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

Bear Creek @ Kibby Rd is one of the second four priority site subwatersheds within the ESJWQC and is in its first year of focused outreach (2010-2012). The Coalition's strategy for the Bear Creek subwatershed has been to target growers along or adjacent to the waterway that have the potential to discharge. Focus will be on water retention management practice implementation and minimizing spray drift. 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 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 May 2010. 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.

V. COTTONWOOD CREEK @ RD 20

Management Plan Constituents

Priority A/B

- Diazinon
- Chlorpyrifos

Priority C

- Copper
- Diuron

Priority E

- Dissolved Oxygen
- Lead
- *E. coli*

Description of Cottonwood Creek @ Rd 20 Site Subwatershed

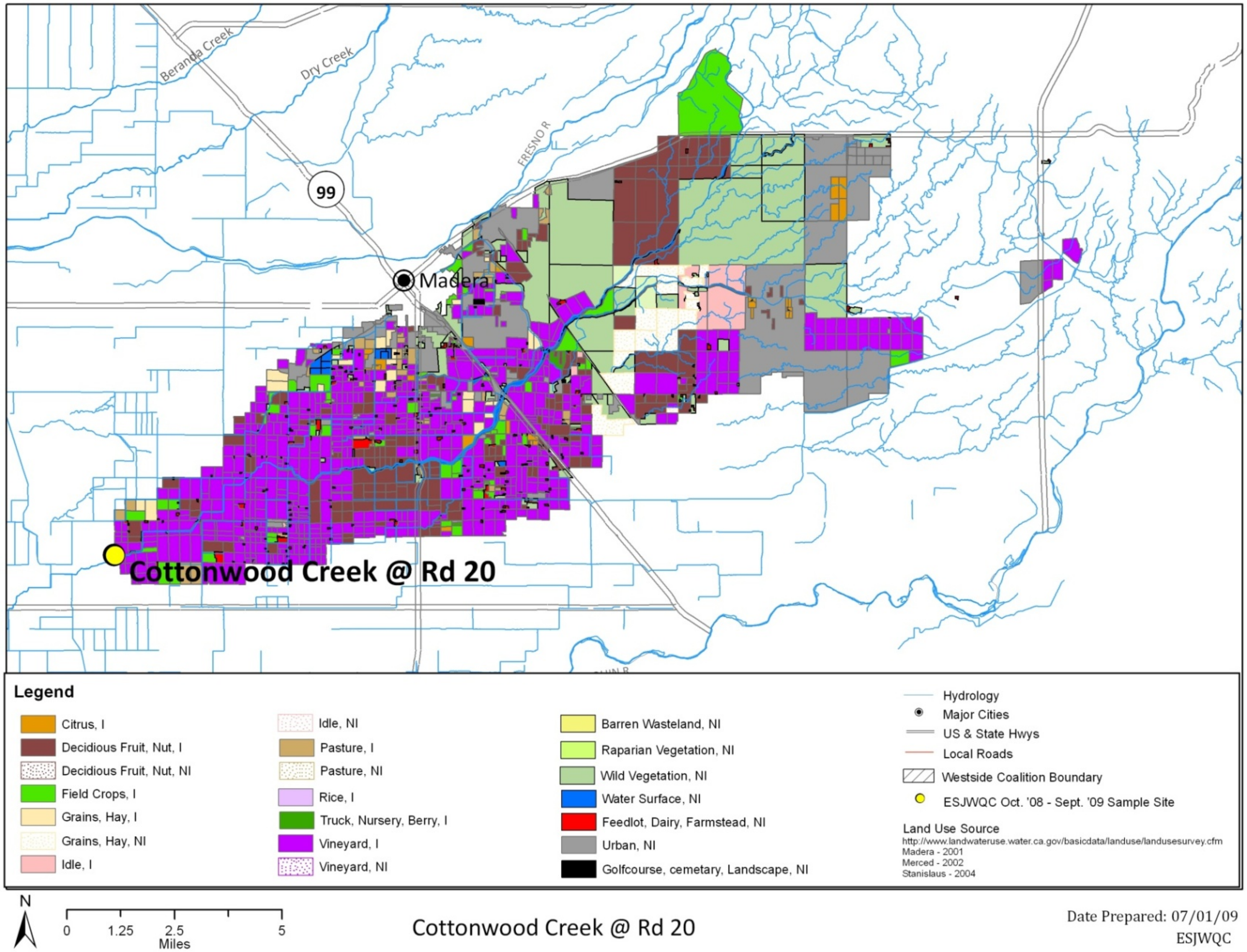
Cottonwood Creek @ Road 20 (37,360 irrigated acres) – This site subwatershed is at the very southern edge of the Coalition region in Madera County and drains into the Eastside Bypass. The immediate upstream agriculture is vineyards, and there are deciduous nuts farther to the east. There are only a few dairies in the Cottonwood Creek site subwatershed (Figure V-1). This site subwatershed includes an upstream location (Cottonwood Creek @ Hwy 145) which was sampled in 2008. Table V-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

Table V-1. Coordinates of the Cottonwood Creek site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Cottonwood Creek @ Rd 20*	545XCCART	36.8686	-120.1818
Cottonwood Creek @ Hwy 145[U]	545XCCAHO	36.9002	-120.0555

* Original ESJWQC sampling site
[U] Upstream sites

Figure V-1. Site subwatershed map of land use for the Cottonwood Creek @ Rd 20 sample site.



Subwatershed Monitoring History

Ambient water monitoring conducted at Cottonwood Creek @ Rd 20 was initiated during the storm season of 2005 continuing through 2009 (Table V-2). Cottonwood Creek @ Rd 20 will continue to be monitored as a Core Monitoring location under the current MRPP and will be monitored for all Assessment constituents every third year. The constituents sampled at this location from 2005-2009 are listed in Table V-3. Due to single exceedances that have occurred during previous monitoring, Cottonwood Creek @ Rd 20 is also monitored monthly for *S. capricornutum* (the two toxicities that occurred in May 2008 were considered the same event since one was a resample to test for toxicity persistence one week later), simazine and cyanazine starting in October 2009 (fall season).

Management Plan Monitoring occurred within the Cottonwood Creek site subwatershed in 2007 and 2008 for copper (Table V-4 and Table V-5). Cottonwood Creek was monitored twice a month in June and September 2007 and at Cottonwood Creek @ Hwy 145 (upstream location) monthly from May through September 2008. The Coalition will conduct MPM for copper again starting April 2010.

Cottonwood Creek is scheduled as a high priority site starting in 2010. In January 2010, the Coalition began additional MPM sampling during January, February and March (previously MPM was limited to irrigation months). The Coalition monitored for chlorpyrifos, diazinon and diuron in January and February 2010; these results will be reported on in the Management Plan Update Report to be submitted on April 1, 2011.

Cottonwood Creek is scheduled as a high priority site starting in 2010. Cottonwood Creek is listed as an impaired water body for *E. coli* and unknown toxicity in the proposed 2008 Central Valley Basin Plan 303d list. The expected TMDL completion date for the Cottonwood Creek site subwatershed is scheduled for 2021.

Table V-2. Cottonwood Creek @ Rd 20 sampling events per season and year

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

NA indicates that 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 Cottonwod Creek @ Rd 20 sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

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

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

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

Table V-4. Cottonwood Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for copper. "X" indicates the site, month, and analyte sampled.

Sample Site	Month	Type	Copper
Cottonwood Creek @ Rd 20	19-Jun-07	A	**X**
Cottonwood Creek @ Rd 20	26-Sep-07	A	**X**

Table V-5. Cottonwood Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule for copper. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Copper
Cottonwood Creek @ Hwy 145	27-May-08	U	**X**
Cottonwood Creek @ Hwy 145	24-Jun-08	U	**X**
Cottonwood Creek @ Hwy 145	29-Jul-08	U	**X**
Cottonwood Creek @ Hwy 145	26-Aug-08	U	**X**
Cottonwood Creek @ Hwy 145	30-Sep-08	U	**X**

Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli,* nutrients, metals, pesticides, and water column and sediment toxicity occurred within the Cottonwood Creek site subwatershed (Table V-6). During ambient water monitoring within Cottonwood Creek (including the upstream sampling at Cottonwood Creek @ Hwy 145) exceedances of field, physical, inorganic and organic constituents have occurred including DO (15), pH (1), *E. coli* (14), total copper (13), total lead (3), chlorpyrifos (2), cyanazine (1), diazinon (1), simazine (1), and diuron (2, Table V-6). Copper exceedances have occurred during all irrigation months (May through September) as well as during storm sampling events (January and February); one of those exceedances occurred in June at the upstream sampling location at Hwy 145. Both chlorpyrifos exceedances occurred in the same year (2008) in January and February. In 2008, water column toxicity occurred three times, twice to *S. capricornutum* and once to *P. promelas* (Table V-6). The *S. capricornutum* toxicity occurred in a sample collected in April 2008 and again in the resample collected one week later. Sediment toxicity to *H. azteca* occurred once in March 2008 (Table V-6).

During 2009, the only WQTL exceedances that occurred were for *E. coli* (February and November) and DO (May, Table V-6).

All exceedances are listed in Table V-6 by season and date and are based on WQTLs listed in the introduction to the ESJWQC Management Plan. A management plan is required if a site experiences two or more exceedances of the particular constituent within three years or if a site has a single exceedance of a constituent that has a TMDL. Using the ESJWQC Management Plan prioritization process flow chart (Figure 4), priorities were assigned to management plan constituents and are listed in the bottom row of Table V-6. The highest priority constituents in the Cottonwood Creek subwatershed are chlorpyrifos (A/B), diazinon (A/B), copper (C), and diuron (C).

Table V-6. All exceedances experienced in samples collected from locations within the Cottonwood Creek site subwatershed between February 2005 and December 2009 (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.

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	*E. coli*, 235 MPN/100 mL	Copper, Total 1,300 µg/L	Lead, Total, 15 µg/L	Chlorpyrifos, 0.015 µg/L	Cyanazine, 1 µg/L	Diazinon, 0.1 µg/L	Diuron, 2 µg/L	Simazine, 4 µg/L	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell Count	*H. azteca*, Survival (%)
Cottonwood Creek @ Rd 20	Storm	2/16/2005			1600										
Cottonwood Creek @ Rd 20	Storm	3/21/2005	5.6		1600										
Cottonwood Creek @ Rd 20	Irrigation	5/10/2005			540										
Cottonwood Creek @ Rd 20	Irrigation	6/14/2005	5.7												
Cottonwood Creek @ Rd 20	Irrigation	7/12/2005	5.17												
Cottonwood Creek @ Rd 20	Irrigation	8/16/2005			300										
Cottonwood Creek @ Rd 20	Irrigation	9/20/2005	6.5												
Cottonwood Creek @ Rd 20	Storm	2/28/2006			300										
Cottonwood Creek @ Rd 20	Storm	3/15/2006			1600										
Cottonwood Creek @ Rd 20	Irrigation	5/16/2006	5.71			4.4 (3.5)									
Cottonwood Creek @ Rd 20	Irrigation	6/13/2006	6.9			8 (6.9)	0.73 (0.63)								
Cottonwood Creek @ Rd 20	Irrigation	7/11/2006	6.51												
Cottonwood Creek @ Rd 20	Irrigation	8/8/2006	6.95												
Cottonwood Creek @ Rd 20	Irrigation	9/12/2006	6.11			5.5 (4.4)									
Cottonwood Creek @ Rd 20	Irrigation	5/29/2007	6.55			6.7 (5.5)									
Cottonwood Creek @ Rd 20	Irrigation	6/19/2007				6.7 (4.1)									
Cottonwood Creek @ Rd 20	Irrigation	6/26/2007				4.3 (4.1)									
Cottonwood Creek @ Rd 20	Irrigation	7/24/2007		9.04		5.4 (4.6)									

Station Name	Season	Sample Date	Oxygen, Dissolved, 7 mg/L	pH, 6.5-8.5 units	*E. coli*, 235 MPN/100 mL	Copper, Total 1,300 µg/L	Lead, Total, 15 µg/L	Chlorpyrifos, 0.015 µg/L	Cyanazine, 1 µg/L	Diazinon, 0.1 µg/L	Diuron, 2 µg/L	Simazine, 4 µg/L	*P. promelas*, Survival (%)	*S. capricornutum*, Total Cell Count	*H. azteca*, Survival (%)
Cottonwood Creek @ Rd 20	Irrigation	8/21/2007	6.81			5.2 (4.6)									
Cottonwood Creek @ Rd 20	Irrigation	8/23/2007	3.95												
Cottonwood Creek @ Rd 20	Storm	1/25/2008			1200	24 (3.0)	5.4 (0.6)	0.02			68		45		
Cottonwood Creek @ Rd 20	Storm	2/25/2008				21 (6.5)	1.9 (1.9)	0.04		0.2	65	5			
Cottonwood Creek @ Rd 20	Sediment	3/4/2008													96
Cottonwood Creek @ Rd 20	Irrigation	4/29/2008			580	8 (6.9)								58382	
Cottonwood Creek @ Rd 20	Irrigation	5/7/2008												130025	
Cottonwood Creek @ Rd 20	Irrigation	5/27/2008			250				1						
Cottonwood Creek @ Hwy 145	*Irrigation*	*6/24/2008*				*39 (5.5)*									
Cottonwood Creek @ Rd 20	Irrigation	6/24/2008			1300										
Cottonwood Creek @ Rd 20	Irrigation	7/29/2008			1000										
Cottonwood Creek @ Hwy 145	*Irrigation*	*8/26/2008*	*6.45*												
Cottonwood Creek @ Rd 20	Irrigation	8/26/2008	6.83		390	4.4 (3.7)									
Cottonwood Creek @ Rd 20	Storm	2/7/2009			>2400										
Cottonwood Creek @ Rd 20	Irrigation	5/19/2009	6.72												
Cottonwood Creek @ Rd 20	Fall	11/17/2009			770										
Constituent Priority			**E**	**NP**	**E**	**C**	**E**	**A/B**	**NP**	**A/B**	**C**	**NP**	**NP**	**NP[1]**	**NP**

NP- Not prioritized. Fewer than two exceedances for this constituent at this site within three years and 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).

2007 - 2009 Management Plan Monitoring Results

Management Plan monitoring results are included in Table V-7 for copper for the years 2007 and 2008; MPM did not occur for copper during 2009. Chlorpyrifos, diazinon, and diuron first exceeded their respective WQTLs during 2008 storm sampling (January and February) and MPM monitoring for these constituents was initiated in January 2010.

2007

In 2007, Cottonwood Creek @ Rd 20 was monitored monthly for copper from April through September plus additional copper monitoring was conducted in June and September. The copper WQTL was exceeded in all samples analyzed from May through August during normal monitoring including the additional sample collected in June 2007 (Table V-6). The April sample had detectable amounts of copper (3.9µg/L) however the concentration was not an exceedance. Cottonwood Creek was dry in September and therefore there are no results for NM or MPM (Table V-7).

2008

In accordance with the 2008 upstream MPM schedule, Cottonwood Creek @ Hwy 145 was monitored for copper from May through September 2008 (previous section, Table IV-5). Copper was detected in all samples collected during the irrigation season except in September when the site was dry. The copper WQTL was exceeded in samples collected during April and August at the normal monitoring site, but never at the upstream monitoring site (Table V-7).

2009

Cottonwood Creek @ Rd 20 was not scheduled for 2009 MPM.

Management Plan Monitoring for chlorpyrifos, diazinon and diuron (exceedances occurred during storm monitoring in 2008) took place in January and February of 2010 and will be reported in the 2011 Management Plan Update Report.

Management Plan Monitoring for copper will be conducted during the 2010 irrigation season. Management Plan Monitoring during January and February 2011 is also scheduled for copper, chlorpyrifos, diuron, and diazinon.

Table V-7. Cottonwood Creek site subwatershed. **Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for copper. Exceedance values are in bold.**

	Month:	April	May	June	July	August	September
2007 NM (@ Rd 20)	Date	4/24/07	5/29/07	6/26/07	7/24/07	8/21/07	9/18/07
	Copper (µg/L)	3.9	**6.7**	**4.3**	**5.4**	**5.2**	Dry
2007 MPM A (@Rd 20)	Date	NA	NA	6/19/07	NA	NA	9/25/07
	Copper (µg/L)	NA	NA	**6.7**	NA	NA	Dry
2008 NM (@ Rd 20)	Date	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Copper (µg/L)	**8 (6.9)**	4.9	4.5	4.8	**4.4 (3.7)**	Dry
2008 MPM US (@ Hwy 145)	Date	NA	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Copper (µg/L)	NA	2.4	39	2.3	2.1	Dry

NA - Not applicable. This site was not sampled during this month.

Load Calculations

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

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (milligram/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 V-8. Cottonwood Creek site subwatershed. Instantaneous load calculations for chlorpyrifos, copper, diazinon and diuron where discharge was measured (sorted by analyte, site and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Cottonwood Creek @ Rd 20*	Chlorpyrifos	15-Mar-06	0	0.012	0
Cottonwood Creek @ Rd 20	Chlorpyrifos	15-Mar-06	0	0.011	0
Cottonwood Creek @ Rd 20	Chlorpyrifos	11-Jul-06	1.96	0.014	0.78
Cottonwood Creek @ Rd 20	Chlorpyrifos	24-Jul-07	0	0.007	0
Cottonwood Creek @ Rd 20	Chlorpyrifos	25-Jan-08	3.05	0.019	1.64
Cottonwood Creek @ Rd 20	Chlorpyrifos	25-Feb-08	0.22	0.036	0.22
Cottonwood Creek @ Rd 20	Copper	16-May-06	2.33	4.4	290.31
Cottonwood Creek @ Rd 20*	Copper	16-May-06	2.33	4.8	316.70
Cottonwood Creek @ Rd 20	Copper	13-Jun-06	2.66	8	602.59
Cottonwood Creek @ Rd 20	Copper	11-Jul-06	1.96	5.3	294.16
Cottonwood Creek @ Rd 20	Copper	8-Aug-06	12.92	4.1	1500.01
Cottonwood Creek @ Rd 20	Copper	12-Sep-06	38.2	5.5	5949.40
Cottonwood Creek @ Rd 20	Copper	24-Apr-07	28.24	3.9	3118.72
Cottonwood Creek @ Rd 20	Copper	19-Jun-07	0.59	6.7	111.94
Cottonwood Creek @ Rd 20	Copper	24-Jul-07	0	5.4	0
Cottonwood Creek @ Rd 20*	Copper	24-Jul-07	0	5.1	0
Cottonwood Creek @ Rd 20	Copper	25-Jan-08	3.05	24	2072.80
Cottonwood Creek @ Rd 20	Copper	25-Feb-08	0.22	21	130.82
Cottonwood Creek @ Rd 20	Copper	29-Apr-08	8.26	8	1871.19
Cottonwood Creek @ Rd 20	Copper	27-May-08	17.41	4.9	2415.69
Cottonwood Creek @ Rd 20	Copper	24-Jun-08	0.08	4.5	10.19
Cottonwood Creek @ Rd 20	Copper	29-Jul-08	0.16	4.8	21.75
Cottonwood Creek @ Rd 20	Copper	26-Aug-08	0.79	4.4	98.43
Cottonwood Creek at Highway 145	*Copper*	*27-May-08*	*20.01*	*2.4*	*1359.90*
Cottonwood Creek at Highway 145	*Copper*	*24-Jun-08*	*60.24*	*39*	*66526.83*

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Cottonwood Creek at Highway 145	*Copper*	*29-Jul-08*	*35.03*	*2.3*	*2281.47*
Cottonwood Creek at Highway 145	*Copper*	*26-Aug-08*	*10.85*	*2.1*	*645.20*
Cottonwood Creek @ Rd 20	Diazinon	28-Feb-06	0.26	0.02	0.15
Cottonwood Creek @ Rd 20*	Diazinon	28-Feb-06	0.26	0.023	0.17
Cottonwood Creek @ Rd 20	Diazinon	25-Jan-08	3.05	0.06	5.18
Cottonwood Creek @ Rd 20	Diazinon	25-Feb-08	0.22	0.24	1.50
Cottonwood Creek @ Rd 20	Diuron	24-Apr-07	28.24	0.85	679.72
Cottonwood Creek @ Rd 20	Diuron	25-Jan-08	3.05	68	5872.95
Cottonwood Creek @ Rd 20	Diuron	25-Feb-08	0.22	65	404.93
Cottonwood Creek @ Rd 20	Diuron	29-Apr-08	8.26	0.63	147.36
Cottonwood Creek @ Rd 20	Diuron	27-May-08	17.41	0.23	113.39

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos and diazinon are the only priority A/B constituents listed under the Cottonwood Creek Management Plan.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L two times in this subwatershed from 2005 through 2009 (January and February 2008). Chlorpyrifos was omitted from the monitoring schedule in October 2008 when the Coalition began monitoring under a new MRPP. Starting in 2010, as part of the MPM schedule, chlorpyrifos will be monitored for in January and February. The Coalition uses a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources.

PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds active ingredient (AI) applied, and acres treated (Table V-9, Figure V-2). The greatest chlorpyrifos use occurred in 2006 (7,978 lbs) with the lowest use occurring in 2007 (406 lbs) and 2009 (280 lbs, Table V-9, Figure V-2). In 2005, 2007, and 2008 the greatest amount of chlorpyrifos use occurred in July whereas in 2006, the greatest use occurred in May and in 2009 during October (Table V-9, Figure V-2). The most recent chlorpyrifos use preceding the 2008 January and February chlorpyrifos exceedances occurred in August 2007; no use was reported from September 2007 through February 2008 (Figure V-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos. The highest application rates are associated with almond orchards, orange groves and vineyards/grapes (Table V-10). The largest amount of chlorpyrifos from 2005 through 2009 was to almond orchards (10,012 lbs) followed by orange groves (2,875 lbs) and vineyards/grapes (1,794 lbs, Table V-10). 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 January 2005 through December 2009 in the Cottonwood Creek @ Rd 20 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
February, 2005	2	405.8	203
March, 2005	1	0.4	0.1
May, 2005	1	245.2	41
June, 2005	1	6.0	80
July, 2005	17	1631.3	865
August, 2005	11	1198.8	311.1
September, 2005	16	628.0	212
February, 2006	3	353.1	181
March, 2006	2	131.9	71
May, 2006	21	4107.6	1179
June, 2006	4	277.4	166.5
July, 2006	17	1586.3	792.46
August, 2006	10	784.6	220.75
September, 2006	7	244.4	88.5
October, 2006	4	492.5	110
March, 2007	1	326.1	163
May, 2007	1	14.9	8
July, 2007	8	369.9	197.2
August, 2007	3	75.8	38
March, 2008	1	326.0	163
July, 2008	20	1128.8	482
August, 2008	14	662.6	344
October, 2008	2	40.4	10
July, 2009	2	156.9	67
August, 2009	2	146.8	73
October, 2009	5	262.9	140
Summaries by Year			
2005 Total	49	4115.6	1712.2
2006 Total	68	7977.9	2809.21
2007 Total	13	786.6	406.2
2008 Total	37	2157.9	999
2009 Total	9	566.7	280
Total	**176**	**15,604.6**	**6,206.61**

Figure V-2. Pounds of chlorpyrifos applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

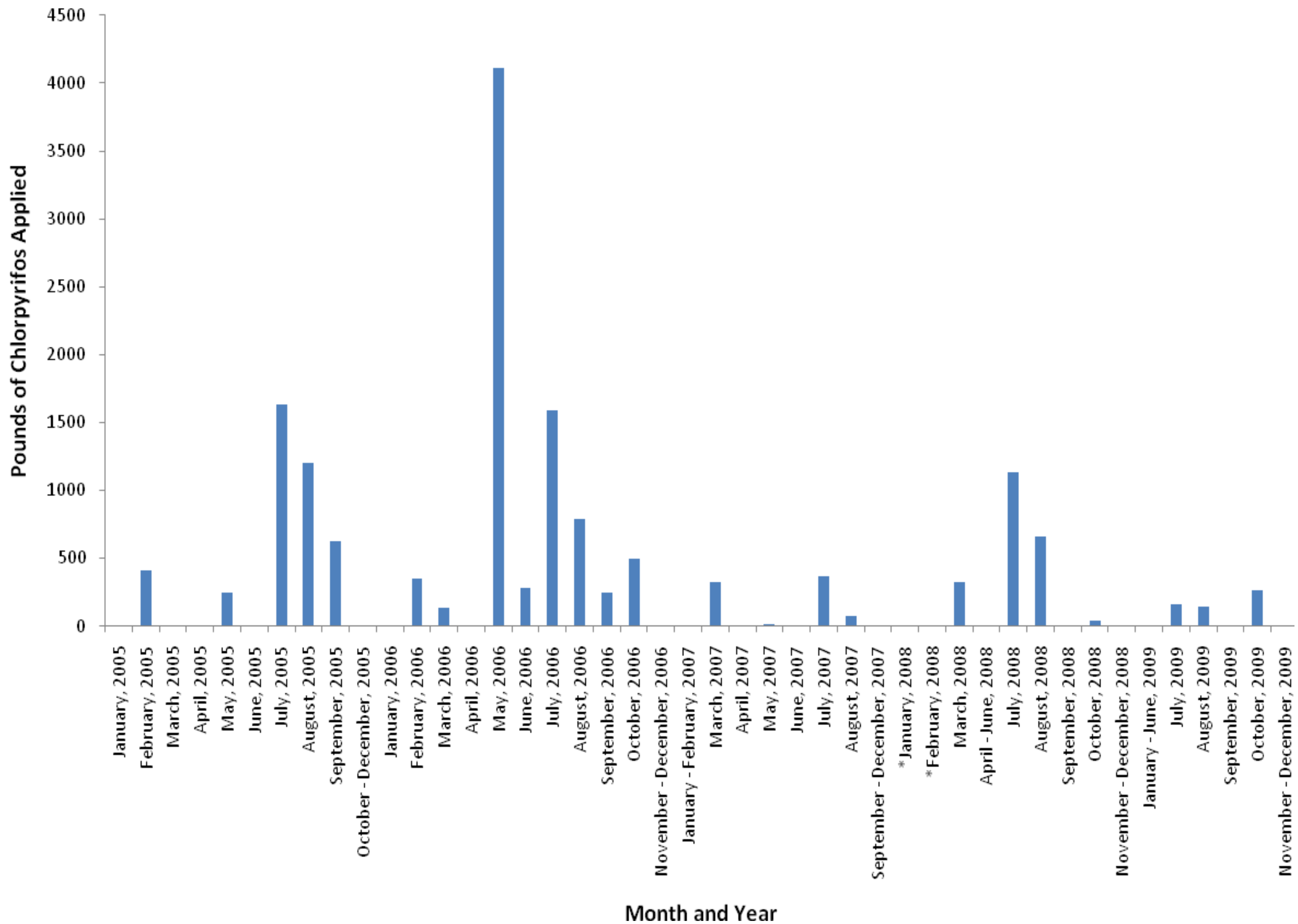


Table V-10. Total pound AI for chlorpyrifos based on PUR data from 2005-2009 within the Cottonwood Creek @ Rd 20 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LORSBAN-4E	23.657
	ALMOND	CHLORPYRIFOS 4E AG	0.404
		GOVERN 4E INSECTICIDE	2014.002
		LORSBAN 4E-HF	970.009
		LORSBAN ADVANCED	75.120
		LORSBAN-4E	6696.266
		NUFOS 4E	256.225
	CHERRY	LORSBAN 4E INSECTICIDE	27.072
	CORN (FORAGE - FODDER)	LORSBAN 4E-HF	117.637
	GRAPES	LORSBAN 4E INSECTICIDE	1304.188
		LORSBAN 4E-HF	79.754
	GRAPES, RAISIN	LORSBAN ADVANCED	75.120
		LORSBAN-4E	14.870
	GRAPES, WINE	LORSBAN ADVANCED	187.800
		LORSBAN-4E	131.945
	ORANGE	GOVERN 4E INSECTICIDE	409.063
	ORANGE (ALL OR UNSPEC)	CHLORPYRIFOS 4E AG	6.289
		GOVERN 4E INSECTICIDE	303.010
		LORSBAN 4E-HF	936.712
		LORSBAN-4E	1219.588
	TANGELO	LORSBAN-4E	306.633
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	GOVERN 4E INSECTICIDE	84.843
		LORSBAN-4E	160.815
	TANGERINE, SEEDL	GOVERN 4E INSECTICIDE	40.401
	WALNUT	GOVERN 4E INSECTICIDE	80.803
		LORSBAN-4E	61.325
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	LORSBAN 4E-HF	0.997
		LORSBAN-4E	20.010

ALFALFA – Total Pounds Chlorpyrifos Applied	23.657
ALMOND – Total Pounds Chlorpyrifos Applied	10012.024
CHERRY – Total Pounds Chlorpyrifos Applied	27.072
CORN – Total Pounds Chlorpyrifos Applied	117.637
GRAPES – Total Pounds Chlorpyrifos Applied	1793.677
ORANGE – Total Pounds Chlorpyrifos Applied	2874.662
TANGELO – Total Pounds Chlorpyrifos Applied	306.633
TANGERINE – Total Pounds Chlorpyrifos Applied	286.058
WALNUT – Total Pounds Chlorpyrifos Applied	163.134
Total pounds chlorpyrifos applied (2005 - 2009)	**15,604.557**

Based on results from general management practice surveys, approximately 82% of the member acreage has no runoff and over 40% of the member acreage uses micro and/or drip irrigation. Cottonwood Creek has sandy soils and a large percentage of orchards. Therefore it is likely that the exceedances of chlorpyrifos that occurred in 2008 were due to spray drift. Although there was no reported use in December, January or February preceding the exceedances, applications of chlorpyrifos during this time of year would be either for Vine Mealybug control (applied to grapes) or dormant sprays (applied to orchards like cherries).

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of the Management Plan Update Report. The Coalition has begun the process of contacting growers, conducting individual meetings, and compiling individual surveys. The Coalition focused outreach to growers owning parcels with the potential to drain to the creek and those applying chlorpyrifos. Using these criteria, a list of 25 targeted growers was created. Targeted growers were made aware of the requirement to schedule an individual meeting with Coalition representatives through conference call meetings in October 2009. Individual meetings are currently ongoing and will be completed by the end of May 2010. Individual contacts will focus mainly on chlorpyrifos exceedances however all water quality results will be reviewed and discussed including diazinon, copper, diuron, *E. coli*, DO, and lead exceedances.

The Coalition will compile and analyze the surveys by the end of August 2010. Based on the exact timing of each individual meeting and/or a grower's resources, some owners will not be able to implement recommended management practices until the 2011 irrigation season. In addition, long term structural BMPs (e.g. sediment ponds) will most likely take longer than two years to implement and will require additional tracking to document their implementation. The Coalition will follow up with growers between February and April of 2011 to determine what practices were implemented during the first irrigation year. Growers who have not already been contacted or have indicated that they have not yet implemented practices during the first year will be contacted from February to April of 2012 to determine what practices were implemented during the dormant season and/or the second irrigation year. To evaluate the management practice process, the Coalition will monitor for high priority constituents during months of past exceedances in 2010 and 2011. Depending on when additional management practices are implemented, the Coalition may monitor through 2012 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or have the potential for spray drift will affect downstream water quality by the end of the second year as a high priority site subwatershed.

The effectiveness of the management practices will be determined through the monitoring of water quality in the years following implementation. However, due to the presence of dairies and nonmembers in the subwatersheds, implementation of management practices by only coalition members may not result in improved water quality. If water quality fails to improve, the Coalition will identify parcels from dairies and nonmembers that could contribute to the exceedances and provide that information to the Regional Board.

Diazinon

Concentrations of diazinon in samples have exceeded the WQTL of 0.1 µg/L once in this subwatershed from 2005 through 2009 (February 25, 2008, Table V-6). Diazinon was omitted from the monitoring schedule in October 2008 however MPM for diazinon will begin in January 2010. The Coalition uses a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources.

PUR data are reviewed for the number of monthly diazinon applications, pounds active ingredient (AI) applied, and acres treated (Table V-11, Figure V-3). Overall, the amount of diazinon applied within the subwatershed has decreased since 2005. The amount of diazinon used in 2005 was more than thirteen times the amount of diazinon used in 2009 (976 lbs in 2005 compared to 71 lbs in 2009, Table V-11, Figure V-3). Diazinon use generally occurs between December and March during dormant sprays (Table V-11, Figure V-3). Exceedances of diazinon have not occurred during the months of highest use (i.e. January 2006 and January 2007, Figure V-3). However, the exceedance that occurred in February 2008 was also the month of greatest diazinon use in 2008 (Table V-11, Figure V-3).

The Coalition also used PUR data to assess which crops receive the most applications of diazinon. The greatest pounds applied are associated with peaches, plums, almonds, and nectarines (Table V-12). The largest amount of diazinon from 2005 through 2009 was to almond and peach orchards (Table V-12). Diazinon was applied to peach, plum, almond, cherry and fig orchards prior to the February 2008 exceedance.

Table V-11. Number of diazinon applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Cottonwood Creek @ Rd 20 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diazinon Applications	Pounds Applied	Acres Treated
January, 2005	7	367.9	184
February, 2005	8	399.8	200
May, 2005	6	5.8	4.2
June, 2005	2	162.5	50
July, 2005	1	4.0	4
August, 2005	1	35.8	35.8
January, 2006	18	816.8	498.8
February, 2006	3	86.1	42.5
May, 2006	7	8.1	32.2
June, 2006	1	31.2	40
January, 2007	13	778.0	394.71
February, 2007	1	20.0	10
March, 2007	1	42.0	28
January, 2008	6	222.7	114.5

Month/Year	Number of Diazinon Applications	Pounds Applied	Acres Treated
February, 2008	8	383.8	300.5
March, 2008	1	42.0	28
December, 2009	1	71.4	36
Summaries by Year			
2005 Total	25	975.7	478
2006 Total	29	942.2	613.5
2007 Total	15	840.0	432.71
2008 Total	15	648.4	443
2009 Total	1	71.4	36
Total	**85**	**3,477.7**	**2,003.21**

Figure V-3. Pounds of diazinon applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

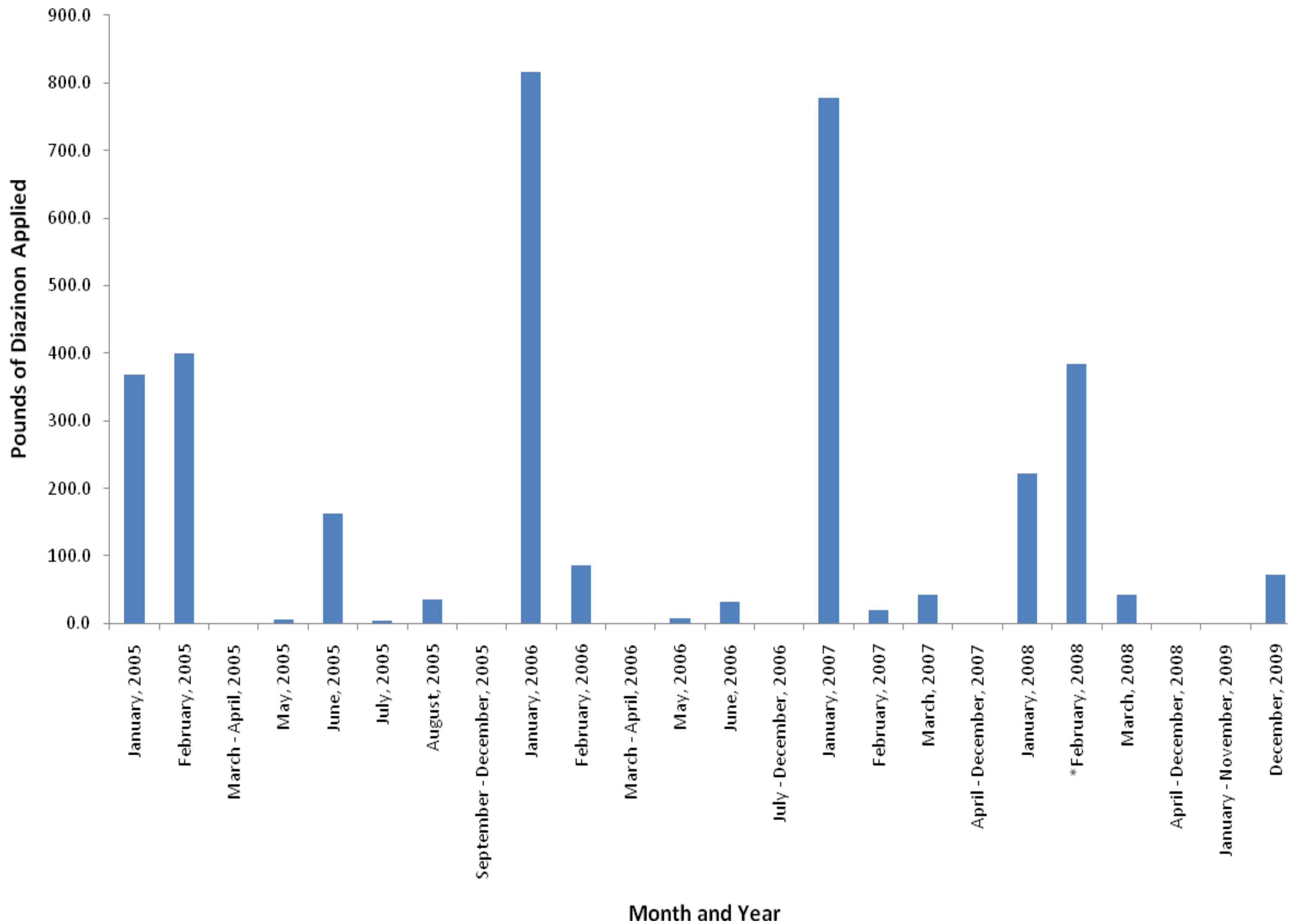


Table V-12. Total pound AI for diazinon based on PUR data from 2005-2009 within the Cottonwood Creek @ Rd 20 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIAZINON	ALMOND	CLEAN CROP DIAZINON AG500 INSECTICIDE	417.882
		DIAZINON AG 500	170.659
		GOWAN DIAZINON 4E	105.958
	APPLE	DIAZINON 50W	0.431
	APRICOT	DIAZINON 50W	4.681
	CHERRY	CLEAN CROP DIAZINON AG500 INSECTICIDE	39.393
		DIAZOL 50 W	20.000
		GOWAN DIAZINON 4E	19.992
	FIG	DIAZOL AG 500	66.994
	GRAPES, WINE	GOWAN DIAZINON 50 WSB	39.800
	NECTARINE	DIAZINON 50W	4.250
		DIAZINON AG 500	79.376
		GOWAN DIAZINON 4E	212.358
	PEACH	CLEAN CROP DIAZINON AG500 INSECTICIDE	661.860
		DIAZINON 50W	4.250
		DIAZINON AG 500	156.768
		DIAZOL 50 W	73.000
		GOWAN DIAZINON 4E	757.987
	PLUM	CLEAN CROP DIAZINON AG500 INSECTICIDE	86.124
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	DIAZINON 50W	4.750
		GOWAN DIAZINON 4E	59.976
		CLEAN CROP DIAZINON AG500 INSECTICIDE	60.792
	PRUNE	DIAZINON 50W	93.750
		DIAZINON AG500 INSECTICIDE	182.232
		DIAZOL 50 W	42.000
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOWAN DIAZINON 4E	112.455

ALMOND – Total Pounds Diazinon Applied	694.498
APPLE – Total Pounds Diazinon Applied	0.431
APRICOT – Total Pounds Diazinon Applied	4.681
CHERRY – Total Pounds Diazinon Applied	79.385
FIG – Total Pounds Diazinon Applied	66.994
GRAPES – Total Pounds Diazinon Applied	39.800
NECTARINE – Total Pounds Diazinon Applied	295.984
PEACH – Total Pounds Diazinon Applied	1653.865
PLUM (INCLUDING PRUNES) – Total Pounds Diazinon Applied	529.624
WALNUT – Total Pounds Diazinon Applied	112.455
Total pounds diazinon applied (2005 - 2009)	**3,477.717**

Ten applications of diazinon occurred within four weeks prior to the single February 2008 exceedance; however other months with high application rates did not have exceedances. The exceedance is most likely due to spray drift from parcels directly next to the creek. Therefore the Coalition has focused its outreach to target specific growers with the potential to discharge to the creek as well as growers with parcels next to the creek with the potential for spray drift; this is the same strategy used with chlorpyrifos outreach. Orchard operators will be advised to consider storm runoff relevant to diazinon applications to prevent the winter exceedances of the pesticide. Individual contacts occurring within this subwatershed are described under the chlorpyrifos outreach section above and include discussions of diazinon exceedances as well as spray drift and storm runoff management practices.

Priority C Constituents

Priority C constituents for Cottonwood Creek are copper and diuron.

Copper

Copper has exceeded the hardness based WQTL numerous times in this subwatershed from 2005 through 2009 based on results from total copper analysis . Additional and upstream MPM confirmed that copper is a water quality concern throughout the subwatershed during most times of the year. The Coalition will begin MPM monitoring for copper (both total and dissolved) in April 2010. PUR data are reviewed for the number of monthly copper applications, pounds active ingredient (AI) applied, and acres treated (Table V-13, Figure V-4). Since 2006 there has been a general decrease in the pounds of copper applied within the subwatershed; the amount of copper used in 2005 was almost twice the amount of copper used in 2009 (23,732 lbs in 2005 compared to 12,388 lbs in 2009, Table V-13, Figure V-4). In 2005 and 2006 the greatest amount of copper use occurred in April whereas in 2007 the greatest use occurred in March, in 2008 the greatest use occurred in January, and in 2009 it was September (Table V-13, Figure V-4). Not all exceedances occurred during months of the greatest amount of use (Figure V-4).

The largest amount of copper applied from 2005 through 2009 was associated with grapes (including wine and raisin), almonds, oranges and peaches (Table V-14). The most common products containing copper used within this subwatershed are DuPont Kocide and Kocide (Table V-14).

Table V-13. Number of copper applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Cottonwood Creek @ Rd 20 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
January, 2005	21	3147.4	704.3
February, 2005	17	2121.8	391
March, 2005	78	5544.1	4534.66
April, 2005	111	6509.6	5140.24
May, 2005	8	133.6	142
June, 2005	10	710.2	561
August, 2005	9	1473.7	487
September, 2005	3	705.0	235
October, 2005	8	1464.9	278
November, 2005	21	1645.3	420.7
December, 2005	1	276.3	60
January, 2006	48	8582.9	2205.8
February, 2006	24	1357.6	307.2

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
March, 2006	16	1144.0	993.6
April, 2006	237	12968.4	13377.61
May, 2006	45	2657.9	2294.1
June, 2006	9	640.3	450
July, 2006	3	281.6	107
August, 2006	3	393.8	190
September, 2006	1	108.0	36
October, 2006	9	1567.0	380.8
November, 2006	14	1212.7	478.25
December, 2006	5	677.2	183.5
January, 2007	23	2444.0	829.71
February, 2007	7	715.2	363
March, 2007	77	3404.8	3981.36
April, 2007	49	2094.1	2428.06
May, 2007	8	120.8	138.8
July, 2007	18	2712.0	1368.42
August, 2007	4	220.0	60
September, 2007	8	1170.1	382
October, 2007	1	94.1	16
January, 2008	45	7245.7	3127.76
February, 2008	12	875.5	313.5
March, 2008	46	1328.0	2369.98
April, 2008	102	4659.1	5422.97
June, 2008	14	269.3	136
August, 2008	10	405.4	344
October, 2008	10	812.2	288
November, 2008	12	2920.6	1202
January, 2009	9	1380.5	576
February, 2009	1	22.6	10
March, 2009	39	851.5	1764.4
April, 2009	64	2168.9	3290.46
May, 2209	7	184.8	186
August, 2009	1	120.0	40
September, 2009	1	4890.5	163
October, 2009	13	1387.5	800
November, 2009	6	1381.3	425
Summaries by Year			
2005 Total	287	23731.9	12953.9
2006 Total	414	31591.4	21003.86
2007 Total	195	12975.1	9567.35

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
2008 Total	251	18515.7	13204.21
2009 Total	141	12387.5	7254.86
Total	**1,288**	**99,201.6**	**63,984.18**

Figure V-4. Pounds of copper applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

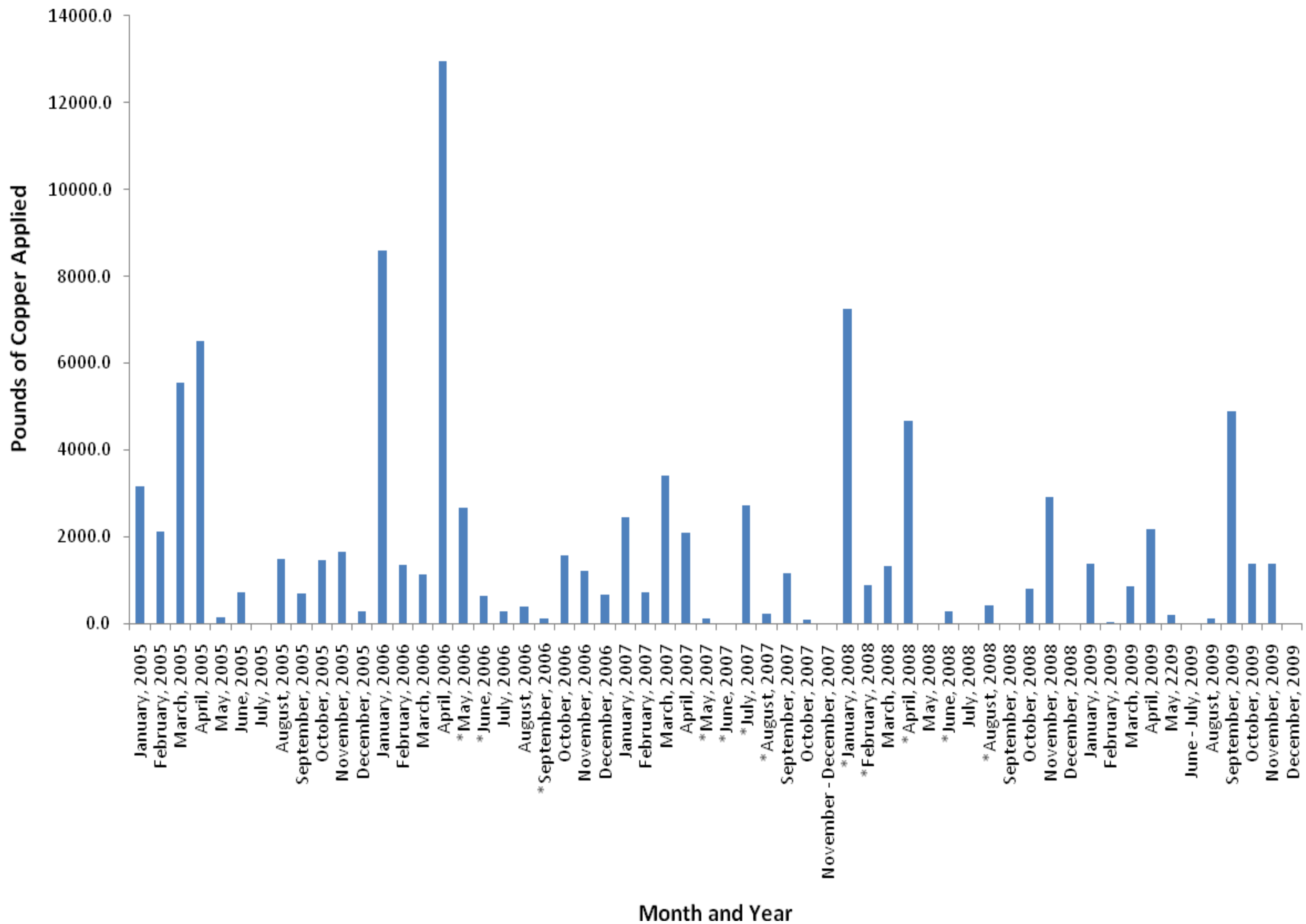


Table V-14. Total pound AI for copper based on PUR data from 2005-2009 within the Cottonwood Creek @ Rd 20 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2.421
	ALMOND	CHAMP FORMULA 2 FLOWABLE	7475.489
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2182.662
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	1418.903
		KOCIDE 101	649.880
		KOCIDE 2000	1329.622
		KOCIDE DF	2124.440
		NORDOX 75 WG	834.803
		TRIANGLE BRAND COPPER SULFATE CRYSTAL	217.800
	APPLE	KOCIDE 2000	0.336
		NU-COP 50DF	8.855
	APRICOT	KOCIDE 2000	3.564
		NU-COP 50DF	27.720
	CHERRY	KOCIDE DF	122.800
	GRAPES	BRITZ COPPER SULFUR 15-25 DUST	11101.734
		CHAMP FORMULA 2 FLOWABLE	1372.442
		CHAMPION WETTABLE POWDER	676.160
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	498.000
		CSC COPPER SULFUR DUST	1645.512
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1660.537
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	938.011
		HYDROX	92.400
		KOCIDE 101	1221.066
		KOCIDE 2000	4876.932
		KOCIDE DF	1715.958
		NORDOX	680.184
		NORDOX 75 WG	1915.020
		NU-COP 50 WP	1.540
		NU-COP 50DF	170.940
		STRETCH FUNGICIDE	0.546
	GRAPES, RAISIN	CHAMP FORMULA 2 FLOWABLE	81.720
		CHAMPION FLOWABLE	8.380
		CHAMPION WETTABLE POWDER	231.000

Chemical Name	Commodity	Product Name	Lbs AI Applied
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	2508.000
		COPPER SULFATE CRYSTALS	269.280
		CSC COPPER SULFUR DUST	108.400
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	697.679
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	1521.028
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	33.402
		KOCIDE 2000	740.330
		KOCIDE DF	42.980
		NORDOX 75 WG	443.344
		NU-COP 50 WP	311.080
		ZINC COPOSIL SULFUR 15-30 DUST	120.000
	GRAPES, WINE	CHAMP FORMULA 2 FLOWABLE	8525.606
		CHAMPION WETTABLE POWDER	1275.505
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	1179.000
		CSC COPPER SULFUR DUST	92.140
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1473.998
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	1762.458
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	151.290
		KOCIDE 101	726.880
		KOCIDE 2000	4733.920
		KOCIDE 4.5 LF	1142.426
		KOCIDE DF	1624.644
		NORDOX	37.224
		NORDOX 75 WG	248.554
		NU-COP 50 WP	246.400
		NU-COP 50DF	154.000
		STRETCH FUNGICIDE	1.364
	NECTARINE	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	267.200
		KOCIDE 2000	288.239
		KOCIDE DF	491.200
		NU-COP 50DF	107.800
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	CHAMP FORMULA 2 FLOWABLE	371.851
	OLIVE (ALL OR UNSPEC)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	96.840

Chemical Name	Commodity	Product Name	Lbs AI Applied
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	NORDOX 75 WG	9.095
	ORANGE	BASIC COPPER 53	948.640
		BASIC COPPER SULFATE	693.000
		COP-O-ZINC	231.000
		NORDOX	1453.428
	ORANGE (ALL OR UNSPEC)	BASIC COPPER 53	1051.344
		BLUE SHIELD DF	30.800
		COP-O-ZINC	432.250
		HYDROX	9.625
		KOCIDE 20/20	1697.480
		KOCIDE DF	2101.354
		NORDOX	1103.748
		NU-COP 50DF	1027.565
	PEACH	CHAMP FORMULA 2 FLOWABLE	77.183
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1443.292
		KOCIDE 2000	487.385
		KOCIDE DF	2683.180
		NORDOX 75 WG	201.360
		NU-COP 50DF	266.420
		STRETCH FUNGICIDE	0.682
	PISTACHIO	KOCIDE 2000	242.100
		TRIANGLE BRAND COPPER SULFATE CRYSTAL	79.200
	PLUM	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	169.470
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	KOCIDE 2000	3.228
		KOCIDE DF	368.400
		NU-COP 50DF	129.360
	PRUNE	KOCIDE 101	77.000
	TANGELO	BASIC COPPER 53	250.880
		COP-O-ZINC	175.000
		KOCIDE 20/20	359.190
		KOCIDE DF	225.952
		NORDOX	591.072
		NU-COP 50DF	215.600
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	CHAMPION WETTABLE POWDER	431.200
	TANGERINE, SEEDL	NORDOX	1316.940
	Unknown	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	46.806

Chemical Name	Commodity	Product Name	Lbs AI Applied
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	KOCIDE DF	337.700
		NORDOX 75 WG	1152.283

ALFALFA – Total Pounds Copper Applied	2.421
ALMOND – Total Pounds Copper Applied	16233.599
APPLE – Total Pounds Copper Applied	9.191
APRICOT – Total Pounds Copper Applied	31.284
CHERRY – Total Pounds Copper Applied	122.800
GRAPES – Total Pounds Copper Applied	59059.012
NECTARINE – Total Pounds Copper Applied	1154.439
N-OUTDR PLANTS – Total Pounds Copper Applied	371.851
OLIVE – Total Pounds Copper Applied	96.840
ONION – Total Pounds Copper Applied	9.095
ORANGE – Total Pounds Copper Applied	10780.233
PEACH – Total Pounds Copper Applied	5159.502
PISTACHIO – Total Pounds Copper Applied	321.300
PLUM (INCLUDING PRUNES) – Total Pounds Copper Applied	747.458
TANGELO – Total Pounds Copper Applied	1817.694
TANGERINE – Total Pounds Copper Applied	1748.140
UNKNOWN – Total Pounds Copper Applied	46.806
WALNUT – Total Pounds Copper Applied	1489.983
Total pounds copper applied (2005 - 2009)	**99,201.649**

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts. Orchard and vineyard operators will be advised to consider irrigation water retention and 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 are described under the chlorpyrifos outreach section above and include discussions of copper exceedances and the above management practices.

Diuron

Concentrations of diuron have exceeded the WQTL twice in this subwatershed from 2005 through 2009 (January and February 2008). Diuron MPM will begin in January 2010.

PUR data are reviewed for the number of monthly diuron applications, pounds active ingredient (AI) applied, and acres treated (Table V-15, Figure V-5). There has been a general decrease in diuron use since 2006. The amount of diuron used in 2006 was three times the amount of diuron used in 2009 (4,056 lbs in 2006 compared to 966 lbs in 2009, Table V-15, Figure V-5).

Diuron is a general herbicide and is applied throughout the year, generally after high amounts of rain during the winter and/or spring (Table V-15, Figure V-5). None of the exceedances occurred during months of the greatest amount of use, although February was the month with the second highest amount of use in 2008 (Figure V-5).

The highest application rates and largest amount of diuron applied from 2005 through 2009 are associated with grapes (including wine and raisin) and oranges (Table V-16).

Table V-15. Number of diuron applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Cottonwood Creek @ Rd 20 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diuron Applications	Pounds Applied	Acres Treated
January, 2005	4	103.7	83.3
February, 2005	19	550.6	473
March, 2005	28	613.7	659.21
April, 2005	12	258.0	328.32
May, 2005	1	9.6	6
October, 2005	3	6.7	109
November, 2005	4	446.4	279
December, 2005	25	827.7	671.4
January, 2006	9	464.7	392.74
February, 2006	37	1140.0	1740.18
March, 2006	17	769.1	545.05
April, 2006	3	100.8	83
November, 2006	16	482.8	957.21
December, 2006	7	314.0	338
January, 2007	7	160.7	370
February, 2007	8	372.9	360.4
March, 2007	16	557.1	556
April, 2007	2	12.8	26
August, 2007	1	8.0	5
September, 2007	2	44.4	806
February, 2008	15	586.7	532.25
March, 2008	17	668.3	647.91
April, 2008	2	296.0	240
November, 2008	16	210.4	1052
January, 2009	12	225.7	339.95
February, 2009	12	295.6	330.34
March, 2009	5	54.4	222
November, 2009	8	359.3	327.7
December, 2009	3	30.8	44

Month/Year	Number of Diuron Applications	Pounds Applied	Acres Treated
Summaries by Year			
2005 Total	96	2816.5	2609.23
2006 Total	89	3271.4	4056.18
2007 Total	36	1155.8	2123.4
2008 Total	50	1761.4	2472.16
2009 Total	40	965.8	1263.99
Total	**311**	**9,970.9**	**12,524.96**

Figure V-5. Pounds of diuron applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

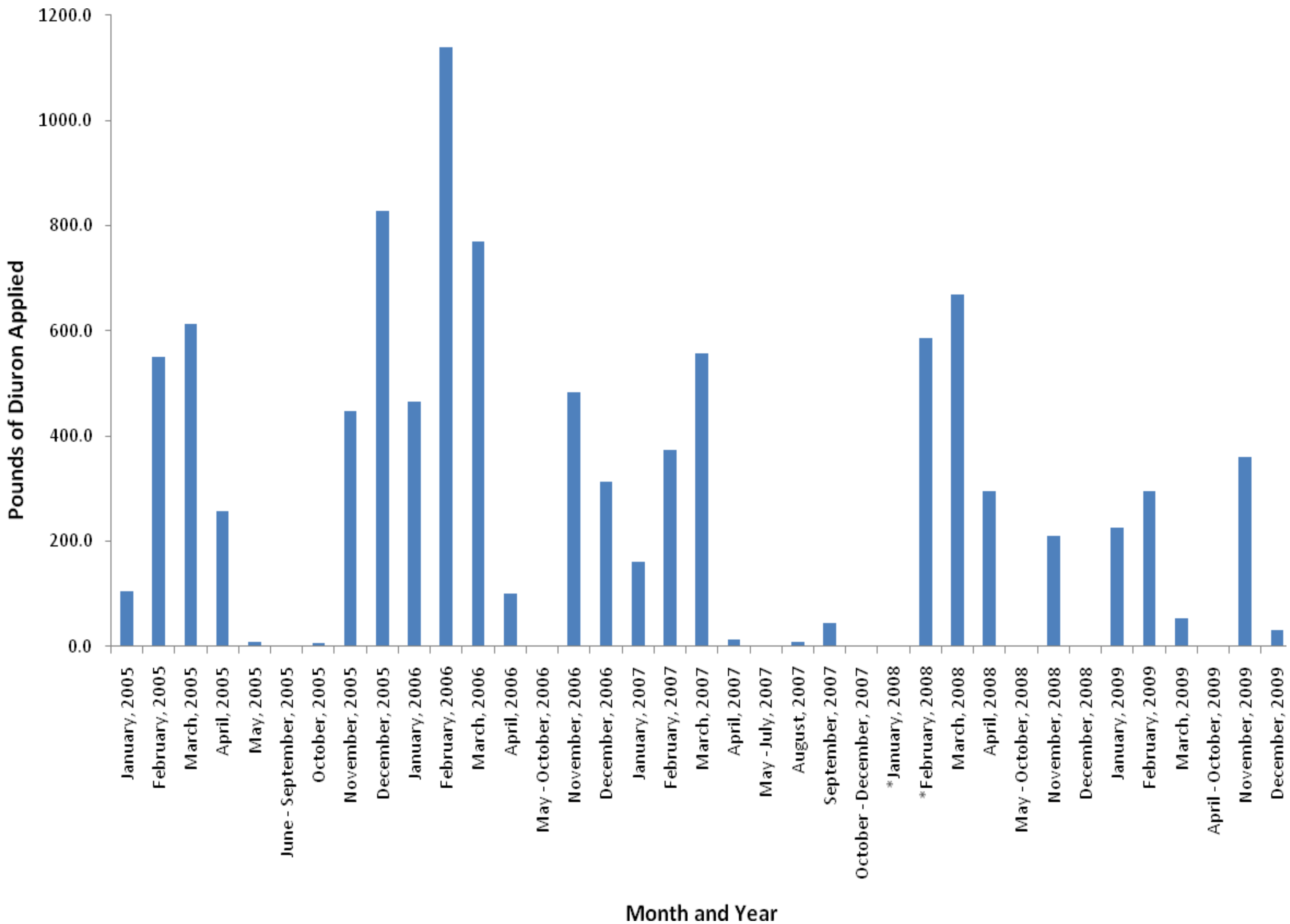


Table V-16. Total pounds AI for diuron based on PUR data from 2005-2009 within the Cottonwood Creek @ Rd 20 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA	DIURON 80 DF HERBICIDE	200.000
		DREXEL DIURON 80 HERBICIDE	244.800
		DUPONT DIREX 4L HERBICIDE	119.977
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DREXEL DIURON 80 HERBICIDE	695.200
	COTTON	ADIOS COTTON DEFOLIANT	44.420
	COTTON, GENERAL	GINSTAR EC COTTON DEFOLIANT	6.722
	GRAPES	DIREX 4L	13.157
		DIREX 80DF	431.872
		DIURON 80 WP WEED KILLER	4.800
		DREXEL DIURON 4L HERBICIDE	11.136
		DREXEL DIURON 80 HERBICIDE	411.288
		DU PONT KARMEX	13.200
		DU PONT KARMEX DF HERBICIDE	533.296
		KARMEX DF HERBICIDE	276.832
		KARMEX XP HERBICIDE	471.736
	GRAPES, RAISIN	DIREX 80DF	25.600
		DIURON 4L	33.969
		DIURON 80 DF HERBICIDE	9.600
		DIURON 80 WP WEED KILLER	4.800
		DREXEL DIURON 4L HERBICIDE	103.359
		DREXEL DIURON 80 HERBICIDE	122.696
		DU PONT KARMEX DF HERBICIDE	150.400
		DUPONT KARMEX DF HERBICIDE	98.200
		DUPONT KARMEX XP HERBICIDE	44.808
		KARMEX DF HERBICIDE	24.000
		KARMEX XP HERBICIDE	927.380
	GRAPES, WINE	DIREX 4L	25.422
		DIREX 80DF	90.400
		DIURON 4L	9.146
		DIURON 4L HERBICIDE	6.650
		DIURON 80 DF HERBICIDE	61.600
		DREXEL DIURON 4L HERBICIDE	106.053
		DREXEL DIURON 80 HERBICIDE	127.440
		DU PONT KARMEX	16.000
		DU PONT KARMEX DF HERBICIDE	175.520
		DUPONT KARMEX DF HERBICIDE	66.000
		KARMEX DF HERBICIDE	229.176
		KARMEX XP HERBICIDE	572.760
	OLIVE (ALL OR UNSPEC)	DU PONT KARMEX	12.800
	ORANGE	DIREX 80DF	246.400

Chemical Name	Commodity	Product Name	Lbs AI Applied
		DU PONT KROVAR I DF HERBICIDE	252.800
		DUPONT KARMEX XP HERBICIDE	240.000
		KARMEX DF HERBICIDE	81.600
	ORANGE (ALL OR UNSPEC)	DIREX 80DF	1128.320
		DU PONT KROVAR I DF HERBICIDE	387.200
		KARMEX XP HERBICIDE	153.000
	TANGELO	DU PONT KROVAR I DF HERBICIDE	504.000
		KARMEX XP HERBICIDE	9.600
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	DU PONT KROVAR I DF HERBICIDE	9.600
	TANGERINE, SEEDL	DU PONT KROVAR I DF HERBICIDE	190.800
		DUPONT KARMEX XP HERBICIDE	180.320
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	65.036

ALFALFA – Total Pounds Diuron Applied	1259.977
COTTON – Total Pounds Diuron Applied	51.142
GRAPES – Total Pounds Diuron Applied	5198.295
OLIVE – Total Pounds Diuron Applied	12.800
ORANGE – Total Pounds Diuron Applied	2489.32
TANGELO – Total Pounds Diuron Applied	513.600
TANGERINE – Total Pounds Diuron Applied	380.720
WALNUT – Total Pounds Diuron Applied	65.036
Total pounds diuron applied (2005 -2009)	**9,970.890**

Priority E Constituents

The following priority E constituents are listed under the Cottonwood Creek Management Plan: DO, *E. coli,* and lead. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

Cottonwood Creek @ Rd 20 is one of the second four priority site subwatersheds within the ESJWQC and is in its first year of focused outreach (2010-2012). The Coalition's strategy for the Cottonwood Creek subwatershed is to target growers along or adjacent to the waterway that have the potential to discharge. Focus will be on water retention and minimizing spray drift. 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 to document current management practices and assess future implementations are in the process of being filled out and will be completed by the end of May 2010. 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.

VI. Duck Slough @ Gurr Rd

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper

Priority D

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

Priority E

- Dissolved Oxygen
- *E. coli*
- Lead
- pH
- Specific Conductivity
- Total Dissolved Solids
- *Ceriodaphnia dubia* water column toxicity

Description of Duck Slough @ Gurr Rd Site Subwatershed

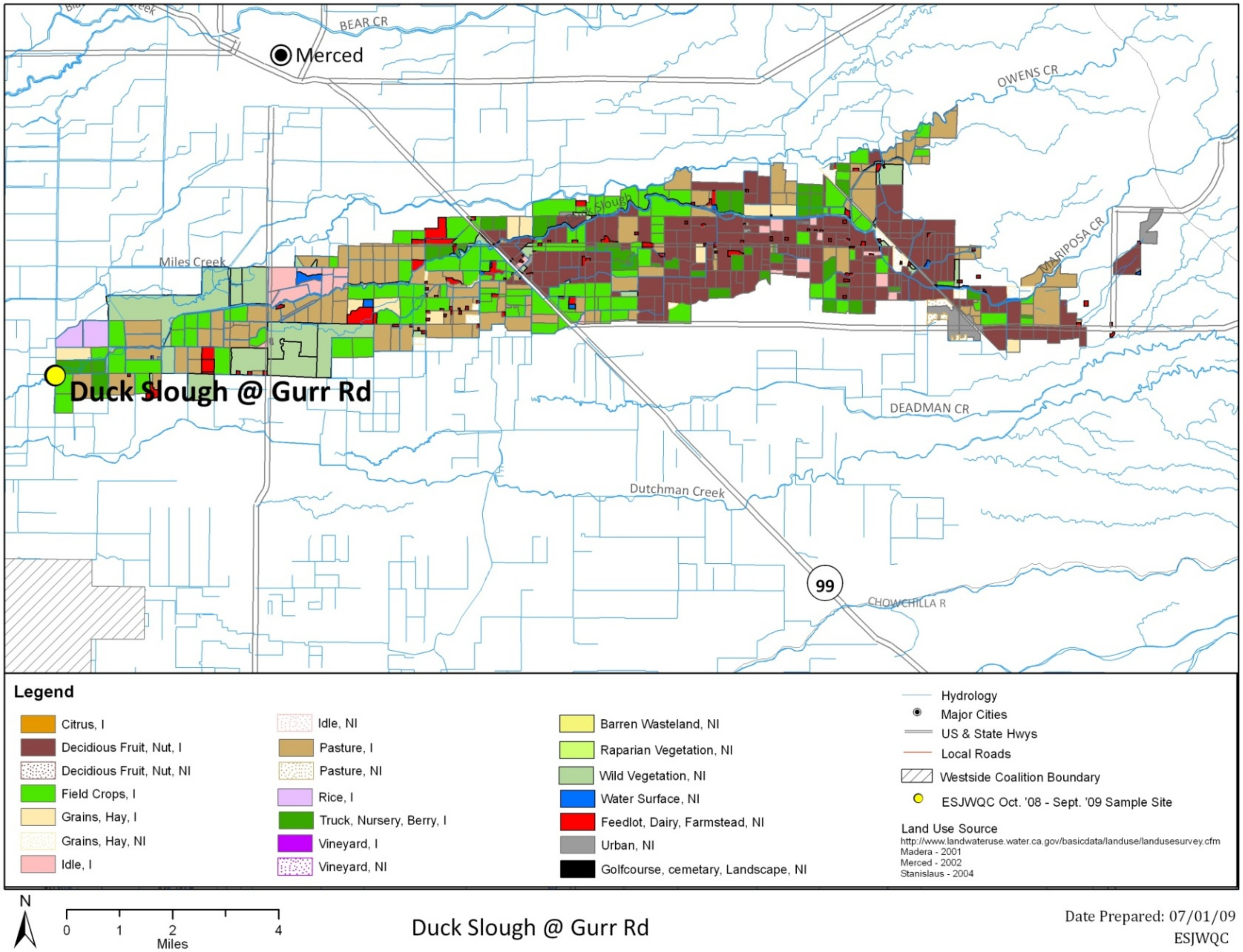
Duck Slough @ Gurr Road (21,082 irrigated acres) – This site subwatershed is a monitoring location downstream from Duck Slough @ Hwy 99. Located to the south and west of Merced, this site drains field crops immediately upstream and deciduous nuts further upstream as well as some irrigated pasture. The city of Merced delivers treated water to Duck Slough a few miles upstream of the Gurr Road site. Duck Slough flows west eventually becoming Deadman Creek in the western portion of the Coalition region. The slough eventually flows into the San Joaquin River via Deadman Creek and Deep Slough (Figure VI-1). This site subwatershed also includes upstream locations (Duck Slough @ Hwy 59 and North Slough @ Hwy 59) that were sampled in 2008. Table VI-1 includes the station name, station code and target latitude/longitudes for sites sampled within this subwatershed.

Table VI-1. Coordinates of the Duck Slough site subwatershed sampling locations.

Station Name	Station Code	Target Latitude	Target Longitude
Duck Slough @ Gurr Rd*	535XDSAGR	37.2142	-120.5596
Duck Slough @ Hwy 59[U]	535XDSHFN	37.2345	-120.4881
North Slough @ Hwy 59[U]	535XNSHFN	37.2277	-120.4880

* Original ESJWQC sampling site
[U] Upstream sites

Figure VI-1. Site subwatershed map of land use for the Duck Slough @ Gurr Rd sample site.



Subwatershed Monitoring History

Ambient water monitoring conducted at Duck Slough @ Gurr Rd was initiated during the irrigation season of 2004 and the site has been monitored through 2009 (Table VI-2). Duck Slough @ Gurr Rd will continue to be monitored as a Core Site in 2010 under the current MRPP. The constituents sampled at this location from 2004-2009 are listed in Table VI-3.

Management Plan Monitoring occurred within the Duck Slough @ Gurr Rd subwatershed in 2007 for chlorpyrifos, thiobencarb and copper and in 2008 for copper and *Selenastrum capricornutum* toxicity (Table VI-4 and VI-5). Duck Slough was monitored twice a month in June and July 2007 (Table VI-4). 2008 upstream MPM occurred at Duck Slough @ Hwy 59 for copper in June, for copper and *Selenastrum* toxicity in July, and for *Selenastrum* toxicity in September, and at North Slough @ Hwy 59 for copper and *Selenastrum* toxicity in July and for *Selenastrum* toxicity in September (Table VI-5). The Coalition will conduct MPM for copper (June-July 2010) and toxicity to *Selenastrum* (July 2010).

Starting in January 2010, the Coalition began additional MPM sampling during January, February and March (previously MPM was limited to irrigation months). The Coalition monitored for copper in January and February 2010; these results will be reported on in the Management Plan Update Report to be submitted on April 1, 2011.

Duck Slough @ Gurr Rd is scheduled as a high priority site starting in 2010. Duck Slough is considered impaired under the proposed 2008 Basin Plan 303d and is listed for chlorpyrifos, *E. coli*, sediment toxicity and unknown toxicity. Agriculture is listed as the potential source for the chlorpyrifos impairment; all other impairments have unknown sources.

Table VI-2. Duck Slough @ Gurr Rd sampling events per season and year.

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

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

Method	Analyte	2004	2005		2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8141A	Chlorpyrifos	3	2	5	2	5	2	7	3	6		2	1	2	
EPA 8141A	Demeton-s								1			2	1	2	
EPA 8141A	Diazinon	3	2	5	2	5	2	7	3	6		2	1	2	
EPA 8141A	Dichlorvos								1			2	1	2	
EPA 8141A	Dimethoate	1				5	2	7	3	6		2	1	2	
EPA 8141A	Disulfoton	1				5	2	7	3	6		2	1	2	
EPA 8141A	Malathion	1				5	2	7	3	6		2	1	2	
EPA 8141A	Methamidophos					5	2	6	3	6		2	1	2	
EPA 8141A	Methidathion					5	2	7	3	6		2	1	2	
EPA 8141A	Molinate					5	2	7	2	6					
EPA 8141A	Parathion, Methyl	1				5	2	7	3	6		2	1	2	
EPA 8141A	Phorate	1				5	2	7	3	6		2	1	2	
EPA 8141A	Phosmet					5	2	7	3	6		2	1	2	
EPA 8141A	Thiobencarb					5	2	9	2	6					
Pyrethroids															
EPA 8081A	Bifenthrin			1	2	5	2	9	2	6					
EPA 8081A	Cyfluthrin, total			1	2	5	2	7	2	6					
EPA 8081A	Cyhalothrin, lambda, total	3	2	5	2	5	2	7	2	6					
EPA 8081A	Cypermethrin, total	3	2	5	2	5	2	7	2	6					
EPA 8081A	Esfenvalerate/Fenvalerate, total	3	2	5	2	5	2	7	2	6					
EPA 8081A	Permethrin, total	3	2	5	2	5	2	7	2	6					
Triazines															
EPA 547M	Glyphosate					5	2	6	2	6					
EPA 549.2M	Paraquat dichloride					5	2	6	2	6					
EPA 619	Atrazine					5	2	6	2	6					
EPA 619	Cyanazine					5	2	6	2	6					
EPA 619	Simazine					5	2	6	2	6					
Metals (Total)															
EPA 200.8	Arsenic					6	3	6	3	6		2	1	1	
EPA 200.8	Boron					6	3	6	3	6		2	1	2	
EPA 200.8	Cadmium					6	3	6	3	6		2	1	1	
EPA 200.8	Copper					6	3	9	3	6		2	1	2	
EPA 200.8	Lead					6	3	6	3	6		2	1	1	

Method	Analyte	2004	2005		2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 200.8	Molybdenum								1			2	1	1	
EPA 200.8	Nickel					6	3	6	3	6		2	1	2	
EPA 200.8	Selenium					6	3	2	3	6		2	1	2	
EPA 200.8	Zinc					6	3	7	3	6		2	1	2	
Metals (Dissolved)															
EPA 200.8	Cadmium								1			2	1	1	
EPA 200.8	Copper								1			2	1	2	
EPA 200.8	Lead								1			2	1	1	
EPA 200.8	Nickel								1			2	1	2	
EPA 200.8	Zinc								1			2	1	2	
Nutrients															
SM 2340 C	Hardness as CaCO3					6	3	9	3	6		2	1	2	
EPA 300.0	Nitrate as N					6	3	6	2	6					
EPA 350.2	Ammonia as N					6	3	6	3	6		2	2	6	2
EPA 351.3	Nitrogen, Total Kjeldahl					6	3	6	3	6		2	1	1	
EPA 354.1	Nitrite as N					6	3	6	2	6					
EPA 353.2	Nitrate + Nitrite as N								1			2	2	6	2
EPA 365.2	Orthophosphate as P					6	3	6	3	6		2	1	1	
EPA 365.2	Phosphate as P					6	3	6	3	6		2	2	6	2
Toxicity															
EPA 821/R-02-012	Ceriodaphnia dubia	3	2	5	4	5	3	7	2	7					
EPA 821/R-02-012	Pimephales promelas	3	2	5	2	5	3	7	2	7					
EPA 821/R-02-013	Selenastrum capricornutum	3	2	5	2	5	3	8	2	7					
EPA 600/R-99-064	Hyalella azteca	2		5	1	1	1	1	1	2					

Table VI-4. Duck Slough @ Gurr Rd. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos, thiobencarb and copper. "X" indicates the site, month, and analyte sampled.

Sample Site	Month	Type	Chlorpyrifos	Thiobencarb	Copper
Duck Slough @ Gurr Rd	19-Jun-07	A		X	X
Duck Slough @ Gurr Rd	31-Jul-07	A	X	X	X

Table VI-5. Duck Slough site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos and copper. "X" indicates the site, month and analyte sampled.

Sample Site	Date	Type	Copper	*Selenastrum capricornutum* Toxicity
Duck Slough @ Hwy 59	24-Jun-08	U	X	
Duck Slough @ Hwy 59	29-Jul-08	U	X	X
North Slough @ Hwy 59	29-Jul-08	U	X	X
North Slough @ Hwy 59	30-Sep-08	U		X
Duck Slough @ Hwy 59	30-Sep-08	U		X

Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli,* nutrients, metals, pesticides, and water column and sediment toxicity occurred within the Duck Slough @ Gurr Rd site subwatershed (Table VI-6). Samples collected over the entire six years of monitoring resulted in exceedances at the normal monitoring and upstream MPM sites, including DO (6),pH (4), SC (3), TDS (1), *E. coli* (19), nitrate + nitrite 91), copper (9), lead (4), Carbofuran (1), chlorpyrifos (1), and thiobencarb (2). Water column toxicity has occurred five times, three times to *Ceriodaphnia dubia* and twice to *Selenastrum capricornutum.* Sediment toxicity to *Hyalella azteca* has occurred five times.

During 2009, exceedances detected at the normal monitoring site included pH (2), specific conductivity (1), *E. coli* (3), nitrate + nitrite (1), and copper (1).

All exceedances are listed in Table VI-6 by season and date and are based on WQTLs listed in the introduction to the ESJWQC Management Plan. A management plan is required if a site experiences two or more exceedances of a particular constituent within three years or if a site has a single exceedance of a constituent that has a TMDL. Using the ESJWQC Management Plan prioritization process flow chart (Figure 4), priorities were assigned to management plan constituents and are listed in the bottom row of Table VI-6. The highest priority constituents in the Duck Slough @ Gurr Road subwatershed are chlorpyrifos (A/B), copper (C), and toxicity to *Selenastrum* and *Hyalella* (D).

Table VI-6. All exceedances experienced in samples collected from locations within the Duck Slough site subwatershed between February 2005 and December 2009 (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.

Station Name	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	Nitrate + Nitrite as N, 10 mg/L	Copper, Dissolved, µg/L	Copper, Total, 1,300 µg/L	Lead, Total, 15 µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	Thiobencarb, 0 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Duck Slough @ Gurr Rd	Irrigation	7/31/2004				350							0.045				
Duck Slough @ Gurr Rd	Irrigation	8/31/2004														33.75	
Duck Slough @ Gurr Rd	Irrigation	9/29/2004			701		540										1220000
Duck Slough @ Gurr Rd	Storm	2/16/2005				1600											
Duck Slough @ Gurr Rd	Storm	3/21/2005				1600											
Duck Slough @ Gurr Rd	Irrigation	5/10/2005				1600											
Duck Slough @ Gurr Rd	Irrigation	6/14/2005				300											
Duck Slough @ Gurr Rd	Irrigation	7/12/2005				300										58.8	
Duck Slough @ Gurr Rd	Irrigation	8/16/2005				240											
Duck Slough @ Gurr Rd	Irrigation	9/20/2005														3.8	
Duck Slough @ Gurr Rd	Storm	2/28/2006													35		
Duck Slough @ Gurr Rd	Storm	3/10/2006													35		
Duck Slough @ Gurr Rd	Storm	3/15/2006				300									40		
Duck Slough @ Gurr Rd	Irrigation	5/17/2006		8.6		2000											
Duck Slough @ Gurr Rd	Irrigation	6/14/2006				690				120 (10.9)				5.8			
Duck Slough @ Gurr Rd	Irrigation	7/12/2006	6.18							14 (9.3)				0.29			
Duck Slough @ Gurr Rd	Irrigation	9/13/2006	5.53														
Duck Slough @ Gurr Rd	Storm	2/12/2007				2400				47 (12.4)	13 (4.88)						
Duck Slough @ Gurr Rd	Storm	2/28/2007				2000				11 (8.8)							
Duck Slough @ Gurr Rd	Storm	3/7/2007		9.17													
Duck Slough @ Gurr Rd	Irrigation	5/29/2007				820											

Station Name	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	Nitrate + Nitrite as N, 10 mg/L	Copper, Dissolved, µg/L	Copper, Total, 1,300 µg/L	Lead, Total, 15 µg/L	Carbofuran, 0 µg/L	Chlorpyrifos, 0.015 µg/L	Thiobencarb, 0 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Duck Slough @ Gurr Rd	Irrigation	6/19/2007	5.85							5.4 (3.0)							
Duck Slough @ Gurr Rd	Irrigation	6/26/2007								4.6 (3.7)	1 (0.81)						
Duck Slough @ Gurr Rd	Irrigation	7/24/2007															413341
Duck Slough @ Gurr Rd	Irrigation	9/18/2007				370											
Duck Slough @ Gurr Rd	Storm	1/25/2008				>2400				13 (9.0)	2.7 (2.4)						
Duck Slough @ Gurr Rd	Storm	2/25/2008				>2400				17 (9.3)	3.7 (3.2)						
Duck Slough @ Gurr Rd	Irrigation	4/29/2008										0.05					
Duck Slough @ Hwy 59	*Irrigation*	*6/24/2008*	*4.22*		*841*												
Duck Slough @ Hwy 59	*Irrigation*	*7/29/2008*	*4.83*														
Duck Slough @ Gurr Rd	Sediment	8/28/2008														62	
Duck Slough @ Hwy 59	*Irrigation*	*9/30/2008*	*3.33*														
Duck Slough @ Gurr Rd	Sediment	10/2/2008														90	
Duck Slough @ Gurr Rd	Storm	2/7/2009						13									
Duck Slough @ Gurr Rd	Winter	3/17/2009		9.7													
Duck Slough @ Gurr Rd	Irrigation	5/19/2009				>2400			7.3 (6.12)								
Duck Slough @ Gurr Rd	Irrigation	9/22/2009		9.03													
Duck Slough @ Gurr Rd	Fall	11/17/2009			1215	340											
Duck Slough @ Gurr Rd	Storm	12/15/2009				>2400											
Constituent Priority			E	E	E	E	E	NP	NP	C	E	NP	A/B	NP[1]	E	D	D

NP- Not prioritized. Fewer than two exceedances for this constituent at this site within three years and currently no TMDL for constituent
NP[1] - Not Prioritized; thiobencarb is used only by rice and therefore all exceedances are turned over to the Rice Coalition.

2007 - 2009 Management Plan Monitoring Results

Management Plan Monitoring results for Duck Slough @ Gurr Rd as well as normal monitoring results are included in Table VI-7 for 2007 through 2009. Management Plan Monitoring results from 2007 are for thiobencarb, copper and chlorpyrifos and from 2008 are for copper and *Selenastrum capricornutum* toxicity. The Coalition began sampling for both dissolved and total fractions of metals in October 2008; results reported from 2009 are for total and dissolved copper.

2007

In 2007 thiobencarb was being managed by the Coalition and was under the Duck Slough Management Plan along with chlorpyrifos and copper. Duck Slough @ Gurr Rd was monitored monthly for thiobencarb, chlorpyrifos, and copper and additional MPM also occurred for these constituents in June (except for chlorpyrifos) and July. There were no exceedances of chlorpyrifos during the irrigation season of 2007; there were, however, three detections including two in July during normal monitoring and MPM and one in September during normal monitoring (Table VI-7). Copper was detected in all normal monitoring samples collected during the irrigation season. Exceedances of the copper WQTL based on hardness occurred in the MPM and the normal monitoring samples collected in June (Table VI-7). Thiobencarb was not detected in any of the samples collected during the irrigation season.

Duck Slough @ Gurr Rd was sampled both upstream and downstream of the bridge on Gurr Rd on June 19, 2007 to determine if a difference in water quality existed between the two water bodies (Table VI-7). The water upstream of the bridge was dammed and was not flowing downstream although a pipe was discharging water into the pool. Just downstream of this dam is Dean Drain which inputs water from the north. Sampling always occurs downstream of Dean Drain. Both samples collected from Duck Slough on June 16, 2007 had detections of copper and no thiobencarb.

2008

In 2008, normal monitoring at was conducted at Duck Slough @ Gurr Rd as well as MPM at both upstream locations for copper and *Selenastrum capricornutum* toxicity. The upstream location North Slough @ Hwy 59 was dry during both its schedule MPM, in July and September (Table VI-7). Copper was detected in every sample collected during 2008, including from the upstream site Duck Slough @ Hwy 59. There was no toxicity to *Selenastrum* experienced during normal monitoring and MPM.

2009

Monitoring for both total and dissolved copper occurred at Duck Slough @ Gurr Rd April and May 2009. Copper was detected in both the total and dissolved copper samples in April and exceeded the WQTL and hardness based WQTL for both total and dissolved copper, respectively, in May. Duck Slough @ Gurr Rd was not scheduled for 2009 MPM.

Management Plan Monitoring for copper, chlorpyrifos, *Selenastrum* toxicity, and *Hyalella* toxicity are planned for the 2010 irrigation season. Management Plan Monitoring during January, February, and March 2011 will also occur for copper and toxicity to *Ceriodaphnia*.

Table VI-7. Duck Slough @ Gurr Rd. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream monitoring for chlorpyrifos, copper and thiobencarb from the 2007 irrigation season. NM and MPM (2008) for copper and *Selenastrum*. NM for copper (2009). Exceedance values are in bold.

	Month:	April	May	June		July	August	September
2007 NM (@ Gurr Rd)	Date	4/24/07	5/29/07	6/26/07		7/24/07	8/21/07	9/18/07
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003		0.007	<0.003	0.009
	Copper (µg/L)	4.6	5.3	**4.6**		4	4.8	5.5
	Thiobencarb (µg/L)	<0.06	<0.06	<0.06		<0.06	<0.06	<0.06
2007 MPM A (@ Gurr Rd)	Date	NA	NA	6/19/07	6/19/07[US]	7/31/07	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	0.007	NA	NA
	Copper (µg/L)	NA	NA	**5.4**	15	8.6	NA	NA
	Thiobencarb (µg/L)	NA	NA	<0.06	<0.06	<0.06	NA	NA
2008 NM (@ Gurr Rd)	Date	4/29/08	5/27/08	6/24/08		7/29/08	8/26/08	9/30/08
	Copper (µg/L)	2.7	7.1	4.0		5.4	3.5	6.1
	S. capricornutum toxicity (% Control)	175	309	459		350	262	263
2008 MPM US (@ Hwy 59[US])	Date	NA	NA	6/24/08		7/29/08	NA	9/30/08
	Copper (µg/L)	NA	NA	12		18	NA	NA
	S. capricornutum toxicity (% Control)	NA	NA	NA		271	NA	131
2008 MPM US (North Slough @ Hwy 59[US])	Date	NA	NA	NA		7/29/08	NA	9/30/08
	Copper (µg/L)	NA	NA	NA		Dry	NA	Dry
	S. capricornutum toxicity (% Control)	NA	NA	NA		Dry	NA	Dry
2009 NM (@ Gurr Rd)	Date	4/21/09	5/19/09	6/16/09		7/21/09	8/18/09	9/22/09
	Copper, total (µg/L)	3.3	**15**	NA		NA	NA	NA
	Copper, dissolved (µg/L)	2.6	**7.3**	NA		NA	NA	NA

[U]Upstream of bridge on Gurr Rd
NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed (Table VI-8) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (milligram/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 VI-8. Duck Slough site subwatershed. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured (sorted by analyte, site and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Duck Slough @ Gurr Rd	Chlorpyrifos	8-Aug-06	6.62	0.014	2.62
Duck Slough @ Gurr Rd	Chlorpyrifos	24-Jul-07	1.78	0.007	0.35
Duck Slough @ Gurr Rd	Chlorpyrifos	31-Jul-07	3.25	0.007	0.64
Duck Slough @ Gurr Rd	Chlorpyrifos	18-Sep-07	5.2	0.009	1.33
Duck Slough @ Gurr Rd	Chlorpyrifos	29-Jul-08	0.4	0.011	0.12
Duck Slough @ Gurr Rd	Chlorpyrifos	20-Jan-09	0.23	0.012	0.08
Duck Slough @ Gurr Rd	Copper	17-May-06	2.29	2.9	188.05
Duck Slough @ Gurr Rd	Copper	14-Jun-06	1.61	120	5470.84
Duck Slough @ Gurr Rd	Copper	12-Jul-06	10.93	14	4333.07
Duck Slough @ Gurr Rd	Copper	8-Aug-06	6.62	3.8	712.34
Duck Slough @ Gurr Rd	Copper	13-Sep-06	0.96	4.1	111.46
Duck Slough @ Gurr Rd*	Copper	13-Sep-06	0.96	4	108.74
Duck Slough @ Gurr Rd*	Copper	13-Sep-06	0.96	4	108.74
Duck Slough @ Gurr Rd	Copper	12-Feb-07	298.79	47	397659.31
Duck Slough @ Gurr Rd*	Copper	12-Feb-07	298.79	46	389198.48
Duck Slough @ Gurr Rd*	Copper	12-Feb-07	298.79	44	372276.80
Duck Slough @ Gurr Rd	Copper	28-Feb-07	321.45	11	100127.50
Duck Slough @ Gurr Rd	Copper	24-Apr-07	1.88	4.6	244.89
Duck Slough @ Gurr Rd	Copper	29-May-07	1.02	5.3	153.08
Duck Slough @ Gurr Rd	Copper	19-Jun-07	0.99	5.4	151.38
Duck Slough @ Gurr Rd	Copper	19-Jun-07	0	15	0
Duck Slough @ Gurr Rd	Copper	26-Jun-07	1.12	4.6	145.89
Duck Slough @ Gurr Rd	Copper	24-Jul-07	1.78	4	201.62
Duck Slough @ Gurr Rd	Copper	31-Jul-07	3.25	8.6	791.46
Duck Slough @ Gurr Rd	Copper	21-Aug-07	1.38	4.8	187.57
Duck Slough @ Gurr Rd	Copper	18-Sep-07	5.2	5.5	809.87

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Duck Slough @ Gurr Rd*	Copper	18-Sep-07	5.2	6.4	942.39
Duck Slough @ Gurr Rd	Copper	29-Apr-08	0.56	2.7	42.82
Duck Slough @ Gurr Rd*	Copper	27-May-08	0.43	7.3	88.89
Duck Slough @ Gurr Rd	Copper	27-May-08	0.43	7.1	86.45
Duck Slough @ Gurr Rd	Copper	24-Jun-08	0.65	4	73.62
Duck Slough @ Gurr Rd	Copper	29-Jul-08	0.4	5.4	61.16
Duck Slough @ Gurr Rd	Copper	26-Aug-08	1.1	3.5	109.02
Duck Slough @ Gurr Rd	Copper	30-Sep-08	0.21	6.1	36.27
Duck Slough @ Gurr Rd	Copper (Dissolved)	16-Dec-08	0.31	0.3	2.63
Duck Slough @ Gurr Rd	Copper	16-Dec-08	0.31	1.2	10.53
Duck Slough @ Gurr Rd	Copper (Dissolved)	20-Jan-09	0.23	0.2	1.30
Duck Slough @ Gurr Rd	Copper	20-Jan-09	0.23	0.4	2.61
Duck Slough @ Gurr Rd	Copper (Dissolved)	7-Feb-09	2.57	7.6	553.09
Duck Slough @ Gurr Rd	Copper	7-Feb-09	2.57	11	800.52
Duck Slough @ Gurr Rd	Copper (Dissolved)	17-Mar-09	0	4.6	0
Duck Slough @ Gurr Rd	Copper	17-Mar-09	0	6.3	0
Duck Slough @ Gurr Rd	Copper	21-Apr-09	0.67	3.3	62.61
Duck Slough @ Gurr Rd	Copper (Dissolved)	21-Apr-09	0.67	2.6	49.33
Duck Slough @ Gurr Rd	Copper (Dissolved)	19-May-09	0.19	7.3	39.28
Duck Slough @ Gurr Rd	Copper	19-May-09	0.19	15	80.70
Duck Slough @ Hwy 59	*Copper*	*24-Jun-08*	*0.64*	*12*	*217.47*
Duck Slough @ Hwy 59	*Copper*	*29-Jul-08*	*0.47*	*18*	*239.56*

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent listed under the Duck Slough @ Gurr Rd Management Plan.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L once in this subwatershed from 2004 through 2009 (July, 2004). The Coalition uses a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources.

PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds active ingredient (AI) applied, and acres treated (Table VI-9, Figure VI-2). The amount of chlorpyrifos applied within the subwatershed has fluctuated over the years. The highest chlorpyrifos use occurred in 2005 (5,383 lbs), and the lowest use was in 2004 (1,214 lbs); in 2009, 1,820 lbs were applied (Table VI-9, Figure VI-2). In 2006, 2008, and 2009 the greatest amount of chlorpyrifos was applied in May, whereas the greatest amount was applied in August of 2004, July of 2005, and March of 2007 (Table VI-9, Figure VI-2). Exceedances did not always occur during months of the greatest amount of use (Figure VI-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos. The highest application rates are associated with alfalfa, almonds, and corn (Table VI-10). The largest amount of chlorpyrifos applied from 2004 through 2009 was to almonds, followed by alfalfa and corn (Table VI-10). The most common product containing chlorpyrifos applied within the subwatershed was Lorsban (Table VI-10).

Table VI-9. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2004 through December 2009 in the Duck Slough @ Gurr Road site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
January, 2004	4	88.0	43.6
April, 2004	7	94.1	222
May, 2004	1	77.9	60
June, 2004	2	152.1	76
July, 2004	6	333.0	214
August, 2004	8	403.2	544
September, 2004	2	66.6	66
January, 2005	4	76.9	38.1
March, 2005	18	585.0	984.5
June, 2005	5	209.0	188
July, 2005	18	4282.9	868
August, 2005	4	131.5	260.5
September, 2005	2	97.9	105
January, 2006	6	119.7	59
March, 2006	5	105.9	336
May, 2006	13	706.5	433
June, 2006	1	137.6	69
July, 2006	6	585.1	528
August, 2006	9	402.2	448
September, 2006	8	425.9	413.1
January, 2007	2	29.9	15
March, 2007	40	999.4	2112.61
April, 2007	3	28.8	57.42
June, 2007	1	19.9	10
July, 2007	3	139.0	185
March, 2008	26	416.7	846.53

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
May, 2008	14	1015.3	669
June, 2008	1	10.2	8
July, 2008	10	339.1	739.3
August, 2008	23	632.7	1283.2
September, 2008	2	34.6	98
March, 2009	14	298.6	754
April, 2009	1	31.7	42.2
May, 2009	3	815.4	624
July, 2009	10	370.5	563
August, 2009	7	246.7	403
September, 2009	4	57.2	227.4
Summaries by Year			
2004 Total	30	1214.8	1225.6
2005 Total	51	5383.2	2444.1
2006 Total	48	2482.8	2286.1
2007 Total	49	1216.9	2380.03
2008 Total	76	2448.5	3644.03
2009 Total	39	1820.1	2613.6
Total	**293**	**14,566.3**	**14,593.46**

Figure VI-2. Pounds of chlorpyrifos applied within the Duck Slough @ Gurr Rd site subwatershed by month for 2004-2009. Asterisk (*) denotes months with exceedances.

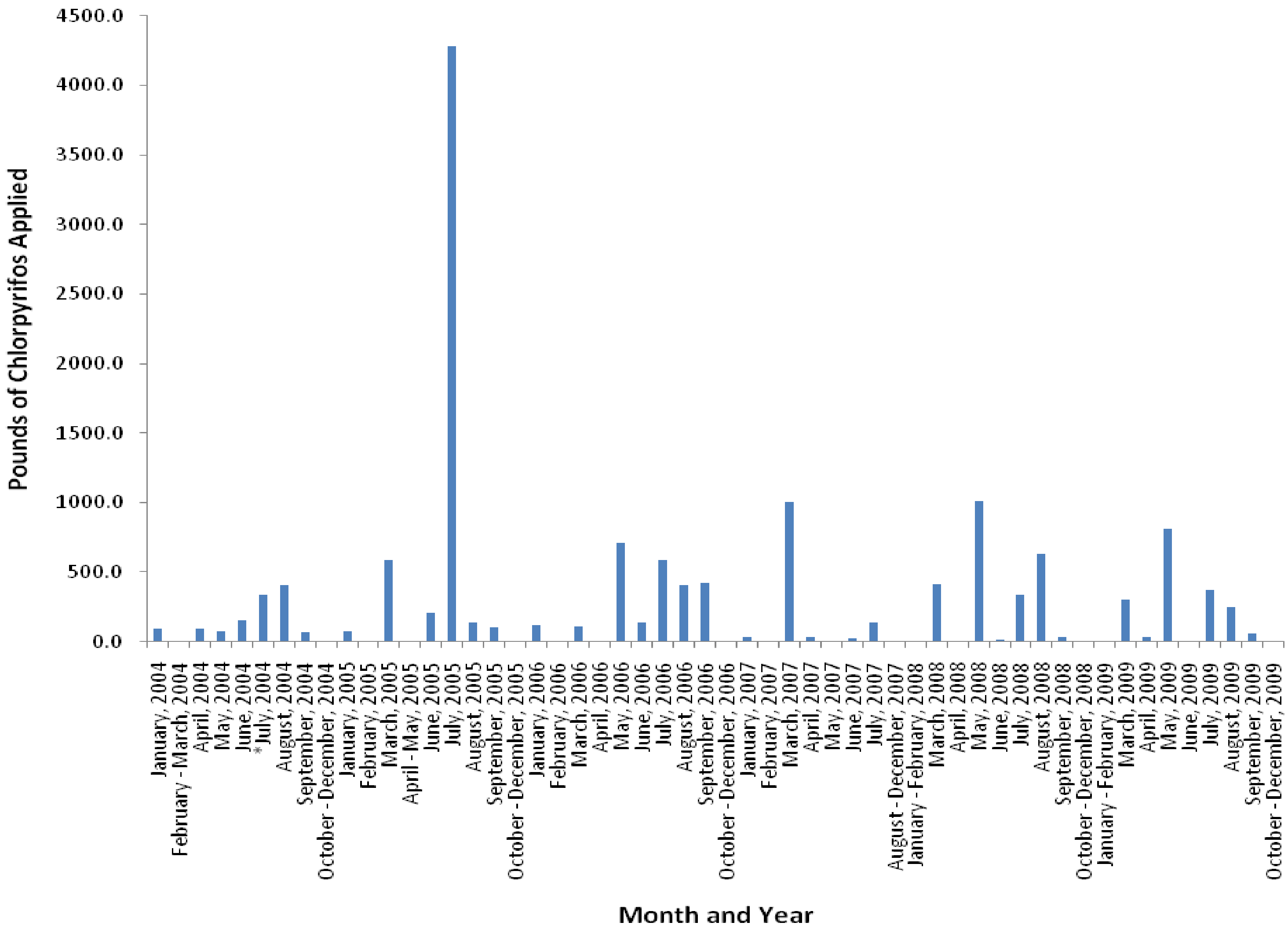


Table VI-10. Total pound AI for chlorpyrifos based on PUR data from 2004-2009 within the Duck Slough @ Gurr Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA	COBALT	139.989
		GOVERN 4E INSECTICIDE	807.143
		LOCK-ON INSECTICIDE	565.502
		LORSBAN 4E-HF	574.758
		LORSBAN-4E	559.166
		NUFOS 4E	191.737
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	54.801
		LORSBAN 4E INSECTICIDE	63.921
		LORSBAN 4E-HF	420.474
		LORSBAN 4E-HF INSECTICIDE	63.435
		LORSBAN-4E	26.133
		NUFOS 4E	281.380
	ALMOND	CHLORPYRIFOS 4E AG	129.830
		GOVERN 4E INSECTICIDE	498.956
		LORSBAN 4E INSECTICIDE	175.710
		LORSBAN 4E-HF	1480.635
		LORSBAN-4E	3619.113
		NUFOS 4E	20.335
		WHIRLWIND	379.940
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	116.990
		GOVERN 4E INSECTICIDE	85.853
		LORSBAN 15G GRANULAR INSECTICIDE	77.852
		LORSBAN 4E-HF	161.382
		NUFOS 4E	100.660
	CORN FOR/FOD	GOVERN 4E INSECTICIDE	202.007
		LORSBAN 15G GRANULAR INSECTICIDE	1781.326
		LORSBAN 4E-HF	19.939
		LORSBAN-4E	31.666
		NUFOS 4E	100.660
	COTTON	NUFOS 4E	13.218
	COTTON, GENERAL	CHLORPYRIFOS 4E AG	246.170
		GOVERN 4E INSECTICIDE	59.087
		LORSBAN 4E-HF	89.589
	PEACH	CHLORPYRIFOS 4E AG	164.852
		LORSBAN 4E-HF	121.625
	SORGHUM FOR/FOD	GOVERN 4E INSECTICIDE	50.502
	SUGARBEET, GENERAL	LORSBAN 4E-HF	69.865
		LORSBAN-4E	215.107
	WALNUT	GOVERN 4E INSECTICIDE	15.150
		LORSBAN-4E	352.616
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	LORSBAN 4E-HF	71.779
		LORSBAN-4E	365.468

Chemical Name	Commodity	Product Name	Lbs AI Applied
		ALFALFA – Total Pounds Chlorpyrifos Applied	3748.437
		ALMOND – Total Pounds Chlorpyrifos Applied	6304.519
		CORN – Total Pounds Chlorpyrifos Applied	2678.334
		COTTON– Total Pounds Chlorpyrifos Applied	408.064
		PEACH – Total Pounds Chlorpyrifos Applied	286.477
		SORGHUM – Total Pounds Chlorpyrifos Applied	50.502
		SUGARBEET – Total Pounds Chlorpyrifos Applied	284.971
		WALNUT – Total Pounds Chlorpyrifos Applied	805.013
		Total pounds chlorpyrifos applied (2004 - 2009)	**14,566.317**

Based on results from general management practice surveys, approximately 23% of the member acreage have no runoff occurs, and 36% of the member acreage uses recirculation and/or tailwater return systems. Because the highest applications of chlorpyrifos occur to almonds, alfalfa and corn, the Coalition believes that outreach to members applying chlorpyrifos and owning parcels with the potential to drain to the creek will result in increased implementation of irrigation water management as well as practices to minimize spray drift which will yield improvements in water quality. Growers are encouraged to review their operation to determine if irrigation return flows are managed properly and owners operating orchards should evaluate their aerial applications to minimize spray drift.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of the Management Plan Update Report. The Coalition has begun the process of contacting growers, conducting individual meetings, and compiling individual surveys for Duck Slough. The Coalition focused outreach to growers owning parcels with the potential to drain to the creek and those applying chlorpyrifos. Using these criteria, a list of 6 targeted growers was created. Individual meetings are currently being scheduled and will be completed by the end of May 2010. Individual contacts will focus mainly on chlorpyrifos exceedances however all water quality results will be reviewed and discussed including copper, DO, *E. coli*, pH, SC, TDS, and lead WQTLs exceedances as well as toxicity to *Ceriodaphnia dubia, Selenastrum capricornutum,* and *Hyalella azteca*.

The Coalition will compile and analyze the surveys by the end of August 2010. Based on the exact timing of each individual meeting and/or a grower's resources, some owners will not be able to implement recommended management practices until the 2011 irrigation season. In addition, long term structural BMPs (e.g. sediment ponds) will most likely take longer than two years to implement and will require additional tracking to document their implementation. The Coalition will follow up with growers between February and April of 2011 to determine what practices were implemented during the first irrigation year. Growers who have not already been contacted or have indicated that they have not yet implemented practices during the first year will be contacted from February to April of 2012 to determine what practices were implemented during the dormant season and/or the second irrigation year. To evaluate the management practice process, the Coalition will monitor for high priority constituents during months of past exceedances in 2010 and 2011. Depending on when additional management practices are implemented, the Coalition may monitor through 2012 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or are have the potential for spray drift will affect downstream water quality by the end of the second year as a high priority site subwatershed.

The effectiveness of the management practices will be determined through the monitoring of water quality in the years following implementation. However, due to the presence of dairies and nonmembers in the subwatersheds, implementation of management practices by only coalition members may not result in improved water quality. If water quality fails to improve, the Coalition will identify parcels from dairies and nonmembers that could contribute to exceedances and provide that information to the Regional Board.

Priority C Constituents

Duck Slough @ Gurr Rd is listed for copper.

Copper

Copper has exceeded the WQTL times in this subwatershed from 2006 through 2008. As of October 2008, the Coalition began to analyze for both total and dissolved fractions of copper to better characterize the subwatershed. Total copper exceedances occurred during June and July 2006, February and June 2007, and in January and February 2008, while the single dissolved copper exceedance occurred in May 2009 (Table VI-6).

PUR data are reviewed for the number of monthly copper applications, pounds active ingredient (AI) applied, and acres treated (Table VI-11, Figure VI-3). The amount of copper applied within the subwatershed has decreased since 2005 (Table VI-11, Figure VI-3). The largest amount of copper applied was in the year of 2005 (12,952 lbs) while the smallest amount applied occurred in 2009 (2,644 lbs). In 2004, 2006, and 2007, the greatest amount of copper use occurred in January, whereas the greatest use amount occurred in December during 2008 and 2009; the greatest amount of copper use occurred in June in 2005 (Table VI-11, Figure VI-3). Not all exceedances occurred during months of the greatest amount of use (Figure VI-3).

The Coalition also used PUR data to assess which crops receive the most applications of copper. The largest amount of copper applied from 2004 through 2009 was associated with almond, peach, rice, tomato and walnut crops (Table VI-12). The most common products containing copper applied withing the subwatershed were DuPont Kocide and Kocide (Table VI-12).

Table VI-11. Number of copper applications, total pounds applied and total acres treated by month for January 2004 through December 2009 in the Duck Slough @ Gurr Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
January, 2004	21	2826.7	707.6
February, 2004	6	428.8	194
March, 2004	3	758.7	135
April, 2004	4	86.0	37.25
August, 2004	3	214.3	191.2
September, 2004	1	263.4	143
October, 2004	4	1328.3	575
November, 2004	2	550.1	224
January, 2005	12	1568.7	376.1
February, 2005	5	514.8	159.7
March, 2005	3	369.9	81
April, 2005	26	1363.2	483.25

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
May, 2005	12	641.9	414.5
June, 2005	10	7053.8	475
August, 2005	3	139.8	127.8
September, 2005	2	82.4	74.7
October, 2005	1	25.8	21
November, 2005	1	69.1	45
December, 2005	5	1122.8	153
January, 2006	12	1872.3	321
February, 2006	9	814.0	251
March, 2006	4	288.0	360
April, 2006	12	1038.3	263.5
May, 2006	14	1197.8	613.7
June, 2006	1	105.2	100
August, 2006	1	113.0	103
October, 2006	2	255.6	166
December, 2006	2	539.0	70
January, 2007	9	1502.7	223
February, 2007	8	533.7	280
March, 2007	3	309.2	115
April, 2007	10	422.9	147.5
May, 2007	2	145.0	163
January, 2008	6	826.5	136
February, 2008	2	650.3	42
March, 2008	1	8.1	5
April, 2008	2	108.3	65
May, 2008	5	318.9	165.5
June, 2008	1	17.9	25.84
September, 2008	1	42.4	92
November, 2008	1	166.0	60
December, 2008	3	901.0	100
January, 2009	2	847.7	102
February, 2009	1	35.6	58
April, 2009	12	596.1	294.5
May, 2009	5	157.9	125.5
August, 2009	1	69.3	30
November, 2009	1	77.0	10
December, 2009	4	861.0	73
Summaries by Year			
2004 Total	44	6456.4	2207.05
2005 Total	80	12952.2	2411.05

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
2006 Total	57	6223.3	2248.2
2007 Total	32	2913.6	928.5
2008 Total	22	3039.2	691.34
2009 Total	26	2644.6	693
Total	**261**	**34,229.3**	**9,179.14**

Figure VI-3. Pounds of copper applied within the Duck Slough @ Gurr Rd site subwatershed by month for 2004-2009. Asterisk (*) denotes months with exceedances.

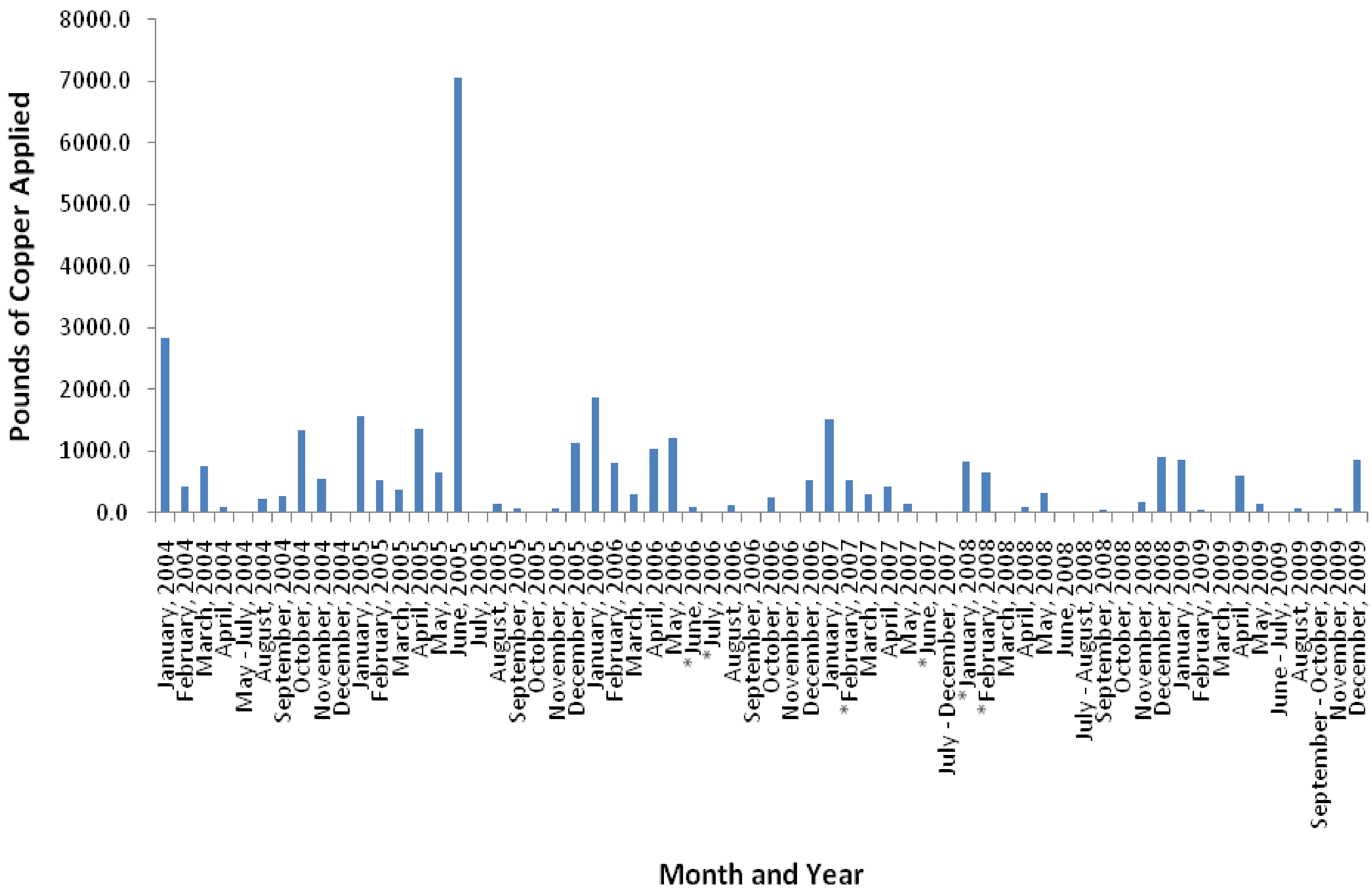


Table VI-12. Total pound AI for copper based on PUR data from 2004-2009 within the Duck Slough @ Gurr Rd subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 2000	63.753
	ALMOND	BASIC COPPER 53	220.500
		BASICOP	307.400
		CHAMPION WETTABLE POWDER	80.080
		COOKE BLUESTONE	8.250
		CUPROFIX ULTRA 40 DISPERSS	602.217
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	117.822
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	67.076
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	35.612
		KOCIDE 101	887.040
		KOCIDE 2000	750.510
		KOCIDE DF	1899.716
		KOP-HYDROXIDE 50W	776.160
		NORDOX 75 WG	1969.972
	APRICOT	BASIC COPPER 53	58.800
		KOCIDE 2000	118.360
		KOCIDE DF	122.800
	CHERRY	NU-COP 50DF	154.000
	NECTARINE	BASIC COPPER 53	98.000
		CHAMPION WETTABLE POWDER	24.063
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	42.368
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	23.050
		KOCIDE 101	1155.000
		KOCIDE 2000	201.750
	N-OUTDOOR PLANT	BASIC COPPER 53	1519.000
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	331.920
	N-OUTDR CONTAINER/FLD GRWN PLANTS	KOCIDE 101	473.550
	PEACH	BASIC COPPER 53	2528.400
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	172.160
		KOCIDE 101	154.000
		KOCIDE DF	788.744
	PEPPERS (FRUITING VEGETABLE), (BELL, CHILI, ETC.)	KOCIDE 101	121.275
		KOCIDE DF	27.016
	PISTACHIO (PISTACHE NUT)	CUPROFIX DISPERSS DRY FLOWABLE FUNGICIDE/BACTERCIDE FOR	8.303

Chemical Name	Commodity	Product Name	Lbs AI Applied
		TURF AND ORNAMENTAL USE	
	PLUM	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	80.700
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	KOCIDE 101	154.000
	PRUNE	KOCIDE DF	110.520
		NORDOX 75 WG	1056.133
	RICE	COPPER-Z 4/4	136.770
	RICE (ALL OR UNSPEC)	COPPER-Z 4/4	355.287
		TRIANGLE BRAND COPPER SULFATE CRYSTAL	7053.750
	TOMATO	BLUE SHIELD WP	127.820
		CHAMPION WETTABLE POWDER	51.398
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	19.368
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	85.861
		KOCIDE 101	422.153
		KOCIDE 2000	1011.687
		KOCIDE DF	892.449
		NU-COP 50 WP	127.820
		NU-COP 50DF	1328.250
	TOMATO PROCESSING	CHAMPION WETTABLE POWDER	69.300
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	67.541
	TOMATOES, FOR PROCESSING/CANNING	CHAMPION WETTABLE POWDER	34.650
		KOCIDE 2000	29.052
	WALNUT	DUPONT GX-569 FUNGICIDE/BACTERICIDE	212.982
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	503.568
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	436.106
		KOCIDE 101	309.232
		KOCIDE 2000	350.238
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	167.453
		KOCIDE 101	1410.640
		KOCIDE 2000	1168.267
		KOP-HYDROXIDE 50W	396.550
		NORDOX 75 WG	151.020

ALFALFA – Total Pounds Copper Applied	63.753
ALMOND – Total Pounds Copper Applied	7722.355
APRICOT – Total Pounds Copper Applied	299.960
CHERRY – Total Pounds Copper Applied	154.000
NECTARINE – Total Pounds Copper Applied	1544.230

Chemical Name	Commodity	Product Name	Lbs AI Applied
		N-OUTDOOR PLANT – Total Pounds Copper Applied	2324.47
		PEACH – Total Pounds Copper Applied	3643.304
		PEPPERS – Total Pounds Copper Applied	148.291
		PISTACHIO – Total Pounds Copper Applied	8.303
		PLUM (INCLUDES PRUNES) – Total Pounds Copper Applied	1401.353
		RICE – Total Pounds Copper Applied	7545.807
		TOMATO – Total Pounds Copper Applied	4267.349
		WALNUT – Total Pounds Copper Applied	5106.056
		Total pounds copper applied (2004 - 2009)	**34,229.230**

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts. Orchard and vineyard operators will be advised to consider irrigation water retention and 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 are described under the chlorpyrifos outreach section above and will include discussions of copper exceedances and the above management practices.

Priority D Constituents

The following priority D constituents are listed under the Duck Slough @ Gurr Road Management Plan: *Selenastrum capricornutum* and sediment toxicity to *Hyalella azteca*. Toxicity was not experienced at all during 2009 monitoring. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Selenastrum toxicity

Toxicity to *Selenastrum* occurred in September 2004 and July 2007. The July toxicity is associated with a copper exceedance that occurred in the prior month, but toxicity was not persistent in the resample on July 31, 2007.

The Coalition's strategy for eliminating *Selenastrum* toxicity involves focusing on copper. If copper can be prevented from entering waterways throughout the irrigation season, the Coalition believes that *Selenastrum* toxicity can also be reduced or eliminated. If copper is no longer detected in the slough but *Selenastrum* toxicity persists, the Coalition will consider other herbicides.

Hyalella toxicity

Sediment toxicity to *Hyalella* occurred in August 2004, July 2005, and in August 2008. Toxicity was persistent in the 2008 resample that occurred in October 2008. Toxicity was not experienced during 2009 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. Management Plan Monitoring is scheduled for this site in 2010.

Priority E Constituents

The following priority E constituents are listed under the Duck Slough @ Gurr Road Management Plan: DO, pH, SC (new as of 2009 sampling), TDS, *E. coli,* lead, and water column toxicity to *Ceriodaphnia dubia.* Exceedances of pH, SC, and *E. coli* continued in 2009.

Toxicity to *Ceriodaphnia* has not been associated with the presence of pesticides or metals in the past. The Coalition did not perform testing for *Ceriodaphnia* toxicity in 2009. The Coalition will monitor this site for *Ceriodaphnia* toxicity during March 2011.

The toxicity and other constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

Duck Slough @ Gurr Rd is one of the second four priority site subwatersheds within the ESJWQC and is in its first year of focused outreach (2010-2012). The Coalition's strategy for the Duck Slough subwatershed has been to target growers along or adjacent to the waterway that have the potential to discharge. Focus will be on tail water management and minimizing spray drift. 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 to document current management practice and assess future planned implementations will be completed by the end of May 2010. 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.

VII. Highline Canal @ Hwy 99

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper
- Diuron

Priority D

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

Priority E

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

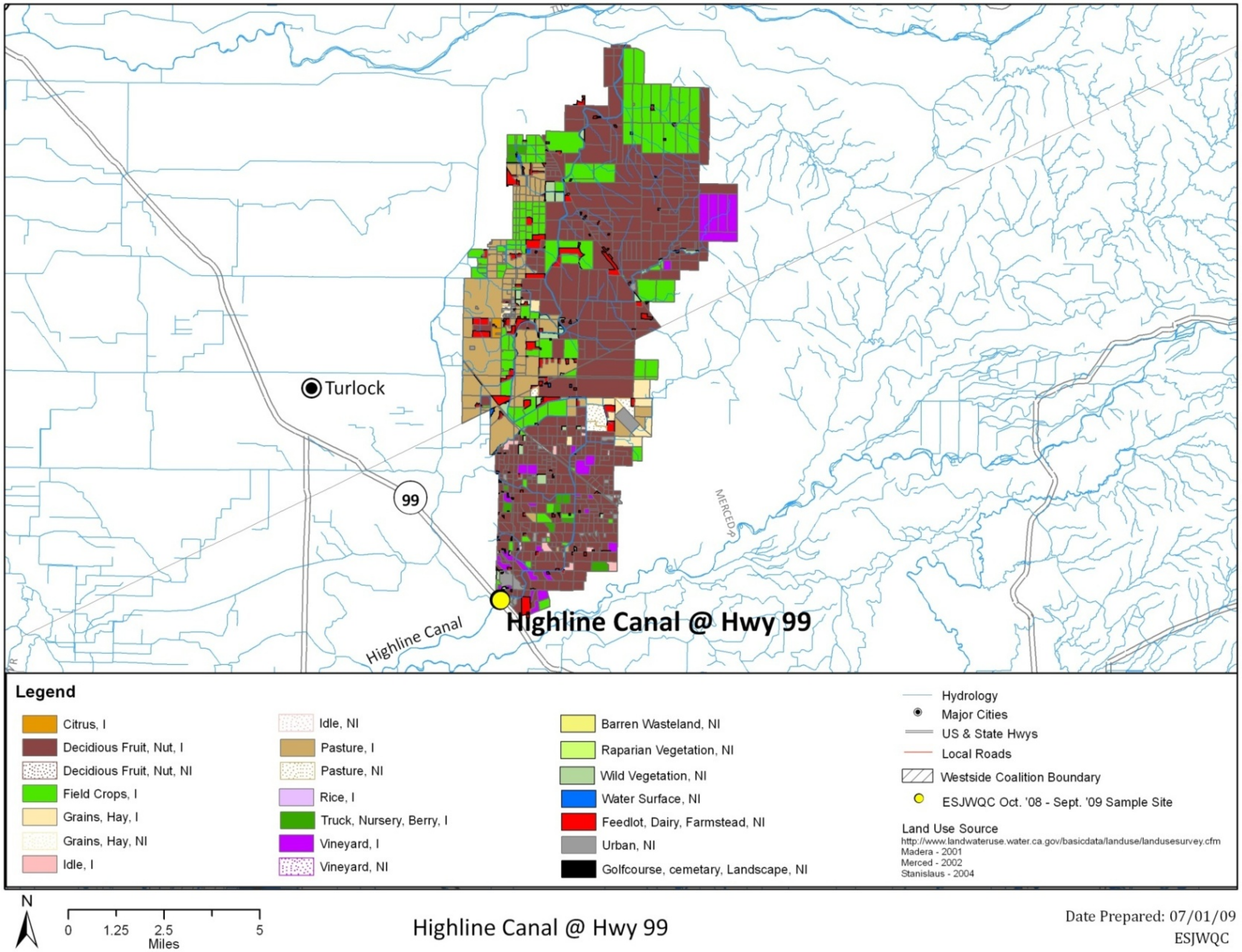
Description of Highline Canal @ Hwy 99 Site Subwatershed

Highline Canal @ Highway 99 (35,220 irrigated acres) – The Highline Canal is a conveyance of the Turlock Irrigation District (TID) and carries both clean irrigation water and irrigation return flow during the summer, and storm water runoff during the winter. This site was selected as a downstream companion site to the Highline Canal @ Lombardy Road site. This site subwatershed is monitored to determine the relative contribution of the upstream and downstream site subwatersheds to water quality impairments. The sampling site is located just south of Delhi as the canal crosses the highway. The irrigated agriculture is primarily deciduous nuts, and these are located at the lower end of the site subwatershed. A small number of vineyards are also present (Figure VII-1). The sample location for Highline Canal @ Hwy 99 is provided in Table VII-1.

Table VII-1. Coordinates of the Highline Canal site subwatershed sampling location.

Station Name	Station Code	Target Latitude	Target Longitude
Highline Canal @ Hwy 99	535XHCHNN	37.4153	-120.7557

Figure VII-1. Site subwatershed map of land use for the Highline Canal @ Hwy 99 sample site.



Subwatershed Monitoring History

Ambient water monitoring conducted at the Highline Canal @ Highway 99 site was initiated in the 2005 irrigation season and monitoring has continued through 2009 (Table VII-2). Highline Canal @ Hwy 99 will remain a Core Monitoring location under the current MRPP until 2011 when it will rotate to an Assessment Monitoring location. Specific information on the analysis conducted across each of the monitoring seasons is provided below (Table VII-3).

Management Plan Monitoring occurred at Highline Canal during 2007 and 2008 for *Ceriodaphnia dubia* toxicity only in 2007 then for *Ceriodaphnia dubia* toxicity, chlorpyrifos, and copper in 2008 (Table VII-4, Table VII-5). The site was also monitored for these constituents monthly April through September in 2007 and 2008. Management Plan Monitoring in 2009 occurred for *Selenastrum capricornutum* toxicity and chlorpyrifos (Table VII-6). The upstream location, Highline Canal @ Lombardy Rd, allows for an analysis of the contribution of each portion of the watershed to loads measured at Highline Canal @ Hwy 99. Highline Canal @ Lombardy Rd is sampled as a separate monitoring location and is not considered an upstream MPM location to Highline Canal @ Hwy 99.

Highline Canal @ Hwy 99 is scheduled as a high priority site starting in 2010. Highline Canal is considered an impaired water body under the proposed 2008 Basin Plan and is listed on the 303d list for chlorpyrifos, simazine, unknown toxicity, and sediment toxicity. Agriculture is listed as the potential source for the chlorpyrifos, simazine and unknown toxicity impairments; sediment toxicity is listed with an unknown potential source.

Table VII-2. Highline Canal @ Hwy 99 sampling events per season and year.

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

NA indicates that this site was not sampled during this season/year.

Table VII-3. Number of analyses performed per analyte in each sampling season and year for the Highline Canal @ Hwy 99 sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005	2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Field and Physical Parameters													
EPA 110.2	Color	5	2	5	1	6	2	6					
EPA 160.1	Dissolved Solids	5	2	5	1	6	2	6			2	6	1
EPA 160.2	Suspended Solids										2	6	1
EPA 180.1	Turbidity	5	2	5	1	6	2	6			2	6	1
EPA 405.1	BOD			1	1	2							
EPA 415.1	Total Organic Carbon	5	2	5	1	6	2	6			2	6	1
SM 9223	E. coli	5	2	5	1	6	2	6			2	6	1
NA	Dissolved Oxygen	6	5	5	1	8	5	15	2	2	2	6	2
NA	Specific Conductivity	6	5	5	1	8	5	15	2	2	2	6	2
NA	pH	6	5	5	1	8	5	15	2	2	2	6	2
Carbamates													
EPA 8321A	Aldicarb			5	1	6	2	6					
EPA 8321A	Carbaryl			5	1	6	2	6					
EPA 8321A	Carbofuran			5	1	6	2	6					
EPA 8321A	Diuron			5	1	6	2	6					
EPA 8321A	Linuron			5	1	6	2	6					
EPA 8321A	Methiocarb			5	1	6	2	6					
EPA 8321A	Methomyl			5	1	6	2	6					
EPA 8321A	Oxamyl			5	1	6	2	6					
Organochlorines													
EPA 8081A	DDD(p,p')			5	1	6	2	6					
EPA 8081A	DDE(p,p')			5	1	6	2	6					
EPA 8081A	DDT(p,p')			5	1	6	2	6					
EPA 8081A	Dicofol			5	1	6	2	6					
EPA 8081A	Dieldrin			5	1	6	2	6					

Method	Analyte	2005	2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 8081A	Endrin			5	1	6	2	6					
EPA 8081A	Methoxychlor			5	1	6	2	6					
Organophosphates													
EPA 8141A	Azinphos methyl			5	1	6	2	6					
EPA 8141A	Chlorpyrifos	5	2	5	1	6	2	7				1	
EPA 8141A	Diazinon	5	2	5	1	6	2	6					
EPA 8141A	Dimethoate			5	1	6	2	6					
EPA 8141A	Disulfoton			5	1	6	2	6					
EPA 8141A	Malathion			5	1	6	2	6					
EPA 8141A	Methamidophos			5	1	6	2	6					
EPA 8141A	Methidathion			5	1	6	2	6					
EPA 8141A	Molinate			5	1	6	2	6					
EPA 8141A	Parathion, Methyl			5	1	6	2	6					
EPA 8141A	Phorate			5	1	6	2	6					
EPA 8141A	Phosmet			5	1	6	2	6					
EPA 8141A	Thiobencarb			5	1	6	2	6					
Pyrethroids													
EPA 8081A	Bifenthrin	1	2	5	1	6	2	6					
EPA 8081A	Cyfluthrin, total	1	2	5	1	6	2	6					
EPA 8081A	Cyhalothrin, lambda, total	5	2	5	1	6	2	6					
EPA 8081A	Cypermethrin, total	5	2	5	1	6	2	6					
EPA 8081A	Esfenvalerate/Fenvalerate, total	5	2	5	1	6	2	6					
EPA 8081A	Permethrin, total	5	2	5	1	6	2	6					
Triazines													
EPA 547M	Glyphosate			5	1	6	2	6					
EPA 549.2M	Paraquat dichloride			5	1	6	2	6					
EPA 619	Atrazine			5	1	6	2	6					
EPA 619	Cyanazine			5	1	6	2	6					

Method	Analyte	2005	2006		2007		2008			2009			
		Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 619	Simazine			5	1	6	2	6					
Metals (Total)													
EPA 200.8	Arsenic			5	1	6	2	6					
EPA 200.8	Boron			5	1	6	2	6					
EPA 200.8	Cadmium			5	1	6	2	6					
EPA 200.8	Copper			5	1	6	2	10					
EPA 200.8	Lead			5	1	6	2	6					
EPA 200.8	Nickel			5	1	6	2	6					
EPA 200.8	Selenium			5	1	2	2	6					
EPA 200.8	Zinc			5	1	6	2	6					
Nutrients													
SM 2340 C	Hardness as CaCO3			5	1	6	2	10					
EPA 300.0	Nitrate as N			5	1	6	2	6					
EPA 350.2	Ammonia as N			5	1	6	2	6			2	6	1
EPA 351.3	Nitrogen, Total Kjeldahl			5	1	6	2	6			1	1	
EPA 353.2	Nitrate + Nitrite as N										2	6	1
EPA 354.1	Nitrite as N			5	1	6	2	6					
EPA 365.2	Orthophosphate as P			5	1	6	2	6			1	1	
EPA 365.2	Phosphate as P			5	1	6	2	6			2	6	1
Toxicity													
EPA 0821/R-02-012	Ceriodaphnia dubia	6	3	6	1	8	2	7					
EPA 0821/R-02-012	Pimephales promelas	5	2	5	1	7	2	7					
EPA 0821/R-02-013	Selenastrum capricornutum	5	3	5	1	7	2	7				1	
EPA 600/R-99-064	Hyalella azteca	5	1	2		1	1	2					

Table VII-4. Highline Canal @ Hwy 99. 2007 Management Plan additional (A) sampling schedule for *Ceriodaphnia.* "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	*Ceriodaphnia dubia*
Highline Canal @ Hwy 99	25-Sep-07	**A**	**X**

Table VII-5. Highline Canal @ Hwy 99. 2008 Management Plan additional (A) sampling schedule for chlorpyrifos, copper, and *Ceriodaphnia*. "X" indicates the site, month, and analyte sampled.

Sample Site	Date	Type	Chlorpyrifos	Copper	*Ceriodaphnia dubia*
Highline Canal @ Hwy 99	29-Apr-09	A		**X**	
Highline Canal @ Hwy 99	07-May-09	A			**X**
Highline Canal @ Hwy 99	03-Jun-09	A		**X**	
Highline Canal @ Hwy 99	08-Jul-09	A	**X**	**X**	
Highline Canal @ Hwy 99	05-Aug-09	A		**X**	
Highline Canal @ Hwy 99	09-Sep-09	A			**X**

Table VII-6. Highline Canal @ Hwy 99. 2009 Management Plan sampling schedule for chlorpyrifos and *Selenastrum*. "X" indicates the site, month and analyte sampled.

Site Name	Date	Chlorpyrifos	*Selenastrum capricornutum*
Highline Canal @ Hwy 99	21-Apr-09		**X**
Highline Canal @ Hwy 99	19-May-09		**X**
Highline Canal @ Hwy 99	21-Jul-09	**X**	

Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli,* nutrients, metals, pesticides, and water column and sediment toxicity occurred within the Highline Canal site subwatershed (Table VII-7). Samples collected over the entire five years of monitoring at the normal monitoring and upstream MPM sites resulted in several exceedances, including DO (1), pH (14), SC (1), TDS (2), *E. coli* (8), ammonia (2), copper (7), lead (7), chlorpyrifos (5), and diuron (2). Water column toxicity has occurred eight times; four times each to *Ceriodaphnia dubia* and to *Selenastrum capricornutum.* Sediment toxicity to *Hyalella azteca* has occurred six times.

During 2009, the only WQTL exceedances that occurred were for pH (February, June, August, September, and December), *E. coli* (May) and chlorpyrifos (July, Table VII-7).

All exceedances are listed in Table VII-7 by season and date and are based on WQTLs listed in the introduction to the ESJWQC Management Plan. The priority level (A-E) assigned to each constituent is listed in the bottom row of Table VII-7 and is determined using the ESJWQC Management Plan prioritization process flow chart (Figure 4). Constituents that are the highest priority in the Highline Canal @ Highway 99 subwatershed are chlorpyrifos (A/B), copper (C), diuron (C), and toxicity to *Selenastrum capricornutum, Ceriodaphnia dubia,* and *Hyalella azteca* (D).

Table VII-7. All exceedances experienced in samples collected within the Highline Canal @ Hwy 99 site subwatershed between March 2005 and December 2009 (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.

Station Name	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	Copper, Total, 1,300 µg/L	Lead, Total, 15µg/L	Chlorpyrifos, 0.015 µg/L	Diuron, 2 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Highline Canal @ Hwy 99	Irrigation	5/10/2005											45		
Highline Canal @ Hwy 99	Irrigation	5/19/2005											0		
Highline Canal @ Hwy 99	Irrigation	9/20/2005												87.5	
Highline Canal @ Hwy 99	Storm	3/1/2006	5.6								0.021				12750
Highline Canal @ Hwy 99	Storm	3/16/2006				300							0		
Highline Canal @ Hwy 99	Storm	5/2/2006		8.73											
Highline Canal @ Hwy 99	Irrigation	5/17/2006								0.42 (0.36)					
Highline Canal @ Hwy 99	Irrigation	8/9/2006								0.39 (0.31)				88.75	
Highline Canal @ Hwy 99	Irrigation	9/5/2006												80	
Highline Canal @ Hwy 99	Irrigation	9/13/2006											60		
Highline Canal @ Hwy 99	Storm	2/11/2007							3 (2.2)	0.52 (0.36)		25			
Highline Canal @ Hwy 99	Irrigation	4/17/2007							11 (10.1)	5.1 (3.59)					
Highline Canal @ Hwy 99	Irrigation	5/15/2007		8.56		250									
Highline Canal @ Hwy 99	Irrigation	6/19/2007				320			2.4 (1.9)	0.5 (0.31)					
Highline Canal @ Hwy 99	Irrigation	7/17/2007				440			3.2 (2.2)	1 (0.36)	0.017				
Highline Canal @ Hwy 99	Irrigation	8/14/2007		8.62					1.9 (1.7)	0.44 (0.26)					
Highline Canal @ Hwy 99	Irrigation	9/25/2007		8.73											
Highline Canal @ Hwy 99	Storm	1/24/2008				>2400	500	3.3	37 (14.7)		0.019	3.2			
Highline Canal @ Hwy 99	Storm	2/26/2008			747	>2400	520	8.3	81 (81)						817147

Station Name	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	Copper, Total, 1,300 µg/L	Lead, Total, 15µg/L	Chlorpyrifos, 0.015 µg/L	Diuron, 2 µg/L	*C. dubia*, Survival (%)	*H. azteca*, Survival (%)	*S. capricornutum*, Total Cell Count
Highline Canal @ Hwy 99	Sediment	3/4/2008												90	
Highline Canal @ Hwy 99	Storm	3/4/2008		9.32											
Highline Canal @ Hwy 99	Irrigation	4/22/2008													791095
Highline Canal @ Hwy 99	Irrigation	5/7/2008		8.69											
Highline Canal @ Hwy 99	Irrigation	5/20/2008				240									1022306
Highline Canal @ Hwy 99	Irrigation	6/3/2008		8.61											
Highline Canal @ Hwy 99	Irrigation	7/22/2008									0.021				
Highline Canal @ Hwy 99	Irrigation	8/19/2008		9.24											
Highline Canal @ Hwy 99	Sediment	8/28/2008												91	
Highline Canal @ Hwy 99	Irrigation	9/9/2008		8.54											
Highline Canal @ Hwy 99	Sediment	10/2/2008												89	
Highline Canal @ Hwy 99	Storm	2/7/2009		8.86											
Highline Canal @ Hwy 99	Irrigation	5/19/2009				340									
Highline Canal @ Hwy 99	Irrigation	6/16/2009		8.95											
Highline Canal @ Hwy 99	Irrigation	7/21/2009									0.093				
Highline Canal @ Hwy 99	Irrigation	8/18/2009		9.03											
Highline Canal @ Hwy 99	Irrigation	9/22/2009		8.61											
Highline Canal @ Hwy 99	Storm	12/15/2009		8.61											
Constituent Priority			**NP**	**E**	**E**	**E**	**E**	**E**	**C**	**E**	**A/B**	**C**	**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 - 2009 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table VII-8 for *Ceriodaphnia dubia* (2007), for chlorpyrifos, copper and *Ceriodaphnia dubia* (2008), for chlorpyrifos and *Selenastrum capricornutum* (2009).

2007

Highline Canal @ Hwy 99 was sampled monthly for toxicity to *Ceriodaphnia* and twice in September as a part of additional 2007 MPM (Table VII-8). No toxicity occurred in any sampled collected (Table VII-8). Chlorpyrifos exceeded the WQTL for a second time at this site in 2007 and copper exceeded the hardness based WQTL five times during 2007 normal monitoring.

2008

In 2008, normal monitoring occurred for all constituents monthly from April through September. Management Plan Monitoring occurred at the Highline Canal @ Hwy 99 monitoring site for copper, chlorpyrifos and *Ceriodaphnia dubia* toxicity (Table VII-8). Copper was detected in every sample collected during the irrigation season of 2008 without exceeding the WQTL. Chlorpyrifos exceeded the WQTL once in 2008 during July normal monitoring (0.021µg/L, Table VII-8). Toxicity to *Ceriodaphnia* was not experienced in any samples collected in 2008. Toxicity to *Selenastrum capricornutum* occurred in February, April, and May of 2008 a are all associated with copper detections.

2009

Highline Canal @ Hwy 99 was a Core site during 2009. Management Plan Monitoring schedule for chlorpyrifos in July and toxicity to *Selenastrum* in April and May revealed no detections of chlorpyrifos and no toxicity to *Selenastrum*.

Management Plan Monitoring for copper, chlorpyrifos, *Selenastrum* toxicity, and *Hyalella* toxicity are planned for the 2010 irrigation season. Management Plan Monitoring during January, February, and March 2011 will also occur for copper, chlorpyrifos, diuron and toxicity to *Hyalella*.

Table VII-8. Highline Canal @ Hwy 99. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for *Ceriodaphnia* from the 2007 irrigation season. Normal monitoring (NM) and Management Plan Monitoring (MPM) results for copper, chlorpyrifos and *Ceriodaphnia* for the 2008 irrigation season and Management Plan Monitoring (MPM) results for chlorpyrifos and *Selenastrum* for 2009. Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (@ Hwy 99)	Date	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/11/07
	C. dubia toxicity (% Control)	90	100	100	95	100	100
2007 MPM (@ Hwy 99)	Date	NA	NA	NA	NA	NA	9/25/07
	C. dubia toxicity (% Control)	NA	NA	NA	NA	NA	100
2008 NM (@ Hwy 99)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Copper (µg/L)	1.8	1.6	1.2	1.2	1.0	1.1
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	**0.021**	<0.003	<0.003
	C. dubia toxicity (% Control)	100	100	100	100	100	100
2008 MPM (@ Hwy 99)	Date	4/29/08	5/7/08	6/3/08	7/8/08	8/5/08	9/9/08
	Copper (µg/L)	1.4	NA	1.5	1.7	1.6	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	NA
	C. dubia toxicity (% Control)	NA	100	NA	NA	NA	100
2009 MPM (@Hwy 99)	Date	4/21/09	5/19/09	NA	7/21/09	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	NA
	S. capricornutum toxicity (% Control)	428	222	NA	NA	NA	NA

NA - Not applicable. This site was not sampled during this month.

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed (Table VII-9) based on the following formula:

Load = Discharge (cfs) X 28.317L/ft^3 X Concentration (milligram/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 VII-9. Highline Canal @ Hwy 99. Instantaneous load calculations for chlorpyrifos, copper and diuron where discharge was measured (sorted by analyte and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Highline Canal @ Hwy 99	Chlorpyrifos	1-Mar-06	0	0.021	0
Highline Canal @ Hwy 99	Chlorpyrifos	12-Jul-06	111.81	0.012	37.99
Highline Canal @ Hwy 99*	Chlorpyrifos	17-Jul-07	56.81	0.015	24.13
Highline Canal @ Hwy 99	Chlorpyrifos	17-Jul-07	56.81	0.017	27.35
Highline Canal @ Hwy 99	Chlorpyrifos	24-Jan-08	55.88	0.019	30.06
Highline Canal @ Hwy 99	Chlorpyrifos	26-Feb-08	6.91	0.0076	1.49
Highline Canal @ Hwy 99	Chlorpyrifos	21-Jul-09	118.93	0.093	313.20

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Highline Canal @ Hwy 99	Copper	17-May-06	82.45	1.8	4202.53
Highline Canal @ Hwy 99	Copper	14-Jun-06	90.82	1.7	4371.97
Highline Canal @ Hwy 99	Copper	12-Jul-06	111.81	1.6	5065.80
Highline Canal @ Hwy 99	Copper	9-Aug-06	162.04	1.3	5965.03
Highline Canal @ Hwy 99	Copper	13-Sep-06	72.64	1.3	2674.03
Highline Canal @ Hwy 99	Copper	11-Feb-07	55.43	3	4708.83
Highline Canal @ Hwy 99	Copper	17-Apr-07	22.54	11	7020.92
Highline Canal @ Hwy 99	Copper	15-May-07	60.6	1.4	2402.41
Highline Canal @ Hwy 99	Copper	19-Jun-07	84.28	2.4	5727.74
Highline Canal @ Hwy 99*	Copper	17-Jul-07	56.81	3.1	4986.94
Highline Canal @ Hwy 99	Copper	17-Jul-07	56.81	3.2	5147.80
Highline Canal @ Hwy 99	Copper	14-Aug-07	81.98	1.9	4410.71
Highline Canal @ Hwy 99	Copper	11-Sep-07	33.38	1.5	1417.83
Highline Canal @ Hwy 99	Copper	24-Jan-08	55.88	37	58547.10
Highline Canal @ Hwy 99	Copper	26-Feb-08	6.91	81	15849.31
Highline Canal @ Hwy 99	Copper	29-Apr-08	34.66	1.4	1374.05
Highline Canal @ Hwy 99	Copper	20-May-08	81.42	1.6	3688.91
Highline Canal @ Hwy 99	Copper	3-Jun-08	57.91	1.5	2459.76
Highline Canal @ Hwy 99	Copper	19-Aug-08	37.45	1	1060.47
Highline Canal @ Hwy 99	Diuron	11-Feb-07	55.43	25	39240.28
Highline Canal @ Hwy 99	Diuron	24-Jan-08	55.88	3.2	5063.53
Highline Canal @ Hwy 99	Diuron	26-Feb-08	6.91	0.43	84.14

*Field Duplicate

Source Identification and Outreach

Priority A/B Constituents

Chlorpyrifos is the only priority A/B constituent listed under the Highline Canal @ Hwy 99 Management Plan.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015 µg/L five times in this subwatershed from 2005 through 2009 (March 2006, July 2007-2009 and January 2008). The Coalition uses a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources.

PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds active ingredient (AI) applied, and acres treated (Table VII-10, Figure VII-2). The amount of chlorpyrifos applied within the subwatershed in 2009 has decreased significantly from the 2007 level. The amount of chlorpyrifos used in 2007 was more than 20 times the amount of chlorpyrifos used in 2009 (20,905 lbs in 2007 compared to 1010 lbs in 2009, Table VII-10, Figure VII-2). The greatest amount of chlorpyrifos applied in 2005 and 2009 was during May, while July received the most chlorpyrifos applied in 2006 and 2007, and in 2008 the month of August received the most pounds applied (Table VII-10, Figure VII-2). Exceedances did not always occur during months of the greatest amount of use (Figure VII-2).

The Coalition also used PUR data to assess which crops receive the most applications of chlorpyrifos. The highest application rates are associated with almonds, corn, and walnuts (Table VII-11). The largest amount of chlorpyrifos from 2005 through 2009 was to almonds and walnuts, followed by grain/sorghum/milo and corn (Table VII-11).   The most common product containing chlorpyrifos applied within the subwatershed was Lorsban (Table VII-11).

Table VII-10. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Highline Canal @ Hwy 99 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
January, 2005	14	768.3	549.2
March, 2005	5	231.9	492.2
April, 2005	2	360.2	360
May, 2005	17	6208.7	1686
June, 2005	19	1313.8	778
July, 2005	42	3632.3	2094
August, 2005	20	2815.7	2271
September, 2005	2	33.9	17
November, 2005	4	1444.7	724.6
January, 2006	7	2041.1	1035
May, 2006	13	2535.4	2007
June, 2006	11	1753.6	1538.9
July, 2006	28	6231.2	3615.2
August, 2006	30	2606.1	2461.5
September, 2006	2	85.1	42
March, 2007	1	110.6	217.4
April, 2007	1	6.2	20
May, 2007	25	3250.0	2869
June, 2007	8	3971.9	1435
July, 2007	37	9124.0	5450.3
August, 2007	3	4442.6	386.4
May, 2008	5	467.1	348
June, 2008	2	121.8	75
July, 2008	16	684.7	503
August, 2008	19	1035.1	654.5

Month/Year	Number of Chlorpyrifos Applications	Pounds Applied	Acres Treated
September, 2008	2	31.9	20
May, 2009	4	433.5	376
June, 2009	2	40.2	35
July, 2009	12	361.2	209
August, 2009	10	175.6	146
Summaries by Year			
2005 Total	125	16809.6	8972
2006 Total	91	15252.5	10699.6
2007 Total	75	20905.3	10378.1
2008 Total	44	2340.7	1600.5
2009 Total	28	1010.5	766
Total	**363**	**56,318.6**	**32,416.2**

Figure VII-2. Pounds of chlorpyrifos applied within the Highline Canal @ Hwy 99 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

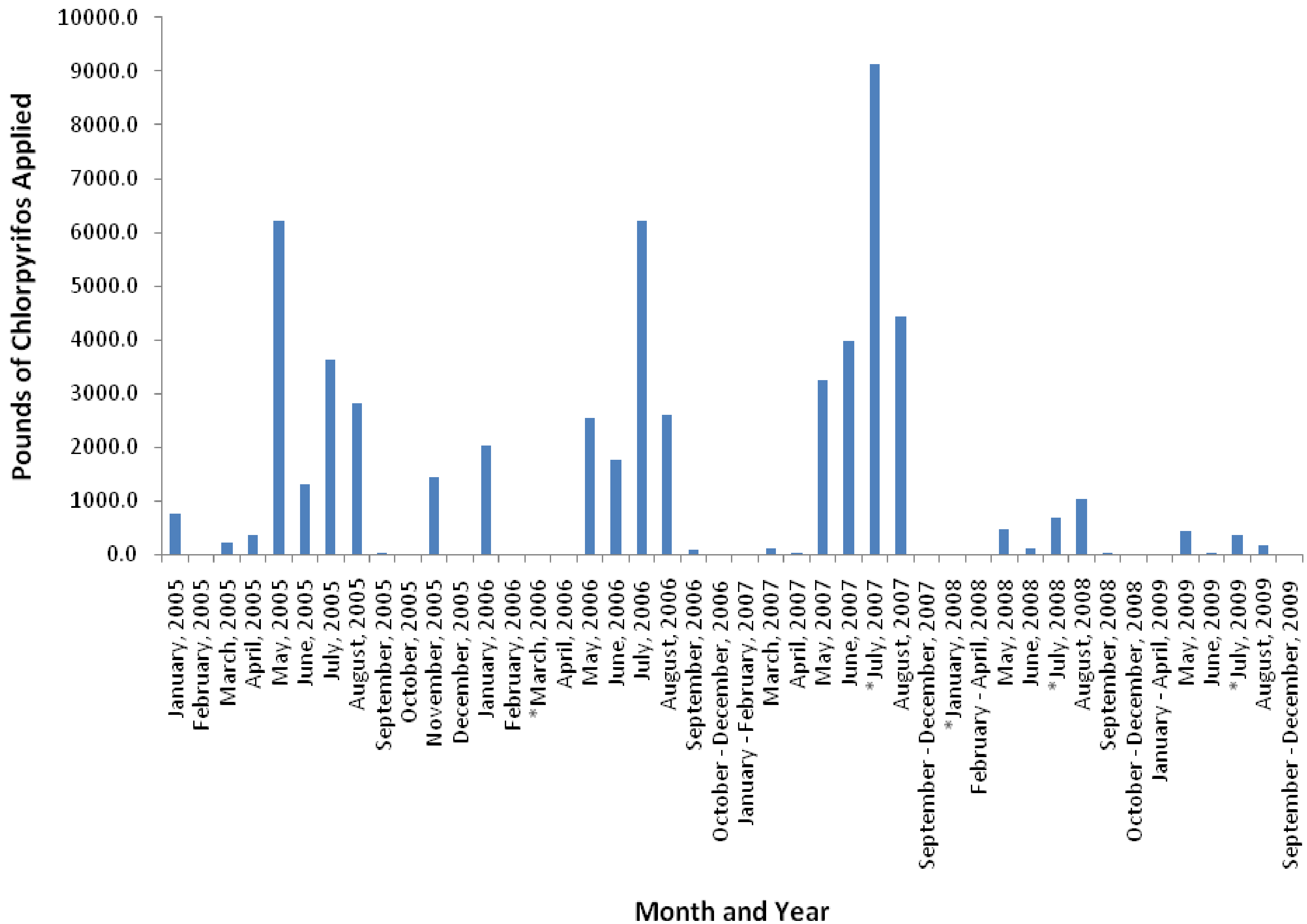


Table VII-11. Total pounds AI for chlorpyrifos based on PUR data from 2005-2009 within the Highline Canal @ Hwy 99 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
CHLORPYRIFOS	ALFALFA	LOCK-ON INSECTICIDE	2.504
		NUFOS 4E	110.624
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	0.501
		LORSBAN 4E-HF	9.969
		NUFOS 4E	221.940
	ALMOND	CHLORPYRIFOS 4E AG	871.181
		DURSBAN 4E INSECTICIDE	20.178
		GOVERN 4E INSECTICIDE	4098.714
		LORSBAN 4E INSECTICIDE	478.782
		LORSBAN 4E-HF	5189.897
		LORSBAN 50W WETTABLE POWDER INSECTICIDE	30.000
		LORSBAN-4E	29930.115
		NUFOS 4E	1053.369
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	147.292
		LORSBAN 15G GRANULAR INSECTICIDE	81.675
		LORSBAN 4E INSECTICIDE	120.017
		LORSBAN 4E-HF	199.844
		LORSBAN-4E	639.321
		NUFOS 4E	490.793
	CORN FOR/FOD	CHLORPYRIFOS 4E AG	52.987
		LORSBAN 4E-HF	594.048
		LORSBAN-4E	318.158
		NUFOS 4E	665.900
		WARHAWK	326.241
	GRAPES, WINE	LORSBAN 4E-HF	1444.745
	PEACH	CHLORPYRIFOS 4E AG	118.666
		LORSBAN 4E-HF	41.746
		LORSBAN-4E	36.018
	SORGHUM MILO	NUFOS 4E	4148.796
	SWEET POTATO	LORSBAN 15G GRANULAR INSECTICIDE	93.150
	WALNUT	CHLORPYRIFOS 4E AG	270.192
		GOVERN 4E INSECTICIDE	30.301
		LORSBAN 4E-HF	279.139
		LORSBAN-4E	757.074
		NUFOS 4E	480.930
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	135.096
		GOVERN 4E INSECTICIDE	190.896
		LORSBAN 4E-HF	484.456
		LORSBAN-4E	1957.075
		NUFOS 4E	196.236
		ALFALFA – Total Pounds Chlorpyrifos Applied	345.538

Chemical Name	Commodity	Product Name	Lbs AI Applied
		ALMOND – Total Pounds Chlorpyrifos Applied	41672.236
		CORN – Total Pounds Chlorpyrifos Applied	3636.275
		GRAPES – Total Pounds Chlorpyrifos Applied	1444.745
		PEACH – Total Pounds Chlorpyrifos Applied	196.430
		SORGHUM MILO – Total Pounds Chlorpyrifos Applied	4148.796
		SWEET POTATO – Total Pounds Chlorpyrifos Applied	93.150
		WALNUT – Total Pounds Chlorpyrifos Applied	4781.395
		Total pounds chlorpyrifos applied (2005 - 2009)	**56,318.565**

Based on results from general management practice surveys, approximately 41% of the member acreage indicates no runoff occurs and 18% of the member acreage uses recirculation and/or tailwater return systems. Chlorpyrifos exceedances often occur in July (2007-2009), but have also occurred during storm monitoring (January 2008 and March 2006). The Coalition targets growers applying chlorpyrifos and also those with the potential to drain to the canal. Growers should be encouraged to review their operation to determine if irrigation return flows are managed properly. Owners operating orchards should evaluate their aerial applications to minimize spray drift.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2009 is provided in the Summary of Coalition Outreach Activities section of the Management Plan Update Report. The Coalition has begun the process of contacting growers, conducting individual meetings, and compiling individual surveys for Highline Canal @ Hwy 99. The Coalition focused outreach to growers owning parcels with the potential to drain to the creek and those applying chlorpyrifos. Using these criteria, a list of 10 targeted growers was created. Individual meetings are currently ongoing and will be completed by the end of May 2010. Individual contacts will focus mainly on chlorpyrifos exceedances however all water quality results will be reviewed and discussed including copper, diuron, ammonia, pH, SC, TDS, *E. coli*, and lead WQTLs exceedances as well as toxicity to *Ceriodaphnia dubia, Selenastrum capricornutum* and *Hyalella azteca*.

The Coalition will compile and analyze the surveys by the end of August 2010. Based on the exact timing of each individual meeting and/or a grower's resources, some owners will not be able to implement recommended management practices until the 2011 irrigation season. In addition, long term structural BMPs (e.g. sediment ponds) will most likely take longer than two years to implement and will require additional tracking to document their implementation. The Coalition will follow up with growers between February and April of 2011 to determine what practices were implemented during the first irrigation year. Growers who have not already been contacted or have indicated that they have not yet implemented practices during the first year will be contacted from February to April of 2012 to determine what practices were implemented during the dormant season and/or the second irrigation year. To evaluate the management practice process, the Coalition will monitor for high priority constituents during months of past exceedances in 2010 and 2011. Depending on when additional management practices are implemented, the Coalition may monitor through 2012 to evaluate improvements in water quality. The Coalition anticipates that changes in management practices by members that have direct drainage and/or are have the potential for spray drift will affect downstream water quality by the end of the second year as a high priority site subwatershed.

The effectiveness of the management practices will be determined through the monitoring of water quality in the years following implementation. However, due to the presence of dairies and nonmembers in the subwatersheds, implementation of management practices by only coalition members may not result in improved water quality. If water quality fails to improve, the Coalition will identify parcels from dairies and nonmembers that could contribute to the exceedances and provide that information to the Regional Board.

Priority C Constituents

Highline Canal @ Hwy 99 is listed for copper and diuron as priority C constituents.

Copper

Copper has exceeded the hardness based WQTL seven times in this subwatershed from 2005 through 2009. Copper exceedances occurred five times during 2007 (February, April, and June-August), and twice in 2008 (January and February).

PUR data are reviewed for the number of monthly copper applications, pounds active ingredient (AI) applied, and acres treated (Table VII-12, Figure VII-3). The amount of copper applied within the subwatershed decreased annually since 2006 (Table VII-12, Figure VII-3). The month of January consistently receives the greatest amount of copper applied (Table VII-12, Figure VII-3). Not all exceedances occurred during months of the greatest amount of use (Figure VII-3).

The Coalition also used PUR data to assess which crops receive the most applications of copper. The largest amount of copper applied from 2005 through 2009 was associated with almond, peach and walnut orchards (Table VII-13). The most common products containing copper applied withing the subwatershed were Dupont Kocide and Kocide (Table VII-13).

Table VII-12. Number of copper applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Highline Canal @ Hwy 99 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
January, 2005	63	21059.0	5037.3
February, 2005	101	5123.9	4325.19
March, 2005	35	3319.9	1511.23
April, 2005	41	5387.7	2321.7
May, 2005	18	2139.3	678
June, 2005	2	100.1	45
August, 2005	2	293.8	63
September, 2005	1	8.6	4

Month/Year	Number of Copper Applications	Pounds Applied	Acres Treated
October, 2005	2	9.1	8
November, 2005	20	15983.3	3993.08
December, 2005	59	14774.6	1746.1
January, 2006	79	90658.2	13310
February, 2006	96	10879.8	5316.13
March, 2006	21	1152.6	1374.1
April, 2006	25	2544.1	665
May, 2006	22	2701.2	1545.4
August, 2006	2	318.6	63
November, 2006	12	12148.1	3039.59
December, 2006	17	2809.6	267.09
January, 2007	73	28634.4	5479.75
February, 2007	50	4993.0	2280.93
March, 2007	55	3895.0	2407.83
April, 2007	49	5367.4	1172
May, 2007	17	2220.3	511.1
January, 2008	31	8127.0	865.4
February, 2008	49	3733.2	1229.56
March, 2008	42	2405.4	1163.15
April, 2008	4	139.9	93
May, 2008	1	9.2	5
July, 2008	2	135.0	63
December, 2008	25	3298.2	406.94
January, 2009	24	4650.5	576.94
February, 2009	52	3077.1	963.71
March, 2009	17	550.4	396
April, 2009	14	847.4	219
May, 2009	5	401.6	63
June, 2009	2	191.2	64
July, 2009	2	153.7	63
December, 2009	3	268.1	47
Summaries by Year			
2005 Total	344	68199.1	19732.6
2006 Total	274	123212.1	25580.31
2007 Total	244	45110.2	11851.61
2008 Total	154	17847.9	3826.05
2009 Total	119	10140.0	2392.65
Total	**1,135**	**264,509.3**	**63,383.22**

Figure VII-3. Pounds of copper applied within the Highline Canal @ Hwy 99 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances.

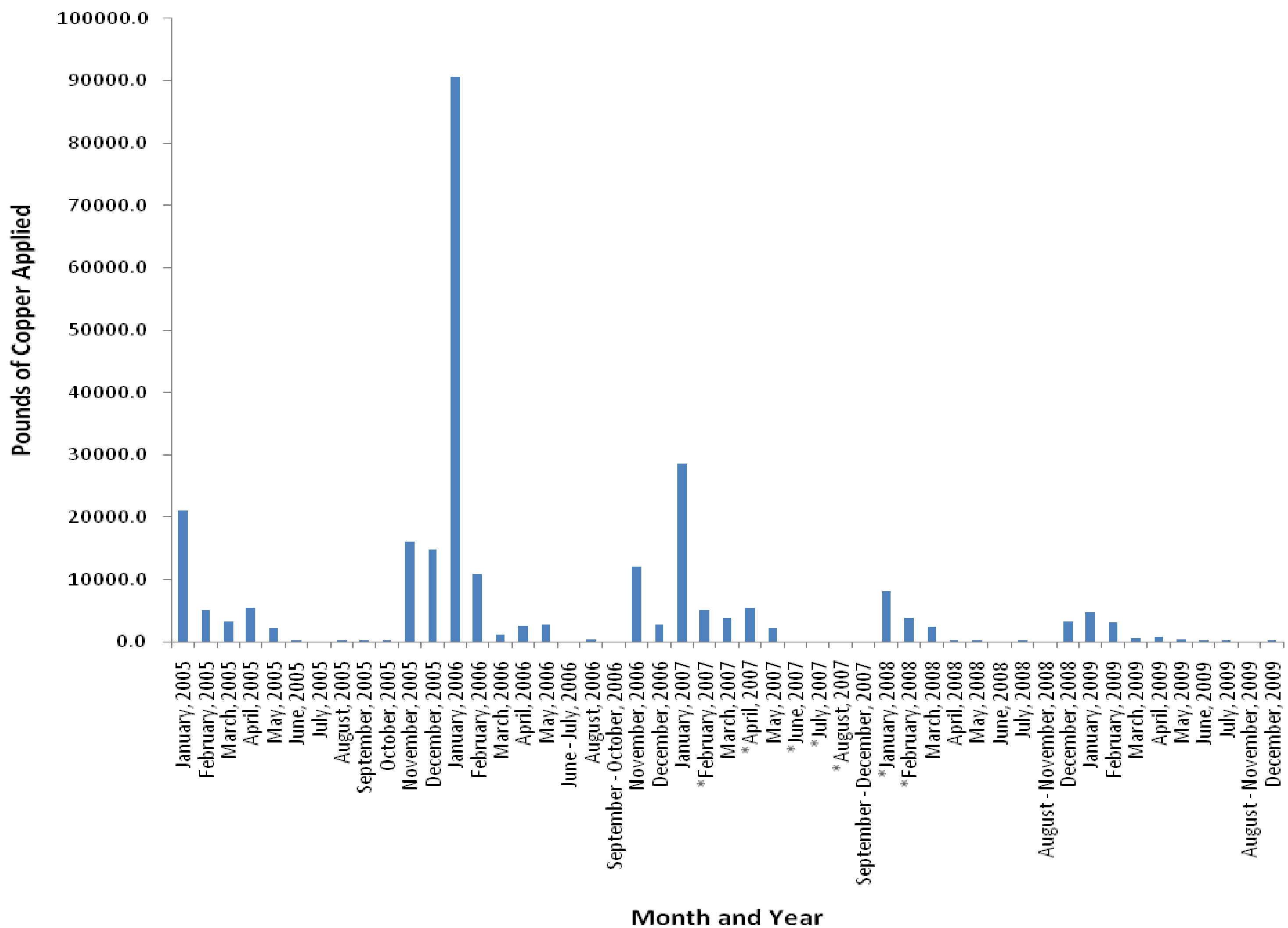


Table VII-13. Total pounds AI for copper based on PUR data from 2005-2009 within the Highline Canal @ Hwy 99 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
COPPER	ALMOND	BASIC COPPER 53	74465.006
		BASIC Copper53	9472.484
		BASICOP	1229.050
		CHAMP FORMULA 2 FLOWABLE	9525.065
		CHAMPION WETTABLE POWDER	6007.540
		CUPROFIX DISPERSS	22.140
		CUPROFIX ULTRA 40 DISPERSS	489.879
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	5241.062
		HYDROX	4350.500
		KOCIDE 101	12470.965
		KOCIDE 2000	4366.704
		KOCIDE DF	8957.943
		NORDOX	56.400
		NORDOX 75 WG	19651.184
		NU-COP 50 WP	6190.800
		NU-COP 50DF	29077.302
	ALMOND, ORGANIC	CHAMPION WETTABLE POWDER	53.900
	APRICOT	KOCIDE DF	310.070
	CHERRY	BASIC COPPER 53	9.800
		CHAMPION WETTABLE POWDER	23.100
	GRAPES	BASIC Copper53	230.300
		CHAMP FORMULA 2 FLOWABLE	183.036
		CHAMPION WETTABLE POWDER	10.780
	GRAPES, WINE	CHAMP FORMULA 2 FLOWABLE	1859.947723
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	747.328475
		IAP COPPER SULFUR 15-25 DUST	344.97
		KOCIDE 4.5 LF	318.4275093
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	713.781873
	N-OUTDR CONTAINER/FLD GRWN PLANTS	CHAMPION WETTABLE POWDER	1135.303
		KOCIDE 2000	242.638
	N-OUTDR PLANTS	NU-COP 50 WP	71.610
		NU-COP 50DF	73.920
	PEACH	BASIC COPPER 53	15082.886
		BASIC Copper53	14828.331
		CHAMPION WETTABLE POWDER	641.441
		DUPONT KOCIDE 2000	535.041

Chemical Name	Commodity	Product Name	Lbs AI Applied
		FUNGICIDE/BACTERICIDE	
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	39.254
		KOCIDE 101	1121.120
		KOCIDE 2000	104.264
		KOCIDE DF	1880.068
		NORDOX 75 WG	6706.295
		NU-COP 50DF	1398.320
	PEACH PROCESSNG	KOCIDE DF	98.240
		NU-COP 50 WP	40.040
		NU-COP 50DF	616.000
	PISTACHIO	CUPROFIX ULTRA 40 DISPERSS	81.054
	WALNUT	BASIC COPPER 53	911.400
		CHAMP FORMULA 2 FLOWABLE	426.002
		CHAMPION WETTABLE POWDER	49.280
		CUPROFIX ULTRA 40 DISPERSS	298.620
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	9.220
		DUPONT KOCIDE 101 FUNGICIDE/BACTERICIDE	78.540
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	684.336
		KENTAN DF	279.528
		KOCIDE 101	2585.660
		KOCIDE 2000	1251.388
		KOCIDE DF	39.296
		NORDOX 75 WG	3580.852
		NU-COP 50DF	1068.760
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHAMP FORMULA 2 FLOWABLE	744.871
		CHAMPION WETTABLE POWDER	337.260
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	645.600
		KOCIDE 101	3321.924
		KOCIDE 2000	4496.604
		KOCIDE DF	1882.524
		NORDOX 75 WG	656.098
		NU-COP 50DF	86.240

ALMOND – Total Pounds Copper Applied	191627.924
APRICOT – Total Pounds Copper Applied	310.070
CHERRY – Total Pounds Copper Applied	32.900
GRAPES – Total Pounds Copper Applied	4408.571

Chemical Name	Commodity	Product Name	Lbs AI Applied
		N-OUTDOOR PLANTS – Total Pounds Copper Applied	1523.471
		PEACH – Total Pounds Copper Applied	43091.300
		PISTACHIO – Total Pounds Copper Applied	81.054
		WALNUT – Total Pounds Copper Applied	23434.004
Total pounds copper applied (2005 - 2009)			**264,509.294**

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts. Orchard and vineyard operators will be advised to consider irrigation water retention and 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 are described under the chlorpyrifos outreach section above and will include discussions of copper exceedances and the above management practices.

Diuron

Diuron is a soluble herbicide applied throughout the year in the Highline Canal watershed, primarily in the months of October – June. There was an exceedance of diuron in February 2007 and one in January 2008. The months with the largest amount of pounds applied are usually January (2006 and 2007) and December (2005), however April received the most pounds applied in 2009 (Table VII-14, Figure VII-4). Pounds applied and acres treated have decreased annually since 2005. The lowest amount applied between 2005 and 2009 was in April 2009; it was the only month that received applications that year (Table VII-14, Figure VII-4). Diuron was only applied to alfalfa, walnuts, and corn in this subwatershed, and alfalfa and walnuts received the most pounds applied (Table VII-15).

Table VII-14. Number of diuron applications, total pounds applied and total acres treated by month for January 2005 through December 2009 in the Highline Canal @ Hwy 99 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year*	Number of Diuron Applications	Pounds Applied	Acres Treated
January, 2005	4	106.0	151
October, 2005	2	59.1	40
November, 2005	2	44.5	73
December, 2005	4	341.1	242.4
January, 2006	2	67.2	46
October, 2006	1	30.0	20
November, 2006	2	27.1	65
December, 2006	1	318.8	217.4
January, 2007	3	122.6	104.35
February, 2007	2	66.3	46

Month/Year*	Number of Diuron Applications	Pounds Applied	Acres Treated
March, 2007	1	17.8	40
April, 2007	2	33.4	75
June, 2007	2	1.1	28
April, 2009	2	15.3	104.9
Summaries by Year			
2005 Total	12	550.7	506.4
2006 Total	6	443.1	348.4
2007 Total	10	241.0	293.35
2009 Total	2	15.3	104.9
Total	**30**	**1,250.1**	**1,253.05**

*No applications of diuron reported for 2008.

Figure VII-4. Pounds of diuron applied within the Highline Canal @ Hwy 99 site subwatershed by month for 2005-2009. Asterisk (*) denotes months with exceedances. No use of diuron was reported for 2008.

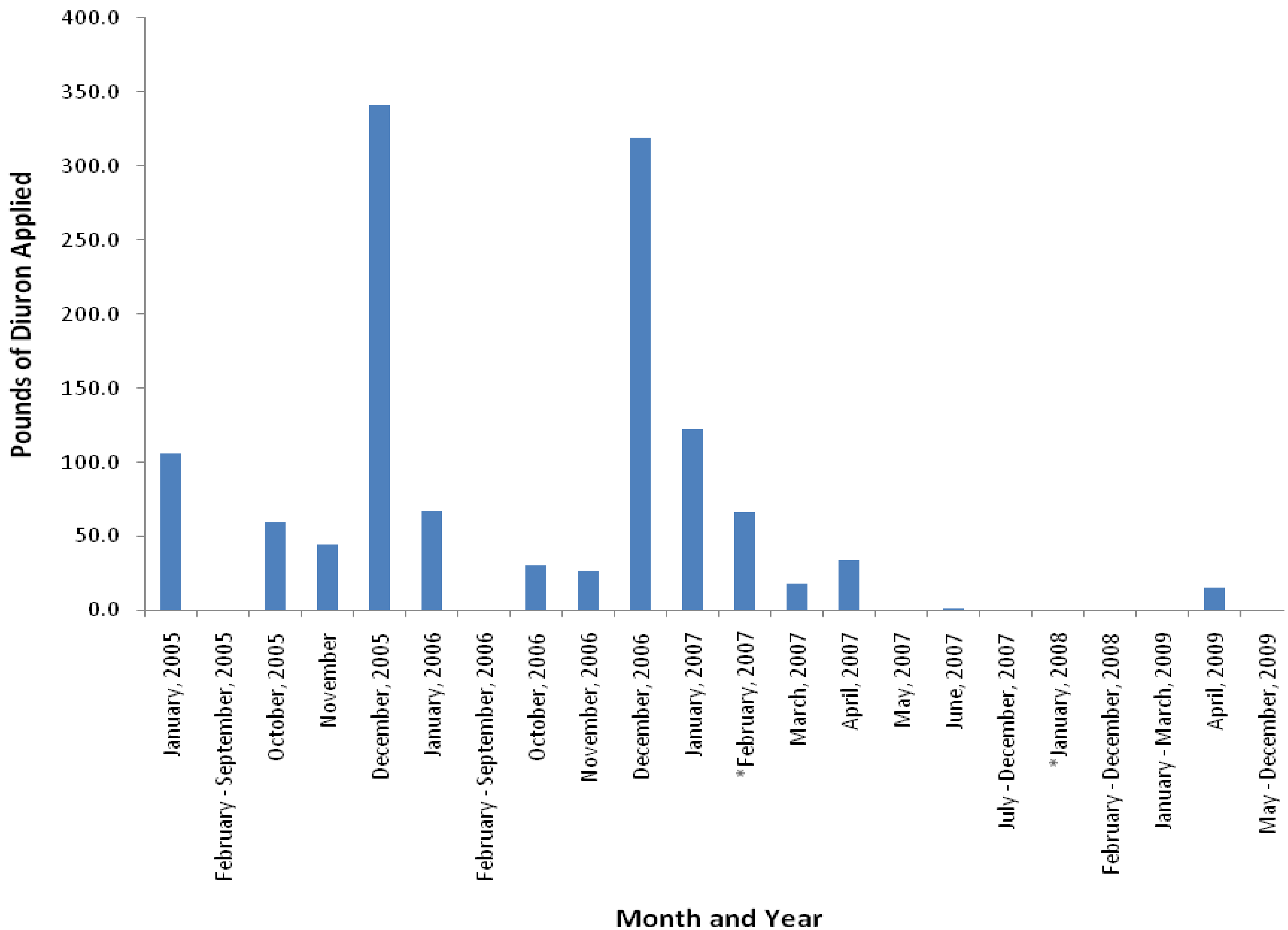


Table VII-15. Total pounds AI for diuron based on PUR data from 2005-2009 within the Highline Canal @ Hwy 99 subwatershed.

Chemical Name	Commodity	Product Name	Lbs AI Applied
DIURON	ALFALFA	DIREX 4L	107.207
	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	649.476
	CORN FOR/FOD	DU PONT KARMEX DF HERBICIDE	1.050
	WALNUT	DIREX 4L	66.273
		DREXEL DIURON 4L HERBICIDE	66.488
		DUPONT DIREX 4L HERBICIDE	15.255
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	274.353
		DREXEL DIURON 4L HERBICIDE	69.972

ALFALFA – Total Pounds Diuron Applied	756.683
CORN – Total Pounds Diuron Applied	1.050
WALNUT – Total Pounds Diuron Applied	492.342
Total pounds diuron applied (2005 - 2009)	**1,250.074**

*No applications of diuron reported for 2008.

Management of diuron in this watershed should focus on providing information to the small number of growers whose applications could be associated with the exceedances. The Coalition's management plan strategy for addressing diuron exceedances is to include diuron in discussions with individual growers relevant to preventing storm and irrigation discharge to waterways. Hopefully improved and additional water management practices will reduce or eliminate these exceedances.

Priority D Constituents

Highline Canal is listed for water column toxicity to *Ceriodaphnia dubia, Selenastrum capricornutum* and *Hyalella azteca*. *Selenastrum* toxicity was monitored during 2009 MPM and no water column toxicity experienced.

Ceriodaphnia toxicity

Toxicity to *Ceriodaphnia* occurred in May 2005 and in March and September 2006. The 2005 toxicity was persistent in the resample a week later; however, this was not the case in any of the 2006 toxicities. Both 2006 toxicities were associated with exceedances of the chlorpyrifos WQTL. Toxicity to *Ceriodaphnia* did not occur during 2008.

The Coalition's strategy for eliminating *Ceriodaphnia* toxicity will involve focusing on chlorpyrifos. If chlorpyrifos can be prevented from entering waterways throughout the irrigation season, the Coalition believes that *Ceriodaphnia* toxicity can also be reduced or eliminated. If chlorpyrifos is no longer detected in the slough but *Ceriodaphnia* toxicity persists, the Coalition will consider other pesticides to eliminate toxicity.

***Selenastrum* toxicity**

Water column toxicity to *Selenastrum capricornutum* in occurred March 2006 and in February, April, and May 2008. The 2008 February storm toxicity coincided with a copper exceedance on the same day.

The Coalition's strategy for eliminating *Selenastrum* toxicity will involve focusing on copper. If copper can be prevented from entering storm water during the winter rainy season and early irrigation season, the Coalition believes that *Selenastrum* toxicity can also be reduced or eliminated. There were no exceedances of the copper WQTL and also no water column toxicity associated with *Selenastrum* during 2009 monitoring.

***Hyalella* toxicity**

Sediment toxicity to *Hyalella* occurred in the late irrigation months in of 2005 and 2006, and during both the storm and late irrigation seasons of 2008. Both the August 2006 and 2008 toxicities were persistent in the resample. Sediment toxicity was not monitored during 2009.

The Coalition has begun to conduct management plan sampling for sediment toxicities. 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. Management Plan Monitoring is scheduled for this site in 2010.

Priority E Constituents

The following priority E constituents are listed under the Highline Canal @ Highway 99 Management Plan: ammonia, pH, SC, dissolved solids, *E. coli*, and lead. Exceedances of pH and *E. coli* continued in 2009. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

Highline Canal @ Hwy 99 is one of the second four priority site subwatersheds within the ESJWQC and is in its first year of focused outreach (2010-2012). The Coalition's strategy for the Highline Canal subwatershed has been to target growers along or adjacent to the waterway that have the potential to discharge. Focus will be on water retention management practice implementation and minimizing spray drift. 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 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 May 2010. 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.

Merced River @ Santa Fe Drive

Merced River @ Santa Fe Drive (33,421 irrigated acres) – This water body is designated as a major water body and is 303d listed. It was selected as an integrator site for several of the drains and tributaries in the vicinity. The Merced River originates in the high Sierra encountering several dams and impoundments as it flows west. The Merced River eventually drains into the San Joaquin River near Hatfield State Park. Upstream agriculture includes some field crops in the immediate vicinity of the river and deciduous nuts, primarily almonds.

Merced River @ Santa Fe Drive is a Core monitoring location. The high load associated with one of the three prior exceedances of the chlorpyrifos WQTL and the concomitant toxicity to *C. dubia* (the third since 2004) initiated an effort to source the chlorpyrifos including a review of pesticide use reports and meetings with growers in the subwatershed. Based on information gained from these efforts, the Coalition decided to collect upstream samples in 2009 during months of past chlorpyrifos exceedances in the Merced River; the Coalition also collected samples for chlorpyrifos at the downstream location during the same events. It is believed that the chlorpyrifos is entering the Merced River via Dry Creek (not Dry Creek @ Wellsford Rd) several miles upstream. Since the toxicity to *Ceriodaphnia dubia* was associated with chlorpyrifos in the water, the Coalition is focusing its efforts in further identifying the sources of the chlorpyrifos which will aid in future outreach within this large subwatershed.

Other constituents that have exceeded their respective WQTLs at the Merced River sampling site are DO (September and October, 2009), lead (February 2007 and January 2008), and toxicity to *Selenastrum capricornutum* (March 2005).

Merced River @ Santa Fe Drive was monitored as a normal monitoring location from January to December 2009. Merced River @ Santa Fe Drive will be monitored as a Core Monitoring site in 2010.

Dry Creek @ Oakdale Rd (upstream of Merced River)

Dry Creek @ Oakdale Rd (13,564 irrigated acres) – Dry Creek flows into Merced River at Oakdale Ave. The agriculture draining into Dry Creek consists primarily of deciduous trees.

Dry Creek @ Oakdale Rd is a MPM location. This upstream location was selected based on a review of PUR data indicating likely upstream sources. The upstream monitoring site was selected to cut the watershed into smaller areas which allows for an analysis of the contribution of each portion of the watershed to the load measured at the Merced River @ Santa Fe Dr site. Management Plan Monitoring for chlorpyrifos occurred at this site during the months of November and December of 2009. However, the site was dry during both sampling events and thus no sampling data exists for this site to date.

Miles Creek @ Reilly Rd

Miles Creek @ Reilly Rd (9,840 irrigated acres) – Miles Creek is located just north of Duck Slough and drains into Owen's Creek. The primary agriculture includes field crops, deciduous nuts and fruit, pasture and truck/nursery/berry. Within the subwatershed are also urban drainages, dairies and hay, and pasture lands.

Miles Creek @ Reilly Rd was a new site in May 2007. In 2008, toxicity occurred for the second time to *Selenastrum capricornutum* and *Ceriodaphnia dubia,* and exceedances of WQTLs occurred twice for chlorpyrifos and four times for copper. The site was included in the ESJWQC Management Plan in 2009. During the irrigation season of 2009, Miles Creek was monitored for *Selenastrum capricornutum* in April, for copper in July and August, and for chlorpyrifos July through September. Chlorpyrifos was the olny exceedance of the WQTL in July 2009.

Miles Creek will be monitored as an Assessment Monitoring location in 2015 and 2016.