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April 1, 2011

Pamela Creedon
Dania Huggins
Central Valley Regional Water Quality Control Board
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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 2010. The 2011 Management Plan Update Report (2011 MPUR) is being submitted to inform the Regional Board of progress made on the management of water quality 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 a status update of high priority subwatershed performance goals, a summary of newly implemented management practices within 2008-2010 high priority site subwatersheds, and a summary of current management practices within 2010-2012 high priority site subwatersheds. In addition the 2011 MPUR includes an evaluation of management practice effectiveness and a status review of TMDL constituents and Basin Plan requirements.

Submitted respectfully,

A handwritten signature in black ink, appearing to read "P. Klassen", is written over a horizontal line.

Parry Klassen
Board Chairman
East San Joaquin Water Quality Coalition

Management Plan Update Report



January – December 2010

April 1, 2011

Irrigated Lands Regulatory Program

Central Valley Regional Water Quality Control Board

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ATTACHMENTS

Appendix I. High Priority Site Subwatershed Analysis (2008 – 2010, 2010 – 2012 and 2011-2013)

LIST OF ACRONYMS

A	Assessment
AMR	Annual Monitoring Report
APN	Assessor Parcel Number
AWEP	Agricultural Water Enhancement Program
BMP	Best Management Practice
C	Core
CURES	Coalition for Urban/Rural Environmental Stewardship
CVRWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
ESJWQC	East San Joaquin Water Quality Coalition
F	Field
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
PAM	Polyacrylamide
pH	Power of Hydrogen
PUR	Pesticide Use Report
SC	Specific Conductance
SG	Statistically significantly different from control; Greater than 80% threshold
SL	Statistically significantly different from control; Less than 80% threshold
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TRS	Township, Range, Section
USEPA	United States Environmental Protection Agency
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
mph	miles per hour
MPN/100mL	most probable number per 100 milliliters
sec	second
µg	microgram
µS	microsiemens
µg/kg dw	microgram per kilogram of dry weight

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.

This is the third yearly update report to the Coalition's Management Plan. In this report, previous year's monitoring data are reviewed and assessed for exceedances and water quality improvements. This update includes an assessment of water quality based on 2010 monitoring results including new exceedances and new site/constituents requiring management plans.

Water quality monitoring was conducted during every month from January through December 2010 as described in the ESJWQC Monitoring and Reporting Program Plan (MRPP) (pages 33-38). Management Plan Monitoring (MPM) was conducted based on prior exceedances at Coalition monitoring sites. There were 14 MPM sites monitored between January and December 2010; Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99, Prairie Flower Drain @ Crows Landing Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, Bear Creek @ Kibby Rd, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, dry Creek @ Oakdale Ave, Highline Canal @ Lombardy Rd, Merced River @ Santa Fe Dr, Miles Creek @ Reilly Rd and Mustang Creek @ East Ave. Based on the prioritization of exceedances, MPM was conducted for *Ceriodaphnia dubia*, *Selenastrum capricornutum*, and *Hyaella azteca* toxicity, copper, chlorpyrifos, diazinon, diuron and simazine.

As a result of 2010 monitoring, several new site/constituent specific Management Plans are required including:

- Dissolved Oxygen
 - Mootz Drain @ downstream of Langworth Pond
- *E. coli*
 - Merced River @ Santa Fe
 - Mootz Drain @ downstream of Langworth Pond
- Copper (dissolved and total)
 - Howard Lateral @ Hwy 140
- Chlorpyrifos
 - Howard Lateral @ Hwy 140

The Coalition developed an updated flow chart for its Management Plan Monitoring strategy. The strategy has been updated to include MPM for high priority subwatersheds during Year 0, Year 1, and Year 2. Year 0 refers to the year prior to when the subwatershed becomes high priority and allows the Coalition to have recent monitoring data when contacting growers in the subwatershed. When a site becomes a high priority site subwatershed, the Coalition makes contacts with individuals who have the potential for direct drainage and are known to have applied constituents of concern. Contacts occur between January 1 and March 30 of Year 1 in order to schedule meetings between February 1 and

September 30. Meetings 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 discharge. At the meetings, growers are encouraged to complete surveys and return them to Coalition representatives (either at the meeting or by mail). It is anticipated that all surveys are completed by October 1 of Year 1. Surveys document the current management practices, and they identify additional management practices that the member intends to implement in Year 1 and/or Year 2. The Coalition conducts follow up surveys with growers between September of Year 1 and February of Year 2. Follow up may be extended to Year 3 depending on information obtained from the grower on when they plan to implement practices; in some cases a third year may be necessary for funds to be available for structural improvements. Follow up surveys document the additional practices that the grower planned to implement. The returned surveys document whether growers implemented those practices in Year 1 and if not, whether they plan to implement those practices in Year 2. If the grower indicates that they do not intend to implement additional practices despite their previous declaration that they would, they are queried as to why they decided not to implement practices (e.g. they no longer farm, no available funds).

The Coalition prioritized constituents and site subwatersheds to allow for focused source identification, outreach and evaluation. 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 has developed High Priority Site Subwatershed Performance Goals (hereafter referred to as Performance Goals) for its first three of high priority site subwatersheds. Performance goals are submitted for approval each time a new set of subwatersheds rotates into high priority status and 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 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.

For the 2010 – 2012 high priority sites, the Coalition has completed Performance Measure 1.1 (100% of identified growers contacted) and Performance Measure 1.2 (contact owners/operators representing at least 1,000 acres of member acres) of Performance Goal 1; Performance Measure 2.1 (document current management practices at 100% of identified growers) and Performance Measure 2.2 (document management practices that growers were encouraged to implement) of Performance Goal 2. Performance Measure 3.1 (document new management practices implemented by growers) of Performance Goal 3, Performance Measure 4.1 (Assess water quality results from Coalition monitoring locations) of Performance Goal 4, and Performance Goal 5 are in the process of being completed.

Completion dates are February (Performance Measure 3.1 – record implemented management practices in an Access database) or April 2012 (Performance Measure 3.1 – summary of management practices implemented as a result of individual contacts; Performance Measure 4.1) as expensive structural management practices may take some time to implement.

Overall, the following conclusions can be drawn about Coalition outreach efforts.

- Subwatersheds that have high priority status that have had individual grower visits have seen a reduction in exceedances
 - The drop in exceedances coincides with implementation of management practices encouraged by Coalition
 - Remaining exceedances are the result of circumstances such as discharges from nonmembers or growers new to the watershed who were not targeted for original Coalition contacts and interviews
- Subwatersheds with high numbers of exceedances have not attained high priority status
 - Schedules have been modified to move the subwatersheds with large number of exceedances to high priority status in the near future

Other compliance issues involve Total Maximum Daily Load (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 Basin Plan requires that dischargers either individually or as a coalition describe the actions that they will take to reduce chlorpyrifos and diazinon discharges and meet the applicable load allocations by the required compliance date. Improved management practices have been implemented to meet WQOs and load allocations set forth in the Basin Plan including pesticide application practices to reduce drift, alternative irrigation practices to reduce runoff, and drainage management practices to decrease or reduce the volume of runoff of contaminants.

In 2010, the ESJWQC and Westside Water Quality Coalition (Westside Coalition) began implementing a monitoring strategy to comply with the chlorpyrifos and diazinon TMDL program Monitoring Objectives. During the first three quarters of 2010, each Coalition sampled three of the six compliance points as well as tributaries within their respective regions as per each Coalition's monitoring plan.

The chlorpyrifos WQO was exceeded on July 22, 2010 at the San Joaquin River at Las Palmas Avenue near Patterson sampling station (0.041 µg/L). Also on July 22, 2010, chlorpyrifos was detected in both the environmental and field duplicate samples collected from San Joaquin River at the Airport Way Bridge near Vernalis below the WQO (both 0.013 µg/L), although the amount was less than the reporting limit and considered estimated. Chlorpyrifos was not detected at any other San Joaquin River sampling location and diazinon was not detected at any location during the first three quarters of 2010.

Salt and Boron

The Regional Board and stakeholders initiated the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) in July 2008 to facilitate 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 with the goal of developing a Salt and Boron Basin Plan Amendment. 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. Coalition technical consultants participated in several CV SALTS committees including the Technical Advisory Committee, the Knowledge Gained and BMP Subcommittees, and the Executive Committee.

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 (pages 33-58) and Management Plan. The Coalition monitored for DO in at least one representative site within each Coalition zone. The Coalition is addressing DO exceedances through the Management Prioritization process (ESJWQC 2008 Management Plan approved November 25, 2008). In addition, the Coalition is participating in the DO TMDL Technical Working Group meetings. At this point, the Regional Board is in negotiations with stakeholders to determine which organization is willing to fund the operation and maintenance of the aeration facility and maintain the DO content of the water in the deep water ship channel above the threshold dictated by the Basin Plan amendment. The role of the Coalition in this process is unknown at this time.

INTRODUCTION

The East San Joaquin Water Quality Coalition (ESJWQC or Coalition) is submitting a Management Plan Update Report (MPUR) 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 the status of 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 collected from the previous year.

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 including monitoring and exceedance histories, source analyses, outreach and management practice tracking that is supplemental to this report and is attached in Appendix I.

OVERVIEW OF MONITORING

Table 1. January- December 2010 Core (C), Assessment (A) and Management Plan Monitoring (MPM) Sites and Locations.

ZONE	SITE TYPE ¹	2010 MONITORING	SITE NAME	STATION CODE	LATITUDE	LONGITUDE
1	Core	C,MPM	Dry Creek @ Wellsford Rd	535XDCAWR	37.6602	-120.8743
1	Assessment	A	Mootz Drain Downstream of Langworth Pond	535XMDDLDP	37.7055	-120.8944
2	Assessment	A	Lateral 2 1/2 near Keyes Rd	535LTHNKR	37.5478	-121.0927
2	Core	C,MPM	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.4422	-121.0024
3	Assessment	MPM	Dry Creek @ Oakdale	535DCAORD	37.4605	-120.6153
3	Core	C,MPM	Highline Canal @ Hwy 99	535XHCHNN	37.4153	-120.7557
3	Assessment	MPM	Highline Canal @ Lombardy Ave	535XHCHNN	37.4556	-120.7207
3	Assessment	A,MPM	Mustang Creek @ East Ave	535XMCAEA	37.4918	-120.6839
4	Assessment	MPM	Bear Creek @ Kibby Rd	535XBCAKR	37.3128	-120.4138
4	Assessment	A	Howard Lateral @ Hwy 140	535XHLAHO	37.3079	-120.7820
4	Core	C,MPM	Merced River @ Santa Fe	535XMRSFD	37.4271	-120.6721
5	Assessment	A,MPM	Deadman Creek @ Gurr Rd	535XDCAGR	37.1936	-120.5612
5	Assessment	MPM	Deadman Creek @ Hwy 59	535DMCAHF	37.1981	-120.4869
5	Core	C,MPM	Duck Slough @ Gurr Rd	535XDSAGR	37.2142	-120.5596
5	Assessment	MPM	Duck Slough @ Hwy 99	535XDSAHN	37.2501	-120.4100
5	Assessment	MPM	Miles Creek @ Reilly Rd	535XMCARR	37.2582	-120.4755
6	Assessment	A	Ash Slough @ Ave 21	545XASAAT	37.0545	-120.4158
6	Core	C,MPM	Cottonwood Creek @ Rd 20	545XCCART	36.8686	-120.1818

¹ Site types are either Assessment or Core based on the ESJWQC MRPP (page 33). The type of monitoring conducted at sample locations depends on the rotation schedule outlined in the ESJWQC MRPP (Table 10, pages 52-53) where Core Monitoring locations rotate into Assessment Monitoring locations every third year.

C – Core Monitoring

A – Assessment Monitoring

MPM – Management Plan Monitoring

2010 MANAGEMENT PLAN MONITORING

This is the third yearly update report to the Coalition's Management Plan. In this report, previous year's monitoring data are reviewed and assessed for exceedances and water quality improvements. This update includes an assessment of water quality based on 2010 monitoring results including new exceedances and new site/constituents requiring management plans.

During 2010, monitoring was conducted as outlined in the Coalition's Monitoring and Reporting Project Plan approved on February 23, 2011 (MRPP, pages 33-57). Management Plan Monitoring (MPM) in 2010 was conducted at high priority locations for high priority constituents. In some cases, these constituents were already being monitored under the MRPP monitoring schedule (Table 10, pages 52-53). The Coalition's Annual Monitoring Report (AMR) submitted on March 1, 2011 lists the locations, dates and type of sampling that was conducted during 2010.

There were 18 sites monitored from January through December 2010. Of the 18, 14 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 water column toxicity (*Ceriodaphnia dubia* and *Selenastrum capricornutum*), sediment toxicity (*Hyalella azteca*), copper, chlorpyrifos, diazinon, diuron and simazine (Table 2). Water quality results from MPM are used to evaluate the effectiveness of Coalition outreach in priority subwatershed and the effectiveness of management practices implemented by growers within those subwatersheds. Four of the eight management plan constituents that were monitored had no exceedances in 2010 (Table 3). These include *C. dubia* toxicity and three pesticides (diazinon, diuron and simazine) (Table 3). There was a single *S. capricornutum* toxicity out of 18 samples collected (Prairie Flower Drain, January 19, 2010, Table 3). Of the management plan samples collected for copper and chlorpyrifos, 13% of the samples exceeded the water quality trigger limit (WQTL) (Table 3). Sediment toxicity also occurred in management plan samples with 25% of the samples collected resulting in significantly decreased survival to *H. azteca* (Table 3).

Each high priority subwatershed is discussed in more detail regarding water quality exceedances, sourcing of exceedances, outreach and evaluation of management practices in relation to water quality in Appendix I.

Table 2. 2010 Management Plan Monitoring schedule. "X" indicates when a sample was collected for a particular constituent.

SITE NAME	YEAR	MONTH	C. DUBIA	S. CAPRICORNUTUM	COPPER	CHLORPYRIFOS	DIAZINON	DIURON	SIMAZINE	HYALELLA AZTECA
Cottonwood Creek @ Rd 20	2010	January				X	X	X		
Deadman Creek @ Gurr Rd	2010	January		X	X					
Deadman Creek @ Hwy 59	2010	January		X						
Dry Creek @ Oakdale Ave	2010	January	X			X				
Duck Slough @ Gurr Rd	2010	January			X					
Highline Canal @ Hwy 99	2010	January		X	X	X		X		
Highline Canal @ Lombardy Rd	2010	January	X		X	X				
Merced River @ Santa Fe Dr	2010	January	X			X				
Miles Creek @ Reilly Rd	2010	January	X		X					
Mustang Creek @ East Ave	2010	January				X			X	
Prairie Flower Drain @ Crows Landing Rd	2010	January		X						
Cottonwood Creek @ Rd 20	2010	February				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		
Highline Canal @ Lombardy Rd	2010	February	X	X	X	X				
Miles Creek @ Reilly Rd	2010	February	X		X					
Mustang Creek @ East Ave	2010	February				X			X	
Prairie Flower Drain @ Crows Landing Rd	2010	February		X						
Highline Canal @ Lombardy Rd	2010	March		X						
Dry Creek @ Wellsford 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						
Cottonwood Creek @ Rd 20	2010	April			X					
Duck Slough @ Gurr Rd	2010	April				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	May			X					
Bear Creek @ Kibby Rd	2010	May	X			X				
Duck Slough @ Hwy 99	2010	June			X					
Highline Canal @ Hwy 99	2010	June			X					

SITE NAME	YEAR	MONTH	C. DUBIA	S. CAPRICORNUTUM	COPPER	CHLORPYRIFOS	DIAZINON	DIURON	SIMAZINE	HYALELLA AZTECA
Cottonwood Creek @ Rd 20	2010	June			X					
Duck Slough @ Gurr Rd	2010	June			X					
Duck Slough @ Hwy 99	2010	July		X	X	X				
Dry Creek @ Wellsford Rd	2010	July				X				
Highline Canal @ Hwy 99	2010	July			X	X				
Cottonwood Creek @ Rd 20	2010	July			X					
Duck Slough @ Gurr Rd	2010	July		X	X	X				
Bear Creek @ Kibby Rd	2010	July	X			X				
Duck Slough @ Hwy 99	2010	August			X					
Dry Creek @ Wellsford Rd	2010	August				X				
Highline Canal @ Hwy 99	2010	August			X					
Prairie Flower Drain @ Crows Landing Rd	2010	August				X				
Cottonwood Creek @ Rd 20	2010	August			X					
Duck Slough @ Gurr Rd	2010	August								
Bear Creek @ Kibby Rd	2010	August			X					
Duck Slough @ Hwy 99	2010	September			X	X				
Dry Creek @ Wellsford Rd	2010	September				X				X
Prairie Flower Drain @ Crows Landing Rd	2010	September	X			X				X
Cottonwood Creek @ Rd 20	2010	September			X					
Duck Slough @ Gurr Rd	2010	September		X						X
Highline Canal @ Hwy 99	2010	September								X

Table 3. 2010 Management Plan Monitoring results including a percentage of samples with exceedances. "X" indicates that a sample was collected for a management plan constituent and no exceedance of a WQTL occurred.

A number in red indicates an exceedance of a WQTL in a MPM sample. Grey shaded cells indicate that no MPM was conducted on that date for that constituent.

SITE NAME	SAMPLE DATE	C. DUBIA (SURVIVAL)	S. CAPRICORNUTUM (GROWTH)	COPPER	CHLORPYRIFOS	DIAZINON	DIURON	SIMAZINE	H. A. AZTECA (% SURVIVAL)
Cottonwood Creek @ Rd 20	1/19/2010				0.21	X	X		
Deadman Creek @ Gurr Rd	1/19/2010		X	X					
Deadman Creek @ Hwy 59	1/19/2010		X						
Dry Creek @ Oakdale Ave	1/19/2010	X			X				
Duck Slough @ Gurr Rd	1/19/2010			X					
Highline Canal @ Hwy 99	1/19/2010		X	X	X		X		
Highline Canal @ Lombardy Rd	1/19/2010	X		X	0.016				
Merced River @ Santa Fe Dr	1/19/2010	X			X				
Miles Creek @ Reilly Rd	1/19/2010	X		X					
Mustang Creek @ East Ave	1/19/2010				X			X	
Prairie Flower Drain @ Crows Landing Rd	1/19/2010		56						
Cottonwood Creek @ Rd 20	2/23/2010				X	X	X		
Deadman Creek @ Gurr Rd	2/23/2010		X	X					
Dry Creek @ Wellsford Rd	2/23/2010		X	X			X		
Duck Slough @ Gurr Rd	2/23/2010			X					
Highline Canal @ Hwy 99	2/23/2010		X	X	X		X		
Highline Canal @ Lombardy Rd	2/23/2010	X	X	16 (14.10)	X				
Miles Creek @ Reilly Rd	2/23/2010	X		X					
Mustang Creek @ East Ave	2/23/2010				X			X	
Prairie Flower Drain @ Crows Landing Rd	2/23/2010		X						
Highline Canal @ Lombardy Rd	3/23/2010		X						
Dry Creek @ Wellsford Rd	4/20/2010			X					
Duck Slough @ Hwy 99	4/20/2010		X	X					
Highline Canal @ Hwy 99	4/20/2010		X	X					
Prairie Flower Drain @ Crows Landing Rd	4/20/2010		X						
Cottonwood Creek @ Rd 20	4/20/2010			3.1 (2.17)					
Duck Slough @ Gurr Rd	4/20/2010				X				
Dry Creek @ Wellsford Rd	5/18/2010								
Duck Slough @ Hwy 99	5/18/2010				X				
Highline Canal @ Hwy 99	5/18/2010		X						
Prairie Flower Drain @ Crows Landing Rd	5/18/2010		X						
Cottonwood Creek @ Rd 20	5/18/2010			3.6 (2.36)					

SITE NAME	SAMPLE DATE	C. DUBIA (SURVIVAL)	S. CAPRICORNUTUM (GROWTH)	COPPER	CHLORPYRIFOS	DIAZINON	DIURON	SIMAZINE	H. A AZTECA (% SURVIVAL)
Bear Creek @ Kibby Rd	5/18/2010	X			X				
Duck Slough @ Hwy 99	6/15/2010			X					
Highline Canal @ Hwy 99	6/15/2010			X					
Cottonwood Creek @ Rd 20	6/15/2010			X					
Duck Slough @ Gurr Rd	6/15/2010			X					
Duck Slough @ Hwy 99	7/20/2010		X	X	X				
Dry Creek @ Wellsford Rd	7/20/2010				0.067				
Highline Canal @ Hwy 99	7/20/2010			X	X				
Cottonwood Creek @ Rd 20	7/20/2010			X					
Duck Slough @ Gurr Rd	7/20/2010		X	X	X				
Bear Creek @ Kibby Rd	7/20/2010	X			X				
Duck Slough @ Hwy 99	8/17/2010			X					
Dry Creek @ Wellsford Rd	8/17/2010				X				
Highline Canal @ Hwy 99	8/17/2010			X					
Prairie Flower Drain @ Crows Landing Rd	8/17/2010				X				
Cottonwood Creek @ Rd 20	8/17/2010			5.3 (4.9)					
Duck Slough @ Gurr Rd	8/17/2010								
Bear Creek @ Kibby Rd	8/17/2010			X					
Duck Slough @ Hwy 99	9/14/2010			X	X				
Dry Creek @ Wellsford Rd	9/14/2010				X				X
Prairie Flower Drain @ Crows Landing Rd	9/14/2010	X			X				X
Cottonwood Creek @ Rd 20	9/14/2010			X					
Duck Slough @ Gurr Rd	9/14/2010		X						70
Highline Canal @ Hwy 99	9/14/2010								X
Total MPM Exceedances		0	1	4	3	0	0	0	1
Total MPM Samples Collected		9	18	30	23	2	5	2	4
% Exceedances		0%	6%	13%	13%	0%	0%	0%	25%

MPM- Management Plan Monitoring
WQTL – Water Quality Trigger Limit

2004 - 2010 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 2010. 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 Update Report (Appendix I).

Table 5 includes a tally of exceedances experienced since the last update (April 1, 2010) and includes monitoring results from 2010. South Slough @ Quinley Rd has been removed from the ESJWQC MRPP due to recent information regarding the source and drainage of this waterbody (MRPP update approved on February 23, 2011). 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 2010.

Table 4. ESJWQC exceedance tally based on results through December 2010.

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	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, DELTA, 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	2	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	18	1							16		3	12	3				3	1				1			2							1		1	2*	1	
Deadman Creek @ Gurr Rd	27	1	6	6	5				41	11		4					4				1		1				1						4	7†	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	32	5	1						35			3	1				8								2						1		2		5	2	
Duck Slough @ Gurr Rd	3	5	2	1				1	20		1	8	4		1	1															2		3		2	6	
Duck Slough @ Hwy 59	3		1																																		
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				10			7	7				5								2									4		4	6
Highline Canal @ Lombardy Rd	1	5	1		1				4		1	5	8	1			6								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	6	1	1				1	3		3						1																			1	
Lateral 2 ½ near Keyes Rd		4			1			1	2								3										1									1	1
Livingston Drain @ Robin Ave	1	11				1			2			9	2				4																			4	

STATION NAME	OXYGEN, DISSOLVED, MG/L	PH, NONE	SPECIFIC CONDUCTIVITY, µS/CM	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, DELTA, 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 (%)	
Merced River @ Santa Fe	4	1						3				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	9				1			10																	1												
Mustang Creek @ East Ave	12		9	6	1		2	10		4							2			3												2	2*		1	1	
Prairie Flower Drain @ Crows Landing Rd	15	6	71	56	6	18	1	27	42	1							4							1			1						2	2*	9	6	
Silva Drain @ Meadow Dr	17	1			3			13			3	1					6																3	1		4	
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	254	76	171	123	24	57	2	32	320	30	14	104	54	2	1	1	84	1	2	4	4	3	2	2	16	2	3	1	1	1	3	5	46	13	79	56	

All data were evaluated including field duplicates. If a field duplicate has an exceedance, and the associated environmental sample does NOT have an exceedance, the field duplicate 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).

+*P. promelas* exceedance tally at Deadman Creek @ Gurr Rd has decreased by one due to a reporting error in 2009 data.

Table 5. ESJWQC exceedance tally based on 2010 sampling events.

All sites are listed that have had at least one exceedance in 2010. 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 2010 exceedances; blue highlights refer to sites/constituents already in a management plan.

STATION NAME	OXYGEN, DISSOLVED, MG/L	pH, NONE	SPECIFIC CONDUCTIVITY, µS/cm	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	DIURON, µG/L	C. DUBIA, SURVIVAL (%)	P. PROMELAS, SURVIVAL (%)	S. CAPRICORNUTUM, TOTAL CELL	H. AZTECA, SURVIVAL (%)
Ash Slough @ Ave 21									1						
Cottonwood Creek @ Rd 20	4						2		3	1					
Deadman Creek @ Gurr Rd	7		2	2	2		11	1		3		2	2		
Dry Creek @ Wellsford Rd	7	1					6			1					
Duck Slough @ Gurr Rd		1					1								1
Highline Canal @ Hwy 99							2								
Highline Canal @ Lombardy Rd		1							1	1					
Howard Lateral @ Hwy 140		3					1		2	1					
Lateral 2 1/2 near Keyes Rd										2					
Merced River @ Santa Fe							2								
Mootz Drain Downstream of Langworth Pond	8				1		9				1				
Mustang Creek @ East Ave	2		2	2			3		1						
Prairie Flower Drain @ Crows Landing Rd	1		11	11		12	11							1	
GRAND TOTAL	29	6	15	15	3	12	48	1	8	9	1	2	2	1	1

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

2010 New Site/Constituents Requiring Management Plans

New sites that require a focused management plan approach have been added to the priority list (Table 6). Source identification, outreach and evaluation of management practices will be addressed at all new site subwatersheds that have been added to the focused management plan list during their years of high priority status as specified in Table 6.

As a result of 2010 monitoring, several new site/constituent specific management plans are required (see green highlights in Table 5). Below is a list of constituents with 2010 exceedances that have triggered a new site/constituent specific management plan:

- Dissolved Oxygen
 - Mootz Drain @ downstream of Langworth Pond
- *E. coli*
 - Merced River @ Santa Fe
 - Mootz Drain @ downstream of Langworth Pond
- Copper (dissolved and total)
 - Howard Lateral @ Hwy 140
- Chlorpyrifos
 - Howard Lateral @ Hwy 140

MANAGEMENT PLAN PROCESS

The ESJWQC Management Plan process was first outlined in the ESJWQC Management Plan submitted on September 30, 2008 and updated in the 2010 MPUR to reflect the current monitoring strategy outlined in the ESJWQC MRPP (page 33) of rotating Core and Assessment Monitoring locations. 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. The process requires 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 is focusing 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 low priority subwatersheds (Figure 1) and high priority subwatersheds (Figure 2). Sites are rotated from low priority to high priority based on a rotating schedule approved by the Regional Board (Table 6). 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 monitoring may overlap with assessment monitoring already occurring at that location and therefore there would not be “additional” monitoring.

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 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 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.

Once a subwatershed rotates into high priority status, the Coalition initiates the process outlined in 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 petitioned for removal 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/or the effectiveness of newly implemented management practices.

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

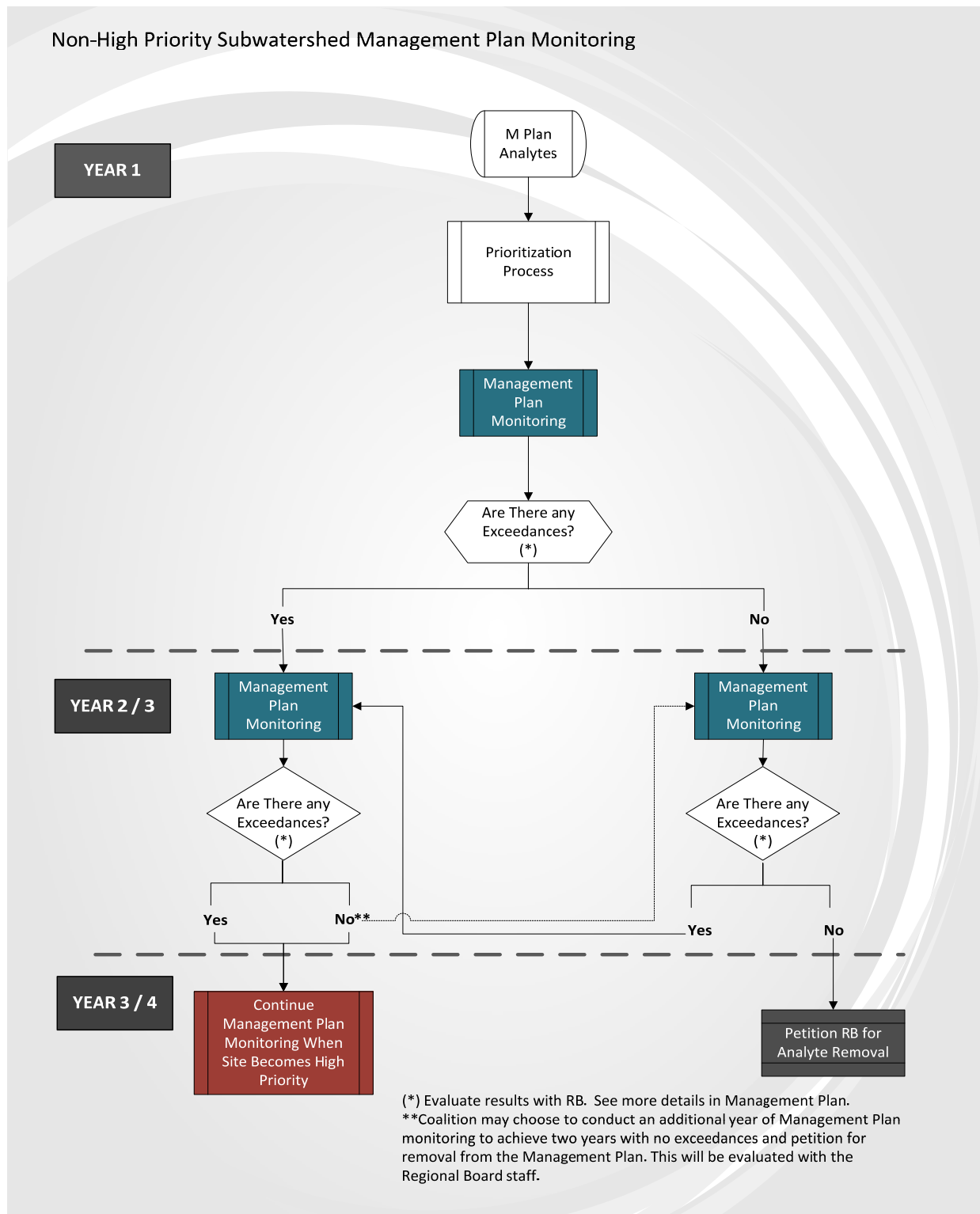
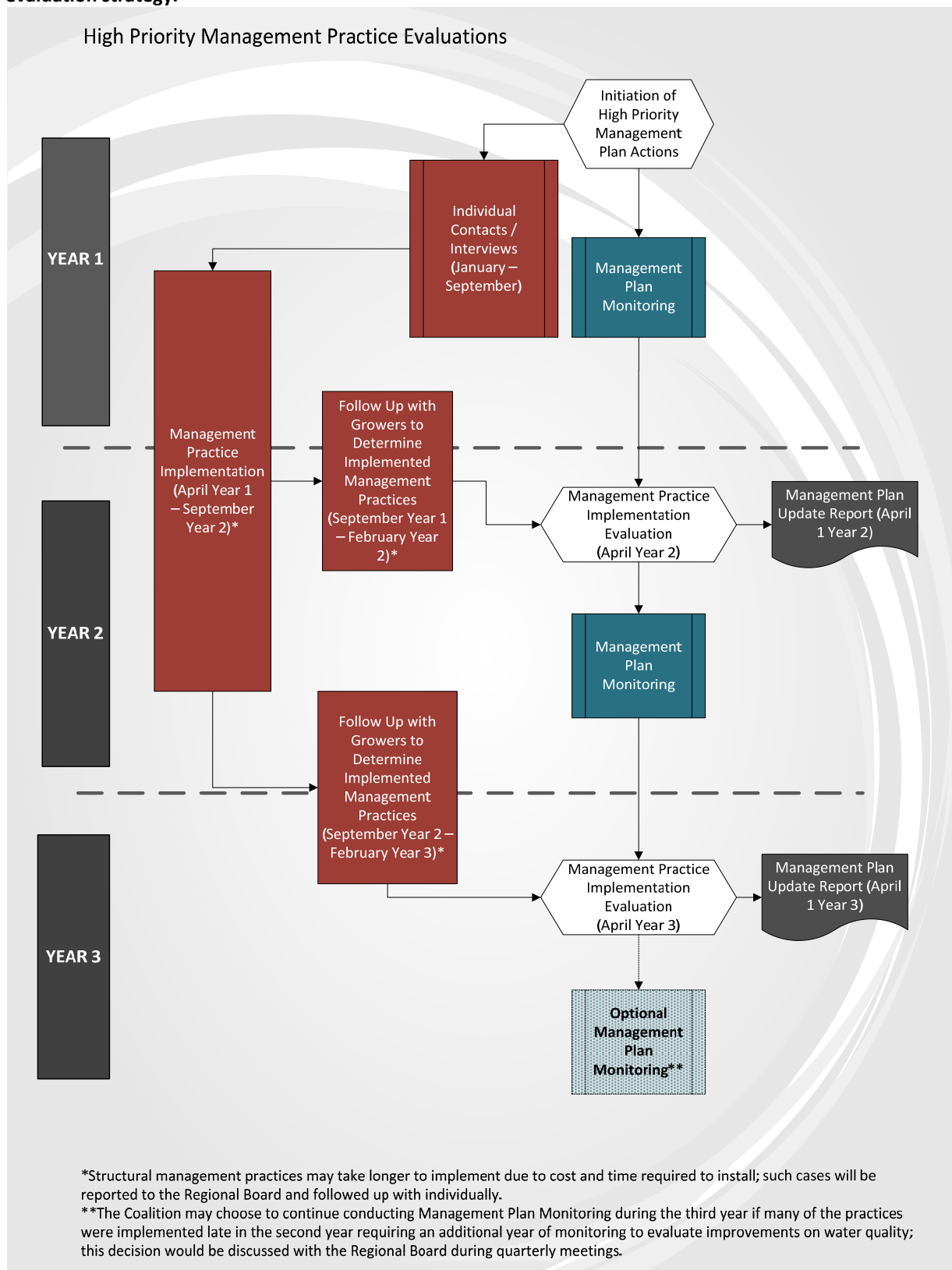


Figure 2. ESJWQC high priority subwatershed Management Plan Monitoring and management practice evaluation strategy.



MANAGEMENT PRACTICE TRACKING STRATEGY

The schedule outlined 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 schedule meetings and conduct individual contacts/interviews between November 1 and July 30. Individual meetings 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.

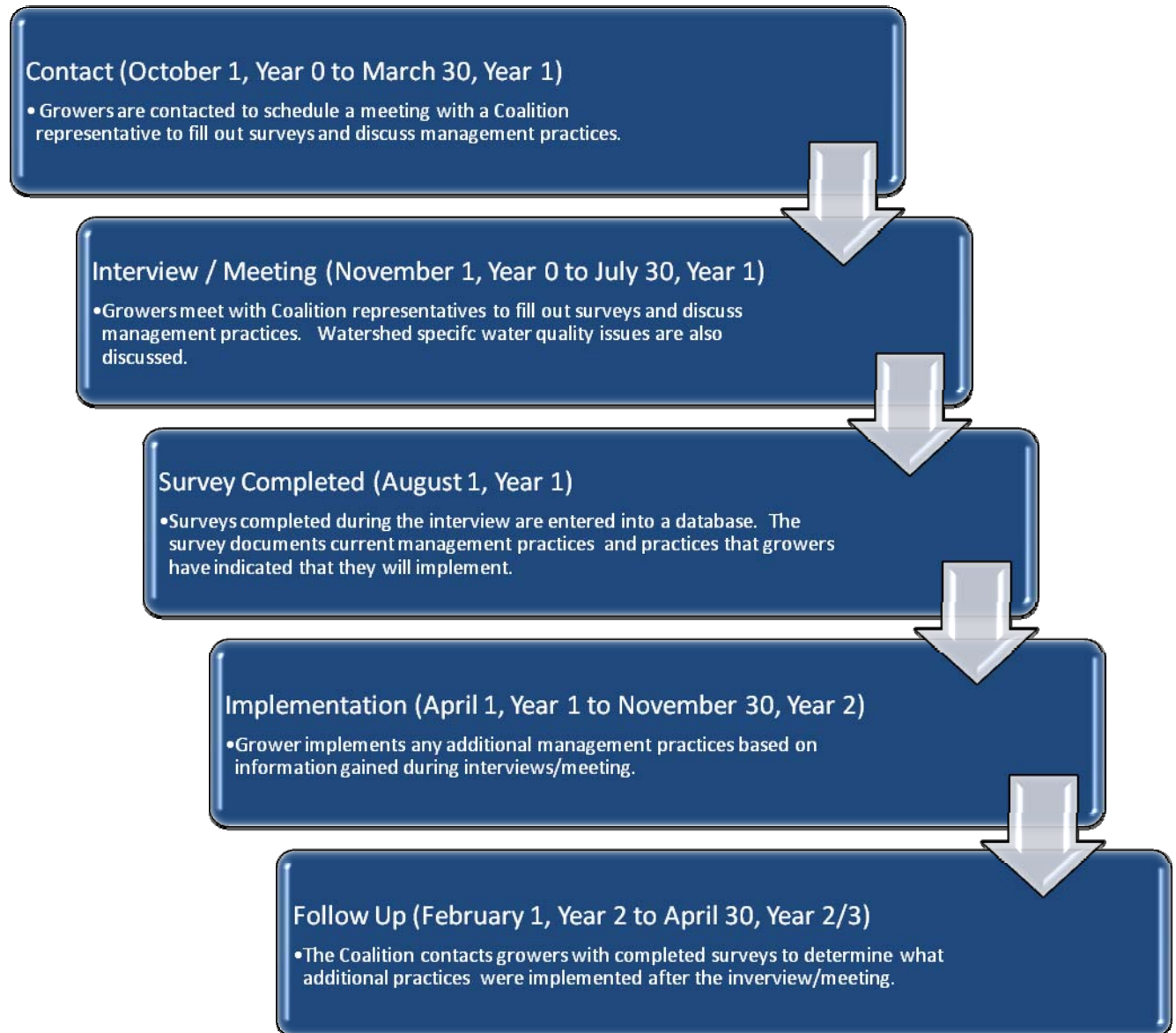
During the interviews, growers are asked about their current farming operations and surveys are completed which document the grower's current management practices and record recommended management practices. It is anticipated that all surveys will be completed and entered into a database by August 1 of the first year. Implementation of management practices 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 fund and construct.

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 as to 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, interactive devices are used by attendees 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.

The interview meeting date for Year 1 has been expanded through July 30.



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 applications) 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.

Sourcing is conducted by utilizing Pesticide Use Reports (PUR) and any associated MPM data (may include upstream and/or increased frequency of monitoring conducted in previous years). Monitoring is 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 involve assessment of water quality but also overall changes in practices at a subwatershed level.

```

graph TD
    Start([Analyte Prioritization]) --> Q1{{Is it an applied Pesticide, Metal, or Nutrient?}}
    Q1 -- No --> Q2{{Is it toxicity?}}
    Q1 -- Yes --> Q3{{Is it sediment toxicity?}}
    Q2 -- No --> E([E])
    Q2 -- Yes --> Q3
    Q3 -- Yes --> D([D])
    Q3 -- No --> Q4{{Previous Priority A-C Exceedances?}}
    Q4 -- No --> E
    Q4 -- Yes --> D
    Q3 -- No --> Q4
    Q2 -- No --> E
    Q2 -- Yes --> E
    Q1 -- Yes --> Q5{{Is There Associated Toxicity?}}
    Q5 -- No --> Q6{{Is There a TMDL?}}
    Q5 -- Yes --> Q7{{Sediment Transport Associated Exceedances?}}
    Q6 -- No --> C([C])
    Q6 -- Yes --> Q8{{Sediment Transport Associated Exceedances?}}
    Q7 -- No --> C
    Q7 -- Yes --> A([A])
    Q8 -- No --> C
    Q8 -- Yes --> A
    Q5 -- No --> Q6
    Q5 -- Yes --> A
    Q6 -- No --> C
    Q6 -- Yes --> Q7
    Q7 -- No --> C
    Q7 -- Yes --> A
  
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MANAGEMENT PLAN DEVELOPMENT TIMELINES

The Coalition developed a schedule establishing when sites become high priority and undergo the focused management plan approach described in the previous section and outlined in Figure 3. This schedule was submitted as an addendum to the ESJWQC Management Plan which was approved on November 25, 2008 (Table B). Table B from that document is evaluated and updated in each yearly MPUR for 1) any new sites requiring a management plan, and 2) changes to the years for focused outreach. Based on the Management Plan process, any new site that requires a management plan due to the previous year's exceedances is added to the bottom of this schedule. Changes, such as time extensions, removal of sites, changing the year of prioritization, must be approved by the Regional Board's Executive Officer.

Table 6 provides the updated schedule that includes approved changes to prioritization years, exchange of priority years for Bear Creek and Hilmar Drain, the omission of South Slough @ Quinley Rd, the change in target subwatersheds Lateral 2 ½ near Keyes Rd and Ash Slough @ Ave 21, the three new management plan site subwatersheds, and the proposed prioritization of Howard Lateral @ Hwy 140 (2015-2017). The following is a description of the updates to this schedule that have occurred since the 2010 MPUR.

South Slough @ Quinley Rd was listed as a high priority subwatershed in 2014 – 2016. The Coalition submitted documentation to the Regional Board requesting that South Slough be removed from the ESJWQC MRPP; approval for removal was received on June 3, 2010. Due to the removal of this location from the MRPP this site was also removed from the Management Plan schedule in Table 6.

A revision of the ESJWQC Management Plan schedule for addressing each site subwatershed with a detailed, focused management plan approach (Table 6 in the Management Plan update submitted on April 1, 2010) was approved on November 17, 2010 to include the following updates: 1) Ash Slough @ Ave 21 will be addressed in 2015-2017 instead of 2011-2013 and 2) Lateral 2 ½ near Keyes Rd (lower portion) will be addressed in 2011-2013 instead of 2015-2017.

Howard Lateral @ Hwy 140 has been added to the focused management plan schedule (Table 6). After exceedances of priority A-C constituents during 2010 Assessment Monitoring, Howard Lateral @ Hwy 140 will now undergo one year of MPM in 2011. Howard lateral @ Hwy 140 is scheduled to become a high priority site in 2015-2017 due to recent exceedances of Priority A-D constituents.

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

Table 6. Schedule for addressing each site subwatershed with a detailed, focused Management Plan approach (revised and approved 11-17-2010).

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
Lateral 2 ½ near Keyes Rd	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
Westport Drain @ Vivian Rd	2014-2016
Ash Slough @ Ave 21	2015-2017
Mootz Drain downstream of Langworth Pond ¹	2015-2017
Howard Lateral @ Hwy 140 ²	2015-2017
RE-EVALUATE ALL SITE SUBWATERSHEDS AND REVISE SCHEDULE	ANNUALLY

¹Mootz Drain Downstream of Langworth Pond was monitored for all management plan constituents detected at the upstream location, Mootz Drain @ Langworth Rd.

²Although this is the revised and approved (11-17-2010) schedule, Howard Lateral @ Hwy 140 has been added to the schedule following exceedances of priority A-D constituents in accordance with the preapproved Management Plan process criteria.

PRIORITY SITE MANAGEMENT

MANAGEMENT OBJECTIVES

The Coalition prioritized constituents and site subwatersheds to allow for focused source identification, outreach and evaluation. 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 identify watersheds where exceedances are common and management practices can be implemented to decrease agricultural discharges 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 that may be implemented (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). A site subwatershed analysis was conducted for high priority subwatersheds and is included in Appendix I.

2011 MANAGEMENT PLAN MONITORING (MPM) SCHEDULE

The ESJWQC will conduct MPM at the following sites; Years 1, 2 and 3 refer to the year that the site is a high priority site (Figure 2):

Year 3: First Priority (2008 – 2010)

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

Year 2: Second Priority (2010 – 2012)

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

Year 1: Third Priority (2011-2013)

- Berenda Slough along Ave 18 ½
- Dry Creek @ Rd 18
- Lateral 2 ½ near Keyes Rd
- Livingston Drain @ Robin Ave

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

Starting in September 2010, sediment toxicity was 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 (pages 50-51); the Coalition added in MPM for sediment during months of past exceedances to assess if there has been improvement in sediment quality due to outreach and implemented management practices.

Table 7. 2011 Management Plan sampling schedule.

Site Name	Year	Month	<i>C. dubia</i>	<i>S. capricornutum</i>	Copper	Chlorpyrifos	Diazinon	Diuron	Lead	<i>H. azteca</i>
Bear Creek @ Kibby Rd	2011	January			X					
Cottonwood Creek @ Rd 20	2011	January			X	X		X		
Dry Creek @ Rd 18	2011	January		X	X			X		
Duck Slough @ Gurr Rd	2011	January			X					
Highline Canal @ Hwy 99	2011	January		X	X	X		X		
Livingston Drain @ Robin Ave	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 @ Rd 18	2011	February		X	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		
Livingston Drain @ Robin Ave	2011	February		X	X				X	
Prairie Flower Drain @ Crows Landing Rd	2011	February		X						
Dry Creek @ Rd 18	2011	March								X
Dry Creek @ Wellsford Rd	2011	March		X						X
Duck Slough @ Gurr Rd	2011	March	X							
Highline Canal @ Hwy 99	2011	March		X						X
Prairie Flower Drain @ Crows Landing Rd	2011	March	X							X
Cottonwood Creek @ Rd 20	2011	April			X					
Dry Creek @ Rd 18	2011	April			X	X				
Dry Creek @ Wellsford Rd	2011	April			X					
Duck Slough @ Hwy 99	2011	April		X	X				X	
Highline Canal @ Hwy 99	2011	April		X	X					

Site Name	Year	Month	<i>C. dubia</i>	<i>S. capricornutum</i>	Copper	Chlorpyrifos	Diazinon	Diuron	Lead	<i>H. azteca</i>
Howard Lateral @ Hwy 140	2011	April			X					
Lateral 2 1/2 near Keys Rd	2011	April				X				
Livingston Drain @ Robin Ave	2011	April		X						
Prairie Flower Drain @ Crows Landing Rd	2011	April		X						
Bear Creek @ Kibby Rd	2011	May	X			X				
Berenda Slough along Ave 18 1/2	2011	May		X						
Cottonwood Creek @ Rd 20	2011	May			X					
Dry Creek @ Rd 18	2011	May		X	X				X	
Duck Slough @ Gurr Rd	2011	May			X					
Duck Slough @ Hwy 99	2011	May				X			X	
Highline Canal @ Hwy 99	2011	May		X						
Livingston Drain @ Robin Ave	2011	May		X	X					
Prairie Flower Drain @ Crows Landing Rd	2011	May		X						
Cottonwood Creek @ Rd 20	2011	June			X					
Dry Creek @ Rd 18	2011	June			X				X	
Duck Slough @ Gurr Rd	2011	June			X					
Duck Slough @ Hwy 99	2011	June			X				X	
Highline Canal @ Hwy 99	2011	June			X					
Howard Lateral @ Hwy 140	2011	June				X				
Livingston Drain @ Robin Ave	2011	June			X	X				
Bear Creek @ Kibby Rd	2011	July	X			X				
Berenda Slough along Ave 18 1/2	2011	July		X		X				
Cottonwood Creek @ Rd 20	2011	July			X					
Dry Creek @ Rd 18	2011	July			X	X				
Dry Creek @ Wellsford Rd	2011	July				X				
Duck Slough @ Gurr Rd	2011	July		X	X	X				
Duck Slough @ Hwy 99	2011	July		X	X	X			X	
Highline Canal @ Hwy 99	2011	July			X	X				
Howard Lateral @ Hwy 140	2011	July			X					
Lateral 2 1/2 near Keys Rd	2011	July				X				
Livingston Drain @ Robin Ave	2011	July			X	X				
Bear Creek @ Kibby Rd	2011	August			X					
Cottonwood Creek @ Rd 20	2011	August			X					
Dry Creek @ Rd 18	2011	August			X				X	
Dry Creek @ Wellsford Rd	2011	August				X				
Duck Slough @ Hwy 99	2011	August			X				X	

Site Name	Year	Month	<i>C. dubia</i>	<i>S. capricornutum</i>	Copper	Chlorpyrifos	Diazinon	Diuron	Lead	<i>H. azteca</i>
Highline Canal @ Hwy 99	2011	August			X					
Livingston Drain @ Robin Ave	2011	August				X				
Prairie Flower Drain @ Crows Landing Rd	2011	August				X				
Berenda Slough along Ave 18 1/2	2011	September				X				
Cottonwood Creek @ Rd 20	2011	September			X					
Dry Creek @ Rd 18	2011	September			X				X	X
Dry Creek @ Wellsford Rd	2011	September				X				X
Duck Slough @ Gurr Rd	2011	September		X						X
Duck Slough @ Hwy 99	2011	September			X	X				
Highline Canal @ Hwy 99	2011	September								X
Livingston Drain @ Robin Ave	2011	September			X					
Prairie Flower Drain @ Crows Landing Rd	2011	September	X			X				X
Howard Lateral @ Hwy 140	2011	October			X					

PERFORMANCE GOALS AND SCHEDULES

The Coalition Strategic Plan is outlined in the original Management Plan (submitted on September 30, 2008) Table 18, pages 77-79 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 has developed High Priority Site Subwatershed Performance Goals (hereafter referred to as Performance Goals) for its first three sites of high priority subwatersheds: first priority subwatersheds (2008-2010), second priority subwatersheds (2010- 2012) and third priority subwatersheds (2011-2013), see Table 6 for the schedule of when subwatersheds will be high priority. Performance goals are submitted for approval each time a new set of subwatersheds rotates into high priority and 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

Priority site subwatershed goals were approved by the Regional Board as amendments to the ESJWQC Management Plan on June 16, 2009 (first priority subwatersheds), June 8, 2010 (second priority subwatersheds), and November 17, 2010 (third priority subwatershed). The following sections describe the Coalition actions to meet the approved Performance Goals and the status of each of the Performance Goals and associate measure/outputs.

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 8, 2010) 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 subwatersheds (Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd). Completion deadlines are in bold; if applicable, status updates are included below completion deadlines (updated on June 5, 2009 and approved on June 16, 2009).

Performance Goal/Performance Measure	Outputs	Who	STATUS AS OF APRIL 1, 2011 ¹		
			Dry Creek @ Wellsford	Duck Slough @ Hwy 99	Prairie Flower Drain @ Crows Landing Rd
Performance Goal 1: 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.	Parry Klassen	25 of 25 (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.	MLJ-LLC	6,392 of 23,331 (27%)	4,016 of 10,695 (38%)	865 of 3,611 (24%)
Performance Goal 2: 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.	Parry Klassen	25 of 25 (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.	MLJ-LLC	25 of 25 (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).	MLJ-LLC	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.	Parry Klassen/MLJ-LLC	Complete (April 1, 2011)	Complete (April 1, 2011)	Complete (April 1, 2011)
Performance Goal 4: Evaluate effectiveness of the new management practices implemented during 2009 and 2010.					
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).	MLJ-LLC	2010 Summary Complete (April 1, 2011) ²	2010 Summary Complete (April 1, 2011) ²	2010 Summary Complete (April 1, 2011) ²
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.					

¹Acreage has been updated; the assessment of the total irrigated acreages has been updated to be more accurate by updating GIS parcel layers (actual parcels did not change).

²The Coalition is conducting Assessment Monitoring at Dry Creek @ Wellsford and Prairie Flower Drain @ Crows Landing Rd in 2011 and MPM continues in Duck Slough @ Hwy 99 in 2011. Therefore the Coalition will assess water quality data collected in 2011 from all three sites in the 2012 MPUR.

Table 9. Updated Management Practices survey, outreach, implementation and evaluation tracking schedule based on the table submitted with the ESJWQC schedule extension request submitted on June 5, 2009 and approved on June 8, 2010 to reflect status as of April 1, 2011.

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, 2011	2009 Schedule	Status as of April 1, 2011	2009 Schedule	Status as of April 1, 2011
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	Completed ¹	October 2009 – April 2011	Completed ¹	October 2009 – April 2011	Completed ¹
4) Assess number/type of new management practices implemented.	October 2009 - February 2010	Completed ¹	October 2009 - February 2010	Completed ¹	October 2009 - February 2010	Completed ¹
5) Evaluate effectiveness of new management practices.	April 2009 - February 2011	Completed ²	April 2009 - February 2011	Completed ²	April 2009 - February 2011	Completed ²

¹Management practices have been implemented and documented with follow up surveys in all three first priority subwatersheds; however due to an additional contact in Dry Creek during 2010 (new member) and the potential for Agricultural Water Enhancement Program (AWEP) funding in all three subwatersheds there may be additional practices implemented in 2011.

²The Coalition is conducting Assessment Monitoring at Dry Creek @ Wellsford and Prairie Flower Drain @ Crows Landing Rd in 2011 and MPM continues in Duck Slough @ Hwy 99. Therefore the Coalition will assess water quality data collected in 2011 from all three sites in the 2012 MPUR.

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:

1. high potential of drainage directly into the creek
2. potential for spray drift to reach the waterway
3. grew a crop labeled for chlorpyrifos
4. insecticide applications in the last four years (based on PURs).

Targeted member parcels are selected based on possible direct drainage to the waterbody (identified 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 waterbody, 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 site subwatersheds there were 25, 24 and 11 targeted members, respectively. In the 2010 MPUR the Coalition reported contacting and receiving management practice information from 22 growers within the Dry Creek @ Wellsford subwatershed. This number has been updated from 22 to 25 growers due to two growers who failed to respond to the Coalition's contacts eventually have responded and met with Coalition representatives to document current (2009) management practices. An additional grower within the Dry Creek subwatershed was identified and contacted in 2010 due to recent enrollment in the Coalition, direct drainage potential and proximity to the Dry Creek @ Wellsford monitoring location. Due to the added three members, the acreage represented by individual contacts increased from 6116 to 6392. The numbers of contacted growers have not changed for Prairie Flower Drain @ Crows Landing Rd and Duck Slough @ Hwy 99 since the 2010 MPUR.

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

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 for each first priority subwatershed (Appendix I).

Performance Goal 2 was completed by the required date as reported in the 2010 MPUR (Table 11, pages 36-37). The actions taken by the Coalition to meet this performance goal by August 15, 2009 were described in the 2010 MPUR including dates of contacts. As described under Performance Goal 1, the Coalition contacted an additional three growers including two growers who were going to be dropped from the Coalition for not completing a survey but later complied and one grower who joined the Coalition in 2010.

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

All recommended practices were recorded in a database in addition to current management practice information and has been summarized in the section “Summary of Implemented Management Practices”. The Coalition conducted follow up meetings and phone calls to obtain additional information regarding practices that were implemented in 2009 and 2010. The Coalition has obtained management practice implementation information from all growers who indicated that they planned to implement additional practices.

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

The evaluation of the efficiency of new management practices is assessed using water quality monitoring results from 2009 and 2010 (Table 9). An evaluation of the water quality data collected to date is included in the section “Evaluation of Management Practice Effectiveness” for the first priority subwatersheds. In addition, the Coalition is monitoring all three first high priority sites an additional year for management plan constituents. In the 2012 MPUR to be submitted April 1, 2012, results from 2011 monitoring will be reviewed relative to previous monitoring results and implemented practices. Due to additional funds available for structural management practices through a Proposition 84 grant it is anticipated that additional practices may be implemented in these subwatersheds resulting in a reduction of discharges of management plan constituents.

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 in 2009 and 2010. Quarterly meeting dates from 2009 were reported in the 2010 MPUR (see Table 10, page 34). Quarterly meeting in 2010 are reported in Table 11.

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 for second priority subwatersheds are included in Table 10 and were approved by the Regional Board on June 8, 2010.

Table 10. 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 included below completion deadlines.

Performance Goal/Performance Measure	Outputs	Who	STATUS AS OF APRIL 1, 2011 ¹			
			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.	Parry Klassen	May 30, 2010 25 of 25	May 30, 2010 10 of 10	May 30, 2010 6 of 6	May 30, 2010 14 of 14
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.	MLJ-LLC	Quarterly 5768 of 12,940 (45%)	Quarterly 368 of 1106 (33%)	Quarterly 2656 of 5761 (46%)	Quarterly 1292 of 4179 (31%)
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.	Parry Klassen	July 30, 2010 25 of 25 (100%)	July 30, 2010 10 of 10 (100%)	July 30, 2010 6 of 6 (100%)	July 30, 2010 14 of 14 (100%)
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.	MLJ-LLC	Aug.30, 2010 Complete	Aug. 30, 2010 Complete	Aug. 30, 2010 Complete	Aug. 30, 2010 Complete
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.	Parry Klassen, MLJ-LLC	Feb. 28, 2011* Feb. 28, 2012	Feb. 28, 2011* Feb. 28, 2012	Feb. 28, 2011* Feb. 28, 2012	Feb. 28, 2011* Feb. 28, 2012
	Summary of management practices implemented as a result of individual contacts.	MLJ-LLC	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 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.	MLJ-LLC	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.

¹County overall direct drainage acreage has been updated; the assessment of the acreages has been updated to be more accurate by updating GIS parcel layers (actual parcels did not change).

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

One hundred percent of targeted members were contacted by May 30, 2010 as scheduled in the second priority subwatershed Performance Goal 1 (Table 10). The Coalition initiated contacts to second priority subwatershed targeted members with conference calls to discuss member responsibilities, management plan strategies and initiate scheduling of visits with growers (see the 2010 MPUR Table 11 for details). Following these conference calls, the Coalition sent mailings to targeted growers in Cottonwood Creek (October 14, 2009), Highline Canal @ Hwy 99 (November 11, 2009), Bear Creek @ Kibby Rd and Duck Slough @ Gurr Rd (both on April 28, 2010) subwatersheds (Table 11 and Table 15 for 2010 contacts; the 2010 MPUR included contacts in 2009). The mailings 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.

A total of 55 growers were contacted by May 30, 2010 representing 10,084 acres or 42% of the acreage determined to have the potential for direct drainage into the four second priority subwatersheds (Table 10). Of the four subwatersheds, Duck Slough had the highest percent of acreage represented by contacted growers (46%) followed by Cottonwood Creek @ Rd 20 (45%), Highline Canal @ Hwy 99 (33%) and Bear Creek @ Kibby Rd (31%), see Table 10.

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

The Coalition created the second priority subwatershed Individual Contact Packets and met with growers during farm visits to record current management practices (see the 2010 MPUR pages 32-33 for more details regarding individual grower visits). The Coalition has met with and documented current management practices for 100% of targeted growers within the Bear Creek @ Kibby Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd and Highline Canal @ Hwy 99 subwatersheds (total growers = 55, Table 10). Surveys document current management practices regarding irrigation practices, storm water runoff, pest management and dormant sprays (when applicable). One hundred percent of the management practices documented on the surveys were recorded in an Access database by the scheduled date of August 30, 2010 (Table 10).

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).

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

One hundred percent of the management practices recommended to growers during the individual interviews were recorded in the management practice tracking database (Table 10). A summary of management practices recommended to growers is included in the section "Summary of Implemented Management Practices" under the subsection "Second Priority Subwatersheds: Recommended Management Practices – 2010/2011". In addition, each second priority subwatershed is analyzed separately in the High Priority Subwatershed Analysis Appendix (Appendix I).

As noted in the second priority subwatershed Performance Goal table (Table 10), the Coalition conducts follow up meetings with growers between February 1 and April 30th to determine implemented management practices from the year before. A majority of the growers in these subwatersheds could not attend meetings scheduled in early February. The Coalition has postponed follow up meetings until after April 1, 2011; therefore, preliminary results of implemented practices are not available for this report. The Coalition will report on implemented practices in the 2012 MPUR to be submitted April 1, 2012 as detailed in Table 11.

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

The Coalition conducted MPM in the second high priority sites during 2010 and will continue monitoring in 2011 to assess water quality improvements that have occurred since these subwatersheds have become high priority. Water quality monitoring results are included in the High Priority Subwatershed Analysis Appendix for each subwatershed (Appendix I). The Coalition will initiate follow up contacts with growers in April 2011 to record new practices that were implemented in 2010 and evaluate the implementation of new practices with 2010 water quality results. A final evaluation of the second priority site subwatersheds will be provided in the 2012 Management Plan Update Report.

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 met with the Regional Board quarterly to discuss Coalition activities in relation to the first high priority subwatersheds and the second high priority subwatersheds in February, May, September and November (Table 11).

Table 11. 2010 Regional Board Quarterly Meeting dates.

QUARTERLY MEETINGS	MEETING DATE
First Quarter Meeting	February 10, 2010
Second Quarter Meeting	May 4, 2010
Third Quarter Meeting	September 14, 2010
Fourth Quarterly Meeting	November 2, 2010

Third Priority Subwatersheds (2011 – 2013)

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 (Berenda slough along Ave 18 ½ , Dry Creek @ Rd 18, Livingston Drain @ Robin Ave and Lateral 2 ½ near Keyes Rd). The third 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 for the third priority subwatersheds are included in Table 12 and were approved by the Regional Board on November 17, 2010.

Table 12. Subwatershed specific performance goals for 2011 - 2013 high priority subwatersheds (Berenda Slough along Ave 18 ½, Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd, Livingston Drain @ Robin Ave). Completion deadlines are in bold and status updates are in bold; if applicable, status updates are included below completion deadlines.

Performance Goal/Performance Measure	Outputs	Who	STATUS AS OF APRIL 1, 2011 ¹			
			Berenda Slough Along Ave 18 ½	Dry Creek @ Rd 18	Lateral 2 ½ Near Keyes Rd	Livingston Drain @ Robin Ave
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.	Parry Klassen	Mar. 30, 2011 22 of 22	Mar. 30, 2011 18 of 18	Mar. 30, 2011 27 of 27	Mar. 30, 2011 11 of 11
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.	MLJ-LLC	Quarterly 4,337 of 11,891	Quarterly 4,750 of 9,865	Quarterly 1,846 of 4,240	Quarterly 352 of 1,433
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.	Parry Klassen	July 30, 2011 0 of 22	July 30, 2011 0 of 18	July 30, 2011 13 of 27	July 30, 2011 3 of 11
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.	MLJ-LLC	Aug. 30, 2011	Aug. 30, 2011	Aug. 30, 2011	Aug. 30, 2011
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.	Parry Klassen/MLJ-LLC	Feb. 28, 2012*	Feb. 28, 2012*	Feb. 28, 2012*	Feb. 28, 2012*
	Summary of management practices implemented as a result of individual contacts.	MLJ-LLC	April 1, 2012 April 1, 2013	April 1, 2012 April 1, 2013	April 1, 2012 April 1, 2013	April 1, 2012 April 1, 2013
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.	MLJ-LLC	April 1, 2012 April 1, 2013	April 1, 2012 April 1, 2013	April 1, 2012 April 1, 2013	April 1, 2012 April 1, 2013
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.

¹County overall direct drainage acreage has been updated; the assessment of the acreages has been updated to be more accurate by updating GIS parcel layers (actual parcels did not change).

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

Targeted growers in Livingston Drain (11 total) were mailed initial contact letter announcements on November 8, 2010, Lateral 2 ½ near Keyes Rd (27 total) on November 10, 2010, Dry Creek @ Rd 18 (18 total) on November 22, 2010 and Berenda Slough along Ave 18 ½ (22 total) on March 9, 2011. The contact letters focused on informing growers of member responsibilities, management plan strategies and to initiate the scheduling of individual contact meetings (Table 12). The mailings also informed growers of the Coalition's Management Plan strategy, member responsibilities and requested that growers call the Coalition to schedule meetings for individual interviews. All initial contacts were complete on March 30, 2011 (Table 12).

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 13 growers (48% of targeted growers) within the Lateral 2 ½ near Keyes Rd subwatershed and three growers (27% of targeted growers) within the Livingston Drain @ Robin Ave subwatershed (Table 12). 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 (48% of Lateral 2 ½ near Keyes Rd targeted growers and 27% of Livingston Drain @ Robin Ave targeted growers) (Table 12).

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 third high priority sites (Berenda Slough along Ave 18 ½ will also undergo Assessment Monitoring in 2011 where all priority constituents will be analyzed monthly) during 2011 and 2012 to assess water quality improvements. The Coalition will submit an interim evaluation of management practice effectiveness in the 2012 Management Plan Update Report and a final evaluation in the 2013 Management Plan Update Report (Table 12).

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.

Quarterly meetings with the Regional Board to discuss Coalition activities have been scheduled for 2011 (Table 13). The Coalition has already met with Regional Board staff on February 8, 2010 for its first

quarterly meeting. Other Coalition activities (meetings, outreach/education) that occurred during 2010 and early 2011 can be referenced in Table 14.

Table 13. 2011 Regional Board Quarterly Meeting dates (subject to change).

QUARTERLY MEETINGS	MEETING DATE
First Quarter Meeting	February 8, 2011
Second Quarter Meeting	May 3, 2011
Third Quarter Meeting	August 2, 2011
Fourth Quarterly Meeting	November 1, 2011

Table 14. Priority subwatershed contacts including grower notifications and outreach/education meetings to track management practices.

AREA	DATE	CATEGORY	DETAILS	CONSTITUENTS ADDRESSED	WHO
Entire Coalition Region	15-Jan-10	Grower Notification	Annual Report and ESJWQC Update Newsletter Mailing: sent to all members.	All	Parry Klassen
Duck Slough @ Hwy 99	9-Feb-10	Grower Notification / Management Practice Tracking	Duck Slough Follow-Up to 2009 Individual Contacts Meeting Announcement Mailing: sent to all members who participated in an individual meeting during 2009.	All	Parry Klassen
Dry Creek @ Wellsford	15-Feb-10	Grower Notification / Management Practice Tracking	Dry Creek Follow-Up to 2009 Individual Contacts Meeting Announcement Mailing: sent to all members who participated in an individual meeting during 2009.	All	Parry Klassen
Prairie Flower Drain	17-Feb-10	Grower Notification / Management Practice Tracking	Prairie Flower Drain Follow-Up to 2009 Individual Contacts Meeting Announcement Mailing: sent to all members who participated in an individual meeting during 2009.	All	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. Turning Interactive Survey Devices were used to assess implementation of management practices since individual contact meetings in 2009.	All	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: 11 members in attendance. Turning Interactive Survey Devices were used to assess implementation of management practices since individual contact meetings in 2009.	All	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	1-Mar-10 through 4- Aug-10	BMP Outreach and Education / Management Practice Tracking	Phone call to assess management practice implementation of all targeted members with recommended practices for 2009 that did not attend their respective subwatershed follow-up meeting (eight total members).	All	Parry Klassen

AREA	DATE	CATEGORY	DETAILS	CONSTITUENTS ADDRESSED	WHO
Prairie Flower Drain	19-Mar-10	BMP Outreach and Education / Management Practice Tracking	Prairie Flower Drain Follow-Up to 2009 Individual Contacts Grower Meeting: 4 members in attendance. By using the Turning Interactive Survey Devices, assessed implementation of management practices since individual contact meetings in 2009.	All	Parry Klassen, Wayne Zipser
Bear Creek @ Kibby, Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford, Highline Canal @ 99, Duck Slough @ Hwy 99, Duck Slough @ Gurr, and Prairie Flower Drain	26-Apr-10	Grower Notification	CURES AWEF Funding Informational Mailing: sent to 429 members. Letter informed growers of available CURES AWEF funding for their operations and the necessary steps to apply.	All	Parry Klassen
Bear Creek @ Kibby, Duck Slough @ Gurr	28-Apr-10	Grower Notification / Management Practice Tracking	Individual Contacts Meeting Announcement Mailing: 13 growers in Bear Creek @ Kibby subwatershed and 6 growers in Duck Slough @ Gurr subwatershed. Letter mailed to notify growers of the management plan high priority tracking process and that they need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	4-May-10	Grower Notification	Sample of Water Monitoring Results Mailing: sent to 2,373 members. Included return form to request quarterly reports like this if interested.	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	21-May-10	Grower Notification	Watershed Approach Brochure Mailing: sent to all Coalition members, including key industry contacts. Brochure detailed findings during management practice tracking grower meetings and how this information will help water quality. One of three cover letter versions was included with each mailing: the 58 members and the 53 members whom participated in the first priority set and second priority set, respectively; of meetings received a cover letter thanking them for their cooperation; and the remaining 2,266 members received a general cover letter.	All	Parry Klassen, Wayne Zipser

AREA	DATE	CATEGORY	DETAILS	CONSTITUENTS ADDRESSED	WHO
Merced and Stanislaus Counties	30-Jun-10	Grower Notification	The Watershed Coalition News was inserted into the Farm Bureau News, of which 6,000 copies were distributed.	All	Parry Klassen
Sierra Foothills	13-Jul-10	Grower Notification	Sediment Discharges from Lower Sierra Foothill Farms/Ranches Meeting Announcement Mailing: sent to 303 members with property in the Sierra Foothills area.	Sediment Runoff	Parry Klassen
Sierra Foothills	22-Jul-10	Grower Notification	Sediment Discharges from Lower Sierra Foothill Farms/Ranches Meeting Reminder Postcard Mailing: sent to 303 members with property in the Sierra Foothills area.	Sediment Runoff	Parry Klassen
Sierra Foothills	5-Aug-10	BMP Outreach and Education	Sediment Discharges from Lower Sierra Foothill Farms/Ranches Meeting: 23 members represented in attendance. To inform and educate growers of both the recent regulatory actions taken by Regional Board related to sediment discharge to waterways and management practices to reduce sediment discharge.	Sediment Runoff	Parry Klassen
Entire Coalition Region	24-Aug-10	Grower Notification	Quarterly Monitoring Results: 131 mailings and 114 emails. Sent to all Coalition Members who requested these results in their response to the May 4, 2010 Sample of Water Monitoring Results Mailing.	All	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	24-Aug-10	Grower Notification / Management Practice Tracking	Results from Individual Contact Meeting Confirmation Mailing: sent to all members whom participated in individual contacts. The mailing summarized management practice implementations and recommendations recorded during each grower's Individual Contact Meeting. Growers reviewed their responses for accuracy and made corrections if necessary.	All	Parry Klassen

AREA	DATE	CATEGORY	DETAILS	CONSTITUENTS ADDRESSED	WHO
Bear Creek @ Kibby, Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford, Highline Canal @ 99, Duck Slough @ Hwy 99, Duck Slough @ Gurr, and Prairie Flower Drain	8-Oct-10	Grower Notification	CURES AWEF Funding Informational Mailing: sent to 503 members. Letter informed growers of available CURES AWEF funding for their operations and the necessary steps to apply.	All	Parry Klassen
Entire Coalition Region	27-Oct-10	Grower Notification	Quarterly Monitoring Results: 117 mailings and 118 emails. Sent to all Coalition Members who requested these results in their response to the May 4, 2010 Sample of Water Monitoring Results Mailing.	All	Parry Klassen, Wayne Zipser
Lateral 2 1/2 @ Keyes Rd, Livingston Drain @ Robin Ave, Bear Creek @ Kibby, Dry Creek @ Wellsford Rd	8-Nov-10	Grower Notification / Management Practice Tracking	Individual Contacts Meeting Announcement Mailing: 27 growers in Lateral 2 1/2 @ Keyes Rd subwatershed (1st portion), 11 growers in Livingston Drain @ Robin Ave subwatershed, 3 growers in Bear Creek @ Kibby subwatershed (additional members), and 2 growers in Dry Creek @ Wellsford subwatershed (additional members). Letter mailed to notify growers of the management plan high priority tracking process and that they need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	All	Parry Klassen, Wayne Zipser
Dry Creek @ Rd 18	22-Nov-10	Grower Notification / Management Practice Tracking	Individual Contacts Meeting Announcement Mailing: 18 growers in Dry Creek @ Road 18 subwatershed. Letter mailed to notify growers of the management plan high priority tracking process and that they need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	All	Parry Klassen, Wayne Zipser
Madera, Merced, and Stanislaus Counties	23-Nov-10	Grower Notification / Management Practice Tracking	Orchard Sprayer Calibration Mailing: advertisement and sign-up sheet mailed to all Coalition members within the three county area offering free orchard sprayer calibrations, sponsored by the Coalition and CURES. The advertisement encouraged growers to participate to improve application efficiency and protect local watersheds.	Pesticides	Parry Klassen

AREA	DATE	CATEGORY	DETAILS	CONSTITUENTS ADDRESSED	WHO
Entire Coalition Region	23-Nov-10	Grower Notification	Annual Grower Meeting Announcement Email: sent to all members on the email list to announce meeting dates in their local areas (284 members request communication by email and comprise the email list).	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	29-Nov-10	Grower Notification	Annual Grower Meeting Announcement Postcard Mailing: sent to all members and new applicants to announce meeting dates in their local areas (2,048 mailings went out).	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	8-Dec-10	Grower Notification	Annual Grower Meeting Announcement Email Reminder: sent to all members on the email list to remind them of meeting dates in their local areas (284 members request communication by email and comprise the email list).	All	Parry Klassen, Wayne Zipser
Modesto County	14-Dec-10	BMP Outreach and Education	Annual Grower Meeting: 77 members represented in attendance. Reviewed and discussed Coalition actions toward and progress in solving water quality problems over the past year. Also discussed impending groundwater regulations and impact on Coalition members. Various handouts were made available to growers, including Management Practice information and 2009 Watershed Update Report.	All	Parry Klassen, Wayne Zipser, Mike Johnson
Merced County	15-Dec-10	BMP Outreach and Education	Annual Grower Meeting: 38 members represented in attendance. Reviewed and discussed Coalition actions toward and progress in solving water quality problems over the past year. Also discussed impending groundwater regulations and impact on Coalition members. Various handouts were made available to growers, including Management Practice information and 2009 Watershed Update Report.	All	Parry Klassen, Wayne Zipser, Mike Johnson
Merced and Stanislaus Counties	15-Dec-10	Grower Notification	The Watershed Coalition News was inserted into the Farm Bureau News, of which 6,000 copies were distributed.	All	Parry Klassen

AREA	DATE	CATEGORY	DETAILS	CONSTITUENTS ADDRESSED	WHO
Madera County	16-Dec-10	BMP Outreach and Education	Annual Grower Meeting: 32 members represented in attendance. Reviewed and discussed Coalition actions toward and progress in solving water quality problems over the past year. Also discussed impending groundwater regulations and impact on Coalition members. Various handouts were made available to growers, including Management Practice information and 2009 Watershed Update Report.	All	Parry Klassen, Wayne Zipser, Mike Johnson
Entire Coalition Region	5-Jan-11	BMP Outreach and Education	Diazinon and chlorpyrifos TMDL in the Lower San Joaquin River Grower Mailing: sent to 1,357 members who own or operate parcels adjacent to the River and its tributaries. Included a Coalition cover letter and Regional Board letter that explain the TMDL and its impact on growers, the actions taken by the Coalition to meet the TMDL requirements, and grower's responsibilities in protecting surface waterways.	Chlorpyrifos and diazinon	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford Rd and Duck Slough @ Hwy 99	5-Jan-11 through 28- Feb-11	BMP Outreach and Education / Management Practice Tracking	Phone call to assess management practice implementation of all targeted members with recommended practices for 2010 (8 members total).	All	Wayne Zipser

AWEP-Agricultural Water Enhancement Program

BMP-Best management Practice

CURES-Coalition for Urban/Rural Environmental Stewardship

SUMMARY OF IMPLEMENTED MANAGEMENT PRACTICES

The Coalition identified eight general classifications of management practices that would be effective at reducing the 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/tailwater return system,
7. Retention pond/holding basin, and
8. Grass waterways or grass filter strips.

For the first priority subwatersheds initiated in 2009, the Coalition submitted a schedule of when the above eight practices would be implemented based on the assumption that non structural practices (practices 1-4) could be implemented sooner than structural practices (practices 5-8). The Coalition scheduled an evaluation of the first priority subwatershed to be completed by April 2011 (see Table 14, page 43 in the 2009 MPUR); this deadline is met with the submission of this report.

The Coalition documents current management practices, recommended management practices and implemented practices based on individual contacts and survey results for each high priority site subwatershed. Currently the Coalition has three sets of high priority subwatersheds for which it is documenting management practices through individual contacts; the dates in parenthesis indicates the years that the subwatershed undergoes the focused outreach process:

First Priority Subwatersheds (2008 – 2010)

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

Second Priority Subwatersheds (2010 – 2012)

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

Third Priority Subwatersheds (2011 – 2013)

- Berenda Slough along Ave 18 1/2
- Dry Creek @ Rd 18
- Lateral 2 ½ near Keyes Rd
- Livingston Drain @ Robin Ave

The Coalition has successfully completed contacts and outreach in the first priority subwatersheds. In the 2010 MPUR, the Coalition submitted a preliminary analysis of implemented management practices based on survey information obtained from individual contacts and preliminary follow up contacts for

the first high priority subwatersheds. The following sections contain a full evaluation of current and implemented management practices in the Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd subwatersheds.

The Coalition began contacting growers in the second high priority subwatershed in late 2009 and has recorded current management practices and additional management practices recommended for implementation in 2010 and 2011. The Coalition will be conducting follow up meetings with growers to identify practices implemented in 2010 during the spring of 2011. This report contains a preliminary analysis of the current and recommended practices.

Growers in the third priority subwatersheds were contacted to set up individual contact interviews in early 2011 and individual meetings occur shortly after. The Coalition has gathered current management practice and recommended management practice information for 21% of the growers targeted within third priority subwatersheds. There is a very brief and preliminary assessment of these data included in this section.

FIRST PRIORITY SUBWATERSHEDS

Current and Recommended Management Practices (2008 / 2009)

For each of the three first high priority subwatersheds there is a summary table of current management practices for Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing (Table 15, 16 and 17 respectively). Following the summary tables, a brief analysis of current and recommended practices is performed per each first site subwatershed. When evaluating management practices and the acreage associated with them, a parcel and its associated acreage may be included under multiple management practices. Therefore, the acreages in Tables 15 –17 cannot be summed across management practices since parcels would be included more than once. These tables can be used to evaluate the number of acres with a specific practice with the overall acreage of the subwatershed or in relation to another management practice.

Tables 15, 16 and 17 list 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. Management practices currently utilized by targeted growers are grouped into the following management practice categories:

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

Table 15. Current management practices utilized by targeted growers within Dry Creek @ Wellsford subwatershed (2008 and 2009).

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	15	60%	4960.4
		Recirculation – Tailwater return system	3	12%	3050.3
		Use drainage basins (sediment ponds) to capture and retain runoff	3	12%	3046.5
		Use of Polyacrylamide (PAM) to increase water infiltration and reduce furrow erosion	1	4%	2450
	Irrigation System	Microirrigation	15	60%	5644.52
		Not Recorded	1	4%	76
		Other (Dual line drip and sprinkler)	1	4%	76.55
		Sprinkler	7	28%	577.5
		Surface	2	8%	62.5
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	19	76%	5488.77
		Irrigation District Deliveries	3	12%	225.3
		Not Recorded	3	12%	678
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	9	36%	1240.5
		Pump/Drain into waterway & able to control timing	2	8%	3147.2
		Pump/Drain into waterway & unable to control timing	8	32%	1191.8
		Recirculation – Tailwater return system	1	4%	26.3
		Settling Pond	3	12%	2498.8
	When do you have storm water draining from your field?	After soil is saturated-late winter	7	28%	2153.05
		No Storm Drainage	6	24%	913.3
		Not Recorded	5	20%	2727.02
		Only in heavy (100 year) storms	7	28%	598.7
Section 3: Erosion & Sediment Management	Sediment management practices:	Constructed wetlands	1	4%	2450
		Grass Row Centers (Orchards, Vineyards)	21	84%	5616.75
		Maintain vegetated filter strips around field perimeter at least 10' wide	19	76%	5833.87
		Vegetation is planted along or allowed to grow along ditches	19	76%	6054.07

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 3: Erosion & Sediment Management	Do you apply herbicides during winter months?	Do not apply	4	16%	252.12
		Glyphosate (Round-Up)	8	32%	4473.85
		Goal	4	16%	1680.75
		Not Recorded	13	52%	1666.1
		Paraquat (Gramaxone)	6	24%	4330.65
		Simazine (Princep)	1	4%	76.55
	If waterway crosses or borders pasture, how is livestock managed?	N/A – Not Pasture	23	92%	6203.77
		Riparian vegetation prevents livestock access to water	1	4%	26.3
		Water not present when livestock is in pasture	1	4%	26.3
		Waterway is fenced	1	4%	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	28%	938.72
		No	1	4%	107
		Yes	17	68%	5346.35
	How often is spray equipment calibrated?	Never	1	4%	26.3
		Once per year	1	4%	40
		Prior to each application	23	92%	6325.77
	Spray management practices:	Adjust spray nozzles to match crop canopy profile	24	96%	6365.77
		Outside nozzles shut off when spraying outer rows next to sensitive sites	19	76%	5711.07
		Spray areas close to waterbodies when the wind is blowing away from them	22	88%	6098.77
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	18	72%	5121.4
		Use electronic controlled sprayer nozzles	1	4%	2450
		Uses of nozzles that provide largest effective droplet size to minimize drift	22	88%	6168.77
Section 5: Dormant Spray Management	How many acres are sprayed with dormant pesticides?	No Dormant Sprays	25	100%	6392.07

Table 16. Current management practices utilized by targeted growers within Duck Slough @ Hwy 99 subwatershed (2008). No additional initial contacts were made in 2009.

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	20	83%	3438.2
		Recirculation - Tailwater return system	14	58%	2181.9
		Use drainage basins (sediment ponds) to capture and retain runoff	9	38%	2301.7
	Irrigation System	Microirrigation	9	38%	2410.3
		Not Recorded	2	8%	62
		Other (Drip irrigation)	1	4%	229
		Surface	14	58%	1585.9
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	22	92%	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	1	4%	20
		Pump/Drain into waterway & unable to control timing	12	50%	1789.3
		Recirculation - Tailwater return system	4	17%	479.9
		Settling Pond	7	29%	1848.8
	When do you have storm water draining from your field?	After soil is saturated-late winter	13	54%	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)	17	71%	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	20	83%	3617.2
	Do you apply herbicides during winter months?	Do not apply	1	4%	55.9
		Glyphosate (Round-Up)	3	13%	384
		Not Recorded	20	83%	3576.3
		Other (Surflan/Solicam)	1	4%	661.8

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 3: Erosion & Sediment Management	If waterway crosses or borders pasture, how is livestock managed?	N/A	23	96%	3821.2
		Riparian vegetation prevents livestock access to water	1	4%	195
		Water not present when livestock is in pasture	1	4%	195
		Waterway is fenced	1	4%	195
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	22	92%	3789.2
		Outside nozzles shut off when spraying outer rows next to sensitive sites	17	71%	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	16	67%	2639.5
		Use electronic controlled sprayer nozzles	1	4%	82
		Uses of nozzles that provide largest effective droplet size to minimize drift	22	92%	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	13	54%	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	17	71%	3398.2
Section 5: Dormant Spray Management	How many acres are sprayed with dormant pesticides?	No Dormant Sprays	24	100%	4016.2

Table 17. Current management practices utilized by targeted growers within Prairie Flower Drain subwatershed (2008). No additional initial contacts were made in 2009.

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	8	73%	599.3
		Recirculation – Tailwater return system	6	55%	377.9
		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	10	91%	826
	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	4	36%	428.4
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	2	18%	91
		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	3	27%	241
		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	9	82%	788.1
	Do you apply herbicides during winter months?	Do not apply	6	55%	401.5
		Not Recorded	5	45%	463.5
	If waterway crosses or borders pasture, how is livestock managed?	N/A	11	100%	865
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	10	91%	789
		Outside nozzles shut off when spraying outer rows next to sensitive sites	7	64%	457.2

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 4: Pest Management	Spray management practices:	Spray areas close to waterbodies when the wind is blowing away from them	11	100%	865
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	5	45%	341.5
		Use electronic controlled sprayer nozzles	5	45%	341.5
		Uses of nozzles that provide largest effective droplet size to minimize drift	11	100%	865
	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	9	82%	639
		Yes	2	18%	226
	How often is spray equipment calibrated?	Prior to each application	11	100%	865
Section 5: Dormant Spray Management	How many acres are sprayed with dormant pesticides?	No Dormant Sprays	11	100%	865

Dry Creek @ Wellsford

Current management practices have been documented for 25 growers within the Dry Creek @ Wellsford subwatershed representing 6,391 acres (Figure 5). The Coalition originally identified 24 members with the potential for direct drainage; however two of the original 24 were unresponsive to repeated attempts by the Coalition to schedule an individual meeting. Since that time, the two members have elected to remain in the Coalition and participated in an individual grower meeting during which they completed the management practice survey. In addition, due to continued chlorpyrifos exceedances experienced during monitoring in 2010, a single grower was contacted who had reported chlorpyrifos use on parcels that were associated with the exceedances. The grower recently joined the Coalition and is farming property that has the potential to drain to the waterway. Current management practices documented in this analysis include survey information from these three members in addition to the practices reported in the 2010 MPUR. Of the 270,144 acres in the Dry Creek subwatershed, the 25 targeted growers represent 6,392 acres (Table 8).

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.

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 number of parcels with a combination of field/row crops and orchards, and some pasture (Figure 6). The only irrigation runoff was associated with orchards (Figure 6).

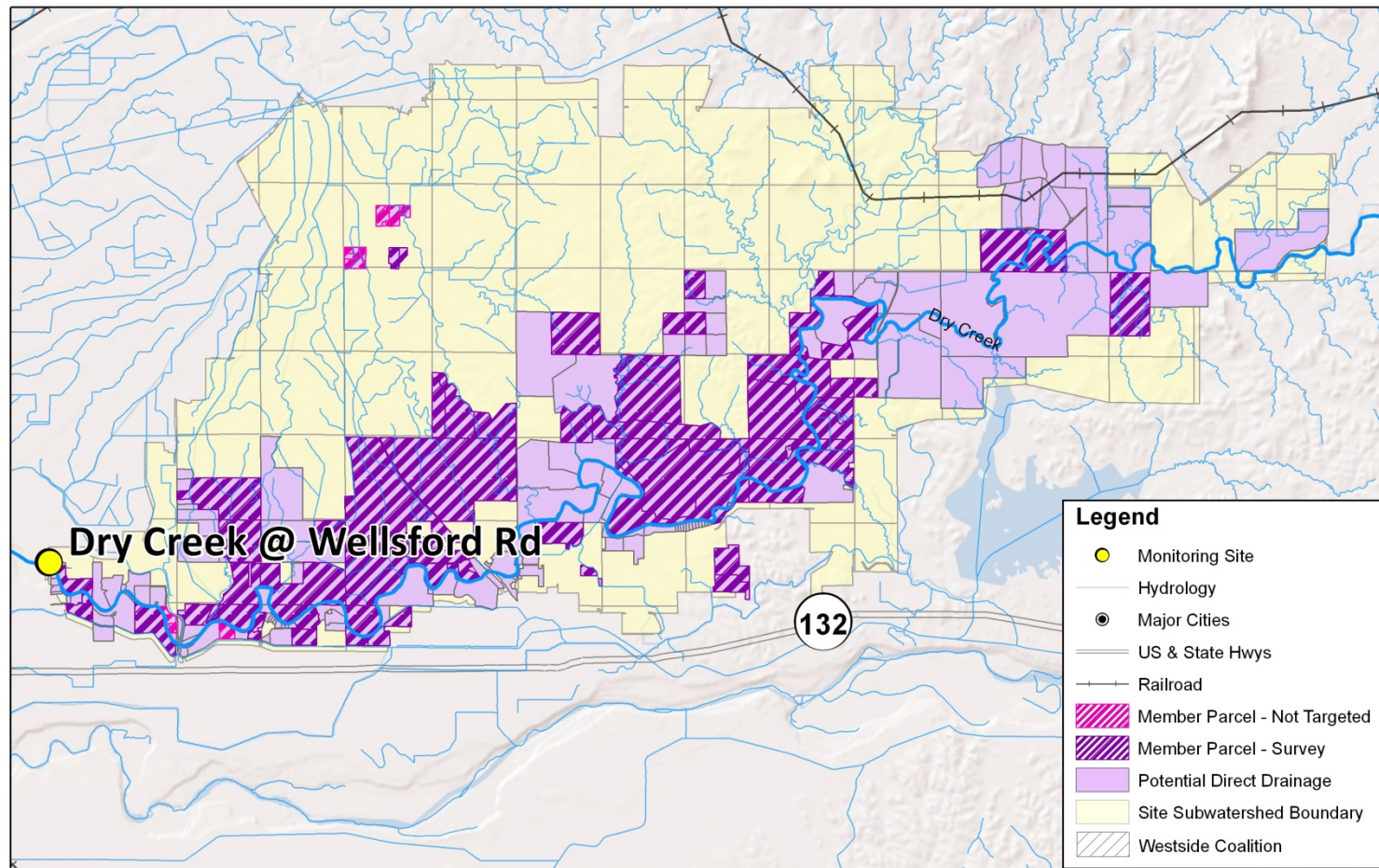
A majority of the growers who filled out surveys irrigate based on moisture levels and crop needs rather than on a set schedule (86%, Table 15). Most growers in Dry Creek utilize pressurized irrigation and/or sprinklers to irrigate their parcels and only 1% irrigated by surface (flood) irrigation (Table 15).

Fifty-six percent of the growers surveyed have storm water drainage either when soils are saturated in late winter or only in heavy, 100-year storms (36% and 9% respectively, Table 15). Growers surveyed indicated that 15% of the acreage represented by that their parcels has no storm water drainage (Table 15). Four growers utilize tailwater return systems and/or settling ponds to manage storm water runoff representing 37% of the acreage with storm water runoff potential (Table 15). All growers indicated that they controlled erosion and sediment delivery by some means.

Herbicides were applied by most growers during winter months with only four growers indicating no applications. However, over half of the respondents did not specify the herbicide that they used (52% did not record a response, Table 15). Seventeen respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season and 25 of 25 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 (96%), shutting outside nozzles when spraying outer two rows (76%), 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 (72%), and using nozzles that provide the largest effective droplet size to minimize drift (88%, Table 15).

In Dry Creek, the majority of growers did not have irrigation drainage from their property (Figure 6) and are currently managing storm water and sediment runoff (Table 15). Drift management is especially important in this subwatershed and a majority of the growers received recommendations to implement additional spray drift practices such as shutting off outside nozzles when spraying outer rows next to creeks. A small percentage of growers with recommended practices were recommended to plant or allow vegetation to grow in ditches (Figure 7).

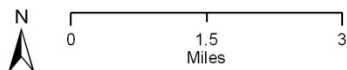
Figure 5. Direct drainage parcels in Dry Creek @ Wellsford subwatershed.



Source of Layers:
 Hydrology - NHD hydrodata, 1:24,000-scale, <http://nhd.usgs.gov/>
 Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library
 TRS - Teale Public Land Survey System, Pub. date. 20090101, California Spatial Information Library
 Parcel Layer - Stanislaus County: 2010, Merced: 2011, Madera: 2011
 Basemap, Shaded Relief - ESRI
 GSC North America 1983

Date Prepared: 03/15/11

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Dry Creek @ Wellsford Rd 1st Priority Subwatershed Parcels

Figure 6. Dry Creek @ Wellsford crop acreage information from member surveys based on crop type and irrigation runoff (2008 / 2009).

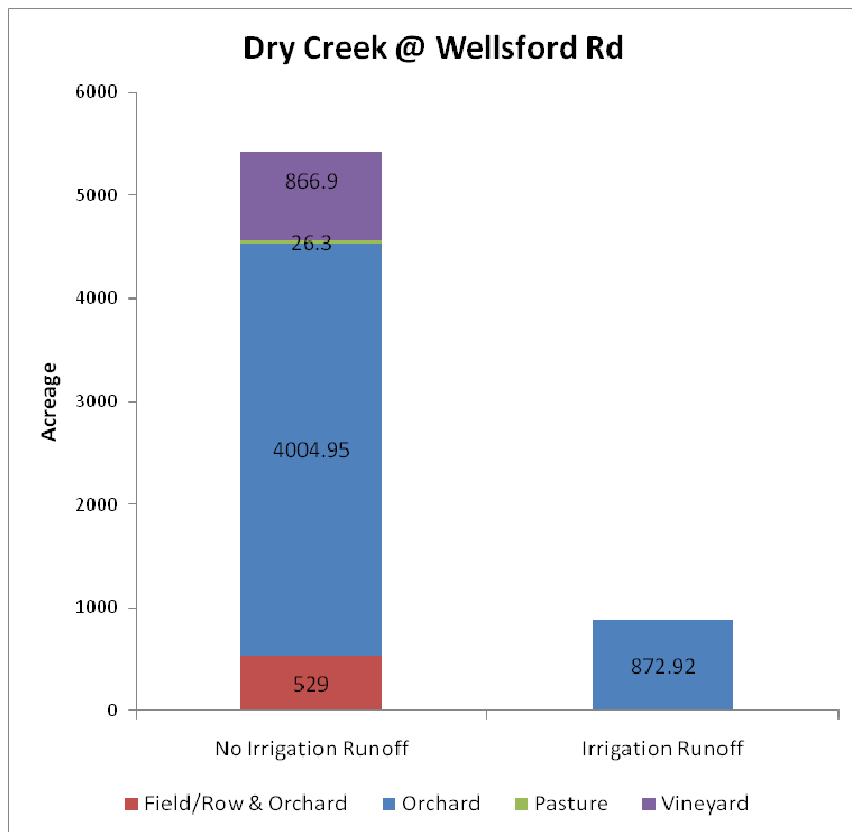
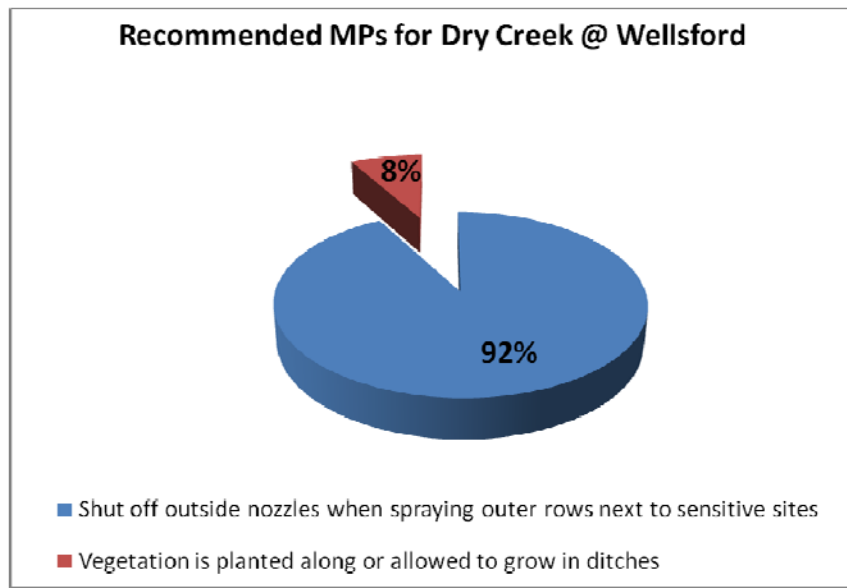


Figure 7. Percentage of acreage represented by each recommended management practice in the Dry Creek @ Wellsford subwatershed. All members that were recommended to implement additional practices did not have irrigation drainage.



Duck Slough @ Hwy 99

The Coalition contacted 24 targeted growers within the Duck Slough @ Hwy 99 subwatershed that were identified as having the potential to drain directly to Duck Slough (including spray drift potential), were currently farming, and had reported pesticide use of high priority constituents (Figure 8). The 24 members farm approximately 4,016 acres within the Duck Slough subwatershed, which includes 12,054 acres (Table 8).

Since the 2010 MPUR, no additional individual contact meetings have occurred and no additional management practice surveys have been filled out. Minor updates have been made to management practice information as the result of follow up discussions with growers and additional review of recorded practices. The following analysis of current management practices in the Duck Slough @ Hwy 99 subwatershed reflects these updates which are slightly different from preliminary data included in the 2010 MPUR.

Of those surveyed, 52% of the acreage had irrigation runoff. A majority of the acreage farmed by targeted growers was orchards, field/row crops, and some pasture (Figure 9). The only acreage that did not have irrigation runoff was from orchards (Figure 9).

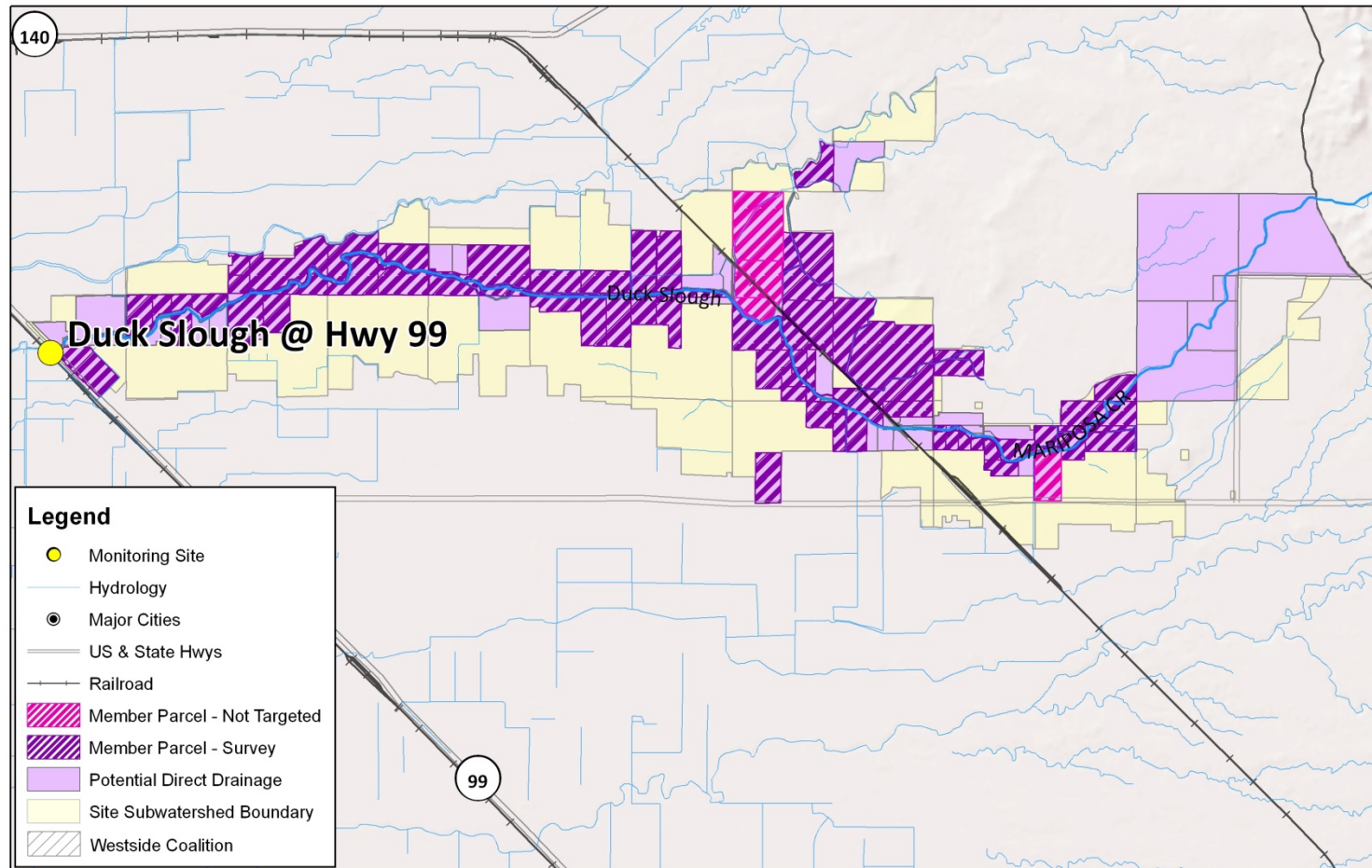
Duck Slough has more irrigation and storm water drainage from parcels directly next to the creek than Dry Creek (Figure 9). Of those surveyed in the Duck Slough watershed, 58% of the respondents operating almost 40% of the acreage used flood irrigation; the remaining growers used drip or microspray systems. To manage irrigation drainage, 83% of the growers used laser leveled fields, 58% recirculation systems, and 38% sediment retention ponds. Eighty-three percent of the contacted growers recorded storm drainage after late winter saturation of soils or in the case of heavy, 100-year storms (54% and 29% respectively, Table 16). Twenty-seven percent of the growers (13 growers) indicated that they pump/drain into waterways to control storm runoff; 12 of these growers were unable to control timing of discharges (Table 16).

Most growers managed erosion and sediment with one or more of the following practices: grass row centers (71%), filter strips around field perimeter (46%), and planting or allowing vegetation to grow in ditches (83%, Table 16).

Herbicides were applied by most growers during the storm season of 2008 and 2009 with only 4% indicating no applications. However, 83% of the respondents did not specify the herbicide that they used (Table 16). Thirteen respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season of 2008; 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; 71% 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 (92%), shutting outside nozzles when spraying outer two rows (71%), 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 (67%), and using nozzles that provide the largest effective droplet size to minimize drift (92%).

A combination pump/drain control of storm drainage, recirculation / tailwater return systems, additions of drainage basins/sediment ponds, use of PAM during irrigation, planting of vegetation in ditches, and use of spray drift management practices were recommended for growers to better manage irrigation runoff to surface waterways (Figure 10). For growers without irrigation drainage, a large portion of growers were recommended to implement additional spray drift practices such as shutting off outside nozzles when spraying outer rows. One grower who indicated no irrigation drainage was also encouraged to install structural improvements including a recirculation system, a drainage basin/sediment pond, and a device to regulate the timing of discharge (Figure 11).

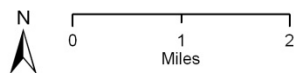
Figure 8. Direct drainage parcels in Duck Slough @ Hwy 99 subwatershed.



Source of Layers:
 Hydrology - NHD hydrodata, 1:24,000-scale, <http://nhd.usgs.gov/>
 Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library
 TRS - Teale Public Land Survey System, Pub. date, 20090101, California Spatial Information Library
 Parcel Layer - Stanislaus County: 2010, Merced: 2011, Madera: 2011
 Basemap, Shaded Relief - ESRI
 GSC North America 1983

Date Prepared: 02/15/11

ESJWQC



Duck Slough @ Hwy 99 1st Priority Subwatershed Parcels

Figure 9. Duck Slough @ Hwy 99 crop acreage information from member surveys based on crop type and irrigation runoff (2008). No additional initial contacts were made in 2009.

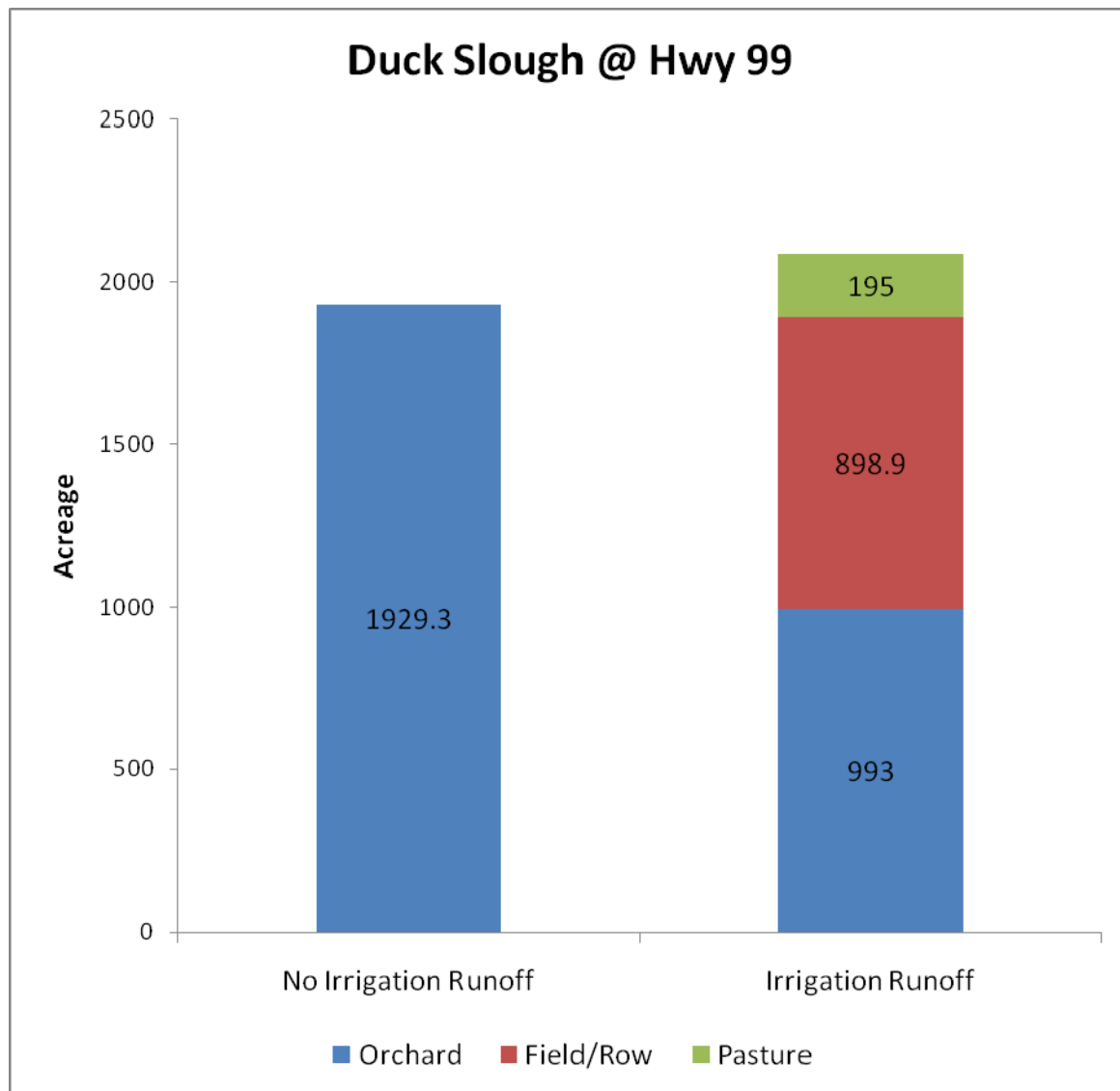


Figure 10. Percentage of acreage represented by each recommended management practice in the Duck Slough @ Hwy 99 subwatershed for members with irrigation drainage.

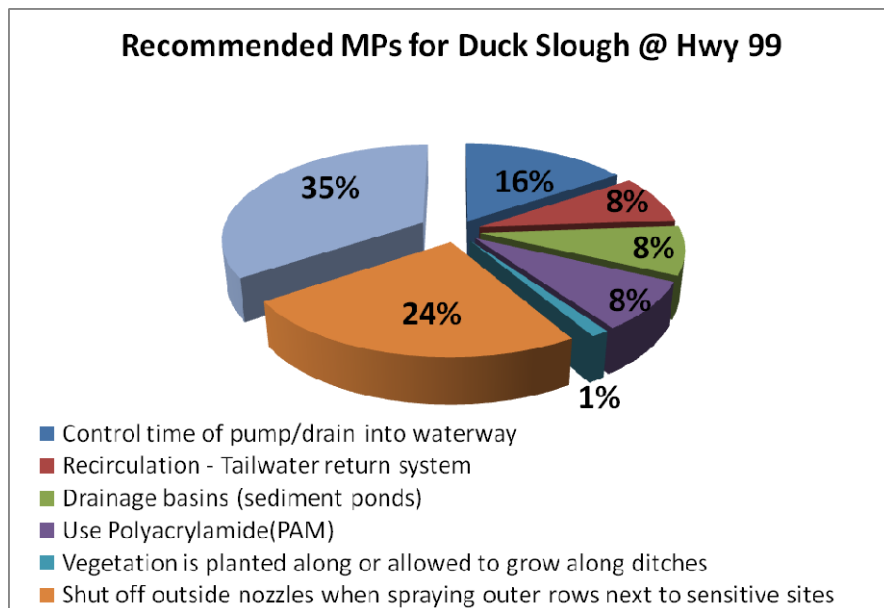
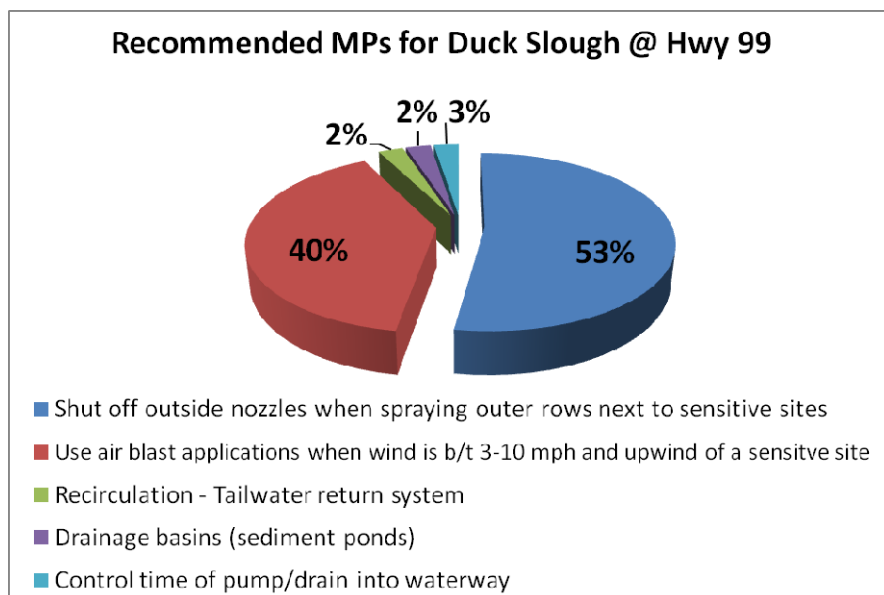


Figure 11. Percentage of acreage represented by each recommended management practice in the Duck Slough @ Hwy 99 subwatershed for members without irrigation drainage.



Prairie Flower Drain @ Crows Landing Rd

The Coalition contacted 11 targeted growers within the Prairie Flower Drain @ Crows Landing Rd subwatershed that were identified as having the potential to drain directly to the drain, were currently farming, and had reported pesticide use of high priority constituents (Figure 12). The 11 members farm approximately 865 acres within the Prairie Flower Drain subwatershed which includes 4,097 acres (Table 8). The remaining acreage is primarily in dairies. The Coalition noticed when reviewing results from initial surveys used to make Table 17 and Figure 10 in the 2010 MPUR (page 55-56 and 58, respectively) that one grower's responses were accidentally omitted and only 10 of the 11 grower responses were included in the analysis. The following summary of initial survey results reflects responses from the 11 targeted growers.

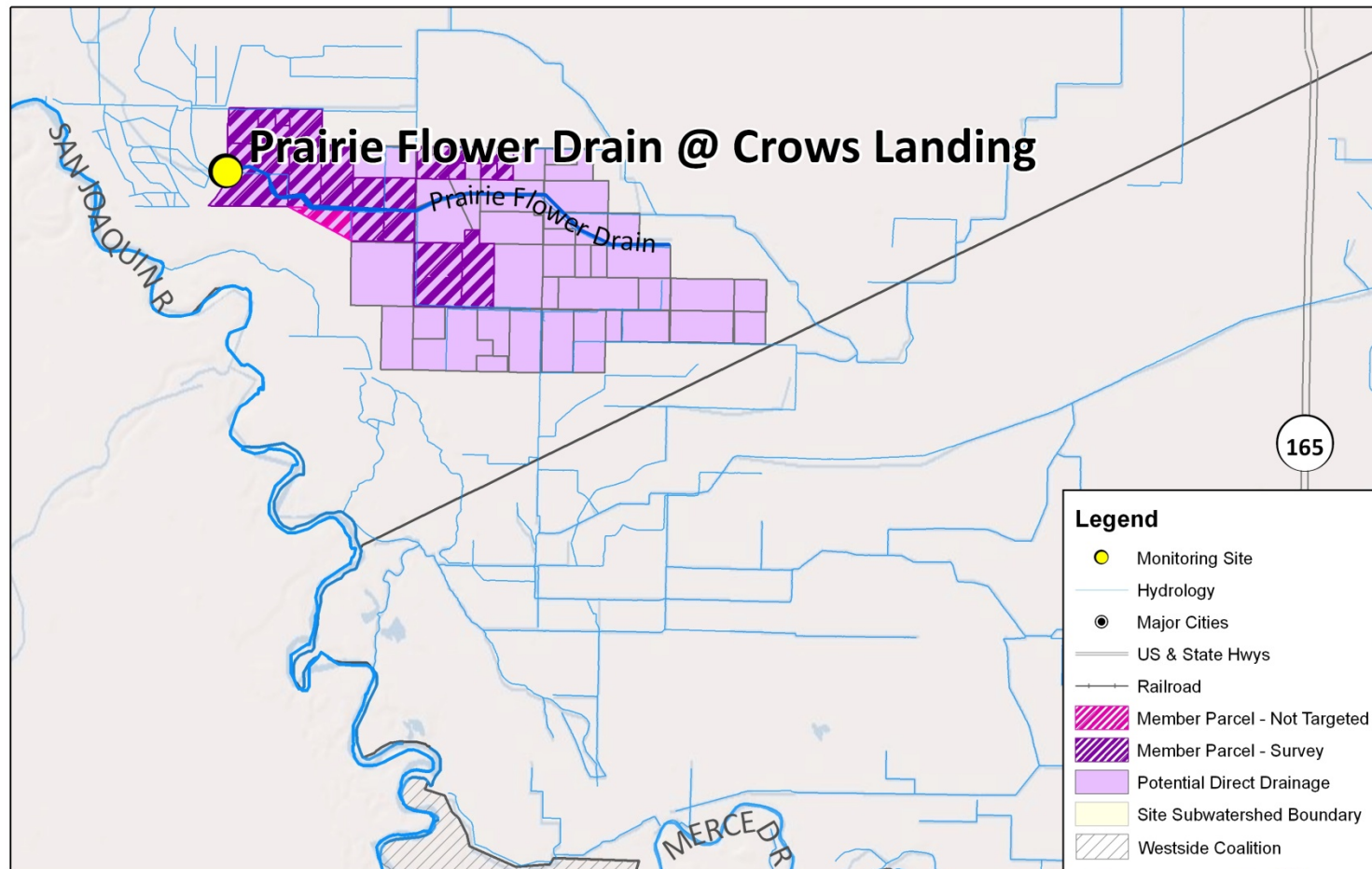
Prairie Flower Drain is dominated by field/row crops and dairy acreage. A majority of the parcels farmed by targeted growers were determined to have irrigation drainage (95%, Figure 13). Of those surveyed in the Prairie Flower Drain watershed, 91% of the respondents with slightly over 95% of the acreage used flood irrigation and there was no reported use of drip or microspray systems (Table 17). However, 73% used laser leveled fields, 55% used recirculation systems, 18% used sediment retention ponds and 18% used polyacrilamide (PAM) to reduce furrow erosion and prevent discharges to surface waters (Table 17). Only 55% of the respondents irrigated based on soil moisture levels and 36% did not respond (Table 17).

There is a mixture of respondents that have storm water drainage when the soil is saturated in late winter (27%) and/or in 100 year storms (9%), see Table 17. Three respondents (27%) indicated that there was no storm water drainage from the property, and 36% did not respond (Table 17). Twenty-seven percent of the respondents indicated they pumped storm water to surface waters and could not control the timing but do use 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 55% indicated no applications and 45% did not respond (Table 17).

Two respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season and nine 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 (Table 17). The majority took numerous steps to manage their spray drift including adjusting spray nozzles to match the canopy profile (91%), shutting outside nozzles when spraying outer two rows (64%), spraying areas close to waterbodies when the wind is blowing away from them (100%), using air blast applications when wind is between 3-10 mph (45%), and using nozzles that provide the largest effective droplet size to minimize drift (100%), see Table 17.

The management practices recommended to these farmers included controlling the timing of pumping/draining into the waterway, planting vegetation in the ditches, utilizing recirculation / tailwater return systems and drainage basins/sediment ponds, and using PAM during irrigation (Figure 14). These management practices all seek to address the irrigation drainage and storm water runoff that are the primary cause of impaired water quality in the Prairie Flower Drain subwatershed.

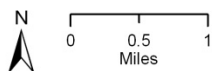
Figure 12. Direct drainage parcels in Prairie Flower Drain @ Crows Landing Rd.



Source of Layers:
 Hydrology - NHD hydrodata, 1:24,000-scale, <http://nhd.usgs.gov/>
 Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library
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 Parcel Layer - Stanislaus County: 2010, Merced: 2011, Madera: 2011
 Basemap, Shaded Relief - ESRI
 GSC North America 1983

Date Prepared: 02/15/11

ESJWQC



Prairie Flower Drain @ Crows Landing 1st Priority Subwatershed Parcels

Figure 13. Prairie Flower Drain @ Crows Landing Rd crop acreage information from member surveys based on crop type and irrigation runoff (2008). No additional initial contacts were made in 2009.

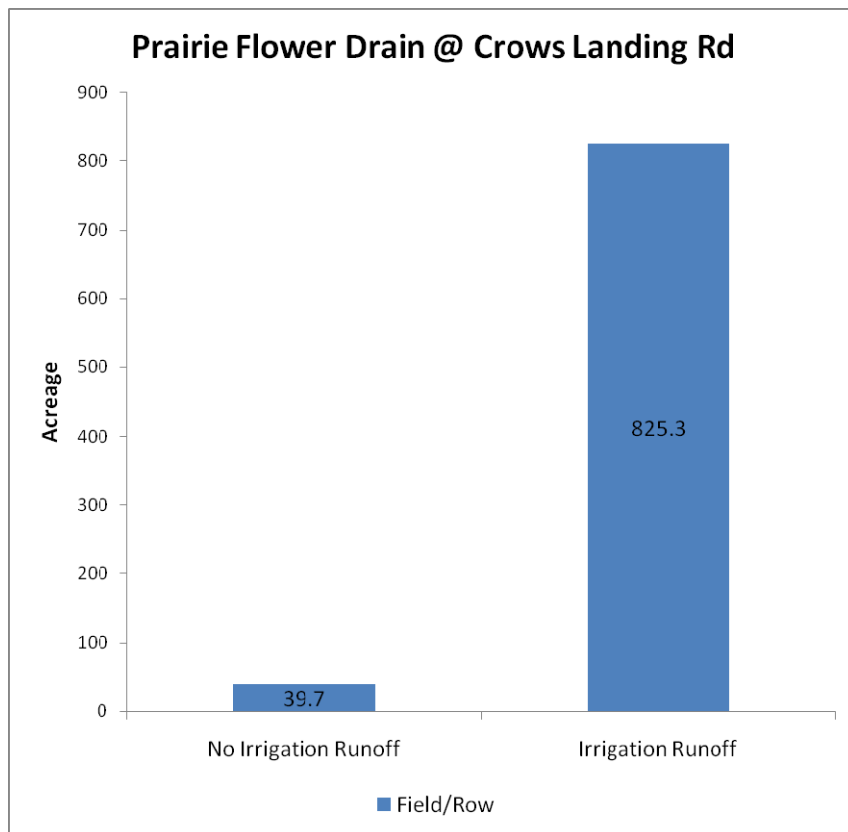
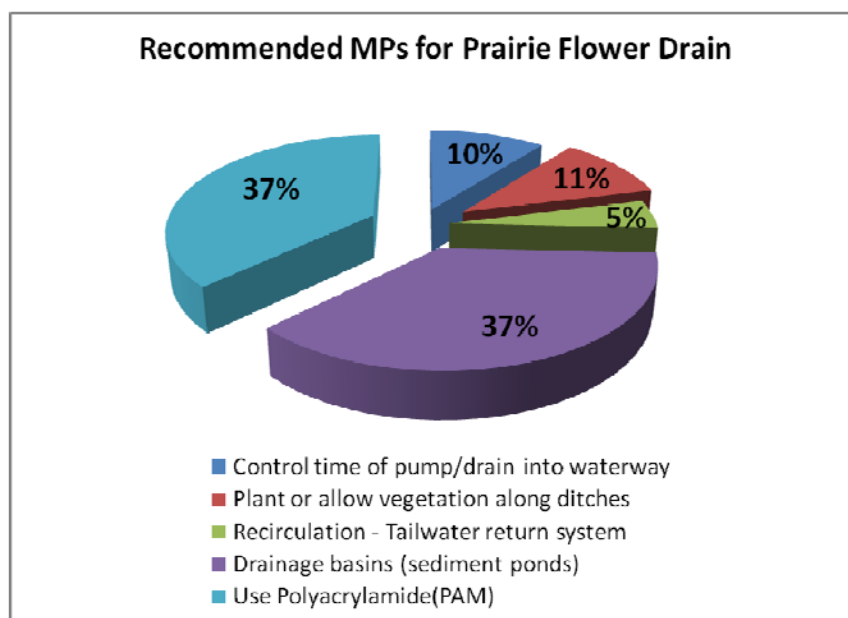


Figure 14. Percentage of acreage represented by each recommended management practice in the Prairie Flower Drain subwatershed. All members that were recommended to implement additional practices have irrigation drainage.



Implemented Management Practices (2009 / 2010)

The Coalition conducts follow up contacts via two methods: follow up group meetings and follow up individual phone interviews.

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 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 initial individual contact surveys (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 Levelled Fields

04) Recirculation/ Tailwater 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 / not asked about during previous questions?

18) Did you wish to receive quarterly water quality information from the Coalition?¹

19) Would you like to receive additional information regarding NRCS funding for management practice implementation?¹

20) Is this type of meeting a good way to provide information?¹

21) Is this approach to solving water quality problems viable in your opinion?¹

¹Questions asked only during follow up group grower meeting, not during follow up phone interviews.

Close to half of the targeted growers from each subwatershed attended the meetings and participated in answering follow up questions; 11 each attended the Dry Creek and Duck Slough meetings, and four members attended the Prairie Flower Drain meeting (Table 19). These numbers of attendees have been updated from those reported in the 2011 AMR because two growers who attended the Dry Creek were not on the targeted grower list, a single grower attended and participated in the follow up questionnaire but failed to sign in at the Duck Slough meeting, and a single grower represented two targeted growers at the Prairie Flower Drain meeting but only signed in for one of the operations. One-hundred percent of growers that participated at follow up group meetings indicated that yes, the meeting approach to is viable and that this type of meeting was a good way to provide information (Question 21 and 20, Table 18).

Follow up contacts with members unable to attend the meetings were conducted via individual phone interviews. Coalition representatives asked growers questions one through 17 listed in Table 18 and recorded growers' responses and discussed the management plan objectives and process with growers. Eleven, nine, and six follow up phone interviews were conducted for the Dry Creek, Duck Slough, and Prairie Flower Drain subwatersheds, respectively (Table 19).

Contact with individual growers provided the Coalition with current information regarding changes in land ownership and/or land use practices, and the Coalition adjusted the list of growers required to participate in follow up contacts based on this information. Two targeted growers in the Dry Creek subwatershed and one grower each in the Duck Slough and Prairie Flower Drain subwatersheds no longer claim their parcel(s) and consequently no follow up contacts were conducted. A follow up survey was also not required for a single grower in the Duck Slough subwatershed because the grower no longer irrigates their parcel(s) (Table 19).

The Coalition has completed the follow up contacts with 100% of targeted growers identified as implementing additional management practices in the Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd subwatersheds. Two members in the Duck Slough subwatershed were unresponsive to repeated attempts by the Coalition to conduct follow up contacts; the Coalition is consequently in the process of dropping these growers from membership in the ESJWQC (Table 19). Therefore, 22, 20, and 10 members in the Dry Creek, Duck Slough, and Prairie Flower Drain subwatersheds, respectively, documented implementation of additional management practices in surveys (Table 19).

Table 19. Tally of growers contacted for follow up in fist high priority subwatersheds (2008 -2010) including number of growers and reasons for not needing following contacts.

	DRY CREEK @ WELLSFORD RD	DUCK SLOUGH @ HWY 99	PRAIRIE FLOWER DRAIN @ CROWS LANDING RD
Completed Individual Survey on Time	22	24	11
Completed Individual Survey Late	3	0	0
Attended Follow Up Group Meeting	11	11	4
Participated in Follow Up Phone Interview	11	9	6
Follow Up Not Required	2	2	1
Follow Up Not scheduled Until 2011	1	0	0
Dropped due to Lack of response	0	2	0
Participated in 2010 Follow Up Contacts	22	20	10

Dry Creek @ Wellsford Rd

Table 20 presents a comparison of Coalition recommended management practices to newly implemented management practices in 2009 and 2010 in the Dry Creek @ Wellsford Rd subwatershed. All recommended practices pertained to parcels with no irrigation drainage. Overall, newly implemented management practices in 2009 and 2010 in the Dry Creek subwatershed include shutting off outside nozzles when spraying outer rows next to sensitive sites, maintaining filter strips at least 10 feet wide around field perimeters, allowing grass to grow in the centers of orchard rows, using less water during surface irrigation, using recirculation/tailwater return systems, and constructing drainage basins/sediment ponds for operations with no irrigation drainage. These practices account for 2,585.5 acres within the Dry Creek subwatershed (Table 20). Figure 15 displays each of the newly implemented management practices as a percentage of the overall acreage. In addition, some growers indicated that they implemented other management practices that were not specified by the Coalition's survey (Table 20).

Three growers were recommended to shut off outside nozzles when spraying outer rows next to sensitive sites implemented the management practice; all three growers representing 523.7 acres implemented this additional practice.

The single grower, farming 45 acres, recommended to plant or allow vegetation to grow along ditches indicated the drainage ditches around his/her fields have been removed, and the management practice is no longer applicable. The same grower pointed out to Coalition representatives during follow up contact that they continue to maintain the vegetation buffer strips around the perimeter of fields.

In addition to Coalition recommended management practices, several other members with no irrigation drainage indicated they implemented new management practices in 2009 and 2010 without specific recommendations from the Coalition (Table 20). One grower farming 107 acres now allows grass to grow in the center of orchard rows as a result of discussions with Coalition representatives. Two growers, accounting for 443 acres, began to use recirculation/tailwater return systems on their properties. A single grower operating 121.3 acres constructed a drainage basins/sediment pond. Another single grower farming 28 acres installed filter strips at least 10 feet wide around their field perimeter and one grower representing 162 acres began to use less water during surface irrigation after (Table 20).

Question 17 of the follow up grower targeted questions (Table 18) gives growers the opportunity to indicate any additional management practices they have recently implemented that are not specifically asked about by the Coalition. Five growers representing 1,200.5 acres of no irrigation drainage indicated they implemented new management practices during 2009 and 2010 (Table 20). One of these growers, representing 121 acres, increased the size of berms surrounding Dry Creek to prevent irrigation and storm runoff. The other growers did not specify type of management practice implemented.

Table 20. Comparison of recommended MPs and implemented MPs in Dry Creek @ Wellsford Rd subwatershed.

MANAGEMENT PRACTICE	ACREAGE: RECOMMENDED PRACTICES	ACREAGE: IMPLEMENTED PRACTICES	PERCENT OF RECOMMENDED ACREAGE WITH IMPLEMENTED PRACTICES
No irrigation drainage from property			
Shut off outside nozzles when spraying outer rows next to sensitive sites	523.7	523.7	100%
Vegetation is planted along or allowed to grow in ditches	45	0	0%
Grass row centers	0	107 ²	NA
Recirculation - Tailwater return system ¹	0	443 ²	NA
Drainage Basins (Sediment Ponds) ¹	0	121.3 ²	NA
Filter strips at least 10' wide around field perimeter	0	28 ²	NA
Reduce amount of water used in surface irrigation	0	162 ²	NA
Other (Not specified) ³	NA	1200.5	NA
Total Acreage Associated with MPs (no drainage)	568.7	2585.5	455%
Yes, irrigation drainage from property			
Other (Not specified) ³	NA	2450	NA
Total (drainage)	NA	2450	NA

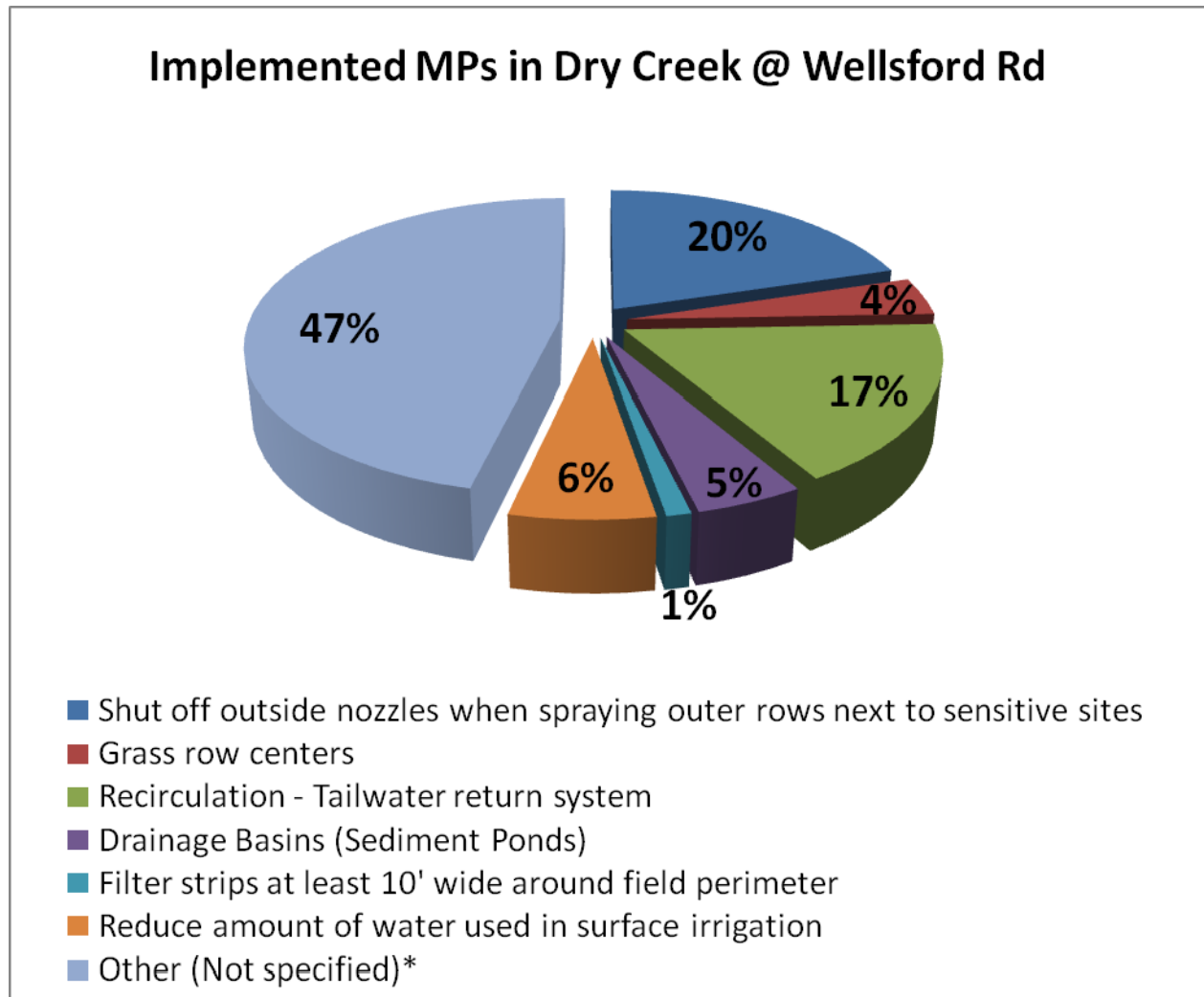
¹ Practices apply to storm drainage

² Management practice not specifically recommended by Coalition representative for grower's operation

³ If growers implemented management practices other than those asked about during Coalition follow-up, they were instructed to indicate so and provide a summary/explanation.

NA – Not applicable; no recommendations for the management practice in the subwatershed and was not indicated as implemented by surveyed growers

Figure 15. Percentage of acreage represented by newly implemented (2009/2010) management practices (MPs) for Dry Creek @ Wellsford. All members that were recommended to implement additional practices have no irrigation drainage.



*Other (Not specified) – Refers to implemented MPs other than those specifically asked about during Coalition follow-up.

Duck Slough @ Hwy 99

Management practices recommended by the Coalition are compared in Table 21 to newly implemented management practices in 2009 and 2010 in the Duck Slough @ Hwy 99 subwatershed. Recommended management practices in the Duck Slough subwatershed are almost equally divided between acreage with no irrigation drainage and acreage with irrigation drainage (Table 21). Overall, newly implemented management practices to property with no irrigation drainage in 2009 and 2010 include shutting off outside nozzles when spraying outer rows next to sensitive sites and installing a device to control timing of discharge. These practices account for 871.8 acres within the Duck Slough @ Hwy 99 subwatershed (Table 21). Figure 16 displays each of the newly implemented management practices as a percentage of the overall acreage with no irrigation drainage.

Newly implemented management practices to property with irrigation drainage in 2009 and 2010 overall include installing a device to control timing of discharge, shutting off outside nozzles when spraying outer rows next to sensitive sites, reducing the amount of water used in surface irrigation, and installing a microirrigation system. These practices account for 2,415 acres within the Duck Slough @ Hwy 99 subwatershed (Table 21). Figure 17 displays each of the newly implemented management practices as a percentage of the overall acreage with irrigation drainage. Several growers with no irrigation drainage from their property were recommended to implement management practices. Of the two growers recommended to shut off outside nozzles when spraying outer rows next to sensitive sites, one grower representing 210 acres implemented the practice whereas the other grower accounting for 661.8 acres plans to implement this practice in 2010 (Table 21). The same grower farming 661.8 acres was also recommended to only use air blast applications when wind is between three to 10 miles per hour (mph) and upwind of a sensitive site. This particular management practice was not asked about during follow up. In addition, this same grower has recently added a device to control timing of irrigation and storm water runoff (Table 21).

Another member with no irrigation drainage was recommended to implement a recirculation / tailwater return system, install a device to control discharge, and to construct a drainage basin /sediment pond. The member has been unresponsive to repeated attempts by Coalition representatives to schedule a follow up phone interview. The Coalition is in the process of dropping the member from the ESJWQC; it is unknown if any of the recommended management practices were implemented.

A single grower recommended to allow vegetation to grow along drainage ditches near his/her 21 acre property indicated no change in practices (Table 21). The grower did, however, begin to shut off outside nozzles when spraying outer rows next to sensitive sites and added a device to control the timing of discharge, neither of which was specifically recommended by the Coalition (Table 21).

The two growers recommended to shut off outside nozzles when spraying outer rows next to sensitive sites were also able to implement this practice, accounting for 414.5 acres (Table 21).

A single grower representing 595.5 acres was recommended to spray areas close to waterbodies only when the wind is blowing away from them. The practice was not specifically asked about during follow up meetings/interviews. The grower indicated no new management practices had been implemented based on information from contact with Coalition representatives. The grower has, however, shut off outside nozzles when spraying outer rows next to sensitive sites and allowed grass to grow in orchard row centers and along drainage ditches since prior to 2005. The grower also has laser leveled fields in

the past and employs a recirculation / tailwater return system as well as utilizing a drainage basin / sediment pond.

Eight growers with irrigation drainage implemented new management practices during 2009 and 2010 without specific recommendation from the Coalition. Three growers, accounting for 764 acres, began to reduce the amount of water used in surface irrigation (Table 21). One grower installed microirrigation to his 279-acre property (Table 21). A grower farming 195 acres did not apply pesticides during 2009 and 2010, except Round-Up for weeds. Two growers, representing 464.5 acres, installed devices to control the timing of discharge. One grower responded that yes, they did implement additional practices not listed in previous questions (Question 17, Table 18).

Some management practices were recommended but were not implemented within this subwatershed. Two growers were unable to implement recommended practices due to a lack of resources; management practices included installing a recirculation / tailwater return system, constructing a drainage basin / sediment pond, adding a device to control timing of discharge and using PAM to reduce furrow erosion (Table 21). Growers indicating a lack of resources for structural management practices may be eligible to receive Proposition 84, AWEP and/or NRCS money in 2011. One grower farming 40 acres indicated they did not implement a device to control timing of discharge because they are no longer farming the parcel and have leased out the land.

Table 21. Comparison of recommended MPs and implemented MPs in Duck Slough @ Highway 99 subwatershed.

MANAGEMENT PRACTICE	ACREAGE: RECOMMENDED PRACTICES	ACREAGE: IMPLEMENTED PRACTICES	PERCENT OF RECOMMENDED ACREAGE WITH IMPLEMENTED PRACTICES
No irrigation drainage from property			
Shut off outside nozzles when spraying outer rows next to sensitive sites	871.8	210	24.1%
Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	661.8	UA	UA
Recirculation - Tailwater return system ¹	42	0	0%
Drainage basins (sediment ponds) ¹	42	0	0%
Install device to control discharge ¹	42	661.8	1575.7%
Total (no drainage)	1659.6	871.8	53%
Yes, irrigation drainage from property			
Recirculation - Tailwater return system	142	0	0%
Drainage basins (sediment ponds)	142	0	0%
Use Polyacrylamide(PAM)	142	0	0%
Install device to control discharge	269	485.5 ²	592.1%
Vegetation is planted or allowed to grow along ditches	21	0	0%
Shut off outside nozzles when spraying outer rows next to sensitive sites	414.5	435.5 ²	105.1%
Spray areas close to waterbodies when the wind is blowing away from them	595.5	UA	UA

MANAGEMENT PRACTICE	ACREAGE: RECOMMENDED PRACTICES	ACREAGE: IMPLEMENTED PRACTICES	PERCENT OF RECOMMENDED ACREAGE WITH IMPLEMENTED PRACTICES
Reduce amount of water used in surface irrigation	0	764 ²	NA
Microirrigation system	0	279 ²	NA
Other (Not specified) ³	NA	451	NA
Total (drainage)	1726	2415	140%

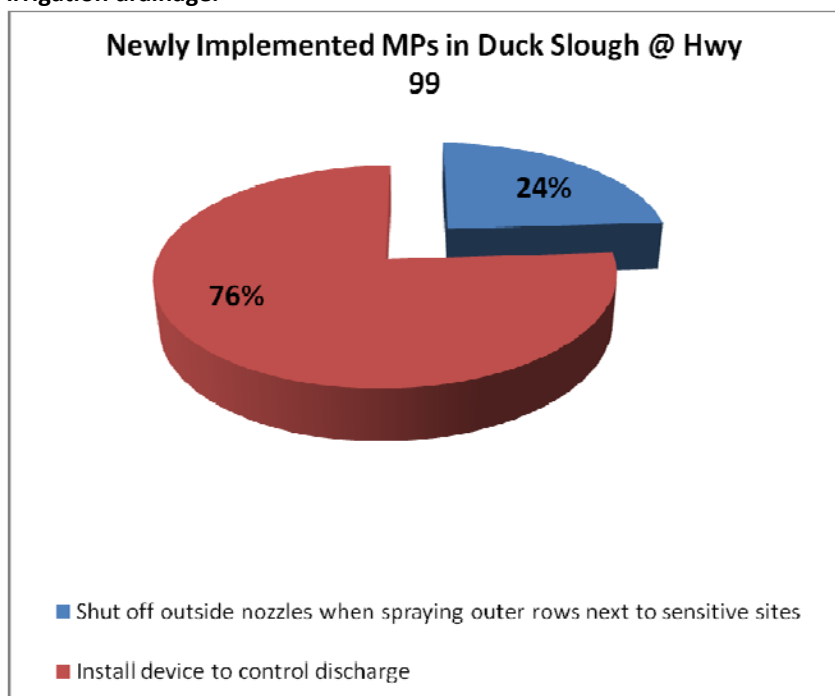
¹ Practices apply to storm drainage

² Management practice not specifically recommended by Coalition representative for grower's operation

³ If growers implemented management practices other than those asked about during Coalition follow-up, they were instructed to indicate so and provide a summary/explanation.

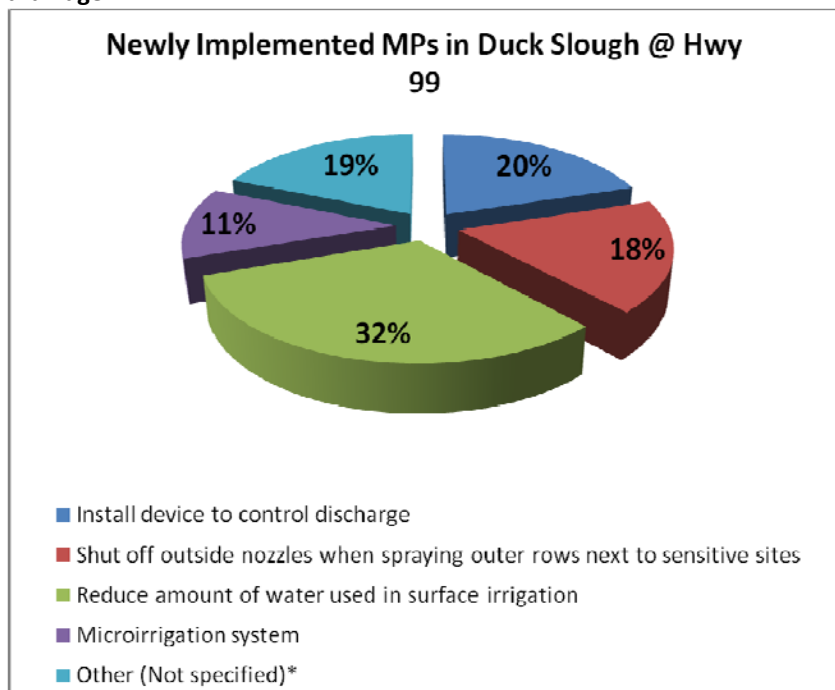
NA – Not applicable; no recommendations for the management practice in the subwatershed and was not indicated as implemented by surveyed growers

Figure 16. Percentage of acreage represented by newly implemented (2009/2010) management practices for Duck Slough @ Hwy 99. All members that were recommended to implement additional practices have no irrigation drainage.



*Other (Not specified) – Refers to implemented MPs other than those specifically asked about during Coalition follow-up.

Figure 17. Percentage of acreage represented by newly implemented (2009/2010) management practices for Duck Slough @ Hwy 99. All members that were recommended to implement additional practices have irrigation drainage.



*Other (Not specified) – Refers to implemented MPs other than those specifically asked about during Coalition follow-up.

Prairie Flower Drain @ Crows Landing Rd

Table 22 compares Coalition recommended management practices to newly implemented management practices in 2009 and 2010 in the Prairie Flower Drain subwatershed. All recommended practices were to properties with irrigation drainage. Overall, newly implemented management practices in 2009 and 2010 to properties with irrigation drainage include installing devices to control discharge, using less water during surface irrigation, using PAM to reduce furrow erosion and decrease discharges to surface waters, and constructing drainage basins/sediment ponds. These practices account for 991.8 acres of the Prairie Flower Drain subwatershed (Figure 18).

Two growers, representing a combined 76.9 acres, were both recommended to allow vegetation to grow along a drainage ditch and to install a gate to control the timing of discharge from the drainage ditch; both growers failed to implement the management practices. The growers both indicated the management practices were no longer applicable for their operations, but did not provide the Coalition with any details as to why.

The Coalition recommended using PAM to a single grower, operating 270.9 acres, to control irrigation runoff. The Coalition also recommended installing a drainage basin /sediment pond to capture excess runoff (Table 22). The Coalition documented that the grower installed a device to control discharge and has reduced the amount of water used during surface irrigation (Table 22). Therefore, although the grower did not use PAM as recommended, they did implement additional practices to reduce irrigation runoff. In addition, the grower plans to implement a recirculation / tailwater return system in the upcoming years and would like to laser level their fields; however, they have no resources to do so at this time. Controlling discharge, reducing the amount of water used during surface irrigation, using a recirculation / tailwater return system, and laser leveling fields are all management practices that reduce excess runoff. Growers indicating a lack of resources for structural management practices may be eligible to receive Proposition 84, AWEP and/or NRCS money in 2011.

The final grower recommended to implement a management practice in the Prairie Flower Drain subwatershed explained they did not install a recirculation / tailwater return system per the Coalition's advice because the 34-acre property is being sold (Table 22).

One grower in the Prairie Flower Drain subwatershed implemented management practices in 2009 and 2010 without specific recommendations from the Coalition. One grower farming 150 acres began to use PAM during irrigation, installed a device to control discharge, and constructed a drainage basin / sediment pond to reduce the amount of irrigation drainage from their property (Table 22).

Some growers indicated no irrigation drainage from their properties during 2009 and 2010. Two growers, accounting for 91 acres, indicated during follow up contacts they installed devices to control the timing of discharge (storm water drainage) on their properties without recommendation from the Coalition (Table 22). The growers were the only landowners to implement new management practices to properties with no irrigation drainage (Table 22). Both growers have laser leveled their fields in the past and have used a recirculation / tailwater return system since prior to 2005. Since Coalition general outreach began in 2005, both growers now allow vegetation to grow along drainage ditches and shut off outside nozzles when spraying outer rows next to sensitive areas.

Table 22. Comparison of recommended MPs and implemented MPs in Prairie Flower Drain @ Crows Landing Rd subwatershed.

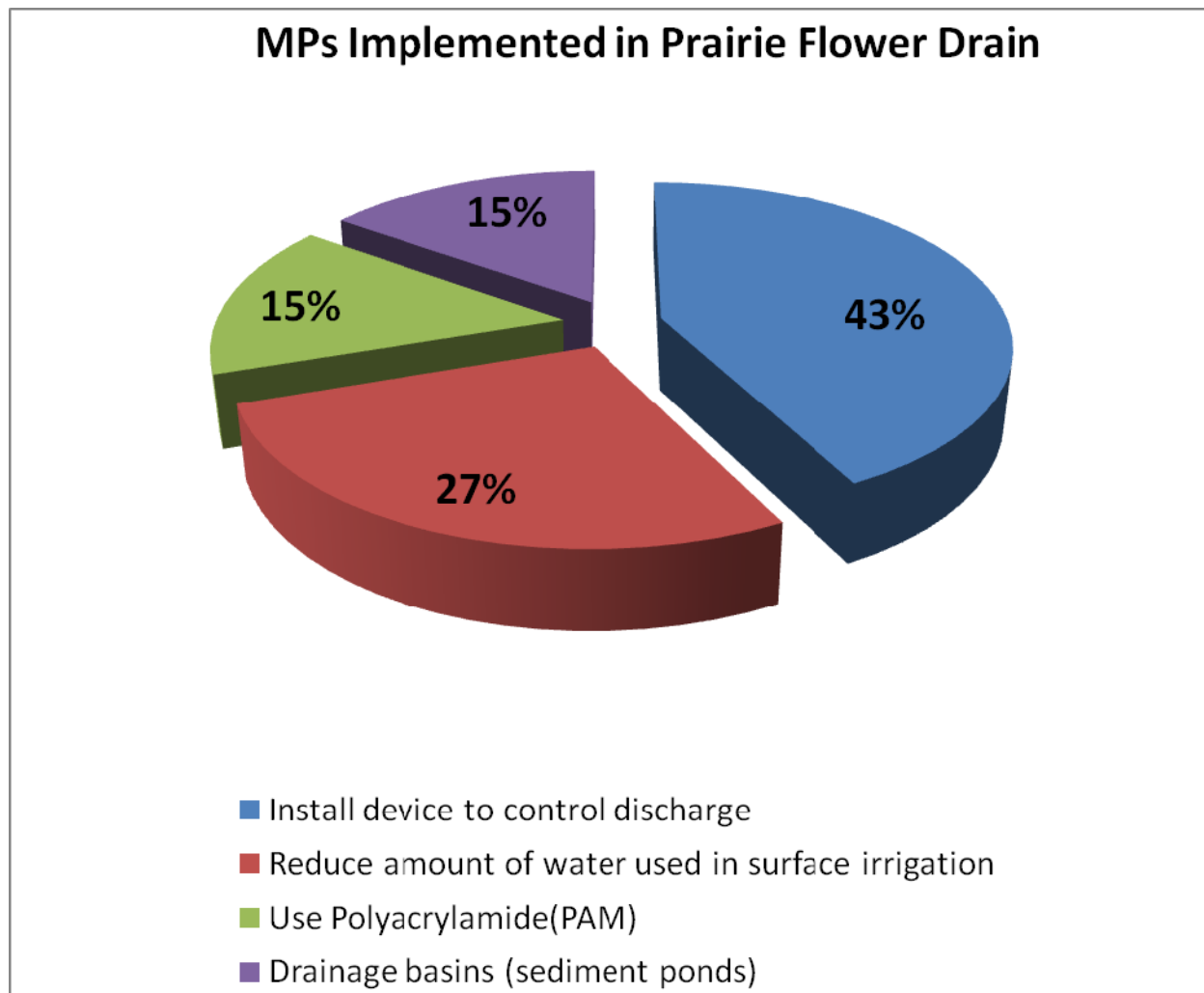
MANAGEMENT PRACTICE	ACREAGE: RECOMMENDED PRACTICES	ACREAGE: IMPLEMENTED PRACTICES	PERCENT OF RECOMMENDED ACREAGE WITH IMPLEMENTED PRACTICES
No irrigation drainage from property			
Install device to control discharge ¹	0	91	NA
Total (no drainage)	0	91	NA
Yes, irrigation drainage from property			
Install device to control discharge	76.9	420.9 ²	547%
Plant or allow vegetation along ditches	76.9	0	0%
Drainage basins (sediment ponds)	270.9	150 ²	55%
Use Polyacrylamide(PAM)	270.9	150 ²	55%
Reduce amount of water used in surface irrigation	0	270.9 ²	NA
Recirculation - Tailwater return system	34	0	0%
Total (drainage)	729.6	991.8	136%

¹ Practices apply to storm drainage

² Management practice not specifically recommended by Coalition representative for grower's operation

NA – Not applicable; no recommendations for the management practice in the subwatershed and was not indicated as implemented by surveyed growers

Figure 18. Percentage of acreage represented by newly implemented (2009/2010) management practices for Dry Creek. All members that were recommended to implement additional practices have irrigation drainage.



SECOND PRIORITY SUBWATERSHEDS

Focused outreach to document current management practices and track implementation of additional management practices in second priority subwatersheds began in 2010 and will continue through 2012. These subwatersheds include Bear Creek @ Kibby Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd and Highline Canal @ Hwy 99.

The Coalition has successfully completed contacts and surveys documenting current and recommended management practices for second priority subwatersheds. The management practice surveys used in the second priority subwatersheds were similar to those used in the first priority subwatersheds. These surveys were also divided into checklist subjects including Irrigation Water Management, Storm Drainage, Erosion and Sediment Management, Pest Management and Dormant Spray Management (Table 23 - 26). Table 23 – 26 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. When evaluating management practices and the acreage associated with them, a parcel and its associated acreage may be included under multiple management practices. Therefore, the acreages in Tables 23 - 26 cannot be summed together across management practices since parcels can be added more than once. These tables can be used to evaluate number of acres for a particular practice with the overall acreage of the subwatershed, or in relation to another management practice.

A preliminary analysis of current and recommended practices was conducted based on survey information obtained in 2010 for practices in 2009 and is included below by subwatershed. Follow up surveys will be conducted in 2011 to document any additional practices implemented in 2011; this information will be included in the 2012 MPUR.

Table 23. Current management practices utilized by targeted growers within Bear Creek @ Kibby Rd subwatershed (2010).

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	9	64%	679.3
		Recirculation - Tailwater return system	3	21%	537.9
		Use drainage basins (sediment ponds) to capture and retain runoff	2	14%	51.9
	Irrigation System	Microirrigation	1	7%	40
		Surface	13	93%	1252
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	13	93%	1272
		Irrigation District Deliveries	1	7%	20
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	2	14%	30
		Pump/Drain into waterway & able to control timing	1	7%	19.9
		Pump/Drain into waterway & unable to control timing	8	57%	942.1
		Recirculation - Tailwater return system	2	14%	51.9
		Settling Pond	1	7%	19.9
	When do you have storm water draining from your field?	After soil is saturated-late winter	3	21%	533
		No Storm Drainage	4	29%	101
		Only in heavy (100 year) storms	7	50%	658
Section 3: Erosion & Sediment Management	Sediment management practices:	Grass Row Centers (Orchards, Vineyards)	6	43%	494.9
		Maintain vegetated filter strips around field perimeter at least 10' wide	11	79%	1127.6
		Vegetation is planted along or allowed to grow along ditches	6	43%	839.7
	Do you apply herbicides during winter months?	Do not apply	3	21%	130.4
		Glyphosate (Round-Up)	10	71%	1055.6
		Goal	4	29%	101.9
		Other	8	57%	1083.9
		Simazine (Princep)	1	7%	32
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	9	64%	503.3
		Other: Livestock drink in creek	1	7%	15
		Riparian vegetation prevents livestock access to water	1	7%	45
		Water not present when livestock is in pasture	3	21%	728.7
		Waterway is fenced	1	7%	45

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	12	86%	1232
		Outside nozzles shut off when spraying outer rows next to sensitive sites	8	57%	584.3
		Spray areas close to waterbodies when the wind is blowing away from them	11	79%	746
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	6	43%	494.9
		Uses of nozzles that provide largest effective droplet size to minimize drift	12	86%	1232
	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	13	93%	1252
		Yes	1	7%	40
	How often is spray equipment calibrated?	Never	1	7%	486
		Once per month	2	14%	205
		Once per year	3	21%	49.9
		Prior to each application	8	57%	551.1
Section 5: Dormant Spray Management	Dormant spray management practices:	Check weather conditions prior to spraying (i.e. storm status)	1	7%	40
		Maintain setback zones	1	7%	40
	Do you apply when soil moisture is at field capacity?	No	1	7%	40
	Have you been informed of DPR's Dormant Spray Regulations?	Yes	1	7%	40
	How many acres are sprayed with dormant pesticides?	40 Acres	1	7%	40
		No Dormant Sprays	13	93%	1252
	Prior to applying winter dormant sprays, what is the condition of your orchard floor?	Vegetated Cover w/Sprayed Berms	1	7%	40
		Vegetative cover	1	7%	40

Table 24. Current management practices utilized by targeted growers within Cottonwood Creek @ Rd 20 subwatershed (2010).

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	20	80%	4283.03
		Recirculation - Tailwater return system	2	8%	510
		Use drainage basins (sediment ponds) to capture and retain runoff	1	4%	96
	Irrigation System	Microirrigation	11	44%	4126
		Sprinkler	3	12%	938
		Surface	13	52%	2096.03
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	25	100%	5770.03
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	12	48%	2167.03
		Pump/Drain into waterway & able to control timing	2	8%	944
		Pump/Drain into waterway & unable to control timing	5	20%	1782
		Recirculation - Tailwater return system	2	8%	510
		Settling Pond	1	4%	414
	When do you have storm water draining from your field?	After soil is saturated-late winter	3	12%	1127
		No Storm Drainage	17	68%	2467.03
		Only in heavy (100 year) storms	5	20%	2176
Section 3: Erosion & Sediment Management	Sediment management practices:	Grass Row Centers (Orchards, Vineyards)	21	84%	5326.03
		Maintain vegetated filter strips around field perimeter at least 10' wide	13	52%	2849.03
		Vegetation is planted along or allowed to grow along ditches	6	24%	2332
	Do you apply herbicides during winter months?	Diuron (Karmex)	1	4%	80
		Do not apply	2	8%	130
		Glyphosate (Round-Up)	19	76%	4899.03
		Goal	13	52%	3592.03
		Other	9	36%	1278
		Paraquat (Gramaxone)	9	36%	3561
		Simazine (Princep)	6	24%	773.03
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	23	92%	5630.03
		Riparian vegetation prevents livestock access to water	1	4%	80
		Waterway is fenced	1	4%	80

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	25	100%	5770.03
		Outside nozzles shut off when spraying outer rows next to sensitive sites	23	92%	5606.03
		Spray areas close to waterbodies when the wind is blowing away from them	23	92%	4663.03
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	20	80%	5195.03
		Uses of nozzles that provide largest effective droplet size to minimize drift	25	100%	5770.03
	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	22	88%	4831
		Yes	3	12%	939.03
	How often is spray equipment calibrated?	Once per month	3	12%	107
		Once per year	3	12%	149
		Prior to each application	19	76%	5514.03
Section 5: Dormant Spray Management	Dormant spray management practices:	Check weather conditions prior to spraying	2	8%	614.03
		Maintain setback zones	2	8%	614.03
	Do you apply when soil moisture is at field capacity?	No	2	8%	614.03
	Have you been informed of DPR's Dormant Spray Regulations?	Yes	2	8%	614.03
	How many acres are sprayed with dormant pesticides?	461 Acres	1	4%	461
		56 Acres	1	4%	153.03
		No Dormant Sprays	23	92%	5156
	Prior to applying winter dormant sprays, what is the condition of your orchard floor?	Some vegetation	1	4%	153.03
		Vegetated Cover w/Sprayed Berms	1	4%	461

Table 25. Current management practices utilized by targeted growers within Duck Slough @ Gurr Rd subwatershed (2010).

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	6	100%	2656
		Recirculation - Tailwater return system	4	67%	1845
		Use drainage basins (sediment ponds) to capture and retain runoff	3	50%	1754.4
	Irrigation System	Surface	6	100%	2656
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	6	100%	2656
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	2	33%	279.6
		Pump/Drain into waterway & able to control timing	3	50%	1754.4
		Pump/Drain into waterway & unable to control timing	1	17%	90.6
		Recirculation - Tailwater return system	2	33%	1309
		Settling Pond	2	33%	1309
	When do you have storm water draining from your field?	No Storm Drainage	2	33%	811
		Only in heavy (100 year) storms	4	67%	1845
Section 3: Erosion & Sediment Management	Sediment management practices:	Maintain vegetated filter strips around field perimeter at least 10' wide	1	17%	189
		Vegetation is planted along or allowed to grow along ditches	5	83%	2210.6
	Do you apply herbicides during winter months?	Diuron (Karmex)	1	17%	484
		Do not apply	1	17%	622
		Glyphosate (Round-Up)	2	33%	536
		Other	4	67%	1845
		Paraquat (Gramaxone)	3	50%	1104.6
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	6	100%	2656
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	6	100%	2656
		Outside nozzles shut off when spraying outer rows next to sensitive sites	1	17%	445.4
		Spray areas close to waterbodies when the wind is blowing away from them	6	100%	2656

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 4: Pest Management	Spray management practices:	Uses of nozzles that provide largest effective droplet size to minimize drift	6	100%	2656
	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	6	100%	2656
	How often is spray equipment calibrated?	Once per month	1	17%	445.4
		Prior to each application	5	83%	2210.6
Section 5: Dormant Spray Management	How many acres are sprayed with dormant pesticides?	No Dormant Sprays	6	100%	2656

Table 26. Current management practices utilized by targeted growers within Highline Canal @ Hwy 99 subwatershed (2010).

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	6	60%	200.94
	Irrigation System	Microirrigation	3	30%	195
		Sprinkler	8	80%	276.84
		Surface	2	20%	181
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	3	30%	90
		Irrigation District Deliveries	6	60%	252.9
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	8	80%	217.84
	When do you have storm water draining from your field?	No Storm Drainage	8	80%	322.9
		Only in heavy (100 year) storms	2	20%	44.94
Section 3: Erosion & Sediment Management	Sediment management practices:	Grass Row Centers (Orchards, Vineyards)	6	60%	246.84
		Maintain vegetated filter strips around field perimeter at least 10' wide	4	40%	168.9
		Vegetation is planted along or allowed to grow along ditches	5	50%	152.9
	Do you apply herbicides during winter months?	Do not apply	5	50%	139.94
		Glyphosate (Round-Up)	3	30%	147.9
		Goal	1	10%	121
		Other (product unknown)	1	10%	60
		Paraquat (Gramaxone)	2	20%	141
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	10	100%	367.84
Section 4: Pest Management	Spray management practices:	Adjust spray nozzles to match crop canopy profile	9	90%	336.84
		Outside nozzles shut off when spraying outer rows next to sensitive sites	9	90%	336.84
		Spray areas close to waterbodies when the wind is blowing away from them	9	90%	336.84
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	4	40%	71.84

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	PERCENT OF RESPONDENTS	SUM OF ASSOCIATED ACREAGE
Section 4: Pest Management	Spray management practices:	Use electronic controlled sprayer nozzles	1	10%	20
		Uses of nozzles that provide largest effective droplet size to minimize drift	9	90%	336.84
	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	5	50%	101.84
		Yes	5	50%	266
	How often is spray equipment calibrated?	Once per year	2	20%	69.94
		Prior to each application	7	70%	266.9
Section 5: Dormant Spray Management	Dormant spray management practices:	Check weather conditions prior to spraying (i.e. storm status)	1	10%	121
		Maintain setback zones	1	10%	121
	Do you apply when soil moisture is at field capacity?	N/A	1	10%	20
		No	2	20%	181
	Have you been informed of DPR's Dormant Spray Regulations?	Yes	3	30%	201
	How many acres are sprayed with dormant pesticides?	120 Acres	1	10%	121
		35 Acres	1	10%	20
		60 Acres	1	10%	60
		No Dormant Sprays	7	70%	166.84
	Prior to applying winter dormant sprays, what is the condition of your orchard floor?	Vegetative cover	3	30%	201

Current and Recommended Management Practices (2009)

Bear Creek @ Kibby Rd

The Coalition contacted 14 targeted growers representing 31% of the direct drainage within the Bear Creek @ Kibby Rd subwatershed (Table 10). The 14 members were determined to have the potential to drain directly to the creek, were currently farming, and had reported pesticide use of high priority constituents (Figure 19).

Almost half of the Bear Creek subwatershed is pasture with irrigation runoff. The remainder of land use is almost evenly split between orchard/pasture, orchard, and field/row crops. The majority of property in the subwatershed has irrigation runoff (93%, Figures 20 and 21).

Of those surveyed in the Bear Creek @ Kibby Rd subwatershed, 93% of the respondents with slightly over 97% of the acreage used flood irrigation (Table 23). A single grower representing 40 acres indicated use of microirrigation systems (Table 23). However, 53% of acres were laser leveled fields and 42% of acres had recirculation systems. The majority of respondents (93%) irrigated based on soil moisture levels; only one grower bases irrigation schedules on irrigation district deliveries (Table 23).

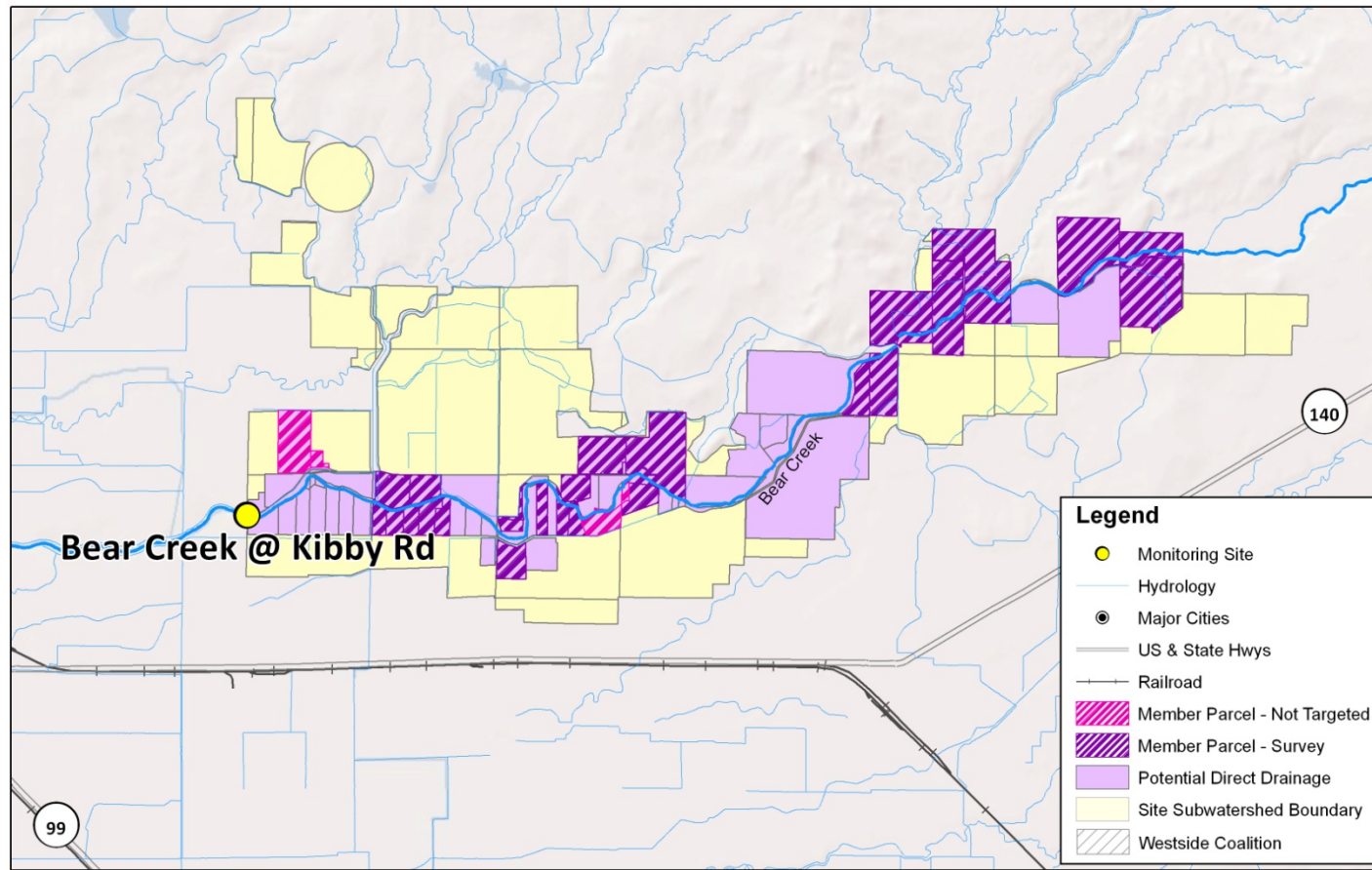
There is a mixture of respondents that have storm water drainage when the soil is saturated in late winter (21%) and/or in 100 year storms (50%, Table 23). Four respondents (29%) indicated that there was no storm water drainage from their property. Only one grower indicated they pumped storm water to surface waters and could control the timing whereas 57% of the respondents indicated they pumped storm water to surface waters and could not control the timing (Table 23). Two growers use recirculation systems and one grower uses a settling pond to hold storm water. All respondents indicated that they controlled erosion and sediment delivery by some means including utilizing vegetative filter strips, vegetated ditches, settling ponds and recirculation/tailwater return systems (Table 26).

Although four growers either remove cattle from pasture when water is present or have riparian vegetation or fences to prevent livestock access to waterways (one grower has both fences and vegetation along waterways), one grower representing 15 acres indicated livestock are permitted to drink from the creek (Table 23).

Seventy-nine percent of respondents indicated they apply herbicides during the winter; glyphosate is the most commonly applied herbicide (71% of respondents, Table 23). One respondent indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season whereas 13 respondents indicated that the question was not applicable to their operation (Table 23). Only one respondent indicated that they use dormant sprays. The grower only applies dormant sprays to orchards with vegetated cover, checks weather conditions prior to spraying, and maintains setback zones during application (Table 23). Eight respondents indicated that they calibrated their nozzles prior to each application, whereas two respondents calibrate once a month, three calibrate once a year, and one respondent never calibrates spray equipment (Table 23). The majority took numerous steps to manage their spray drift including adjusting spray nozzles to match the canopy profile (86%), shutting outside nozzles when spraying outer two rows (57%), spraying areas close to waterbodies when the wind is blowing away from them (79%), using air blast applications when wind is between 3-10 mph (43%), and using nozzles that provide the largest effective droplet size to minimize drift (86%), see Table 23.

Coalition representatives encouraged growers in this subwatershed to improve the management of their irrigation discharge including installing recirculation / tailwater return systems and constructing drainage basins/sediment ponds (Figure 21).

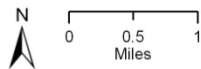
Figure 19. Direct drainage parcels in Bear Creek @ Kibby Rd.



Source of Layers:
 Hydrology - NHD hydrodata, 1:24,000-scale, <http://nhd.usgs.gov/>
 Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library
 TRS - Teale Public Land Survey System, Pub. date: 20090101, California Spatial Information Library
 Parcel Layer - Stanislaus County, 2010, Merced: 2011, Madera: 2011
 Basemap, Shaded Relief - ESRI
 GSC North America 1983

Date Prepared: 03/01/11

ESJWQC



Bear Creek @ Kibby Rd. 2nd Priority Subwatershed Parcels

Figure 20. Bear Creek @ Kibby Rd crop acreage information from member surveys based on crop type and irrigation runoff (2010).

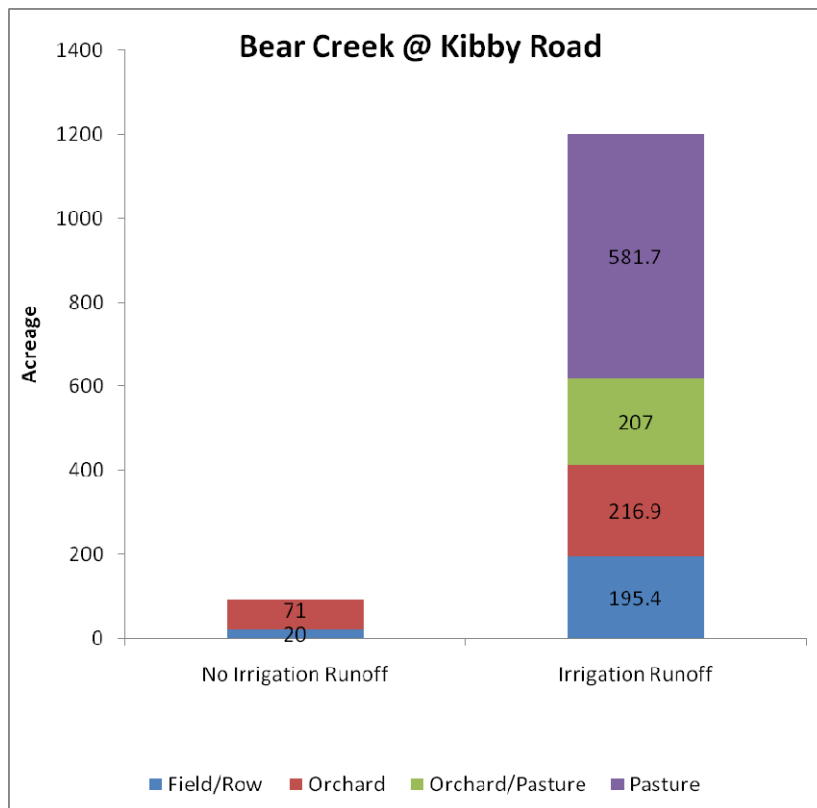
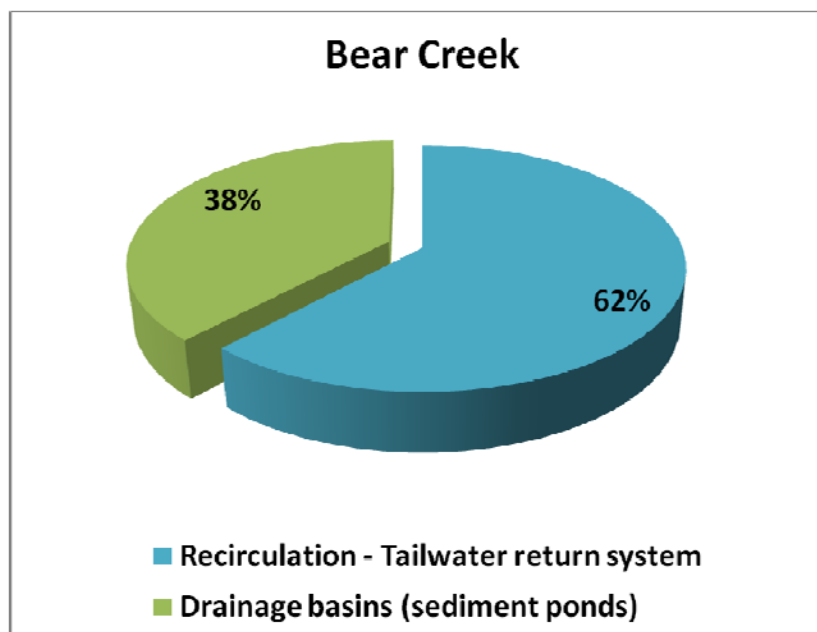


Figure 21. Percentage of acreage represented by recommended management practices for Bear Creek @ Kibby Rd. All members that were recommended to implement additional practices have irrigation drainage.



Cottonwood Creek @ Rd 20

The Coalition contacted 25 targeted growers within the Cottonwood Creek @ Rd 20 subwatershed that were identified as having the potential to drain directly to Cottonwood Creek (including spray drift), were currently farming, and had reported pesticide use of high priority constituents (Figure 22). The 25 members were surveyed for management practices currently implemented across 5,768 acres within the Cottonwood Creek subwatershed. The direct drainage represented by targeted members is 45% of the total direct drainage area within the Cottonwood Creek @ Rd 20 subwatershed (Table 10).

Orchards and vineyards are farmed in Cottonwood Creek by targeted members, the majority of which have no irrigation runoff. A large portion of the creek is bordered by large berms, which prevent discharge to the creek. The only irrigation runoff was associated with orchards (Figures 23 and 24).

Growers in the Cottonwood Creek subwatershed are almost evenly split between those who utilize microirrigation and/or sprinklers to irrigate (56%) and who utilize surface (flood) irrigation (52%, Table 24). However, the 52% of respondents using flood irrigation only account for 37% of the acreage (Table 24). In addition, a single grower farming 695 acres uses surface, sprinkler, and microirrigation techniques and all irrigation systems are associated with the enrolled acreage. All growers irrigate based on actual moisture levels and crop needs rather than on a set schedule and the majority of growers (80%) farm laser leveled fields (Table 24).

The majority of respondents indicated no storm drainage from their property (68%), while five respondents indicated storm drainage only in 100 year storms and three growers have storm drainage when the soil is saturated in late winter (Table 24). Of the respondents with storm drainage, 20% pump or drain discharge into waterway and are unable to control timing, 8% are able to control timing of pumping or discharge, 8% utilize a recirculation system, and one grower has a settling pond (Table 24). All respondents indicated that they controlled erosion and sediment delivery by some means. Herbicides were applied by most growers with only 8% indicating no applications. Glyphosate and goal were the most commonly applied herbicides.

Twenty-two respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season and 23 of 25 respondents indicated that they did not use dormant sprays (Table 24). The two respondents who do apply during the dormant season indicated vegetation covers their fields in the winter and they check weather conditions prior to and maintain setback zone while spraying. Over 96% 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 (100%), shutting outside nozzles when spraying outer two rows (92%), spraying areas close to waterbodies when the wind is blowing away from them (92%), using air blast applications when wind is between 3-10 mph (80%), and using nozzles that provide the largest effective droplet size to minimize drift (100%), see Table 24.

Drift management is especially important in this subwatershed due to the lack of irrigation drainage and a majority of the growers were recommended to implement additional spray drift management practices (Figure 23). One grower was also recommended to install berms between their property and the creek to prevent storm water discharge (Figure 24).

Figure 22. Direct drainage parcels in Cottonwood Creek@ Rd 20 subwatershed.

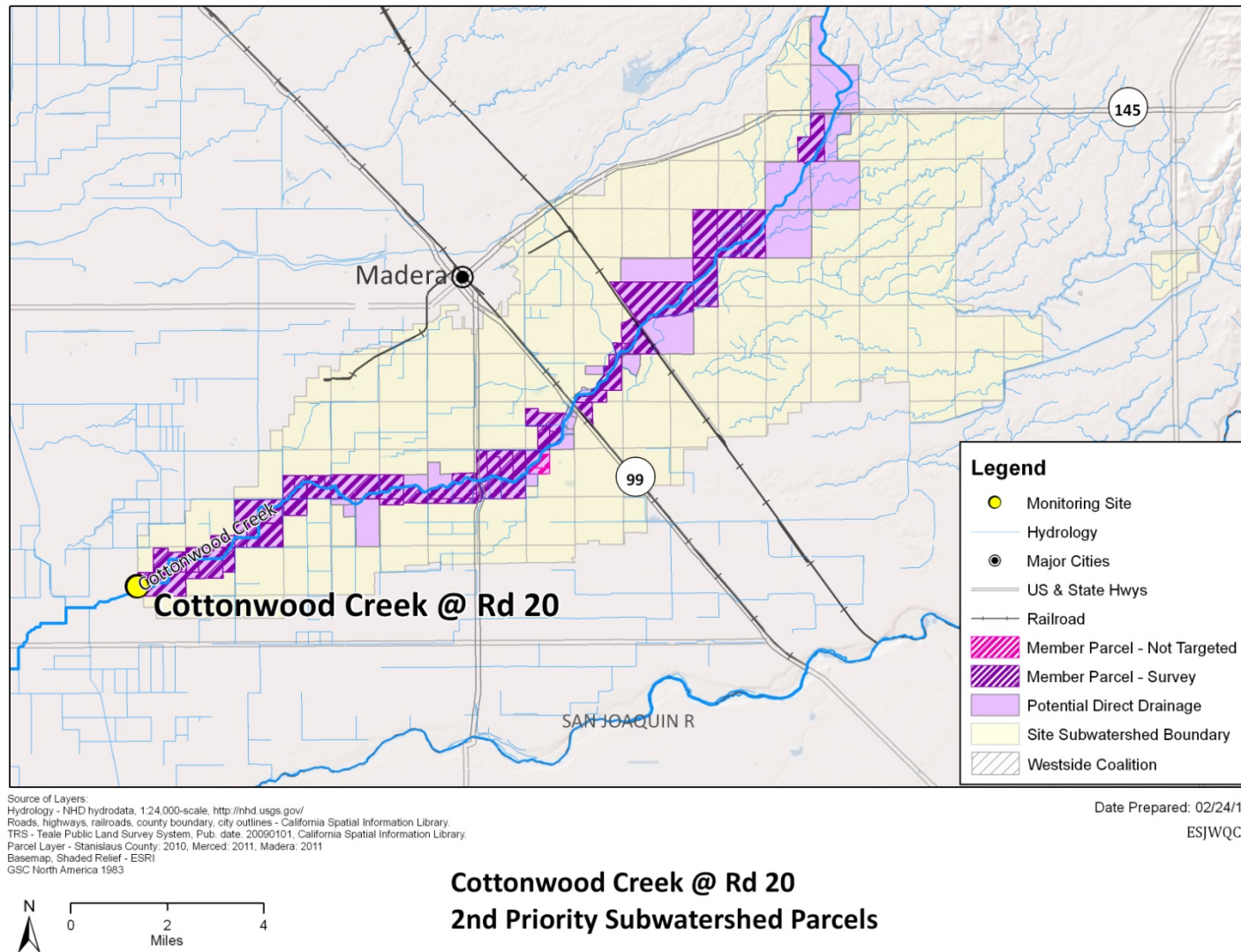


Figure23. Cottonwood Creek@ Rd 20 crop acreage information from member surveys based on crop type and irrigation runoff (2010).

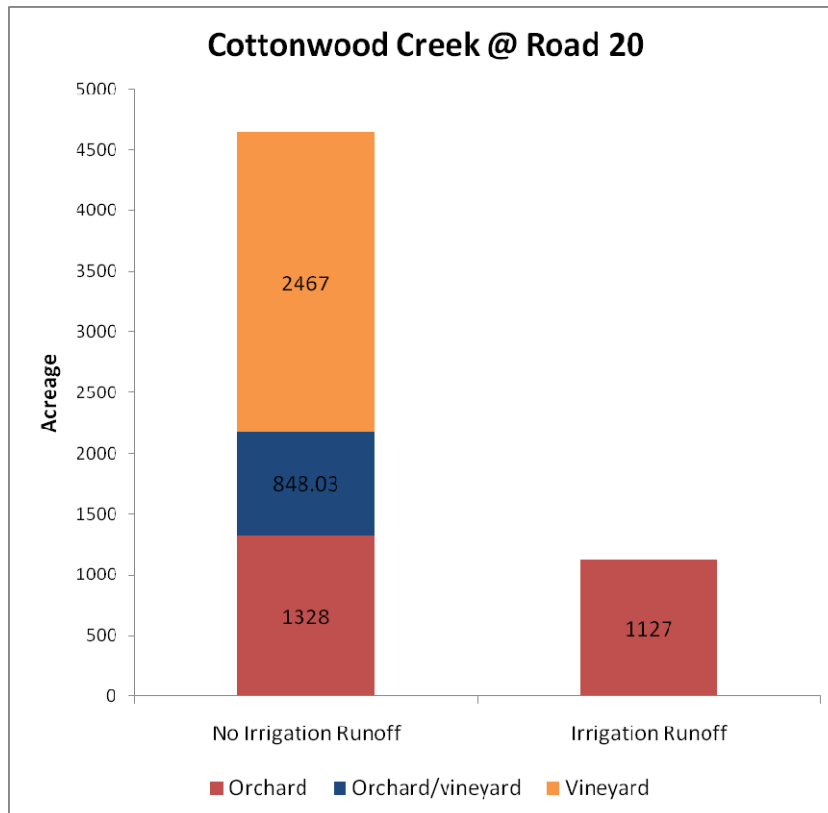
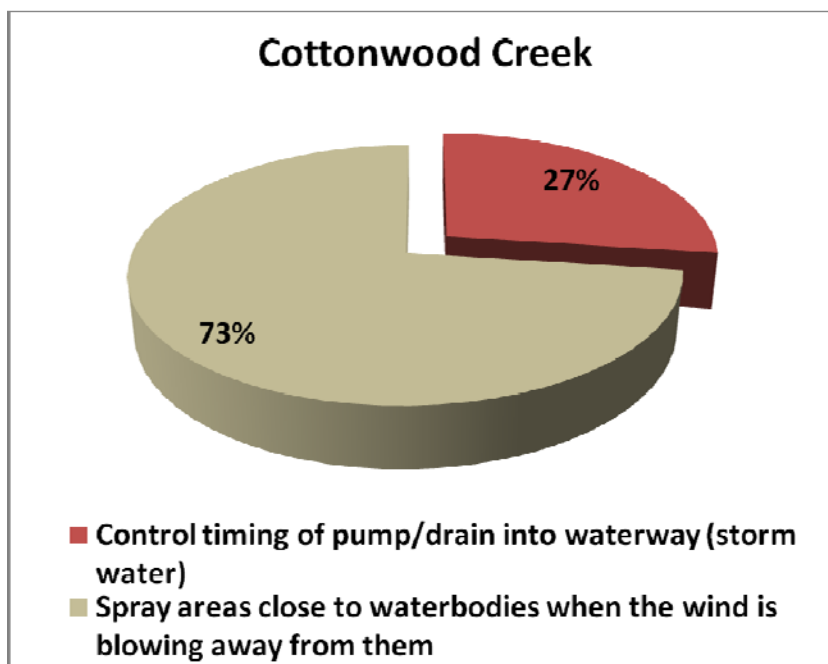


Figure 24. Percentage of acreage represented by recommended management practices for Cottonwood Creek @ Rd 20. All members that were recommended to implement additional practices did not have irrigation drainage.



Duck Slough @ Gurr Rd

The Coalition contacted six targeted growers representing 33% of the direct drainage area within the Duck Slough @ Gurr Rd subwatershed (Table 10). The six members 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 (Figure 25).

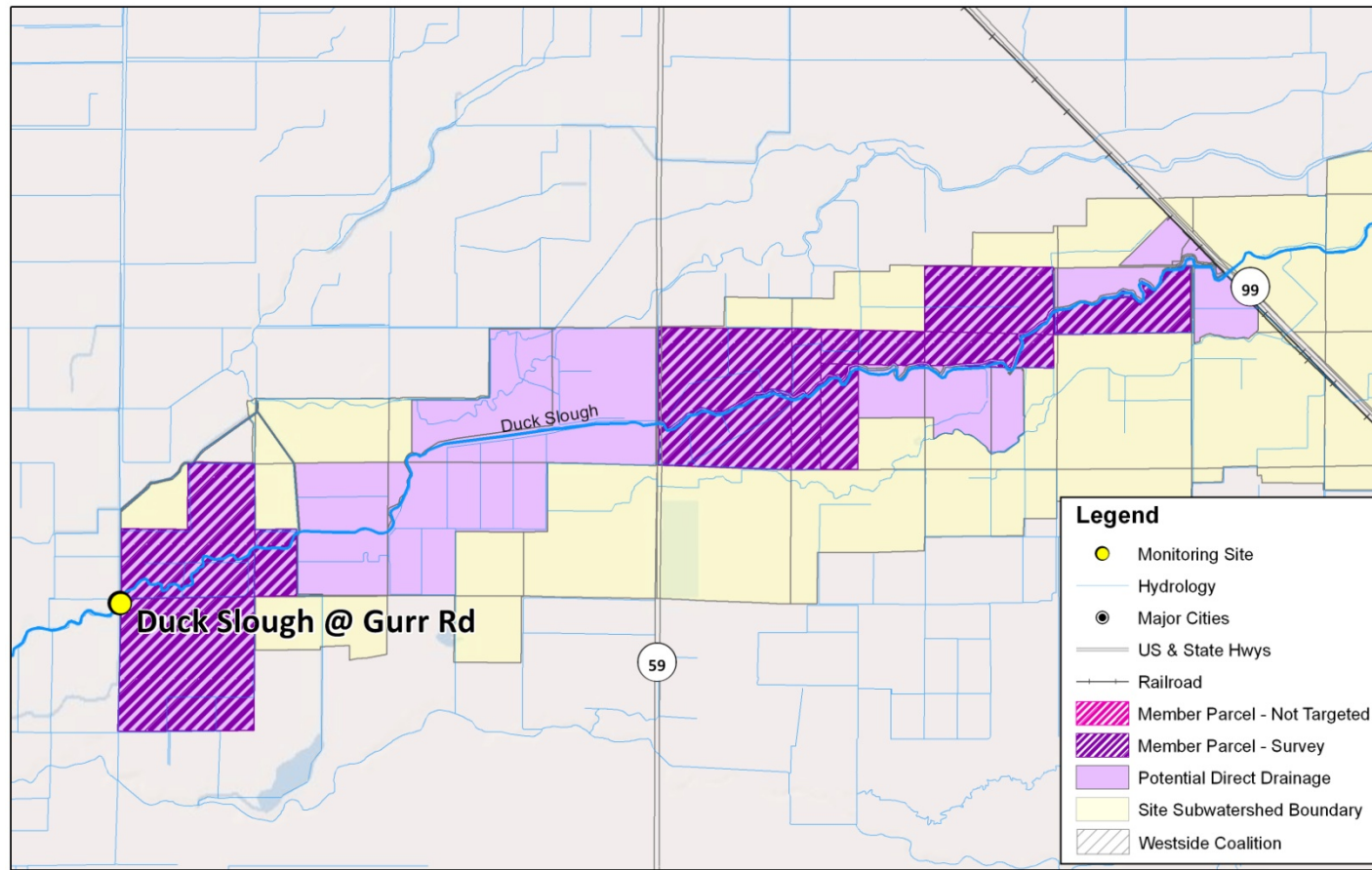
Of those surveyed, 80% of the acreage had irrigation runoff and all crops were field/row crops (Figure 26). All growers surveyed in the Duck Slough watershed indicated they surface irrigate (Table 25). All growers laser leveled fields, 67% used recirculation systems, and 50% used sediment retention ponds to prevent discharges to surface waters (Table 25).

Respondents indicated they have no storm drainage (33%) or that they only have storm drainage during 100 year storms (67%, Table 25). Half of growers representing 66% of the acreage indicated they pumped storm water to surface waters and were able to control the timing; one grower pumps to surface waters but cannot control the timing (Table 25). Fifty percent of the acreage in Duck Slough @ Gurr Rd has both a recirculation system and settling pond installed (Table 25). All respondents indicated that they controlled erosion and sediment delivery by some means.

All but one grower applied herbicides during the winter, with over half applying paraquat and one third applying glyphosate (Table 25). All respondents indicated that considering alternatives to using diazinon or chlorpyrifos was not applicable to their operations and all respondents indicated that they did not use dormant sprays (Table 25). The majority of respondents (83%) calibrated prior to each application, and one grower calibrated once per month (Table 25). Every respondent has taken numerous steps to manage their spray drift including adjusting spray nozzles to match the canopy profile (100%), spraying areas close to waterbodies when the wind is blowing away from them (100%), and using nozzles that provide the largest effective droplet size to minimize drift (100%), see Table 25.

The Duck Slough @ Gurr Rd subwatershed is dominated by field/row crops (Figure 26) and the Coalition believes if irrigation runoff can be reduced, water quality impairments in this subwatershed will also be reduced. Coalition representatives recommended management practices only to growers who indicated they have irrigation drainage from their property. Recommended practices include installing a recirculation / tailwater return system, constructing a drainage basin to reduce runoff, and using PAM during irrigation to reduce furrow erosion (Figure 27).

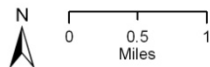
Figure 25. Direct drainage parcels in Duck Slough @ Gurr Rd subwatershed.



Source of Layers:
 Hydrology - NHD hydrodata, 1:24,000-scale, <http://nhd.usgs.gov/>
 Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library
 TRS - Teale Public Land Survey System, Pub. date: 20090101, California Spatial Information Library
 Parcel Layer - Stanislaus County; 2010, Merced; 2011, Madera; 2011
 Basemap, Shaded Relief - ESRI
 GSC North America 1983

Date Prepared: 02/28/11

ESJWQC



Duck Slough @ Gurr Rd 2nd Priority Subwatershed Parcels

Figure 26. Duck Slough @ Gurr Rd crop acreage information from member surveys based on crop type and irrigation runoff (2010).

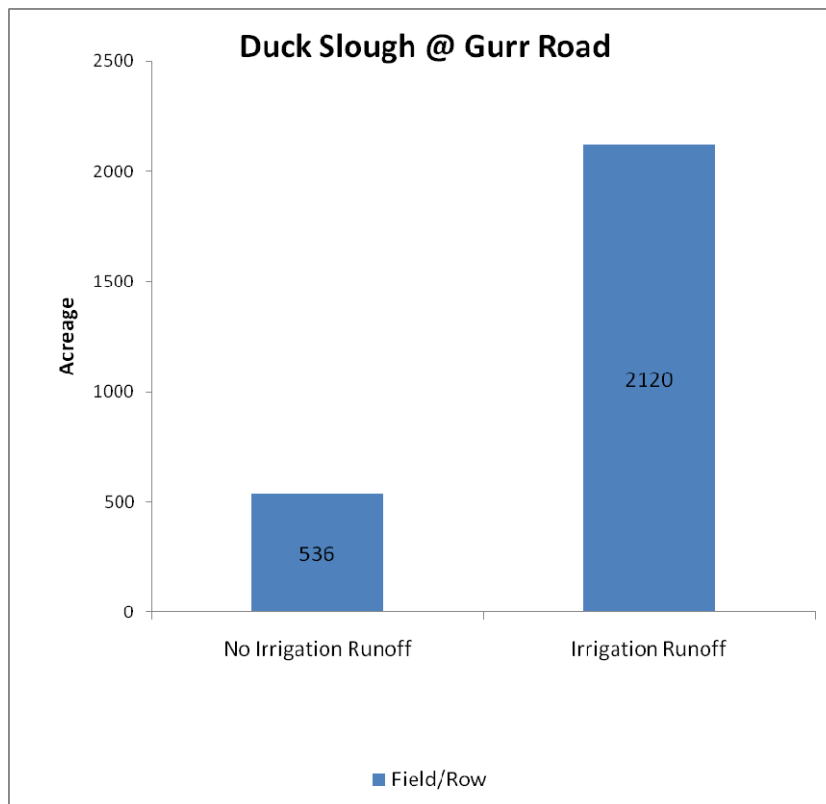
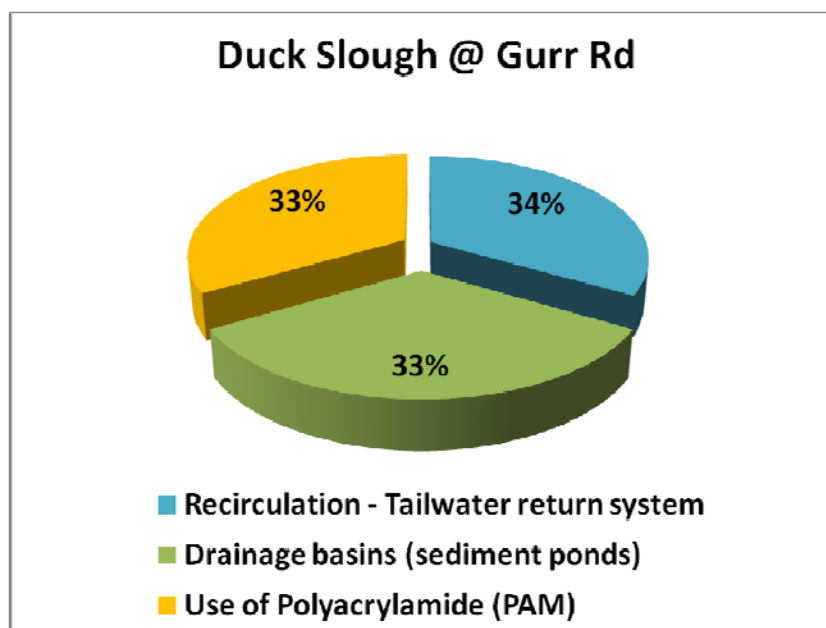


Figure 27. Percentage of acreage represented by recommended management practices for Duck Slough @ Gurr Rd for members with irrigation drainage. All members that were recommended to implement additional practices have irrigation drainage.



Highline Canal @ Hwy 99

The Coalition contacted 10 targeted growers representing 33% of the direct drainage acreage within the Highline Canal @ Hwy 99 subwatershed (Table 10). The 10 members were determined to have the potential to drain directly to the drain, were currently farming, and had reported pesticide use of high priority constituents (Figure 28).

Targeted growers in the Highline Canal @ Hwy 99 predominantly farm orchards, with some field/row crops acreage. There is no irrigation drainage from any of the targeted growers' properties (Figure 29).

Growers in the Highline Canal @ Hwy 99 subwatershed use a variety of irrigation systems on their fields, with some growers employing more than one system on their properties. Only two growers indicated they use surface (flood) irrigation techniques accounting for 52% of the acreage. Eight of the 10 growers use sprinklers (Table 26), some members have a combination of sprinkler and microirrigation. One grower farming 121 acres employs surface, sprinkler, and microirrigation on his operation, and all three irrigation systems are associated with the enrolled acreage. Only 30% of the respondents irrigated based on soil moisture levels whereas 60% allow the irrigation district deliveries to dictate their watering schedule; one grower did not respond to this question.

All respondents indicated that they controlled erosion and sediment discharge by some means and two growers indicated that only in the case of a heavy, 100-year storm would they have storm water discharge (Table 26).

Half of respondents representing 40% of the acreage indicated they do not apply herbicides in the winter. Of those making winter herbicide applications, 30% apply glyphosate, 20% apply paraquat, 10% apply Goal, and 10% indicated they applied herbicides but did not know which ones (Table 26). Half of respondents indicated they had considered alternatives to using diazinon or chlorpyrifos during the growing season and the other half indicated that the question was not applicable to their operation. Eighty percent of respondents indicated that they did not use dormant sprays. Seven respondents indicated that they calibrated their nozzles prior to each application and two growers calibrated their nozzles once a year; one grower did not respond (Table 26). The majority took numerous steps to manage their spray drift including adjusting spray nozzles to match the canopy profile (90%), shutting outside nozzles when spraying outer two rows (90%), spraying areas close to waterbodies when the wind is blowing away from them (90%), using air blast applications when wind is between 3-10 mph (40%), and using nozzles that provide the largest effective droplet size to minimize drift (90%), see Table 26.

Coalition representatives did not make any specific recommendations to targeted members in this subwatershed. The Coalition discussed water quality exceedances and grower responsibilities during individual meetings.

Figure 28. Direct drainage parcels in Highline Canal @ Hwy 99.

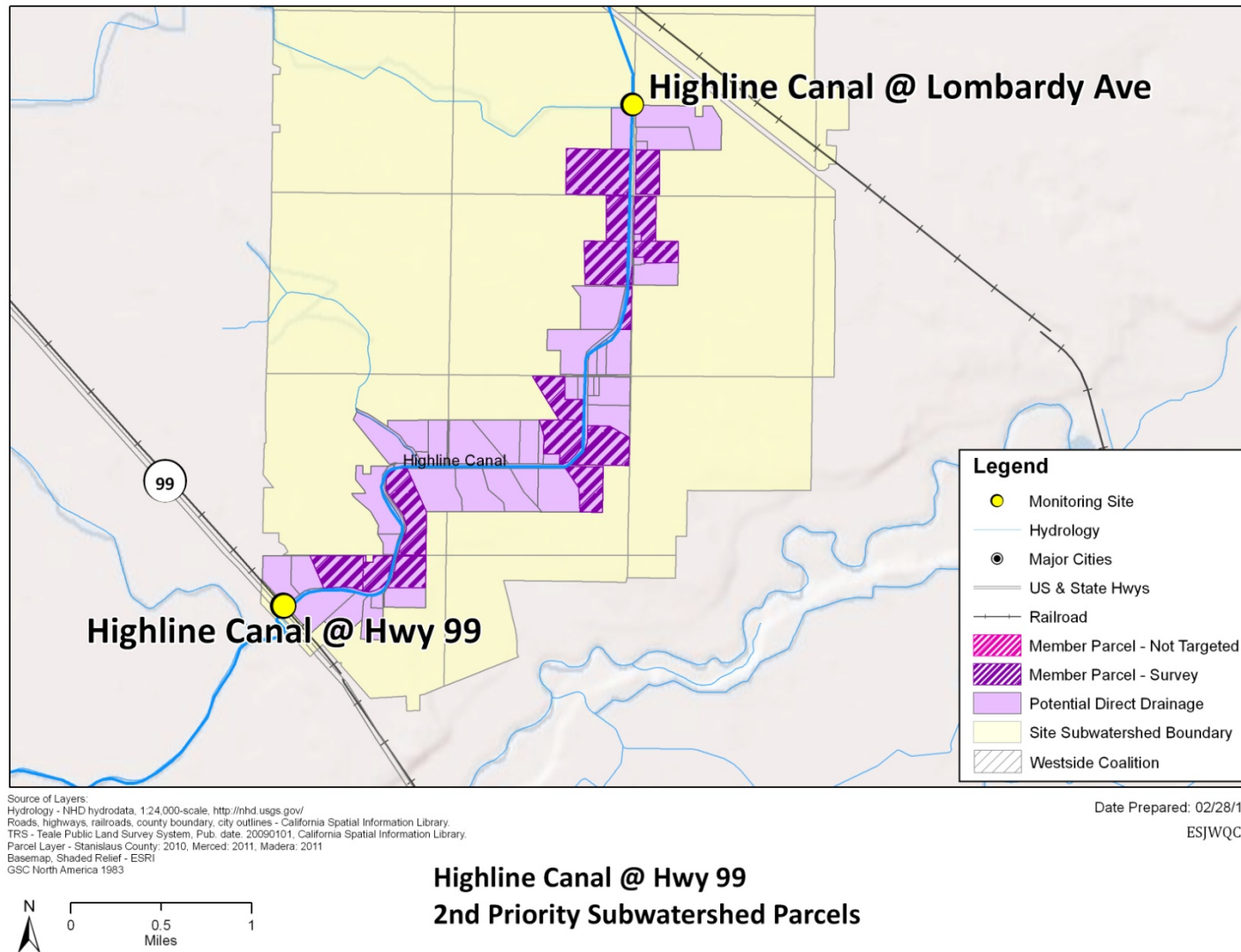
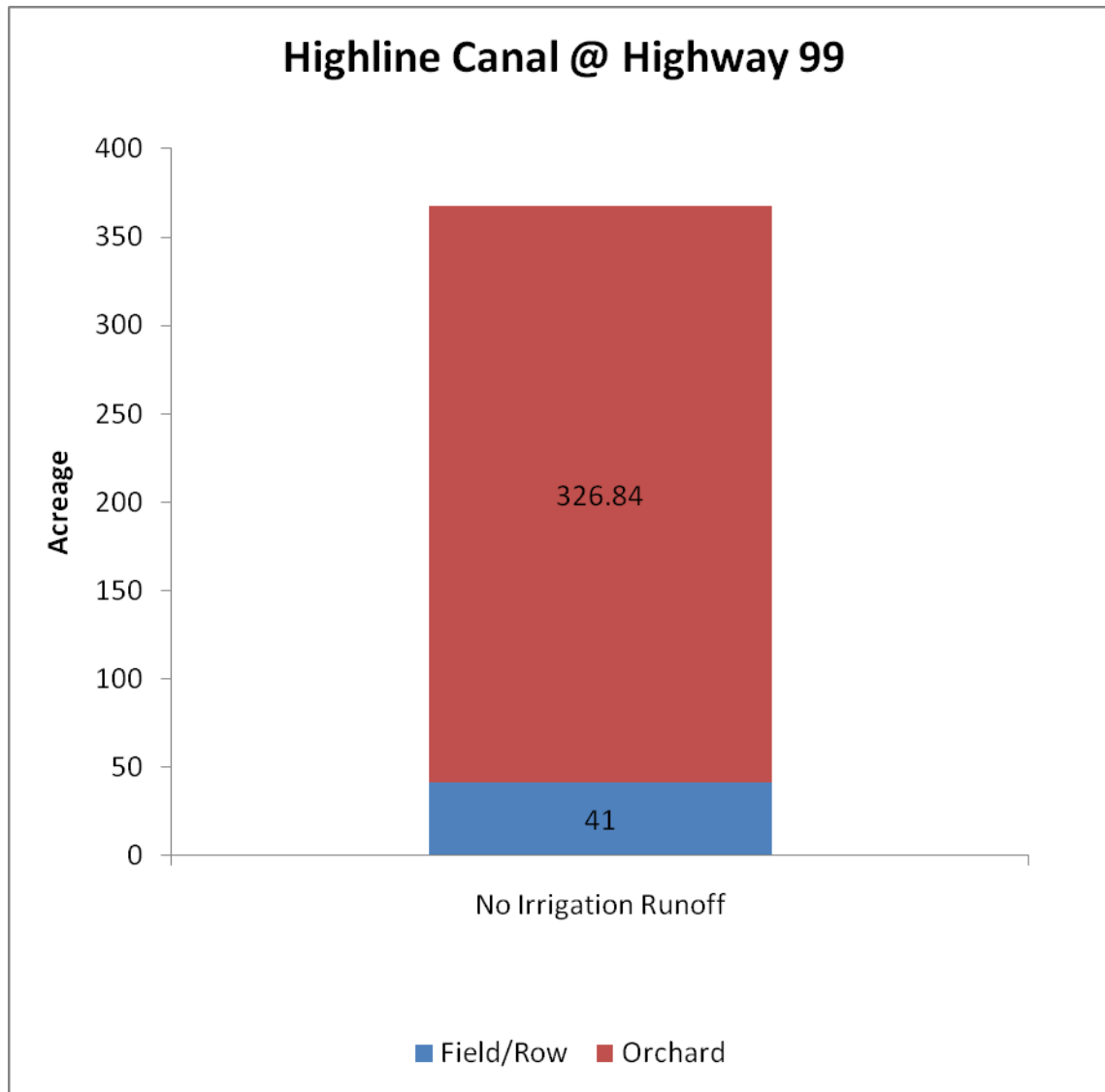


Figure 29. Highline Canal @ Hwy 99 crop acreage information from member surveys based on crop type and irrigation runoff (2010).



THIRD PRIORITY SUBWATERSHEDS

Focused outreach to document current management practices and track implementation of additional management practices in third priority subwatersheds began in late 2010 / early 2011 and will continue through 2013. These subwatersheds include Berenda Slough along Ave 18 1/2 , Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd and Livingston Drain @ Robin. As of April 1, 2011 the Coalition has completed initial contacts with all growers and has documented current management practices for 21% of the growers targeted across all four subwatersheds (Table 12).

A preliminary analysis of current and recommended practices will be included in the 2012 MPUR based on surveys completed in 2011. Follow up meetings will be conducted in 2012 to document additional management practices implemented in 2011.

EVALUATION OF MANAGEMENT PRACTICE EFFECTIVENESS

FIRST PRIORITY SUBWATERSHEDS

Management Plan Monitoring in the first priority subwatersheds (Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing) has occurred for the past four years (2007 through 2010) to identify potential sources of water quality exceedances and evaluate changes in water quality. These three sites have completed two years as priority site subwatersheds and the Coalition has recorded current management practices of targeted members (2008 and 2009 practices), new practices implemented by those growers in 2009 and 2010 and have conducted MPM for high priority constituents including chlorpyrifos, copper, algae toxicity, and sediment toxicity (see Appendix I for site subwatershed monitoring details).

The Coalition has since completed follow up contacts and obtained management practice implementation information from growers within the first three high priority subwatersheds, except for a single grower in the Dry Creek @ Wellsford Rd subwatershed who was not contacted until 2010; this grower will be contacted in 2012 to determine any additional management practices implemented in 2011. In 2010, targeted growers implemented management practices in addition to those already implemented in 2009. Thirty-six, 35% and 50% of the growers in Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd, respectively, implemented one or more additional management practice (Table 27).

When evaluating management practices and the acreage associated with them, a parcel and its associated acreage may be included under multiple management practices. Therefore, the acreages in Table 28 cannot be summed together across management practices since parcels would be added more than once. These tables can be used to evaluate number of acres with a particular practice with the overall acreage of the subwatershed or in relation to another management practice.

Table 27. Tally of growers implementing new management practices (MPs) for first high priority subwatersheds.

SUBWATERSHED	NUMBER OF GROWERS IMPLEMENTING			# GROWERS IMPLEMENTING NEW MPs	# GROWERS CONTACTED FOR FOLLOW UP	# NEW MPs IMPLEMENTED	% GROWERS IMPLEMENTING NEW MPs
	1 NEW MP	2 NEW MPs	3 NEW MPs				
Dry Creek @ Wellsford Rd	7	1	0	8	22	9	36%
Duck Slough @ Hwy 99	3	3	1	7	20	12	35%
Prairie Flower Drain @ Crows Landing Rd	2	1	1	5	10	7	50%

Table 28. Tally of acreage with newly implemented management practices (MPs) for first priority subwatersheds.

SUBWATERSHED (PRIORITY)		MANAGEMENT PRACTICES	ACREAGE: RECOMMENDED MPs	ACREAGE: ADDITIONAL MPs	ACREAGE: TOTAL MPs IMPLEMENTED	PERCENT OF IMPLEMENTED ACRES
Dry Creek @ Wellsford Rd (2008 – 2010)	No Irrigation Drainage (Implemented: 2,585.5 acres)	Shut off outside nozzles when spraying outer rows next to sensitive sites	523.7	0	523.7	20.3%
		Vegetation is planted along or allowed to grow in ditches	45	0	0	0%
		Grass row centers	0	107	107	4.1%
		Recirculation - Tailwater return system	0	443	443	17.1%
		Drainage Basins (Sediment Ponds)	0	121.3	121.3	4.7%
		Filter strips at least 10' wide around field perimeter	0	28	28	1.1%
		Reduce amount of water used in surface irrigation	0	162	162	6.3%
		Other (Not specified) ¹	NA	1200.5	1200.5	46.4%
	Irrigation Drainage (Implemented: 2,450 acres)	Other (Not specified) ¹	NA	2450	2450	100.0%
Duck Slough @ Hwy 99 (2008 – 2010)	No Irrigation Drainage (Implemented: 871.8 acres)	Shut off outside nozzles when spraying outer rows next to sensitive sites	871.8	0	210	24.1%
		Use air blast applications when wind is b/t 3-10 mph and upwind of a sensitive site	661.8	UA	UA	UA
		Recirculation - Tailwater return system	42	0	0	0%
		Drainage basins (sediment ponds)	42	0	0	0%
		Control time of pump/drain into waterway	42	661.8	661.8	75.9%
	Irrigation Drainage (Implemented: 2,415 acres)	Control time of pump/drain into waterway	269	485.5	485.5	20.1%
		Recirculation - Tailwater return system	142	0	0	0%
		Drainage basins (sediment ponds)	142	0	0	0%
		Use Polyacrylamide(PAM)	142	0	0	0%
		Vegetation is planted along or allowed to grow along ditches	21	0	0	0%
		Shut off outside nozzles when spraying outer rows next to sensitive sites	414.5	21	435.5	18.0%
		Spray areas close to waterbodies when the wind is blowing away from them	595.5	UA	UA	UA
		Reduce amount of water used in surface irrigation	0	764	764	31.6%
		Microirrigation system	0	279	279	11.6%
		Other (Not specified) ¹	NA	451	451	18.7%

SUBWATERSHED (PRIORITY)		MANAGEMENT PRACTICES	ACREAGE: RECOMMENDED MPs	ACREAGE: ADDITIONAL MPs	ACREAGE: TOTAL MPs IMPLEMENTED	PERCENT OF IMPLEMENTED ACRES
Prairie Flower Drain @ Crows Landing Rd (2008 – 2010)	No Irrigation Drainage (Implemented: 91 acres)	Install device to control discharge	0	91	91	100.0%
	Irrigation Drainage (Implemented: 991.8 acres)	Control time of pump/drain into waterway	76.9	420.9	420.9	42.4%
		Plant or allow vegetation along ditches	76.9	0	0	0%
		Recirculation - Tailwater return system	34	0	0	0%
		Drainage basins (sediment ponds)	270.9	150	150	15.1%
		Use Polyacrylamide(PAM)	271	150	150	15.1%
		Reduce amount of water used in surface irrigation	0	270.9	270.9	27.3%

¹ If growers implemented management practices other than those asked about during Coalition follow-up, they were instructed to indicate so and provide a summary/explanation.

UA – Unanswered, MP not specifically asked about during follow up contacts.

Each first priority subwatershed is unique in the percentages of management practices recommended and those that were implemented by growers in 2009 and 2010. One way to review management practices is to associate those practices with acreages enrolled by the grower in the Coalition. Figure 30 shows the percentage of acreages with a specific recommended management practice in relation to the overall acreages associated with one or more recommended management practice. Figure 31 shows the percentage of acreages associated with a specific implemented management practice relative to the overall acreage associated with one or more implemented management practice. Figure 16 does not include the acreages associated with “Other” which reflects a management practices not recommended by the Coalition and not listed in the follow up survey. “Other” is discussed and included in each site subwatershed analysis of implemented practices and is included in Table 28.

Overall, spray management practices were recommend most often including shutting off outside nozzles when spraying outer rows next to sensitive sites, spraying areas close to waterbodies when the wind is blowing away from them and using air blast sprayers (38%, 13%, and 14% of associated acreage, Figure 30). Installation of a device to control drainage was the most common implemented practice representing 31% of the acreage with implemented practices compared to 8% of the acreage with recommended practices (Figure 31).

One of the most expensive management practices to implement includes drainage basins (sediment ponds) and recirculation/tailwater return systems. Eight percent of the acreage with recommended practices had recommendations to install a drainage basin and/or a recirculation/tailwater return system (Figure 30). Follow up surveys indicate that 13% of acreage with newly implemented management practices now have a drainage basin and/or a recirculation/tailwater return system (Figure 31). Relatively, more acreage was recommended to use PAM than implemented this practice (413 acres versus 150 acres) which may be due to the increase of acreage associated with drainage basins and/or recirculation/tailwater return systems (Figures 30 and 31).

In addition, growers implemented practices not recommended including reducing the amount of water used in surface irrigation (23% of acreage with implemented practices) and installing microirrigation

systems (5% of acreage with implemented practices) (Figure 31). Though not included in Figure 31, there are 3,650 acres associated with “Other” on follow up surveys which represents management practices not listed specifically on the follow up surveys indicating that growers in these subwatersheds are implementing additional management practices aimed to reduce agricultural discharge into downstream waterbodies (Table 28).

Figure 30. Percentage of acreage associated with recommended management practices for all first priority subwatersheds.

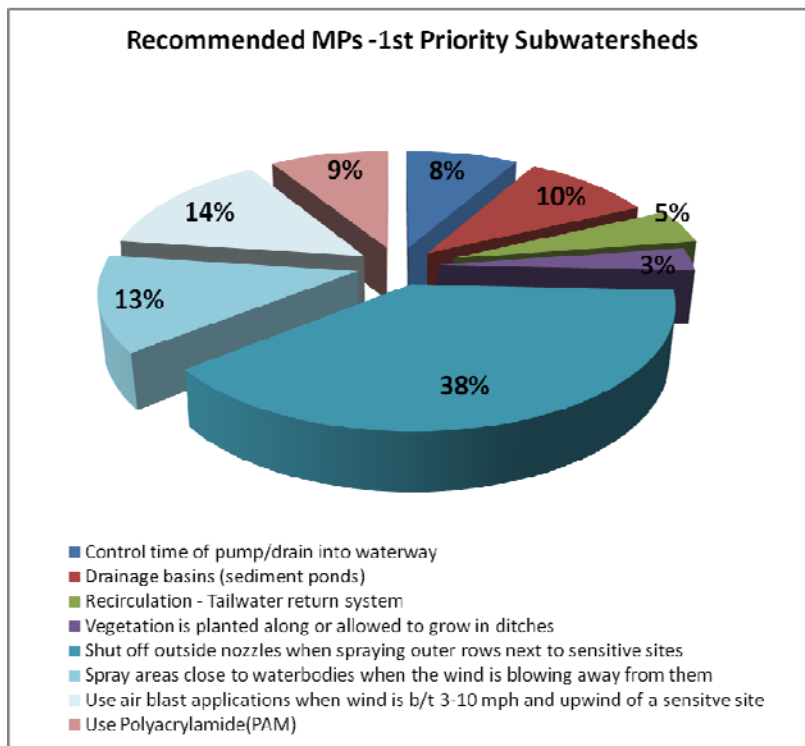
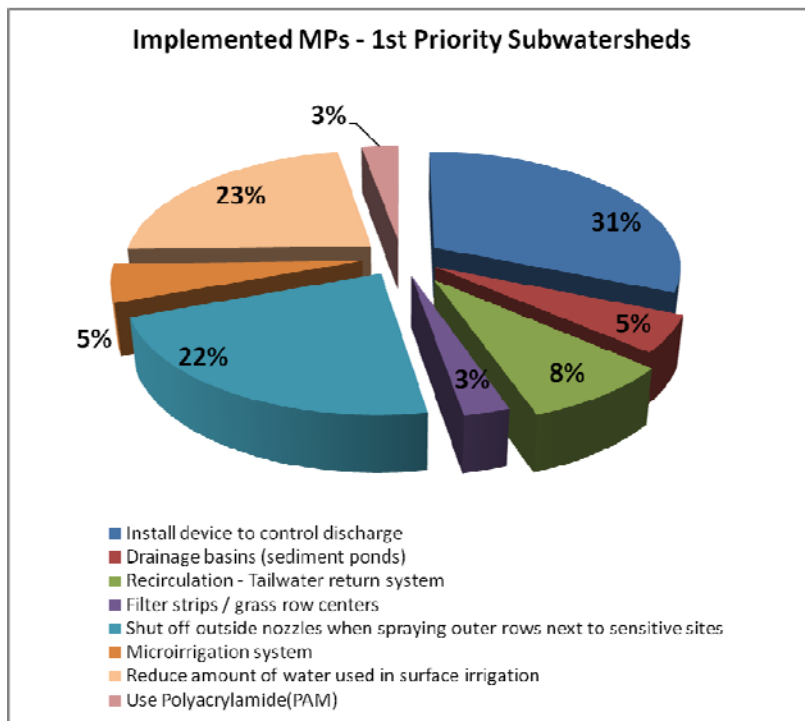


Figure 31. Percentage of acreage associated with implemented management practices for all first priority subwatersheds.



Across the three high priority subwatersheds, management practices have been recommended and implemented in addition to current practices for spray drift management, irrigation management and sediment management. The overall effect of these management practices has been improved water quality as demonstrated by MPM conducted within each of the site subwatersheds. Below is a brief description of the effectiveness of the management practices implemented within each first priority site subwatershed based on monitoring results. Appendix I describes the history of each priority site subwatershed in additional detail including sourcing, outreach and evaluation activities.

For Dry Creek @ Wellsford and Prairie Flower Drain subwatersheds, there have been no chlorpyrifos exceedances in 2009 and 2010. Within the Dry Creek @ Wellsford subwatershed there was a single exceedance in 2009 and also in 2010 (Table 29). The Coalition has information indicating that the 2009 exceedance was due to discharge from a dairy operation upstream whose parcels are not included in the ESJWQC membership. The Coalition enrolled new members since 2008 within this subwatershed and has a new member that is directly upstream of the Wellsford monitoring location. The parcels associated with this new member have also had applications within the time frame of the 2009 and 2010 chlorpyrifos exceedances. The Coalition conducted on site farm visits with this grower late in 2010 and will follow up with them in late 2011 or early 2012 to record any newly implemented practices. Although membership has increased within this subwatershed, there are still parcels that are not enrolled in the Coalition that could be contributing to the chlorpyrifos exceedances. The Coalition has demonstrated improvement in the number of exceedances from 2007 (Table 29) however recognizes that this subwatershed requires additional monitoring to determine if practices implemented by this new member will further improve water quality.

The only subwatershed with diuron under a management plan is Dry Creek @ Wellsford. The Coalition has reduced the number of exceedances from two in 2007 to zero in 2008, 2009 and 2010 (Table 29).

Both Dry Creek @ Wellsford and Duck Slough @ Hwy 99 have management plans for copper. There have been no exceedances of the dissolved or total copper WQTL since 2007 (Table 29).

Algae (*S. capricornutum*) toxicity is listed in the management plans for all three site subwatersheds. Both Dry Creek @ Wellsford and Duck Slough @ Hwy 99 have had no water column toxicity to algae since 2008 (Table 29). Prairie Flower Drain @ Crows Landing has had a single toxic sample in both 2009 and 2010 (Table 29). In 2009 the toxic sample was collected in May and in 2010 was collected in January. Past toxic samples have not been associated with exceedances of either herbicide or copper WQTLs and it is unclear what is causing the algae toxicity. For Prairie Flower Drain, algae toxicity is a low priority constituent (Priority E) however the Coalition was anticipating that the additional practices implemented within the subwatershed would eliminate algae toxicities and therefore conducted MPM during months of past exceedances. The Coalition will continue to monitor for algae toxicity every third year (starting 2011) when this location becomes an assessment monitoring site.

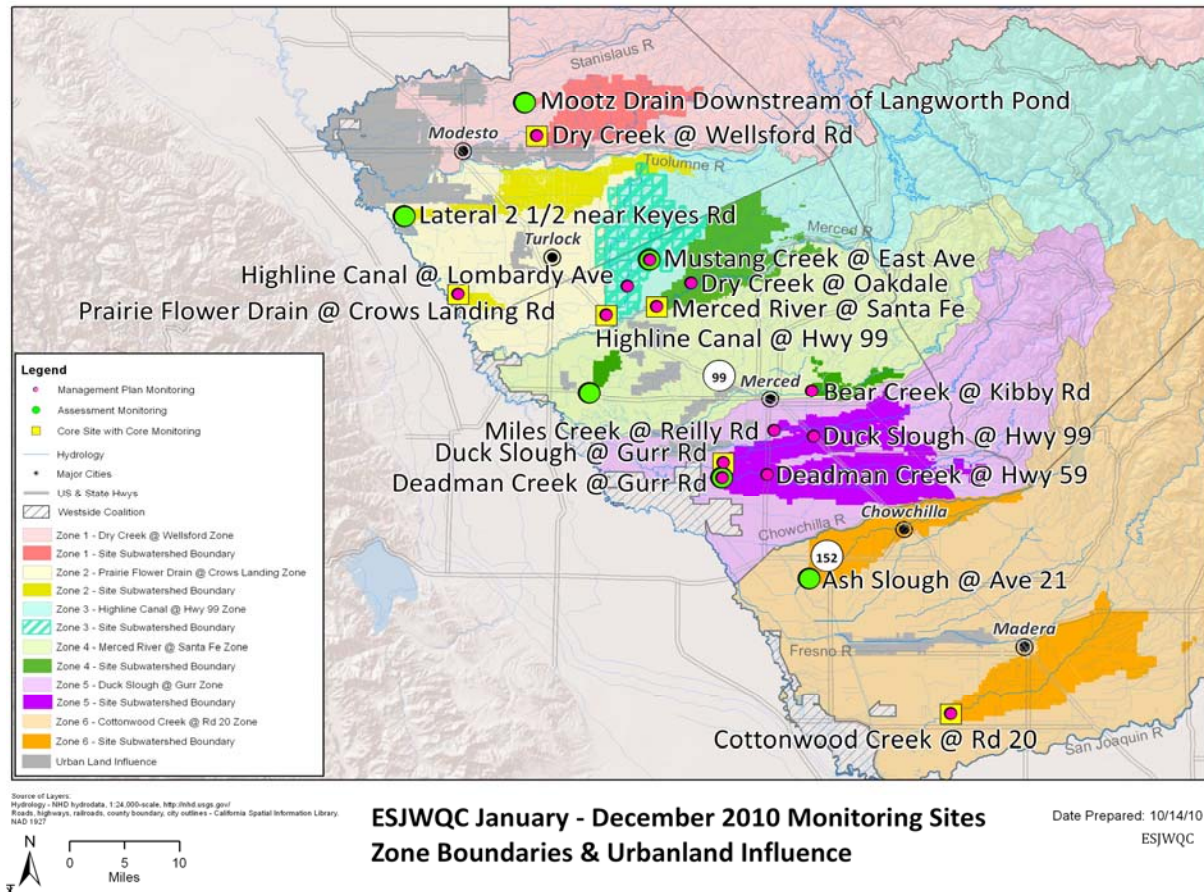
Table 29. Exceedance tally for high priority constituents within the first high priority subwatersheds (2005 - 2010).

	2005	2006	2007	2008	2009	2010
CHLORPYRIFOS						
Dry Creek @ Wellsford	1	2	2	1	1	1
Duck Slough @ Hwy 99	1	1	1	1	0	0
Prairie Flower Drain @ Crows Landing	2	0	1	1	0	0
DIURON						
Dry Creek @ Wellsford	NA	0	2	0	0	0
Duck Slough @ Hwy 99	NA	0	0	0	NA	NA
Prairie Flower Drain @ Crows Landing	NA	0	0	0	NA	NA
COPPER						
Dry Creek @ Wellsford	NA	0	2	1	NA	0
Duck Slough @ Hwy 99	NA	2	7	2	0	0
Prairie Flower Drain @ Crows Landing	NA	0	0	0	NA	NA
S. CAPRICORNUTUM						
Dry Creek @ Wellsford	0	0	4	1	0	0
Duck Slough @ Hwy 99	1	0	0	2	0	0
Prairie Flower Drain @ Crows Landing	0	0	1	6	1	1
H. AZTECA						
Dry Creek @ Wellsford	0	0	0	2	NA	0
Duck Slough @ Hwy 99	0	0	0	2*	NA	NA
Prairie Flower Drain @ Crows Landing	1	1	2	2	NA	0

*Although two exceedances have occurred, they were from the same monitoring event (sample and resample) and therefore does not require a management plan.

COALITION WIDE EVALUATION

Figure 32. Monitoring locations sampled during 2010 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 2010, in all zones except Zone 2, where it has remained constant (Figure 32). The decrease coincides with the period in which the majority of new management practices were implemented. The number of exceedances that occurred in 2010 compared to those that occurred in 2008 were reduced from four exceedances to one in Zone 1 (Dry Creek @ Wellsford Zone) and from six exceedances to three in Zone 5 (Duck Slough @ Gurr Rd Zone; Figure 33). Two exceedances were experienced in Zone 2 (Prairie Flower Drain @ Crows Landing Rd Zone) in 2008 and 2010, however only one exceedance was experienced during 2009 in Zone 2. Overall, since the decline of exceedances coincides with the implementation of new management practices (2009 and 2010), 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 water quality in regards to chlorpyrifos exceedances.

The Coalition did note, however, that exceedances of chlorpyrifos increased from 2009 to 2010 in four of the Coalition Zones (Figure 33). The number of exceedances that occurred in 2009 compared to

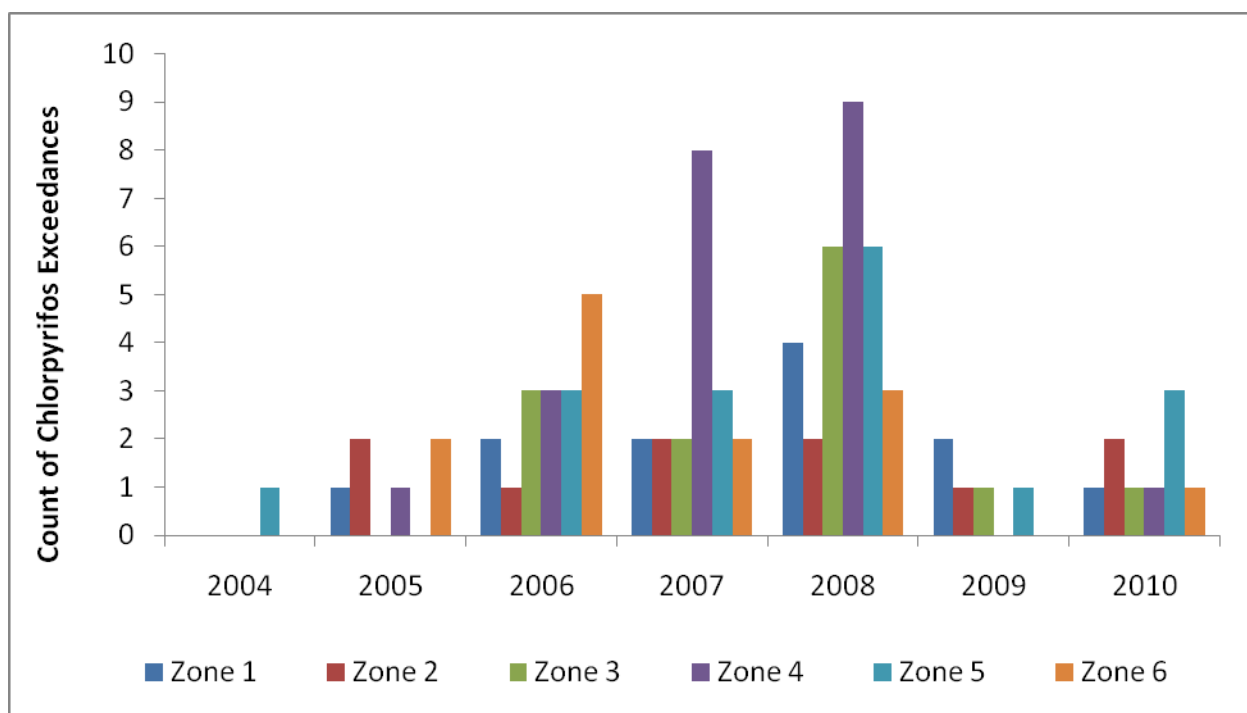
those that occurred in 2010 increased from zero to one in Zone 4 (Merced River @ Santa Fe), from one to three in Zone 5, and from zero to one in Zone 6 (Cottonwood Creek @ Rd 20).

The exceedance in Zone 4 occurred in the Howard Lateral @ Hwy 140 subwatershed. The Coalition's Assessment and Core monitoring schedule included Howard Lateral @ Hwy 140 for Assessment Monitoring during 2008, 2009 and 2010, and this year was the first in which priority A – D constituent exceedances occurred. The Coalition has added Howard Lateral subwatershed to the proposed high priority schedule (2015-2017; Table 6). Management Plan Monitoring will occur at this location when the site becomes a high priority.

One of the exceedances in Zone 5 and the exceedance in Zone 6 were in non contiguous waterbodies that were sampled per Irrigated Land and Regulatory Program (ILRP) guidelines.

All three of exceedances in Zone 5 occurred in samples collected from Deadman Creek @ Gurr Rd, which is scheduled to become a high priority subwatershed next year, 2012.

Figure 33. Exceedance counts of the chlorpyrifos water quality trigger limit from 2004 - 2010 within the ESJWQC Zones.



Two exceedances were experienced within Zone 2 during 2010 compared to one exceedance during 2009. Both exceedances occurred in the Lateral 2 1/2 near Keyes Rd subwatershed; Assessment monitoring has been ongoing at this subwatershed since October 2008. To address these exceedances, the Coalition modified its Management Plan prioritization schedule (Table 6) so that Lateral 2 1/2 near Keyes Rd is now a high priority subwatershed (2011-2013; approved by Region Board on November 17, 2010). The Coalition has already conducted several individual contacts and, given the significant drop in exceedances once management plan implementation began in Zones 1 and 5, is hopeful the focused outreach will address the chlorpyrifos exceedances in the subwatershed.

The Coalition conducted MPM within 12 site subwatersheds during 2010 plus two upstream locations within the same site subwatershed (Dry Creek @ Oakdale and Deadman Creek @ Hwy 59; Table 1). Of the 23 MPM samples collected for chlorpyrifos analysis, three samples had detections above 0.015µg/L (13% of the samples collected specifically for MPM; Table 3). This is less than the percentage of chlorpyrifos exceedances in MPM samples collected during 2009 (three of 20, 15%; page 66). Two of the chlorpyrifos exceedances occurred during January storm event monitoring in Cottonwood Creek @ Rd 20, which was a non contiguous waterbody, and in Highline Canal @ Lombardy Rd. Highline Canal @ Lombardy Rd will undergo Assessment monitoring during 2011 and is schedule for high priority status in 2013. In addition, the Highline Canal @ Hwy 99 subwatershed, which is downstream from the Lombardy Rd site, began high priority focused outreach in 2010 which may positively impact the entire subwatershed. The other chlorpyrifos exceedance occurred during July at the Dry Creek @ Wellsford Rd site, which is one of the first priority subwatersheds (2008-2010). Following this exceedance, the Coalition re-assessed its targeted grower list and added a single grower who was new to the Coalition and whose parcel applications had been associated with the exceedance. The Coalition will conduct Assessment monitoring at this location in 2011.

During 2009, the Coalition did not experience a single exceedance of the copper WQTL in samples collected for MPM and samples collected for normal monitoring. However, in 2010, eight copper concentrations were above exceedance levels, four of which were from samples collected during 2010 MPM (four of 20 MPM samples analyzed for copper, 13%; Table 3). One of the MPM copper exceedances occurred during a storm event Highline Canal @ Lombardy Rd; the future plan for this subwatershed is discussed in the previous paragraph. The other three MPM copper exceedances all occurred at the Cottonwood Creek @ Rd 20 site. This site became a high priority subwatershed in 2010 and 100% of targeted growers have been participated in an individual contact meeting to evaluate growers' operations. Recommended practices are anticipated to be implemented during the 2011 irrigation season. The Coalition is conducting Assessment monitoring at this site during 2011.

Sediment toxicity occurred in one of the four samples analyzed for MPM in September 2010. The toxicity occurred in samples collected from Duck Slough @ Gurr Rd; chemical analysis of the sediment revealed concentrations of bifenthrin (J0.143 µg/kg dw), chlorpyrifos (J0.182 µg/kg dw), lambda-cyhalothrin (1.2 µg/kg dw) and permethrin (J0.127 µg/kg dw; AMR 2011, page 131). Duck Slough @ Gurr Rd is a second priority site; 100% of individual contact meetings have already taken place within the subwatershed and the Coalition anticipates recommended management practices to be implemented during the 2011 irrigation season. Duck Slough @ Gurr Rd is scheduled for Assessment monitoring during 2011.

The Coalition will conduct MPM for the second year in the four second high priority subwatershed (2010 – 2012). These sites include Bear Creek @ Kibby Rd (Zone 4), Cottonwood Creek @ Rd 20 (Zone 6), Duck Slough @ Gurr Rd (Zone 5), and Highline Canal @ Hwy 99 (Zone 3). Bear Creek @ Kibby Rd will be the only site to undergo only MPM during months of past exceedances for *Ceriodaphnia*, copper, and chlorpyrifos, whereas the other three sites will all be monitored as Assessment locations during 2011. The Coalition has completed individual contacts with all targeted growers in the second priority subwatersheds and anticipates the majority of new management practices will be implemented during the 2011 irrigation season. Follow up contacts with targeted growers in these second priority subwatersheds are in the process of being scheduled and the Coalition will evaluate implemented management practices in the second priority subwatersheds in the 2012 MPUR (expected April 1, 2012).

The Coalition will also begin the first year of MPM in the third priority subwatersheds (2011 – 2013), which will be in Year 1 of focused outreach. These sites include Berenda Slough @ Ave 18 ½ (Zone 6), Dry Creek @ Rd 18 (Zone 6), Lateral 2 ½ near Keyes Rd (Zone 2), and Livingston Drain @ Robin Ave (Zone 4). Management Plan Monitoring conducted in 2011 at the third priority sites will include samples collected for copper, chlorpyrifos, diazinon, diuron and lead analysis as well as toxicity to *S. capricornutum* and *H. azteca*. The Coalition has contacted all targeted members to schedule an individual meeting date and has already initiated individual contacts within the Lateral 2 ½ near Keyes Rd and Livingston Drain @ Robin Ave subwatersheds. Surveys have been completed for 48% of the targeted growers in Lateral 2 ½ and 27% of the targeted growers within Livingston Drain. The Coalition is hopeful that the trend of reductions in the number of exceedances when new management practices are implemented will continue to occur in the Coalition Zones with third priority subwatersheds.

Conclusions:

- Subwatersheds that have high priority status that have had individual grower visits have seen a reduction in exceedances
 - The drop in exceedances coincides with implementation of management practices encouraged by Coalition
 - Remaining exceedances are the result of circumstances such as discharges from nonmembers or growers new to the watershed who were not targeted for original Coalition contacts and interviews
- Subwatersheds with high numbers of exceedances have not attained high priority status
 - Schedules have been modified to move the subwatersheds with large number of exceedances to high priority status in the near future

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 establishes 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 is 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, 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 monitoring, sourcing, and outreach within subwatersheds. Coalition efforts include but are not limited to: (1) Management Plan Monitoring, (2) conducting site subwatershed grower meetings, (3) encouraging the adoption of and evaluating the efficacy of management practices, and (4) addressing the seven compliance components described in the Basin Plan. 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 in locations that the Coalition has designated as high priority subwatersheds (see Table 6). Furthermore, the Coalition conducts annual meetings to provide growers with information on management practices that can improve water quality.

CHLORPYRIFOS AND DIAZINON TMDL

The San Joaquin River chlorpyrifos and diazinon TMDL was adopted by the Regional Board in June 23, 2006 and documented in an amendment to the Basin Plan (Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Lower San Joaquin River). This TMDL was approved by the US EPA on October 10, 2007. Dischargers had until December 31, 2010 to be compliant with the water quality objectives (WQOs), loading capacity in the San Joaquin River and load allocations for diazinon and chlorpyrifos.

The Basin Plan requires that dischargers either individually or as a coalition describe the actions that they will take to reduce chlorpyrifos and diazinon discharges and meet the applicable load allocations by the required compliance date. The Coalition's Management Plan strategy 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. During this process, improved management practices have been implemented to meet WQOs and load allocations set forth in the Basin Plan including pesticide application practices to reduce drift, alternative irrigation practices to reduce runoff, and drainage management practices to decrease or reduce the volume of runoff of contaminants. Meetings have been held quarterly with the Regional Water Board (Table 14) in order to evaluate progress, and revisions to the Management Plan will be made if sufficient progress is not being achieved.

In 2010, the ESJWQC and Westside Water Quality Coalition (Westside Coalition) began implementing a monitoring strategy to comply with the chlorpyrifos and diazinon TMDL program Monitoring Objectives:

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 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.

The Coalitions submitted a memorandum to the Regional Board on May 14, 2010 outlining the approach to implement the monitoring component for the San Joaquin River chlorpyrifos and diazinon TMDL. The approach includes compliance monitoring of chlorpyrifos and diazinon in the San Joaquin River at six compliance points on a quarterly basis, monthly tributary monitoring outlined in each Coalition's approved monitoring plan, and an annual assessment of the monitoring objectives and results. The annual monitoring report covers the monitoring period from October 2009 through September 2010; however, due to the timing of the memorandum, there was no monitoring before May 2010.

The San Joaquin River Chlorpyrifos and Diazinon 2010 AMR was submitted on October 31, 2010. The results of the report are summarized below as they pertain to each of the Monitoring Objectives. Results from October 2010 (fourth quarter) monitoring will be included in the 2011 San Joaquin River Chlorpyrifos and Diazinon AMR.

Compliance with WQOs and Loading Capacity

During the first three quarters of 2010, each Coalition sampled three of the six compliance points (Table 30) as well as tributaries within their respective regions as per each Coalition's monitoring plan. The dates of all River monitoring events and tributary monitoring events occurring during the same month are listed in Table 30.

Table 30. Sample event dates for all San Joaquin River monitoring events and upstream tributary monitoring events occurring during the same month. SJR compliance points are listed from upstream to downstream.

RESPONSIBLE COALITION	STATION NAME	QTR 4	QTR 1			QTR 2			QTR 3			
		OCT. – DEC., 2009	MARCH 9, 2010	MARCH 23, 2010	MARCH 25, 2010	MAY 6, 2010	MAY 11, 2010	MAY 18, 2010	MAY 20, 2010	JULY 14, 2010	JULY 20, 2010	JULY 22, 2010
Westside Coalition	SJR @ Sack Dam	NA			X	X						X
Westside Coalition	SJR @ Lander Ave	NA			X	X						X
ESJWQC	SJR @ Hills Ferry Rd	NA			X				X			X
Westside Coalition	SJR @ Las Palmas Ave	NA			X	X						X
ESJWQC	SJR @ Maze Blvd	NA			X				X			X
ESJWQC	SJR @ Airport Way	NA			X				X			X
ESJWQC	ESJWQC normal monitoring of tributaries	NA		X				X			X	
Westside Coalition	Westside Coalition normal monitoring of tributaries	NA	X				X			X		

NA – not applicable. Sampling for the chlorpyrifos and diazinon TMDL San Joaquin River project was not initiated until 2010.

The chlorpyrifos WQO was exceeded on July 22, 2010 at the San Joaquin River at Las Palmas Avenue near Patterson sampling station (0.041µg/L). Also on July 22, 2010, chlorpyrifos was detected in both the environmental and field duplicate samples collected from San Joaquin River at the Airport Way Bridge near Vernalis below the WQO (both 0.013 µg/L), although the amount was less than the reporting limit and considered estimated. Chlorpyrifos was not detected at any other San Joaquin River sampling location and diazinon was not detected at any location during the first three quarters of 2010.

Compliance with Established Load Capacity for Chlorpyrifos and Diazinon

The chlorpyrifos and diazinon WQOs (4-day average (chronic) maximum) are used to determine the concentration based loading capacity for the San Joaquin River and also load allocations within the upstream tributaries. Both the loading capacity of the San Joaquin River and load allocation of any tributary to the river shall not exceed one, as determined from the formula listed in Equation 1.

Load capacity of the San Joaquin River and load allocations for nonpoint source discharges, including agricultural discharges, are based on the following equation:

Equation 1. Load capacity and allocation formula for chlorpyrifos and diazinon.

$$S = \frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

Where

S = load capacity

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

If the measured concentration of either constituent exceeds its WQO in a sample collected from the San Joaquin River, the loading capacity is exceeded. If the measured concentration of either constituent exceeds its WQO in a sample collected from a tributary within the drainage area, the load allocation is exceeded. The chlorpyrifos and diazinon load capacity also can be exceeded if the combined concentrations of chlorpyrifos and diazinon cause the load capacity to be greater than one, even if both concentrations are below the two constituents' respective WQOs (Equation 1).

The load capacity for all samples collected from each San Joaquin River monitoring location during the reporting period (January through September 2010) is listed in the San Joaquin River Chlorpyrifos and Diazinon 2010 AMR (Table 28, page 34). The only non-complaint load (2.73) occurred in samples collected on July 22, 2010 from the SJR @ Las Palmas Ave monitoring location and was due to a chlorpyrifos concentration of 0.041µg/L. No diazinon was detected in the sample. There were no detections of chlorpyrifos or diazinon at the next upstream location along the San Joaquin River, SRJ @ Hills Ferry Rd, or at the next downstream location, SJR @ Maze Blvd.

The Coalition employed two methods to assess the potential source of the chlorpyrifos in the samples collected from SJR @ Las Palmas Ave: a review of tributary monitoring results from July and an analysis of associated PUR data. The Coalition limited its review to July monitoring results from tributaries in the immediate upstream tributaries draining to the Las Palmas Ave compliance point (the Turlock, Merced, and Greater Orestimba subareas; refer to Table 6, page 10, and Figure 2, page 16 of the ESJWQC Chlorpyrifos and Diazinon 2010 AMR). Drainage from other upstream subareas enters the San Joaquin River upstream of the SJR @ Hills Ferry Rd station, the next upstream compliance point above Las Palmas Ave, and there was no detection of chlorpyrifos at that site during July 2010. Within the immediate upstream subareas, the Westside Coalition analyzed samples from four tributaries on July 14, 2010 for chlorpyrifos and one tributary location was monitored for chlorpyrifos by the ESJWQC on July 20, 2010 (Table 31).

No chlorpyrifos was detected in samples collected from the ESJWQC tributary (Table 31). Chlorpyrifos exceeded the WQO in three of the four tributaries analyzed for chlorpyrifos in the Westside Coalition region (Table 33, refer to bolded entries).

Table 31. ESJWQC and Westside Coalition tributary sites in the Turlock, Merced, and Greater Orestimba subareas that drain to the SJR @ Las Palmas Ave compliance station. Tributaries upstream of SJR @ Las Palmas that drain to other compliance points (i.e. SJR @ Hills Ferry Rd) are not listed.

COALITION REGION	TRIBUTARY STATION NAME	TRIBUTARY LATITUDE	TRIBUTARY LONGITUDE	SAMPLE DATE	CHLORPYRIFOS (µg/L)	<0.015 µg/L
Westside	Marshall Road Drain near River Road	37.436300	-121.036200	7/14/10	0.53	
Westside	Orestimba Creek at Hwy 33	37.377150	-121.058120	7/14/10	0.032	
Westside	Orestimba Creek at River Road	37.413880	-121.014166	7/14/10	0.06	
Westside	Ramona Lake near Fig Avenue	37.478800	-121.068400	7/14/10	0.014	✓
ESJWQC	Highline Canal @ Hwy 99	37.415300	-120.755700	7/20/10	<0.0026	✓
ESJWQC	Mustang Creek @ East Ave	37.491800	-120.683900	7/20/10	Dry ¹	✓

¹ Chlorpyrifos monitoring scheduled, but site was dry.

Instantaneous loads for chlorpyrifos were calculated for tributary locations (Table 32) and all San Joaquin River locations (Table 33) sampled in July 2010 based on the following formula (Equation 2):

Equation 2. Instantaneous load formula.

Load = Discharge (cfs) * 28.317L * Concentration (µg/L).

Despite factors such as residence time, unpredicted water inputs to/exports from waterways, hydrological conditions, and ambient air temperature that determine the time it takes water to move from a tributary to the River, the Coalition summed the instantaneous loads measured in the tributaries during July (Table 4) and compared that value to the load measured in the San Joaquin River in July (Table 5). The sum of the instantaneous loads in the tributaries sampled on July 14 and July 20, 2010 is 81.33 µg (Table 34). This is less than the load experienced in the San Joaquin River @ Las Palmas Ave on July 22, 2010 (631.58 µg; Table 33). If the Coalitions assume the water measured on July 14 and July 20 in the tributaries was the same water sampled from the River on July 22, then the loads experienced in the tributaries cannot account for the entire load in the River. However, the assumption that the water in the tributaries and the San Joaquin River is the same and the loads should be additive is not supported by calculations of flow and distance traveled, particularly for the Westside Coalition sites. Given the flow rates in the Marshall Road Drain and the San Joaquin River, water from the Marshall Road Drain site would have traveled to San Francisco Bay or beyond (depending on tidal conditions and Sacramento River flow) in the 8 days between the July 14 and the July 22 sample collection dates.

Table 32. Calculated instantaneous loads for chlorpyrifos for ESJWQC and Westside Coalition tributary sites sampled for chlorpyrifos and draining to the SJR @ Las Palmas Ave compliance station. Tributaries upstream of SJR @ Las Palmas that drain to other compliance points (i.e. SJR @ Hills Ferry Rd) are not listed.

COALITION REGION	TRIBUTARY STATION NAME	SAMPLE DATE	CHLORPYRIFOS (µg/L)	FLOW (CFS)	CALCULATED INSTANTANEOUS LOAD (µg/SEC)
Westside	Marshall Road Drain near River Road	7/14/10	0.53	4.79	71.89
Westside	Orestimba Creek at Hwy 33	7/14/10	0.032	3.0	2.72
Westside	Orestimba Creek at River Road	7/14/10	0.06	2.8	4.76
Westside	Ramona Lake near Fig Avenue	7/14/10	0.014	4.95	1.96
ESJWQC	Highline Canal @ Hwy 99	7/20/10	<0.0026	NR	0
Total					81.33

NR – Unable to measure discharge during sampling event.

Table 33. Calculated instantaneous loads for chlorpyrifos in San Joaquin River sampling locations during the July 22, 2010 monitoring event.

SAN JOAQUIN RIVER SAMPLING LOCATION	SAMPLE DATE	CHLORPYRIFOS (µg/L) MEASURED IN JULY SAMPLES	FLOW (CFS)	CALCULATED INSTANTANEOUS LOAD
SJR @ Sack Dam	7/22/10	<0.0026	22	0
SJR @ Lander Ave	7/22/10	<0.0026	195	0
SJR @ Hills Ferry Rd	7/22/10	<0.0026	49.12	0

SAN JOAQUIN RIVER SAMPLING LOCATION	SAMPLE DATE	CHLORPYRIFOS	FLOW (CFS)	CALCULATED INSTANTANEOUS LOAD
		(µG/L) MEASURED IN JULY SAMPLES		
SJR @ Las Palmas Ave	7/22/10	0.041	544	631.58
SJR @ Maze Blvd	7/22/10	<0.0026	1648	0
SJR @ Airport Way	7/22/10	0.013	1350	496.96

NR – Not recorded; data was unavailable

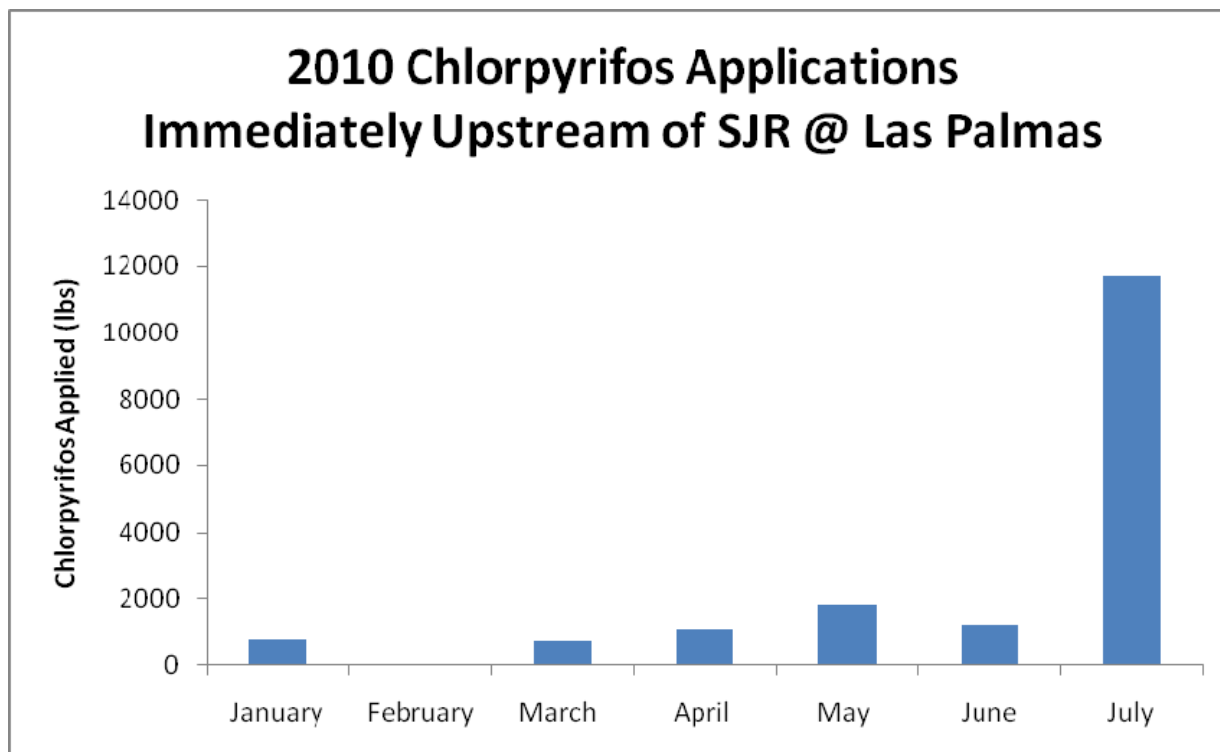
NC – Not calculated; insufficient data to complete calculation

To assess the sources of chlorpyrifos contributing to the exceedance in samples collected from SJR @ Las Palmas Ave, PUR data was reviewed. All chlorpyrifos applications made to the immediate upstream subareas four weeks prior to July 22, 2010 were evaluated (Table 34). The majority of applications were to almond orchards and corn (Table 34). More than 5,000 pounds of chlorpyrifos were applied to 3,173 acres of almond orchards, and 2,477 pounds of chlorpyrifos were applied to 3,147 acres of corn. Of these totals, 84% and 93% of the almond and corn acres treated, respectively, were in the ESJWQC region. Overall, more pounds of chlorpyrifos were applied in the ESJWQC region than in the Westside Coalition region prior to the July exceedance. The exceedance at SJR @ Las Palmas coincided with the greatest amount of applications in the immediate upstream subareas (Figure 34).

Table 34. Chlorpyrifos applications made four weeks prior to each 2010 monitoring event in the immediate upstream subareas (Turlock, Merced, and Greater Orestimba) of the SJR @ Las Palmas Ave compliance point.

MONITORING EVENT	COMMODITY	COALITION REGION	NUMBER OF APPLICATIONS	ACTIVE INGREDIENT APPLIED (LBS)	ACRES TREATED
March 25, 2010	ALFALFA	ESJWQC	18	479.73	1071.6
		Westside Coalition	25	277.73	767
	ONION DRY ETC	ESJWQC	2	6.44	13
May 6, 2010	ALMOND	ESJWQC	3	158.76	126
	SWEET POTATO	ESJWQC	15	747.78	370
July 22, 2010	ALFALFA	ESJWQC	10	98.23	195.85
		Westside Coalition	2	116.44	252
	ALMOND	ESJWQC	28	4341.49	2659
		Westside Coalition	7	848.71	514
	CITRUS	Westside Coalition	1	24.92	25
	CORN FOR/FOD	ESJWQC	69	2353.12	2937.34
		Westside Coalition	5	124.09	210
	PECAN	ESJWQC	1	35.68	19
	TURF/SOD	ESJWQC	1	39.88	40
	WALNUT	ESJWQC	13	355.60	201.5
		Westside Coalition	6	327.62	238
March Totals			45	763.90	1851.6
May Totals			18	906.54	496
July Totals			143	8665.78	7291.69

Figure 34. Pounds of chlorpyrifos applied immediately upstream (Turlock, Merced, and Greater Orestimba subareas) of the SJR @ Las Palmas monitoring location in 2010.



The PUR data suggest a positive correlation between pounds of chlorpyrifos applied in upstream subareas and chlorpyrifos concentrations downstream in the San Joaquin River. However, this trend in PUR data does not hold true for other San Joaquin River compliance points. For example, a huge spike in chlorpyrifos applications during March compared to other months occurred in the immediate upstream subareas of the SJR @ Lander station, similar to the spike in chlorpyrifos applications during July upstream of the SJR @ Las Palmas station. Yet there was no chlorpyrifos detected in samples collected from SJR @ Lander during March 2010 monitoring. Previous attempts to establish a relationship between pesticide applications and concentration in site subwatershed areas in the ESJWQC region met with only minor success and attempting the same analysis on a much larger geographic scale is very unlikely to result in any success.

In summary, PUR data reveals that the majority of chlorpyrifos applications associated with the July exceedance were to land within the ESJWQC region. However, monitoring data reveals chlorpyrifos exceedances occurred in three different Westside Coalition upstream tributaries during the month of July. Furthermore, the analysis assumes only the immediate upstream subareas (Turlock, Merced, and Orestimba) could have contributed to the concentration measured in the San Joaquin River, which may not be the case. Given the available information, it is difficult to determine the exact source(s) contributing to the chlorpyrifos exceedance in samples collected from Las Palmas on July 22, 2010.

The ESJWQC encourages management practices that reduce spray drift, irrigation drainage, and off site movement of storm water. The Coalition recognizes that although the frequency of applications may increase the likelihood of chlorpyrifos in the waterway, it only takes one poorly executed application or a single incidence of irrigation tailwater mismanagement to result in an exceedance of chlorpyrifos in surface waters.

Compliance with Established Load Allocations for Chlorpyrifos and Diazinon

In the 2010 MPUR, the Coalition reviewed all data collected from 2004 through 2009 to determine load allocation compliance based on the formula in Figure 32 (Tables 20 and 21, pages 72-77).

The Coalition monitored 17 tributaries for chlorpyrifos and diazinon during 2010 (Table 35). There were nine non-compliant loads in tributaries during 2010 (Table 36), and each zone experienced at least one exceedance (Table 37). Of the exceedances, two occurred during the July 2010 monitoring event in samples collected from Dry Creek @ Wellsford Rd and Lateral 2 ½ near Keyes Rd. Both tributaries enter the River downstream of the SJR @ Las Palmas compliance point and therefore did not contribute to the exceedance in the San Joaquin River (refer to Table 6, page 10, and Figure 2, page 16 of the SJR Chlorpyrifos and Diazinon 2010 AMR). In addition, samples collected from Deadman Creek @ Gurr Rd on March 23, 2010 exceeded the chlorpyrifos WQO; however, this site was a non contiguous waterbody at the time of sampling. Likewise, chlorpyrifos exceeded the WQO in samples collected from Howard Lateral @ Hwy 140 and Duck Slough @ Hwy 99 on May 18, 2010, but no chlorpyrifos was detected in samples collected from the associated downstream San Joaquin River compliance point (SJR @ Lander Ave) on May 20, 2010.

Overall, 86% percent of samples collected from tributaries within the ESJWQC were compliant with load allocations with yearly percentages ranging from 84% (2006 and 2008) to 100% (2004) (Table 37). Monitoring in 2004 was initiated late in the irrigation season and was conducted only for a few locations. Focused outreach efforts by the Coalition began in 2009 with growers in high priority subwatersheds and in 2009 the percentage of compliant samples increased to 90% (Table 37).

Table 35. ESJWQC tributaries sampled for chlorpyrifos and diazinon in 2010.

ZONE	SITE NAME	CHLORPYRIFOS	DIAZINON
1	Dry Creek @ Wellsford Rd	X	
	Mootz Drain downstream of Langworth Pond	X	X
2	Lateral 2 1/2 near Keyes Rd	X	X
	Prairie Flower Drain @ Crows Landing Rd	X	
3	Dry Creek @ Oakdale Ave	X	
	Highline Canal @ Lombardy Ave	X	
	Highline Canal @ Hwy 99	X	
	Mustang Creek @ East Ave	X	X
4	Bear Creek @ Kibby Rd	X	
	Howard Lateral @ Hwy 140	X	X
	Merced River @ Santa Fe	X	
5	Deadman Creek @ Gurr Rd	X	X
	Duck Slough @ Gurr Rd	X	
	Duck Slough @ Hwy 99	X	
	Miles Creek @ Reilly Rd	X	X
6	Ash Slough @ Ave 21	X	X
	Cottonwood Creek @ Rd 20	X	

Table 36. 2010 TMDL load calculations for diazinon and chlorpyrifos runoff in the San Joaquin River for nonpoint source discharges. Detections above the MDLs (chlorpyrifos=0.0026µg/L and diazinon=0.004µg/L) are listed.

ZONE	STATION NAME	SAMPLE DATE	CHLORPYRIFOS	DIAZINON	LOAD	LOAD ALLOCATION COMPLIANCE
1	Dry Creek @ Wellsford Rd	7/20/2010	0.067	NT	4.47	Out of compliance
1	Dry Creek @ Wellsford Rd	8/17/2010	0.013	NT	0.87	In Compliance
1	Dry Creek @ Wellsford Rd	9/14/2010	<0.0026	NT	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	1/19/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	2/23/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	3/23/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	4/20/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	5/18/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	6/15/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	7/20/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	8/17/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	9/14/2010	<0.0026	<0.004	0	In Compliance
1	Mootz Drain Downstream of Langworth Pond	12/14/2010	<0.0026	<0.004	0	In Compliance

ZONE	STATION NAME	SAMPLE DATE	CHLORPYRIFOS	DIAZINON	LOAD	LOAD ALLOCATION COMPLIANCE
2	Lateral 2 1/2 near Keyes Rd	3/23/2010	<0.0026	<0.004	0	In Compliance
2	Lateral 2 1/2 near Keyes Rd	4/20/2010	0.076	<0.004	5.07	Out of compliance
2	Lateral 2 1/2 near Keyes Rd	5/18/2010	<0.0026	<0.004	0	In Compliance
2	Lateral 2 1/2 near Keyes Rd	6/15/2010	<0.0026	<0.004	0	In Compliance
2	Lateral 2 1/2 near Keyes Rd	7/20/2010	0.061	<0.004	4.07	Out of compliance
2	Lateral 2 1/2 near Keyes Rd	8/17/2010	0.013	<0.004	0.87	In Compliance
2	Lateral 2 1/2 near Keyes Rd	9/14/2010	<0.0026	<0.004	0	In Compliance
2	Lateral 2 1/2 near Keyes Rd	10/19/2010	<0.0026	<0.004	0	In Compliance
2	Prairie Flower Drain @ Crows Landing Rd	8/17/2010	0.014	NT	0.93	In Compliance
2	Prairie Flower Drain @ Crows Landing Rd	9/14/2010	<0.0026	NT	0	In Compliance
3	Dry Creek @ Oakdale Rd	1/19/2010	<0.0026	NT	0	In Compliance
3	Highline Canal @ Hwy 99	1/19/2010	<0.0026	NT	0	In Compliance
3	Highline Canal @ Hwy 99	2/23/2010	<0.0026	NT	0	In Compliance
3	Highline Canal @ Hwy 99	7/20/2010	<0.0026	NT	0	In Compliance
3	Highline Canal @ Lombardy Rd	1/19/2010	0.016	NT	1.07	Out of compliance
3	Highline Canal @ Lombardy Rd	2/23/2010	<0.0026	NT	0	In Compliance
3	Mustang Creek @ East Ave	1/19/2010	<0.0026	<0.004	0	In Compliance
3	Mustang Creek @ East Ave	2/23/2010	<0.0026	<0.004	0	In Compliance
3	Mustang Creek @ East Ave	3/23/2010	<0.0026	<0.004	0	In Compliance
3	Mustang Creek @ East Ave	4/20/2010	<0.0026	<0.004	0	In Compliance
4	Bear Creek @ Kibby Rd	5/18/2010	<0.0026	NT	0	In Compliance
4	Bear Creek @ Kibby Rd	7/20/2010	<0.0026	NT	0	In Compliance
4	Howard Lateral @ Hwy 140	4/20/2010	<0.0026	<0.004	0	In Compliance
4	Howard Lateral @ Hwy 140	5/18/2010	0.0099	<0.004	0.66	In Compliance
4	Howard Lateral @ Hwy 140	6/15/2010	0.022	<0.004	1.47	Out of compliance
4	Howard Lateral @ Hwy 140	7/20/2010	<0.0026	<0.004	0	In Compliance
4	Howard Lateral @ Hwy 140	8/17/2010	0.0062	<0.004	0.41	In Compliance
4	Howard Lateral @ Hwy 140	9/14/2010	<0.0026	<0.004	0	In Compliance
4	Howard Lateral @ Hwy 140	10/19/2010	<0.0026	<0.004	0	In Compliance
4	Merced River @ Santa Fe	1/19/2010	<0.0026	NT	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	1/19/2010	<0.0026	<0.004	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	2/23/2010	<0.0026	<0.004	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	3/23/2010	0.14	<0.004	9.33	Out of compliance
5	Deadman Creek (Dutchman) @ Gurr	4/20/2010	0.018	<0.004	1.20	Out of compliance
5	Deadman Creek (Dutchman) @ Gurr	5/18/2010	<0.0026	<0.004	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	6/15/2010	<0.0026	<0.004	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	7/20/2010	<0.0026	<0.004	0	In Compliance

ZONE	STATION NAME	SAMPLE DATE	CHLORPYRIFOS	DIAZINON	LOAD	LOAD ALLOCATION COMPLIANCE
5	Deadman Creek (Dutchman) @ Gurr	8/17/2010	0.024	<0.004	1.60	Out of compliance
5	Deadman Creek (Dutchman) @ Gurr	9/14/2010	<0.0026	<0.004	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	10/19/2010	<0.0026	<0.004	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	11/16/2010	<0.0026	<0.004	0	In Compliance
5	Deadman Creek (Dutchman) @ Gurr	12/14/2010	<0.0026	<0.004	0	In Compliance
5	Duck Slough @ Gurr Rd	4/20/2010	<0.0026	NT	0	In Compliance
5	Duck Slough @ Gurr Rd	7/20/2010	<0.0026	NT	0	In Compliance
5	Duck Slough @ Hwy 99	5/18/2010	0.0048	NT	0.32	In Compliance
5	Duck Slough @ Hwy 99	7/20/2010	<0.0026	NT	0	In Compliance
5	Duck Slough @ Hwy 99	9/14/2010	<0.0026	NT	0	In Compliance
6	Ash Slough @ Ave 21	4/20/2010	<0.0026	<0.004	0	In Compliance
6	Cottonwood Creek @ Rd 20	1/19/2010	0.21	<0.004	14.00	Out of compliance

Table 37. ESJWQC zone load allocation compliance - tally of compliant load calculations for all samples with detections of chlorpyrifos and/or diazinon collected during 2010.

YEAR	ZONE	IN COMPLIANCE	OUT OF COMPLIANCE	PERCENT IN COMPLIANCE
2004	4	3	0	100%
	5	6	0	100%
2005	1	6	1	86%
	2	12	2	86%
	3	11	1	92%
	4	13	0	100%
	5	13	1	93%
	6	10	2	83%
2006	1	5	2	71%
	2	13	1	93%
	3	13	4	76%
	4	23	3	88%
	5	21	3	88%
	6	19	5	79%
2007	1	8	2	80%
	2	26	2	93%
	3	16	2	89%
	4	35	8	81%
	5	36	3	92%
	6	13	3	81%
2008	1	9	4	69%
	2	34	2	94%

YEAR	ZONE	IN COMPLIANCE	OUT OF COMPLIANCE	PERCENT IN COMPLIANCE
2008	3	14	6	70%
	4	44	8	85%
	5	42	6	88%
	6	13	4	76%
2009	1	13	2	87%
	2	7	1	88%
	3	6	1	86%
	4	14	0	100%
	5	21	2	91%
	6	1	0	100%
2010	1	12	1	92%
	2	8	2	80%
	3	9	1	90%
	4	9	1	90%
	5	14	3	82%
	6	1	1	50%
2004 TOTAL		9	0	100%
2005 TOTAL		65	7	90%
2006 TOTAL		94	18	84%
2007 TOTAL		134	20	87%
2008 TOTAL		156	30	84%
2009 TOTAL		62	6	91%
2010 TOTAL		53	9	85%
GRAND TOTAL		573	90	86%

Implementation and Effectiveness of Management Practices to Reduce Off Site Movement of Diazinon and Chlorpyrifos

As discussed in the 2010 MPUR, 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).

Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd were the first group of high priority subwatersheds to undergo the focused outreach strategy. The Coalition obtained current management practices information from targeted growers (growers with the potential to discharge constituents of concern including chlorpyrifos and diazinon), discussed additional management practices that could be implemented and followed up with members to determine whether there had been new practices implemented. 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).

Bear Creek @ Kibby Rd, Cottonwood Creek @ Road 20, Duck Slough @ Gurr Road, and Highline Canal @ Hwy 99 are the second set of high priority subwatersheds (2010-2012). Individual meetings with growers in each subwatershed who have the potential for direct drainage and past use, or anticipated future use of chlorpyrifos and/or diazinon have occurred. The results of surveys from these meetings were discussed in earlier sections of this report (Summary of Implemented Management Practices). Follow up contacts are being scheduled with growers and a complete evaluation of management practice effectiveness in these subwatersheds will be presented in the 2012 MPUR.

Current management practices, newly implemented practices and an evaluation of management practice effectiveness will be conducted within additional subwatersheds as they are scheduled in Table 6. The next set of high priority subwatersheds (2011-2013) are Berenda Slough along Ave 18 ½, Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd, and Livingston Drain @ Robin Ave.

The Coalition also addresses the chlorpyrifos and diazinon TMDL by conducting general outreach. On January 5, 2011, a mailing went out to 1,357 members who own or operate parcels adjacent to the San Joaquin River or one of its tributaries (Table 14). The mailing included a letter from the Regional Board that defined the TMDL and its basis in California water law. In addition, the mailing included a letter from Coalition staff that urged members to use the upmost care when applying chlorpyrifos and/or diazinon products and warned of the consequences if pesticides continued to be detected in the River.

Alternatives to Diazinon and Chlorpyrifos Surface Water Quality Impacts

During grower outreach, the ESJWQC encourages growers to switch to products that are lower risk alternatives to chlorpyrifos and diazinon and works to educate growers about the selection of alternatives. Several alternative pesticide and product options exist, such as other organophosphates, carbamates, and pyrethroids. However, alternatives to chlorpyrifos and diazinon depend on the product registration, commodity type, pest pressures, and time of year, among other factors. Several growers in the first priority and second priority subwatersheds indicated they considered alternative strategies to using diazinon or chlorpyrifos during the dormant and/or growing season (Tables 15-17, 23-26).

Given all the factors that determine applicable alternatives, the Coalition is unable to know or begin to predict the number of growers across the entire Coalition region who switched from chlorpyrifos and diazinon to a lower risk product in 2010. However, water quality data collected during 2010 provides insight to the products being applied within the region. The Coalition analyzes for chlorpyrifos and diazinon only in the San Joaquin River and is not able to determine if other chemicals are present in the San Joaquin River. The Coalition uses its tributary monitoring data to assess surface water quality impairments due to chemicals other than chlorpyrifos and diazinon and can only infer that chemicals found in upstream tributaries are found in the San Joaquin River.

During 2010, there were four water column samples were toxic to *C. dubia* and *P. promelas* (Table 40). The four toxic samples were discussed in the 2011 AMR (pages 130-131). Extremely high ammonia concentrations were associated with all four toxicities (155.4 mg/L on March 23 and 31 mg/L on November 16, 2010), and the chlorpyrifos WQTL was exceeded in the samples collected on March 23, 2010. In addition, samples collected from Deadman Creek @ Gurr Rd on March 23 were from a non contiguous waterbody. An analysis of PUR data revealed that chlorpyrifos and a range of pyrethroids were applied prior to all toxicities.

Table 38. Water column and sediment toxicity exceedance summary for 2010 ESJWQC tributary monitoring.

STATION NAME	SAMPLE DATE	SEASON	SPECIES	TOXICITY END POINT	MEAN	PERCENT CONTROL	TOXICITY SIGNIFICANCE	SUMMARY COMMENTS
Prairie Flower Drain @ Crows Landing Rd	1/19/2010	Storm1, MPM	<i>S. capricornutum</i>	Total Cell Count (cells/ml)	390545	56	SL	
Deadman Creek (Dutchman) @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	<i>C. dubia</i>	Survival (%)	0	0	SL	Total mortality on Day 1. No TIE conducted due to unstable DO levels and extremely high ammonia levels.
Deadman Creek (Dutchman) @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	<i>P. promelas</i>	Survival (%)	0	0	SL	Total mortality on Day 1. No TIE conducted due to unstable DO levels and extremely high ammonia levels.
Duck Slough @ Gurr Rd	9/14/2010	Irrigation5, Sediment, MPM	<i>H. azteca</i>	Survival (%)	60	70	SL	Pyrethroids were detected in the associated chemistry sample.
Deadman Creek (Dutchman) @ Gurr Rd	11/16/2010	Fall2	<i>C. dubia</i>	Survival (%)	0	0	SL	Complete mortality on Day 1. A TIE was conducted on 11/19/10 and it was concluded that ammonia was the cause of toxicity.
Deadman Creek (Dutchman) @ Gurr Rd	11/16/2010	Fall2	<i>P. promelas</i>	Survival (%)	0	0	SL	Complete mortality on Day 1. A TIE was conducted on 11/19/10 and it was concluded that ammonia was the cause of toxicity.

MPM – Management Plan Monitoring

SL-Statistically significantly different from control; Less than 80% threshold

TIE-Toxicity Identification Evaluation

Pyrethroids have become a popular alternative to chlorpyrifos and diazinon due to their relatively low price and perception as less harmful to the environment because of low solubility, minimal runoff rates in water, and relatively short persistence. However, recent research has documented lethal and sublethal effects on zooplankton populations and fish at extremely low concentrations. Pyrethroid products have extremely high K_{oc} values and tend to bind to sediment, and while that reduces runoff rates, contaminated sediment that enters waterways during irrigation or rainfall events poses significant threats to water quality.

During the early years of the ILRP, the Coalition analyzed for pyrethroids in the water column with no detections. The Coalition currently monitors for sediment toxicity and, if there is a toxic sample that meets the threshold for additional analysis (80% compared to control), the Coalition analyzes the sediment for pyrethroids and chlorpyrifos.

There was a single toxic sediment sample collected during 2010 (Table 38). Chemical analysis of the sediment revealed concentrations of bifenthrin (J0.143 $\mu\text{g/kg dw}$), chlorpyrifos (J0.182 $\mu\text{g/kg dw}$), lambda-cyhalothrin (1.2 $\mu\text{g/kg dw}$) and permethrin (J0.127 $\mu\text{g/kg dw}$; “J” indicates a result is below the RL and is considered estimated). Pesticide use report data associated with this toxicity were discussed in the 2011 AMR (page 131); the majority of applications of chlorpyrifos and pyrethroids were to almond, alfalfa, cotton, and tomatoes.

The Coalition also monitors tributaries for other organophosphates and carbamates. During 2010, there were no exceedances of any other organophosphate or carbamates.

Although pyrethroids are contributing to water quality impairments, it is impossible to know if the pyrethroids are being used as an alternative to chlorpyrifos and diazinon. Furthermore, it is impossible to know if the chemicals are making their way into the San Joaquin River and if the chemicals are present at a toxic concentration when they enter the River. Ultimately, growers need to be aware that alternative products carry their own set of environmental risks. Poor management of irrigation drainage (including spray drift) and storm runoff will negatively affect water quality regardless of the product applied. The Coalition discusses with growers specific management practices to prevent toxicity and pesticide runoff when conducting outreach and education. Growers are encouraged not only to consider lower risk products but also to implement management practices that minimize the possibility that agricultural chemicals will contaminate surface waters.

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 2010 (Table 36 of the present report and in the San Joaquin River Chlorpyrifos and Diazinon 2010 AMR Table 28, page 34). There were no detections of diazinon during 2010; hence no additive effects between diazinon and chlorpyrifos were measured during 2010 sampling.

To completely understand whether there is additivity or synergy in toxicity by different chemicals in an ambient sample, the number of toxic units in the ambient sample must be known as well as all of the potential toxic chemicals in the sample. While the Coalition analyzes for numerous pesticides, there are far more pesticides applied than are covered by the standard water chemistry analysis. A full Toxicity Identification Evaluation (TIE) isolates the organic compounds by a solid phase extraction column and then characterizes the compounds by mass spectrometry analysis. The Coalition performs a Phase I and Phase III TIE which allows for the isolation of a compound type (i.e. non-polar organic, metals) but does

not analyze the eluate to identify the specific compound. The cost of a full TIE is beyond the capability of the Coalition. Consequently, there may always be chemicals in the sample that remain unidentified.

If all chemicals in a sample were quantified with confidence, the toxic units in the sample quantified, and the LC50 for the test species available for all quantified chemicals, it is possible to determine if the toxicity observed is matched by the sum of the toxic units of the chemicals in the sample. If the toxic units are accounted for by the toxic units of the individual chemicals, the toxicity is additive. If the number of toxic units quantified from the ambient sample is greater than the sum of the toxic units of the quantified chemicals, the chemicals are synergistic. If the sum of the toxic units calculated from the concentrations of the chemicals known to be present in the sample is lower than the number of toxic units in the ambient sample determined by toxicity testing, and if there are unknown chemicals in the ambient sample, it cannot be determined if synergy among chemicals is present. Given the lack of exhaustive chemical analysis performed by the Coalition on each sample, it is unlikely that true synergy can be positively recognized.

Although an exceedance of the chlorpyrifos WQTL coincided with two toxicities experienced during 2010 (toxicity to *C. dubia* and *P. promelas* in samples collected from Deadman Creek @ Gurr Rd on March 23, 2010; Tables 31 and 39), monitoring did not reveal that any other applied pesticides and/or metals contributed to the toxicities. Other insecticides, fungicides, herbicides and algaecides applications were associated with the toxicity, but a TIE was unable to be run on the two samples so the potential effect of additional chemicals is undetermined. Regardless, as discussed above, extremely high ammonia concentrations were detected in the samples and the toxicity to *C. dubia* and *P. promelas* is most likely due to chlorpyrifos, ammonia, or a combination of both. Although the ESJWQC has noted in past reports that high ammonia concentrations in storm water runoff, possibly from nearby dairy operations not under the ILRP, to the waterway are common in Deadman Creek, the March 23, 2010 sampling was not a storm event. The water was non contiguous at the time of sampling.

Chlorpyrifos and three pyrethroids were detected in the single sediment toxicity during 2010. Toxicity to *H. azteca* in the September 14, 2010 samples collected from Duck Slough @ Gurr Rd could have been the result of the chlorpyrifos, any one of the pyrethroids, or a combination of the pesticides.

No exceedance of any other pesticide and/or metal coincided with any of the nine chlorpyrifos exceedances during 2010.

Given the data, it appears that in at least one instance in the ESJWQC tributaries chlorpyrifos may have interacted with other pollutants (pyrethroids) to cause an impairment of beneficial uses. Pyrethroid use is discussed in the previous section. The ESJWQC will continue with its strategy to discuss the potential harms of all applied agricultural chemicals and to address toxicity, pesticides, and sediment bound analytes with specific management practices regardless of whether a TMDL exists. Management practices that address irrigation drainage (including spray drift) and storm water runoff will continue to be discussed with growers.

Demonstrate that Management Practices are Achieving the Lowest Pesticide Levels Technically and Economically Achievable

A determination of technical and economical feasibility needs to be done at the individual farm level and consequently is expected to vary with the specific operation and commodity farmed. The goal of the Coalition is for its members to have no discharge of pesticides to surface waters. Economic feasibility is

determined by factors outside the control of the Coalition. Profitable operations can afford to implement management practices such as sediment basins or pressurized irrigation both of which can significantly reduce the runoff of irrigation and storm water carrying agricultural discharges. Marginally profitable operations may not be able to afford these practices. Consequently, Coalition efforts to obtain additional funding for growers have been important to achieving the Coalition's goal. The Coalition has been instrumental in helping growers obtain AWEF funding and is publicizing the current funding available through the Proposition 84 grant program run by the Coalition for Urban/Rural Environmental Stewardship (CURES). These programs offer several million dollars towards the implementation of structural management practices within the Coalition region. However, these programs are still in their nascent stages and it will take a few years before the funding available through these programs is able to make an improvement in water quality. Also, there remain many growers who are not members of the Coalition and improvement of their operations is not possible through Coalition efforts.

It is technically feasible to eliminate all discharges of chemicals to surface waters, although it could require steps that are not economically feasible for even the most profitable operations. It does seem possible, given the success in the Coalition region in 2010, to reduce discharges to surface waters to the point that they do not impair beneficial uses. Within the ESJWQC region, there has been a reduction in the number of exceedances of chlorpyrifos (diazinon exceedances are almost nonexistent in the Coalition region) from 2009 to 2010. This reduction did not translate to the elimination of exceedances of the chlorpyrifos WQO in the San Joaquin River. However, there are still a large number of applications by nonmembers within the Coalition region and from outside the Coalition region that can cause or contribute to exceedances in the San Joaquin River. Consequently, the Coalition believes that management practices implemented by growers are resulting in a reduction of discharges, and that it is in the process of achieving the lowest pesticide levels technically and economically achievable.

SALT AND BORON TMDL

The Regional Board and stakeholders initiated the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) in July 2008 to facilitate 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 with the goal of developing a Salt and Boron Basin Plan Amendment. 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 39). Coalition technical consultants participated in several CV SALTS committees including the Technical Advisory Committee, the Knowledge Gained and BMP Subcommittees, and the Executive Committee (Table 39).

In addition, the Coalition monitored tributary sites for specific conductance and boron during 2010 (Table 40).

Table 39. CV-SALTS meetings during 2010.

CONSTITUENT / ORGANIZATION	MEETING DATE	COALITION REPRESENTATIVE IN ATTENDANCE	MEETING TITLE
Boron & Salt / CV-SALTS	1/21/2010	MJ, MT, PK	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	1/21/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	1/21/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	2/10/2010	MJ, MT, PK	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	2/10/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	2/10/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	2/18/2010 through 2/19/2010	None	Multi-State Salinity Coalition 2010 Annual Salinity Summit
Boron & Salt / CV-SALTS	3/11/2010	MJ, MT, PK	Joint CVRWQCB and Economic and Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	3/11/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	4/21/2010	MJ, MT, PK	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	4/21/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	4/21/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	4/26/2010	PK	Public Scoping Workshop (Yolo County)
Boron & Salt / CV-SALTS	4/27/2010	PK	Public Scoping Workshop (Tulare County)
Boron & Salt / CV-SALTS	5/13/2010	MJ, MT, PK	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	5/13/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	5/13/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	5/25/2010	PK	BMP Subcommittee Meeting
Boron & Salt / CV-SALTS	5/26/2010	PK	Beneficial Use and Objective Study Phase 1 Subcommittee Meeting
Boron & Salt / CV-SALTS	5/26/2010	PK	Salt and Nitrate Source Study Lessons Learned*
Boron & Salt / CV-SALTS	6/3/2010	PK	Funding and Fundraising Subcommittee
Boron & Salt / CV-SALTS	6/3/2010	PK	Lower San Joaquin River Committee
Boron & Salt / CV-SALTS	6/10/2010	PK	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	6/10/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	6/10/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	6/29/2010	PK	BMP Subcommittee Meeting
Boron & Salt / CV-SALTS	6/29/2010	PK	Salt and Nitrate Source Study Lessons Learned*
Boron & Salt / CV-SALTS	6/30/2010	PK	Lower San Joaquin River Committee
Boron & Salt / CV-SALTS	7/9/2010	PK	Funding and Fundraising Subcommittee
Boron & Salt / CV-SALTS	7/15/2010	MJ, MT, PK	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	7/15/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	7/15/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	7/26/2010	PK	Lower San Joaquin River Committee
Boron & Salt / CV-SALTS	7/30/2010	PK	Salt and Nitrate Source Study Knowledge Gained Committee
Boron & Salt / CV-SALTS	7/30/2010	PK	Beneficial Use and Objective Study Phase 1 Subcommittee Meeting
Boron & Salt / CV-SALTS	7/30/2010	PK	Central Valley Salinity Leadership Group Planning Subcommittee Meeting
Boron & Salt / CV-SALTS	8/9/2010	PK	Funding and Fundraising Subcommittee
Boron & Salt / CV-SALTS	8/12/2010	MJ, MT, PK	Technical Advisory Committee Meeting
Boron & Salt / CV-SALTS	8/12/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	8/12/2010	PK	Public Education and Outreach Meeting
Boron & Salt / CV-SALTS	8/16/2010	PK	Central Valley Salinity Leadership Group Planning Subcommittee Meeting

CONSTITUENT / ORGANIZATION	MEETING DATE	COALITION REPRESENTATIVE IN ATTENDANCE	MEETING TITLE
Boron & Salt / CV-SALTS	8/18/2010	PK	Salt and Nitrate Source Study Knowledge Gained Committee
Boron & Salt / CV-SALTS	8/19/2010	PK	BMP Subcommittee Meeting
Boron & Salt / CV-SALTS	9/3/2010	PK	Beneficial Use and Objective Study Phase 1 Subcommittee Meeting
Boron & Salt / CV-SALTS	9/16/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	10/28/2010	PK	Executive Subcommittee Call
Boron & Salt / CV-SALTS	11/5/2010	PK	Executive Subcommittee Call
Boron & Salt / CV-SALTS	11/18/2010	PK	Executive Committee Meeting
Boron & Salt / CV-SALTS	12/3/2010	PK	Salinity Leadership Group Planning Subcommittee

MJ – Michael Johnson, MLJ-LLC

MT – Melissa Turner, MLJ-LLC

PK – Parry Klassen, ESJWQC

Table 40. ESJWQC tributaries sampled for specific conductance and boron in 2010.

ZONE	SITE NAME	SPECIFIC CONDUCTANCE	BORON (TOTAL)
1	Dry Creek @ Wellsford Rd	X	
	Mootz Drain downstream of Langworth Pond	X	X
2	Lateral 2 1/2 near Keyes Rd	X	X
	Prairie Flower Drain @ Crows Landing Rd	X	
3	Dry Creek @ Oakdale Ave	X	
	Highline Canal @ Lombardy Ave	X	
	Highline Canal @ Hwy 99	X	
	Mustang Creek @ East Ave	X	X
4	Bear Creek @ Kibby Rd	X	
	Howard Lateral @ Hwy 140	X	X
	Merced River @ Santa Fe	X	
5	Deadman Creek @ Gurr Rd	X	X
	Duck Slough @ Gurr Rd	X	
	Duck Slough @ Hwy 99	X	
	Miles Creek @ Reilly Rd	X	
6	Ash Slough @ Ave 21	X	X
	Cottonwood Creek @ Rd 20	X	

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 (pages 33-58). The Coalition monitored for DO in at least one representative site within each Coalition zone. The Coalition is addressing DO exceedances through the Management Prioritization process (ESJWQC 2008 Management Plan approved November 25, 2008). In addition, the Coalition is participating in the DO TMDL Technical Working Group meetings (<http://www.sjrdotmdl.org/meetings.html>). The DO TMDL Technical Working Group held five meetings

(Table 41) during 2010 to discuss the progress of several studies and pilot programs. These include the upper SJR DO project and the performance of the aeration facility in the deep water ship channel. At this point, the Regional Board is in negotiations with stakeholders to determine which organization is willing to fund the operation and maintenance of the aeration facility and maintain the DO content of the water in the deep water ship channel above the threshold dictated by the Basin Plan amendment. The role of the Coalition in this process is unknown at this time.

Table 41. DO TMDL Technical Working Group Meetings.

DATE	PARTICIPANTS
03/23/2010	MT, MJ
04/20/2010	MT, MJ
06/24/2010	MT, MJ
10/21/2010	MT
12/14/2010	MT

MJ – Michael Johnson, MLJ-LLC

MT – Melissa Turner, MLJ-LLC

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, 2011. Further analysis of high priority site subwatersheds (2008– 2010, 2010 – 2012 and 2011– 2013) is included in Appendix I.

Ash Slough @ Ave 21

Ash Slough @ Ave 21 was monitored for Assessment Monitoring during 2008 through 2010 and was sampled once per month 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 and April 20, 2010. Chlorpyrifos and copper were analyzed as part of normal Assessment Monitoring in 2009 and 2010. Exceedances of dissolved copper were experienced at Ash Slough during the 2009 and 2010 sampling events. Ash Slough rotated out of Assessment Monitoring in 2011 and is not scheduled to be monitored as an Assessment Monitoring location again until 2015.

Bear Creek @ Kibby Rd

Bear Creek @ Kibby Rd is scheduled for Assessment Monitoring 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 was monitored during May and July 2010, and copper only was monitored in August 2010. There were no WQTL exceedances experienced at Bear Creek during the 2010 MPM. During 20011, Bear Creek @ Kibby Rd is scheduled for MPM for copper (January, February and August), chlorpyrifos (May and July) and *C. dubia* water column toxicity (May and July).

Berenda Slough along Ave 18 ½

Berenda Slough along Ave 18 ½ is scheduled for Assessment Monitoring during 2011 and in 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. During 2011, Berenda Slough along Ave 18 ½ is scheduled for Assessment Monitoring where all constituents will be analyzed monthly. Management Plan constituents being monitored in 2011 are chlorpyrifos (July and September) and toxicity to *S. capricornutum* (May and July).

Black Rascal Creek @ Yosemite Rd

Black Rascal Creek @ Yosemite Rd is scheduled for Assessment Monitoring 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

Cottonwood Creek @ Rd 20 was scheduled for Core Monitoring where a limited suite of constituents were analyzed each month during 2008 through 2010. In addition to the core monitoring constituents; the Coalition monitors for *Pimephales promelas*, *S. capricornutum* and *H. azteca* toxicity due to toxicity to each 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, at the Rd 20 site there was 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 occurred during 2010 and is scheduled to occur in 2011. MPM for chlorpyrifos, copper, diuron and diazinon took place in January/February 2010; copper was monitored from April through September in 2010. During 2011, Cottonwood Creek @ Rd 20 is scheduled for Assessment Monitoring where all constituents will be analyzed monthly. Management Plan constituents being monitored in 2011 are copper (January-February and April-September), chlorpyrifos (January and February), diazinon (February), diuron (January and February). Cottonwood Creek will return to Core Monitoring in 2012.

Deadman Creek @ Gurr Rd

Assessment Monitoring occurred at Deadman Creek @ Gurr Rd 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 the Coalition did not conduct any additional MPM in 2009. During January and February of 2010 MPM for toxicity to *S. capricornutum*

and copper WQTL took place. This site will become a high priority subwatershed in 2012 and MPM will be conducted at that time. Assessment Monitoring will not occur again at this location until 2017.

Deadman Creek @ Hwy 59

Deadman Creek @ Hwy 59 is scheduled for Assessment Monitoring during 2011. 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 is scheduled for Assessment Monitoring 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). In 2011, Dry Creek @ Rd 18 becomes a high priority site subwatershed and MPM is scheduled for *S. capricornutum* toxicity (January, February and May), copper (January, February and April-September), chlorpyrifos (February, April and July), diazinon (February), diuron (January and February), *H. azteca* sediment toxicity (March and September) and lead (May, June, August and September).

Duck Slough @ Gurr Rd

Duck Slough @ Gurr Rd is a core site and therefore a limited suite of constituents are monitored monthly. As per table 13 on page 63 in the MRPP, several additional constituents are monitored including organophosphates and metals. Additional MPM was 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. Exceedances in 2009 consisted of: pH, SC, *E. coli*, nitrate + nitrite, and dissolved copper. Duck Slough was scheduled for MPM (second high priority site subwatershed 2010-2012) during 2010 MPM for chlorpyrifos, copper, *S. capricornutum* toxicity, and *H. azteca* sediment toxicity took place. Only two exceedances occurred at Duck Slough @ Gurr Rd in 2010; *E. coli* and sediment toxicity to *Hyalella azteca*. During 2011, Duck Slough @ Gurr Rd is scheduled for Assessment Monitoring where all constituents will be analyzed monthly. Management Plan constituents being monitored in 2011 are copper (January-February and May-July), chlorpyrifos (July), water column toxicity to *C. dubia* (February-March), *S. capricornutum* (July-September) and sediment toxicity to *H. azteca* (September).

Hatch Drain @ Tuolumne Rd

Hatch Drain @ Tuolumne Rd is not scheduled for Assessment Monitoring until 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*. Hatch Drain @ Tuolumne Rd is scheduled for MPM in 2013 and 2014 when this site become a high priority site subwatershed.

Highline Canal @ Hwy 99

Core Monitoring occurred at Highline Canal @ Hwy 99 during 2008 through 2009 therefore limited constituents were monitored during those years. 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 which began in 2010 and MPM in 2010 took place for copper, chlorpyrifos, diuron and toxicity to *S. capricornutum*. In 2011 Highline Canal @ Hwy 99 is scheduled for Assessment Monitoring where every constituent will be monitored on a monthly basis. Management Plan constituents being monitored in 2011 are copper (January-February, April and July-August), chlorpyrifos (January-February and July), diuron (January-February), water column toxicity to *S. capricornutum* (January and March-May) and sediment toxicity to *H. azteca* (March and September).

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 is scheduled for Assessment Monitoring during 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 monthly during Assessment Monitoring in 2011 and 2012. This site will become high priority in 2013 and MPM will occur in 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 for Assessment Monitoring constituents in 2009. As of April 1, 2010, Howard Lateral @ Hwy 140 required a management plan for pH, SC, TDS and *E. coli*. In 2010, Howard Lateral continued as an Assessment Monitoring location where all constituents were monitored monthly. Due to 2010 exceedances of the chlorpyrifos WQTL and two exceedances of the copper WQTL, Howard Lateral will become a priority subwatershed in, 2015-2017.

Lateral 2 1/2 near Keyes Rd

This site was added to the Coalition's MRPP in October 2008 and was first monitored for Assessment Monitoring in 2009. As of April 1, 2010, Lateral 2 ½ near Keyes Rd required a management plan for pH and chlorpyrifos. In 2010, Lateral 2 ½ near Keyes Rd continued as an Assessment Monitoring site monthly for all constituents. Lateral 2 ½ near Keyes Rd was moved up in the priority subwatershed list and is being monitored for MPM in 2011 for chlorpyrifos during months of past exceedances.

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 is now a high priority site subwatershed and MPM is scheduled to occur in 2011 and 2012.

Merced River @ Santa Fe Dr

Merced River @ Santa Fe Dr is a Core Monitoring location and becomes a 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; 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. During 2011, Merced River is scheduled for Assessment Monitoring where all constituents will be analyzed on a monthly basis.

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 was monitored for *C. dubia* and copper in January/February 2010. 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 basin and retain both water and sediment when water flows are low. The Mootz Drain subwatershed requires a management plan for DO, *E. coli*, and chlorpyrifos. The Coalition monitored Mootz Drain downstream of Langworth Pond for all Assessment Monitoring constituents in 2010 and exceedances of DO, ammonia, *E. coli* and diuron continued. 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 was monitored for MPM of chlorpyrifos and simazine WQTL in January/February 2010 with no exceedances. Mustang Creek will become a high priority subwatershed in 2014 and MPM will be conducted at that time. This site is scheduled for Assessment Monitoring in 2015.

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.

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High Priority Site Subwatershed Analysis

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HIGH PRIORITY SITE SUBWATERSHEDS (2008 -2010)

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 (sample site name), station code and target latitude/longitudes for sites sampled within this subwatershed.

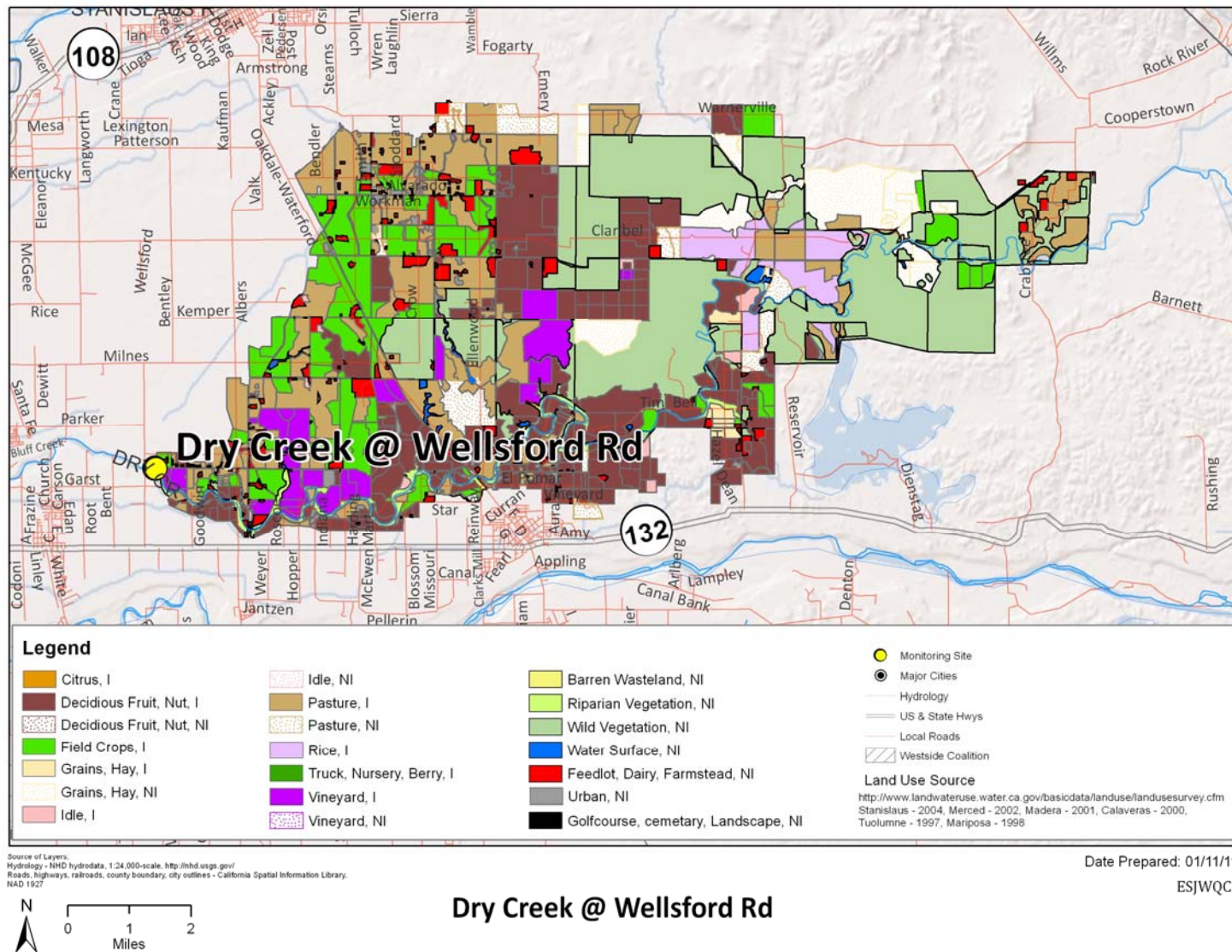
Table I-1. Coordinates of the Dry Creek site subwatershed sampling locations.

SAMPLE SITE	STATION CODE	TARGET LATITUDE	TARGET LONGITUDE
Dry Creek @ Waterford Rd ^u	535XDCAWF	37.6588	-120.7789
Dry Creek @ Wellsford Rd*	535XDCAWR	37.6602	-120.8743

*Original ESJWQC sampling site

^uUpstream 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 2010 (Table I-2). Dry Creek @ Wellsford Rd remained a Core Monitoring location under the current MRPP. Throughout 2011, this site is scheduled for Assessment Monitoring. Core monitoring will resume at this location in January 2012. The constituents sampled at the Dry Creek subwatershed from 2005 through 2010 are listed in Table I-3.

Management Plan Monitoring (MPM) for the Coalition was initiated during the 2007 irrigation season and continued through 2010. Additional sampling occurred in 2007 at Dry Creek @ Wellsford Rd and upstream monitoring occurred in 2008 and 2009 at Dry Creek @ Waterford Rd for copper, chlorpyrifos, diuron and toxicity to *Ceriodaphnia dubia*, *Selenastrum capricornutum* and *Hyaella azteca* (Table I-4, Table I-5, Table I-6 and Table I-7). A summary and discussion of exceedances are provided in the next section (Table I-8).

Dry Creek is considered an impaired waterbody and is included in the 2008 Central Valley Basin Plan 303d list for chlorpyrifos, diazinon, *E. coli*, and unknown water toxicity. In the 303d list, 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				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	3
Events Not Sampled	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	NA	2	5	2	5	2	6	3	6	2	2	0	6	2	1	3	5	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				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	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	3	6	2	2	2	6	2	1	3	5	3
EPA 160.2	Suspended Solids							1		2	2	2	6	2	1	3	5	3
EPA 180.1	Turbidity	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	3
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	1	3	5	3
SM 9223	<i>E. coli</i>	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	3
NA	Dissolved Oxygen	2	5	3	5	3	10	4	8	2	2	2	6	2	1	3	5	3
NA	Specific Conductivity	2	5	3	5	3	10	4	8	2	2	2	6	2	1	3	5	3
NA	pH	2	5	3	5	3	10	4	8	2	2	2	6	2	1	3	5	3
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							1		
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	2	6									
EPA 8141A	Chlorpyrifos	2	5	2	5	2	8	2	6				2				3	

METHOD	ANALYTE	2005		2006		2007		2008			2009				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 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									
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							2		
EPA 200.8	Lead				5	2	6	2	6			1					3	3
EPA 200.8	Molybdenum																	
EPA 200.8	Nickel				5	2	6	2	6									
EPA 200.8	Selenium				5	2	2	2	6									

Method	Analyte	2005		2006		2007		2008			2009				2010			
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
EPA 200.8	Zinc				5	2	6	2	6									
Metals (Dissolved)																		
EPA 200.8	Cadmium																	
EPA 200.8	Copper															2		
EPA 200.8	Lead											1					3	3
EPA 200.8	Nickel																	
EPA 200.8	Zinc																	
Nutrients																		
SM 2340 C	Hardness as CaCO3				5	2	6	2	6			1				2	3	3
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	1	3	5	3
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	3	6	2	2	1	1				3	3
EPA 354.1	Nitrite as N				5	2	6	2	6									
EPA 353.2	Nitrate + Nitrite as N							1		2	2	2	6	2	1	3	5	3
EPA 365.2	Orthophosphate as P				5	2	6	3	6	2	3	1	1				3	3
EPA 365.2	Phosphate as P				5	2	6	3	6	2	2	2	6	2	1	3	5	3
Toxicity																		
EPA 821-02-012	<i>Ceriodaphnia dubia</i>	2	5	2	6	2	7	2	6									
EPA 821-02-012	<i>Pimephales promelas</i>	2	5	2	5	2	6	2	6									
EPA 821-02-013	<i>Selenastrum capricornutum</i>	2	5	2	5	2	6	4	6							1		
EPA 600/R-99-064	<i>Hyalella azteca</i>		1	1	1	1	1	2	2								1	

NA - Not applicable.

Table I-4. Dry Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and *C. dubia* toxicity. "X" indicates what constituents were 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 *C. dubia* toxicity. "X" indicates what constituents were 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 MPM and upstream (U) sampling schedule for chlorpyrifos. "X" indicates what constituents were sampled.

SAMPLE SITE	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

Table I-7. Dry Creek site subwatershed. 2010 MPM for copper, chlorpyrifos, diuron, *H. azteca* and *S. capricornutum* toxicity. "X" indicates what constituents were sampled.

SITE NAME	DATE	TYPE	COPPER	CHLORPYRIFOS	DIURON	HYALELLA AZTECA	SELENASTRUM CAPRICORNUTUM
Dry Creek @ Wellsford Rd	23-Feb-10	MPM	X		X		X
Dry Creek @ Wellsford Rd	20-Apr-10	MPM	X				
Dry Creek @ Wellsford Rd	18-May-10	MPM					
Dry Creek @ Wellsford Rd	20-Jul-10	MPM		X			
Dry Creek @ Wellsford Rd	17-Aug-10	MPM		X			
Dry Creek @ Wellsford Rd	14-Sept-10	MPM		X		X	

Exceedance History

Ambient water monitoring within the Dry Creek subwatershed was initiated in the 2005 storm sampling season at Wellsford Rd site. Dry Creek @ Wellsford Rd samples collected from 2005 through 2010 have had exceedances of the WQTL for field parameters, *E. coli*, pesticides, and metals (Table I-8). Toxicity in the water column to *C. dubia*, and *S. capricornutum*, and sediment toxicity to *H. azteca*, has also occurred (Table I-8). The number of constituent exceedances in this subwatershed (including the upstream site), were DO (35), pH (5), SC (1), *E. coli* (35), chlorpyrifos (10), diuron (2), thiobencarb (1), copper (3), and lead (1). Water column toxicity to *C. dubia* occurred twice, *S. capricornutum* toxicity occurred five times and sediment toxicity to *H. azteca* occurred twice. Samples collected for *S. capricornutum* toxicity as part of a resample event on March 7, 2007 were considered toxic with a 93% growth relative to the control which was considered ecologically significant compared to control replicates.

In 2010, exceedances included DO (7), pH (1), *E. coli* (6), and chlorpyrifos (1).

All exceedances are listed in Table I-8 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-8 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR). No additional prioritizations were necessary following the exceedances of the 2010 sampling season. *C. dubia* water column toxicity is no longer assigned a high priority because the only two toxic samples were collected over three years ago. However, Dry Creek @ Wellsford Rd is scheduled for Assessment Monitoring where every constituent will be analyzed during each month of the year. The highest priority constituents in the Dry Creek @ Wellsford Rd subwatershed are chlorpyrifos (A/B), copper and diuron (C), and toxicity to *S. capricornutum* and *H. azteca* (D) (Table I-8).

Table I-8. All exceedances experienced in samples collected from locations within the Dry Creek site subwatershed from February 2005 through December 2010 (sorted by season and date).

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

SAMPLE SITE	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	PH, <6.5 AND > 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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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		

SAMPLE SITE	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	PH, <6.5 AND > 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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
Dry Creek @ Wellsford Rd	Storm	2/11/2007	6.17			290				37				52
Dry Creek @ Wellsford Rd	Storm	2/22/2007												16
Dry Creek @ Wellsford Rd	Storm	2/28/2007				2400	8.4 (7.2)			4				32
Dry Creek @ Wellsford Rd	Storm	3/7/2007												93
Dry Creek @ Wellsford Rd	Irrigation	4/17/2007					5.1 (5.0)							
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)						33
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					

SAMPLE SITE	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	pH, <6.5 AND > 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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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									
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								
Dry Creek @ Wellsford Rd	Storm	1/19/2010	2.05											

SAMPLE SITE	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	PH, <6.5 AND > 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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
Dry Creek @ Wellsford Rd	Storm	4/20/2010	6.99			2000								
Dry Creek @ Wellsford Rd	Irrigation	5/18/2010				370								
Dry Creek @ Wellsford Rd	Irrigation	6/15/2010	5.77											
Dry Creek @ Wellsford Rd	Irrigation	7/20/2010	6.30			490			0.067					
Dry Creek @ Wellsford Rd	Irrigation	8/17/2010	6.91			490								
Dry Creek @ Wellsford Rd	Fall	10/19/2010	6.01			370								
Dry Creek @ Wellsford Rd	Fall	11/16/2010	5.36	6.14		390								
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 occurred at this site within three years and there is currently no TMDL for constituent.

NP¹ - Not Prioritized; thiobencarb is used only by rice and therefore all exceedances are turned over to the Rice Coalition.

2007 - 2010 Management Plan Monitoring Results

Management Plan Monitoring results from 2007 through 2010 are discussed below and included in Table I-9 for chlorpyrifos, copper, diuron and *C. dubia*, *S. capricornutum* and *H. azteca* toxicity.

2007

Dry Creek was monitored monthly for chlorpyrifos and toxicity to *C. dubia* during 2007. Additional monitoring also occurred for chlorpyrifos (July and August) and toxicity to *C. dubia* (September). No toxicity to *C. dubia* occurred in 2007. Chlorpyrifos exceeded the WQTL of 0.015µg/L during normal monitoring in July and September 2007. Additional monitoring resulted in no detectable levels of chlorpyrifos (<0.003 µg/L).

2008

In 2008, upstream MPM occurred at Dry Creek @ Waterford Road for chlorpyrifos (July, August, and September) and for toxicity to *C. dubia* (September). Normal monitoring occurred monthly at Dry Creek @ Wellsford Rd for these constituents in 2008. Again, no toxicity to *C. dubia* occurred in 2008. 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), see Table I-8.

2009

Although upstream monitoring is typically scheduled for one season only, the Coalition continued to monitor the Dry Creek upstream location (Dry Creek @ Waterford Rd) during the 2009 irrigation season because chlorpyrifos exceedances were inconsistent at the normal monitoring and upstream locations in 2008. During 2009 monitoring at Dry Creek @ Wellsford Rd, chlorpyrifos was detected (0.013 µg/L) in July samples and an exceedance of the chlorpyrifos WQTL (0.027µg/L) occurred in August. The MPM samples collected from Dry Creek @ Waterford Rd during July and August 2009 had no detections of chlorpyrifos.

2010

In 2010, MPM occurred at Dry Creek @ Wellsford Rd for copper (February and April), chlorpyrifos (July through September), diuron (February), *S. capricornutum* toxicity (February) and *H. azteca* toxicity (September). Out of all the 2010 MPM samples collected, only one sample produced an exceedance: chlorpyrifos in July (0.067µg/L).

2011

During 2011, Dry Creek @ Wellsford Rd is scheduled to be monitored for Assessment Monitoring which will include all high priority constituents. Management Plan Monitoring for 2011 includes copper (February and April), chlorpyrifos (July-September), diuron (February) and *S. capricornutum* toxicity (February and March) and *H. azteca* toxicity (March and September). This site will return to Core Monitoring in 2012.

Table I-9. Dry Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

MONTH:		FEBRUARY	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Wellsford Rd)	Date	NA	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/11/07
	Chlorpyrifos (µg/L)	NA	<0.003	0.011	<0.003	0.021	<0.003	0.043
	<i>C. dubia</i> toxicity (% Control)	NA	100	100	100	100	100	100
2007 MPM A (@ Wellsford Rd)	Date	NA	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	<0.003	<0.003	NA
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	100
2008 NM (@ Wellsford Rd)	Date	NA	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	NA	<0.003	<0.003	<0.003	0.03	<0.003	<0.003
	<i>C. dubia</i> toxicity (% Control)	NA	100	100	100	100	100	100
2008 MPM US (@ Waterford Rd)	Date	NA	NA	NA	NA	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	0.02	0.023	<0.003
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	100
2009 MPM (@ Wellsford Rd)	Date	NA	NA	NA	NA	7/21/09	8/18/09	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	0.013	0.027	NA
2009 MPM US (@ Waterford Rd)	Date	NA	NA	NA	NA	7/21/09	8/18/09	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	<0.003	<0.003	NA
2010 MPM (@ Wellsford Rd)	Date	2/23/10	4/20/10	NA	NA	7/20/10	8/17/10	9/14/10
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	0.067	0.013	<0.003
	Diuron (µg/L)	<0.20	NA	NA	NA	NA	NA	NA
	Copper, dissolved (µg/L)	3.2	2.8	NA	NA	NA	NA	NA
	Copper, total (µg/L)	3.9	4.3	NA	NA	NA	NA	NA
	<i>S. capricornutum</i> toxicity (% Control)	1219	NA	NA	NA	NA	NA	NA
	<i>H. azteca</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	115

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

A- Additional Monitoring conducted in 2007.

US- Upstream Monitoring conducted in 2008.

Load Calculations

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

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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-10. Instantaneous load calculations for chlorpyrifos, copper and diuron where discharge was measured in the Dry Creek @ Wellsford Rd site subwatershed (sorted by analyte and date). Upstream site is italicized.

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Dry Creek @ Wellsford Rd	Chlorpyrifos	08/17/05	0	0.024	0
Dry Creek @ Wellsford Rd	Chlorpyrifos	07/13/06	123.91	0.026	91.23
Dry Creek @ Wellsford Rd	Chlorpyrifos	05/15/07	51.13	0.011	15.93
Dry Creek @ Wellsford Rd	Chlorpyrifos	07/17/07	68.57	0.021	40.78
Dry Creek @ Wellsford Rd	Chlorpyrifos	09/11/07	61.02	0.043	74.30
Dry Creek @ Wellsford Rd	Chlorpyrifos	07/22/08	63.22	0.03	53.71
<i>Dry Creek at Waterford Rd</i>	<i>Chlorpyrifos</i>	<i>08/19/08</i>	<i>24.24</i>	<i>0.023</i>	<i>15.79</i>
Dry Creek @ Wellsford Rd	Chlorpyrifos	07/21/09	71.26	0.013	26.23
Dry Creek @ Wellsford Rd	Chlorpyrifos	08/18/09	47.07	0.027	35.99
Dry Creek @ Wellsford Rd	Chlorpyrifos	07/20/10	51.2	0.067	97.14
Dry Creek @ Wellsford Rd	Chlorpyrifos	08/17/10	51.94	0.013	19.12
Dry Creek @ Wellsford Rd	Copper	07/13/06	123.91	3.1	10877.15
Dry Creek @ Wellsford Rd	Copper	04/17/07	30.71	5.1	4435.04
Dry Creek @ Wellsford Rd	Copper	05/15/07	51.13	6.1	8831.87
Dry Creek @ Wellsford Rd	Copper	06/19/07	32.21	5.9	5381.33
Dry Creek @ Wellsford Rd	Copper	07/17/07	68.57	3.9	7572.62
Dry Creek @ Wellsford Rd	Copper	08/14/07	65.83	5.3	9879.77
Dry Creek @ Wellsford Rd	Copper	09/11/07	61.02	3.3	5702.08
Dry Creek @ Wellsford Rd	Copper	04/22/08	39.8	4.7	5296.98
Dry Creek @ Wellsford Rd	Copper	05/20/08	38.3	3.8	4121.26
Dry Creek @ Wellsford Rd	Copper	06/17/08	38.94	3.7	4079.86
Dry Creek @ Wellsford Rd	Copper	07/22/08	63.22	3.2	5728.64
Dry Creek @ Wellsford Rd	Copper	08/19/08	52.75	5.3	7916.73
Dry Creek @ Wellsford Rd	Copper	09/23/08	33.48	2.3	2180.52
Dry Creek @ Wellsford Rd	Copper	02/23/10	4.96	3.9	547.76
Dry Creek @ Wellsford Rd	Copper	04/20/10	20.8	4.3	2532.67
Dry Creek @ Wellsford Rd	Copper (D)	02/23/10	4.96	3.2	449.45
Dry Creek @ Wellsford Rd	Copper (D)	04/20/10	20.8	2.8	1649.18
Dry Creek @ Wellsford Rd	Diuron	04/17/07	30.71	0.29	252.19
Dry Creek @ Wellsford Rd	Diuron	04/22/08	39.8	0.2	225.40

Copper (D)-Dissolved Copper

Source Identification and Outreach

The Coalition addressed source identification in the 2010 Management Plan Update Report (MPUR) and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides—PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007 and 2008, the Coalition conducted additional and upstream MPM during those months in which exceedances had occurred in previous years to better characterize water quality the subwatershed. During 2009 and 2010, MPM continued at the Dry Creek @ Wellsford Rd site during those months in which exceedances had occurred in previous years to continue to assess water quality in the subwatershed.

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

Priority A/B Constituents

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

Chlorpyrifos

Ten exceedances of the chlorpyrifos WQTL (0.015 µg/L) have occurred during the latter months of irrigation seasons in samples collected between 2005 and 2010 (Table I-8), including most recently one exceedance in July of 2010. The Coalition evaluates monitoring and PUR data to identify possible sources of exceedances of constituents of concern.

In every high priority subwatershed, PUR data are reviewed for the number of monthly applications and pounds of active ingredient (AI) applied of the constituent of concern, and the acres treated by the constituent of concern (Table I-11, Figure I-2). The greatest amount of chlorpyrifos use occurred in 2005 (9,996 lbs AI) with the lowest amount of use occurring in 2010 (3,948 lbs AI). The greatest chlorpyrifos use has occurred consistently in the month of July; however in 2009 the largest amount of chlorpyrifos was applied in May. Exceedances often occur in the late summer (Figure I-2). The most recent chlorpyrifos applications preceding the 2010 July chlorpyrifos exceedance occurred in June 2010 (2059.8 lbs AI). There has been a steady decline in the overall used from 2005 to the present.

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications of the constituent of concern (Table I-12). The highest application rates of chlorpyrifos in the Dry Creek subwatershed are associated with almond/walnut orchards, corn and grapes. The largest amount of chlorpyrifos applied from 2005 through 2010 was to almonds (17,625 lbs AI) followed by walnuts (14,608 lbs AI). The most common product containing chlorpyrifos used within this subwatershed was Lorsban.

Table I-11. Number of chlorpyrifos applications, pounds AI applied, and acres treated by month for August 2004 through December 2010 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
August, 2004	16	656.4	619.5
December, 2004	1	80.0	45
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	2022.4
June, 2005	15	1970.3	1244
July, 2005	50	3923.3	2312
August, 2005	16	569.8	425.8
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	1842.4
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	73.9
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	207.8
September, 2007	1	11.6	11
October, 2007	1	117.6	63.3
November, 2007	4	247.4	133.2
January, 2008	1	29.9	14
May, 2008	20	840.6	595
June, 2008	14	858.9	714
July, 2008	41	2012.0	1565.6
August, 2008	10	499.4	350
September, 2008	2	85.6	48
March, 2009	4	381.2	203.0
April, 2009	6	389.9	164.4
May, 2009	19	1355.7	668.5
June, 2009	9	798.2	701
July, 2009	22	1049.7	611.7
August, 2009	7	295.0	290.8
September, 2009	4	122.5	70.8
November, 2009	3	487.4	259.5
February, 2010	1	112.7	60
April, 2010	2	0.7	0.4

MONTH/YEAR	NUMBER OF CHLORPYRIFOS APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
May, 2010	6	393.9	197
June, 2010	4	426.1	226.5
July, 2010	39	2059.8	1691.3
August, 2010	13	650.0	357
September, 2010	4	277.3	210.8
November, 2010	2	27.9	14
Summaries by Year			
2004 Total	17	736.4	664.5
2005 Total	117	9996.5	6806.4
2006 Total	137	8016.6	5776.2
2007 Total	112	6901.1	4505.7
2008 Total	88	4326.4	3286.6
2009 Total	74	4879.6	2969.6
2010 Total	71	3948.5	2757.0
Total	616	38805.1	26765.9

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

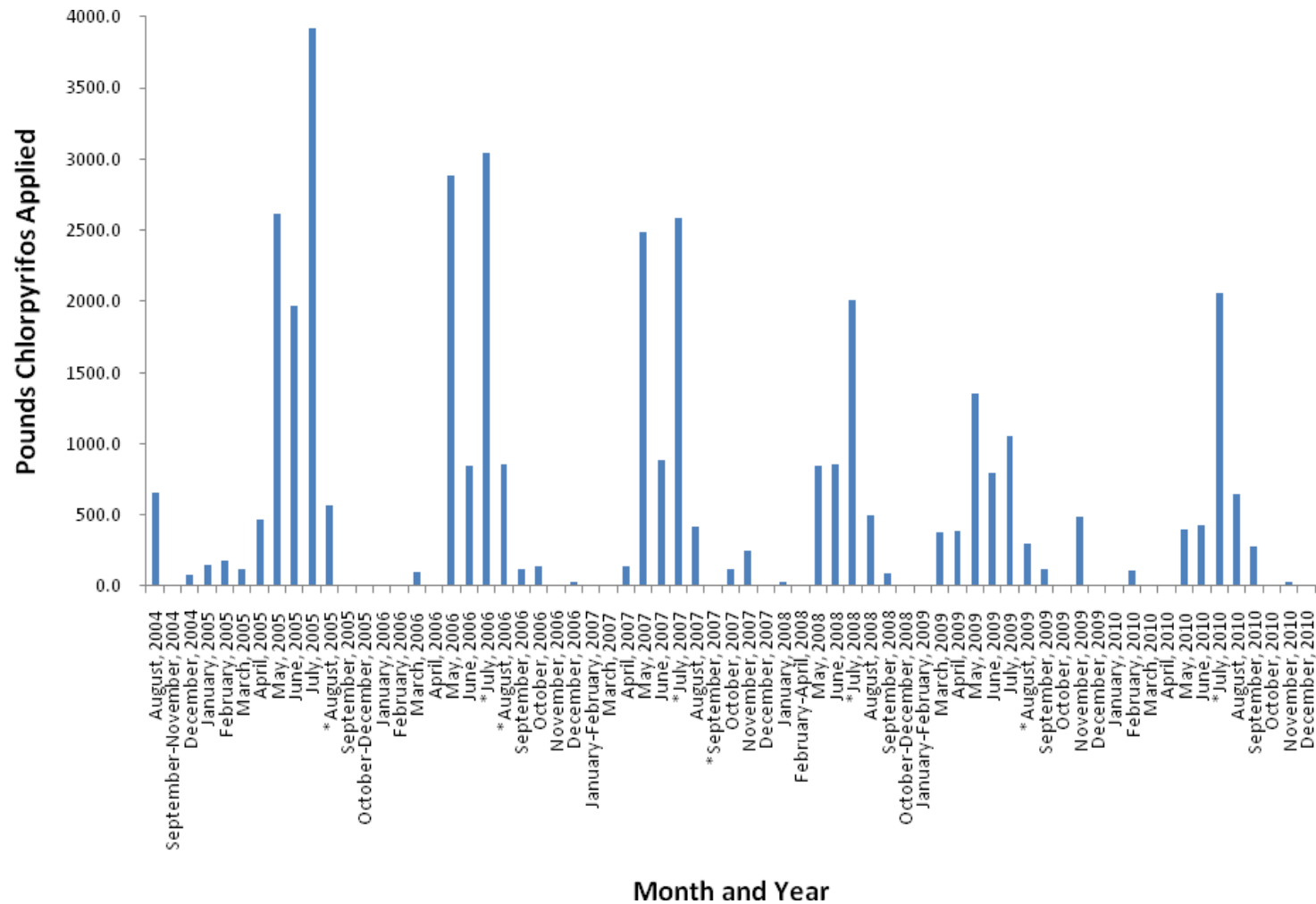


Table I-12. Total pounds of AI for chlorpyrifos based on PUR data from 2004-2010 within the Dry Creek @ Wellsford Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	NUFOS 4E	21.4
	ALMOND	CHLORPYRIFOS 4E AG	382.8
		GOVERN 4E INSECTICIDE	1092.9
		LORSBAN 4E INSECTICIDE	11640.4
		LORSBAN 4E-HF	1457.2
		LORSBAN ADVANCED	1515.5
		NUFOS 4E	1487.5
		WARHAWK	48.5
	APPLE	LORSBAN 4E-HF	4.3
	APRICOT	LORSBAN 4E-HF	9.0
	CORN (FORAGE - FODDER)	GOVERN 4E INSECTICIDE	547.3
		LORSBAN 15G GRANULAR INSECTICIDE	1135.9
		LORSBAN 4E INSECTICIDE	420.1
		LORSBAN 4E-HF	566.7
		LORSBAN ADVANCED	376.7
		NUFOS 15G	618.0
		NUFOS 4E	97.0
		WARHAWK	642.7
	GRAPES, WINE	LORSBAN 4E INSECTICIDE	548.9
		LORSBAN 4E-HF	98.1
		LORSBAN ADVANCED	981.3
	N-OUTDR CONTAINER/FLD GRWN PLANTS	LORSBAN 4E INSECTICIDE	244.1
		LORSBAN 75WG	25.5
		LORSBAN-75WG	64.5
	OP-DEC. TREE	LORSBAN 15G GRANULAR INSECTICIDE	1.1
		LORSBAN 4E-HF	43.9
		LORSBAN-75WG	46.1
	PEACH	LORSBAN 4E INSECTICIDE	80.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	1357.3
		GOVERN 4E INSECTICIDE	40.4
		LORSBAN 4E INSECTICIDE	7104.6
		LORSBAN 4E-HF	2332.5
		LORSBAN ADVANCED	1148.9
		NUFOS 4E	2523.0
		WARHAWK	101.0
ALFALFA - Total Pounds Chlorpyrifos Applied			21.4
ALMOND - Total Pounds Chlorpyrifos Applied			17624.7
APPLE - Total Pounds Chlorpyrifos Applied			4.3
APRICOT - Total Pounds Chlorpyrifos Applied			9.0
CORN - Total Pounds Chlorpyrifos Applied			4404.5
GRAPES - Total Pounds Chlorpyrifos Applied			1628.3
N-OUTDR CONTAINER - Total Pounds Chlorpyrifos Applied			334.1
OP-DEC. TREE - Total Pounds Chlorpyrifos Applied			91.1
PEACH - Total Pounds Chlorpyrifos Applied			80.0
WALNUT - Total Pounds Chlorpyrifos Applied			14607.7
Total Pounds Chlorpyrifos Applied (2004 - 2010)			38805.1

In the 2009 MPUR, the Coalition determined the most probable source of chlorpyrifos in Dry Creek was spray drift from adjacent orchards, particularly during the months July and August. As described in the 2010 MPUR, results from general management practice surveys indicated spray application and orchard and vineyard water management practices are not widely implemented across the Coalition region within the subwatershed. Farmers applying to row crop are advised of methods to better manage their irrigation tailwater and storm water runoff, whereas outreach efforts focus on encouraging management practices aimed at reducing spray drift and also to improve orchard and vineyard water management. The Coalition understands not all management practices are applicable or even necessary for all irrigated acres and thus designed their outreach to affect an increase in implementation of 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, such as available funding for management practice implementation. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report.

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.

In accordance with the Coalition's Management Plan strategy, individual contacts with targeted growers began in January 2009. Targeted growers were selected based on the potential to drain or drift to the creek. The Coalition eventually developed a list of 24 targeted members with the potential to discharge to the creek. Two members who were previously dropped due to not scheduling a meeting elected to remain in the Coalition and participate in a grower meeting where they completed the management practice survey. Moreover, due to continued chlorpyrifos exceedances experienced during monitoring in 2010, a single grower was additionally contacted who had reported chlorpyrifos use on parcels that were associated with the exceedances. The grower recently joined the Coalition and is farming property that has the potential to drain to the waterway.

Subsequently, the Coalition has now contacted 25 targeted growers within the Dry Creek @ Wellsford Rd subwatershed. Of the 23,331 irrigated acres in the Dry Creek subwatershed, the 25 targeted growers represent 6,392 acres of direct drainage, whereas the 22 growers only represented 6,116 acres of direct drainage (2010 MPUR, page 44).

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 *S. capricornutum* and *H. azteca*.

To date, the Coalition has contacted all 25 targeted members, which represent 6,392 or 27% of the total irrigated subwatershed acreage. The final targeted acreage is less than the acreage that has the potential to drain 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.

On February 26, 2010, the Coalition hosted a Follow-Up to the 2009 Individual Contacts Grower Meeting. Using the Coalition's Interactive Survey Devices, growers were polled to determine what additional management practices were implemented in 2009 and if additional practices were planned for 2010. Members unable to attend the meeting were asked to participate in a phone interview with a Coalition representative between March 1 and August 4, 2010 to report their newly implemented management practices. Of the 25 targeted growers, three completed their initial survey late, two were not required to complete a follow up and one will not require scheduling a follow up until late 2011. Therefore, 22 members were required to participate in follow up contacts. Three growers representing 523.7 acres received a recommendation to shut off outside nozzles when spraying outer rows next to sensitive sites, implemented the recommended management practice. Several other members with no irrigation drainage indicated they implemented new management practices in 2009 and 2010 without specific recommendations from the Coalition. One grower (107 acres) now allows grass to grow in the center of orchard rows, two growers (443 acres), began to use recirculation/tailwater return systems on their properties, a single grower (121.3 acres) constructed a drainage basin/sediment pond, a single grower (28 acres) installed filter strips at least 10 feet wide around their field perimeter and one grower (162 acres) used less water during surface irrigation. Overall, newly implemented management practices to acreages in 2009 and 2010 in the Dry Creek subwatershed included: shutting off outside nozzles when spraying outer rows next to sensitive sites, maintaining filter strips at least 10 feet wide around field perimeters, allowing grass to grow in the centers of orchard rows, using less water during surface irrigation, using recirculation/tailwater return systems, and constructing drainage basins/sediment ponds for operations with no irrigation drainage account for 2,585.5 acres. In addition, a single grower with drainage from their 2,450 acre property indicated that they implemented new management practices but did not specify which type. This was the only implementation to property in the Dry Creek subwatershed with irrigation drainage.

All members have been responsive to follow-up interviews and have completed their follow-up questions. The Coalition assessment of implemented management practices is included in the Summary of Implemented Management Practices section of this report.

The Coalition will continue to assess water quality at Dry Creek @ Wellsford Rd as this site is scheduled for Assessment Monitoring during 2011 and every constituent will be analyzed for on a monthly basis. If exceedances occur, the Coalition will discuss with the Regional Board supplementary actions for outreach that may include contacting other chlorpyrifos sources such as dairy operations and/or contacting new members to the Coalition.

Priority C Constituents

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

Copper

Exceedances of the hardness based copper WQTL occurred three times in this subwatershed from 2005 through 2010. 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 AI applied, and acres treated (Table I-13, 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). Between 2004 and 2010, the greatest amount of copper use occurred in the months of January and April. There is no relationship between exceedances and time periods with the greatest use of copper (Figure I-3).

The largest amount of copper applied was associated with almond/walnut orchards and rice (Table I-14). The largest amount of copper from 2005 through 2010 was applied to walnuts (59,463 lbs AI), followed almond (44,743 lbs AI, Table I-14). The most common products containing copper used within this subwatershed were DuPont™ Kocide and Kocide (Table I-14). Copper use has been variable over time with no trend toward decreasing use.

Table I-13. Number of copper applications, total pounds AI applied and total acres treated by month for August 2004 through December 2010 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
September, 2004	2	70	20
November, 2004	4	345.3	709
December, 2004	9	3601.3	718
January, 2005	29	8069.7	1338.4
February, 2005	51	3809.9	1905.3
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	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
April, 2006	51	4937.9	1196.9
May, 2006	47	8561.3	1671.8
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

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
April, 2007	62	7496.8	2287
May, 2007	10	1491.9	224.8
June, 2007	3	938.1	100
July, 2007	2	129	43
August, 2007	1	18	6
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	577.3
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	102.8
November, 2009	4	140.7	21
December, 2009	2	77.3	13.5
January, 2010	25	1107.4	334.5
February, 2010	50	2253.1	1991.5
March, 2010	18	892.6	451
April, 2010	90	10590.6	2935
May, 2010	20	1463.3	385.8
September, 2010	2	1005.9	380
October, 2010	1	45.2	14
November, 2010	2	45.2	14
December, 2010	2	123.7	26
Summaries by Year			
2004 Total	15	4016.6	1447
2005 Total	207	30342.2	8480.3
2006 Total	196	22151.6	6388.6
2007 Total	182	24431.8	7177.0
2008 Total	93	8934.9	3614
2009 Total	109	11286.2	3319.0
2010 Total	210	17527.1	6531.8
Total	1012	118690.3	36957.6

Figure I-3. Pounds of copper applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

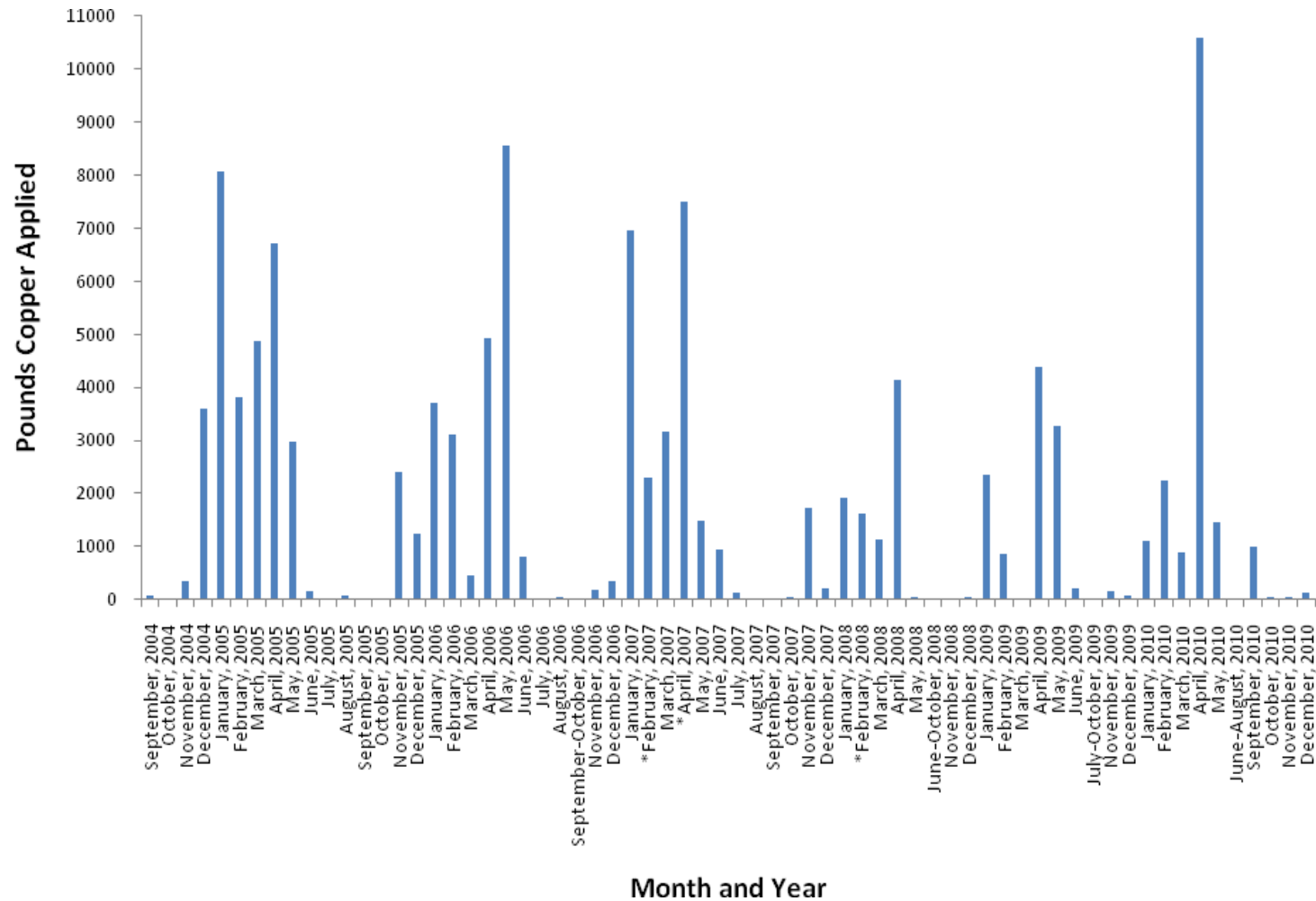


Table I-14. Total pounds of AI for copper based on PUR data from 2004-2010 within the Dry Creek @ Wellsford Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	ALMOND	BASIC COPPER 53	5399.8
		BASICOP	628.1
		CHAMP FORMULA 2 FLOWABLE	7919.6
		CHAMP WG	115.5
		CHAMPION WETTABLE POWDER	611.0
		COPPER-COUNT-N	191.3
		CUPROFIX ULTRA 40 DISPERS	727.7
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2324.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	300.6
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	27.0
		HYDROX	4864.9
		KOCIDE 101	3328.2
		KOCIDE 2000	2066.5
		KOCIDE DF	4777.8
		NORDOX	49.4
		NORDOX 75 WG	6125.9
		NU-COP 50 WP	23.1
		NU-COP 50DF	5149.0
		NUCOP DF	112.5
		NUTRA-SPRAY ZN12-MN2-CU10	0.5
	APRICOT	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	41.5
		NU-COP 50DF	6.2
		TRIANGLE BRAND COPPER SULFATE	89.1
	CHERRY	CHAMPION WETTABLE POWDER	107.8
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	17.3
		KOCIDE 101	57.8
	GRAPES, WINE	BRITZ COPPER SULFUR 15-25 DUST	475.8
		CHAMP FORMULA 2 FLOWABLE	979.4
		COPPER, SULFUR 15-50	40.0
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	43.0
		KOCIDE 2000	82.2
		KOCIDE DF	58.4
		NU-COP 3L	35.8
		WIL-DRY	1005.9
	N-OUTDR CONTAINER/FLD GRWN PLANTS	CHAMP FORMULA 2 FLOWABLE	386.4
		KOCIDE 101	294.1
		KOCIDE DF	92.1
	NECTARINE	CHAMP WG	142.5
		CHAMPION WETTABLE POWDER	492.8
		KOCIDE 101	154.0
	OLIVE	CUPROFIX ULTRA 40 DISPERS	2.7
	OP-DEC. TREE	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	142.0
		KOCIDE DF	29.5
	PEACH	BASIC COPPER 53	73.5
		CHAMP WG	19.3
		CHAMPION WETTABLE POWDER	554.4

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED	
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	17.8	
		HYDROX	161.7	
		KOCIDE 101	16.2	
		KOCIDE 2000	33.9	
		KOCIDE DF	770.0	
		NORDOX 75 WG	326.8	
		NU-COP 50 WP	164.8	
	PISTACHIO	CUPROFIX ULTRA 40 DISPERSS	582.7	
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	CHAMPION WETTABLE POWDER	184.8	
		NORDOX 75 WG	11.4	
	RICE (ALL OR UNSPEC)	BLUE VIKING COPPER SULFATE STAR SHINE CRYSTAL	910.8	
		CHIPCO COPPER SULFATE CRYSTALS	5098.5	
		KOCIDE COPPER SULFATE STAR SHINE CRYSTALS	782.1	
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	BLUE SHIELD DF	92.4	
		CHAMP FLOWABLE	79.4	
		CHAMP FORMULA 2 FLOWABLE	3195.8	
		CHAMP WG	1232.0	
		CHAMPION WETTABLE POWDER	2402.4	
		CUPROFIX ULTRA 40 DISPERSS	256.0	
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	598.8	
		DUPONT KOCIDE 101 FUNGICIDE/BACTERICIDE	123.2	
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	9403.7	
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	1844.5	
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	92.1	
		HYDROX	956.3	
		KENTAN DF	1715.2	
		KOCIDE 101	5424.1	
		KOCIDE 2000	7864.6	
		KOCIDE DF	12843.9	
		NORDOX	450.1	
		NORDOX 75 WG	1468.3	
		NU-COP 50 WP	312.6	
		NU-COP 50DF	9107.6	
ALMOND - Total Pounds Copper Applied			44742.6	
APRICOT - Total Pounds Copper Applied			136.8	
CHERRY - Total Pounds Copper Applied			182.8	
GRAPES - Total Pounds Copper Applied			2720.5	
N-OUTDR CONTAINER - Total Pounds Copper Applied			772.7	
NECTARINE - Total Pounds Copper Applied			789.3	
OLIVE - Total Pounds Copper Applied			2.7	
OP-DEC. TREE - Total Pounds Copper Applied			171.5	
PEACH - Total Pounds Copper Applied			2138.2	
PISTACHIO - Total Pounds Copper Applied			582.7	
PLUM - Total Pounds Copper Applied			196.2	
RICE - Total Pounds Copper Applied			6791.4	
WALNUT - Total Pounds Copper Applied			59463.0	
Total Pounds Copper Applied (2004-2010)			118690.3	

In the 2009 MPUR, 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 when copper is known to enter the waterway. This coincides with the Coalition's management plan strategy outlined in the chlorpyrifos outreach section. Orchard and vineyard operators are advised to consider management practices to prevent copper from entering the waterway with runoff when applicable. Storm runoff management relevant to copper applications has been advised to reduce runoff and prevent winter exceedances. Individual contacts with growers within this subwatershed are described under the chlorpyrifos outreach, as are discussions of copper exceedances and relevant management practices.

Diuron

Diuron is a soluble herbicide applied in the Dry Creek watershed primarily in October through June. Between 2004 and 2010, the largest amount of diuron used was in 2006 (1,063 lbs AI) and the least amount used was in 2010 (80 lbs AI), see Table I-15. The month with the greatest amount AI applied has varied over the years with the most applications occurring in January and November 2006, January 2007, April 2008, November 2009 and February 2010 (Table I-15, Figure I-4). The highest application rates and largest amount of diuron applied from 2005 through 2010 are associated with walnuts and grapes (including wine and raisin, Table I-16).

Two applications were associated with two storm event exceedances in 2007. 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.

Core Monitoring took place at Dry Creek during 2009; diuron was not monitored as a part of 2009 MPM. Diuron was monitored during February 2010 MPM and was not detected. In 2010, a total of six applications of diuron occurred in the Dry Creek subwatershed. As part of Assessment Monitoring, diuron will be monitored monthly at Dry Creek @ Wellsford Rd during 2011.

Table I-15. Number of diuron applications, total pounds AI applied and total acres treated by month for August 2004-December 2010 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
October, 2004	3	291.4	196
November, 2004	2	115.4	87
December, 2004	8	195.1	72.6
January, 2005	2	40.5	42
February, 2005	1	9.8	6
March, 2005	1	40.2	25.8
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

MONTH/YEAR	NUMBER OF DIURON APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
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
January, 2009	3	16.0	40
February, 2009	1	4.0	5
November, 2009	5	237.8	795
December, 2009	1	53.8	185
February, 2010	5	68.4	379
July, 2010	1	12.3	12.3
Summaries by Year			
2004 Total	13	601.8	355.6
2005 Total	11	233.1	208.3
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
2010 Total	6	80.6	391.3
Total	74	3043.9	4209.4

Figure I-4. Pounds of diuron applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

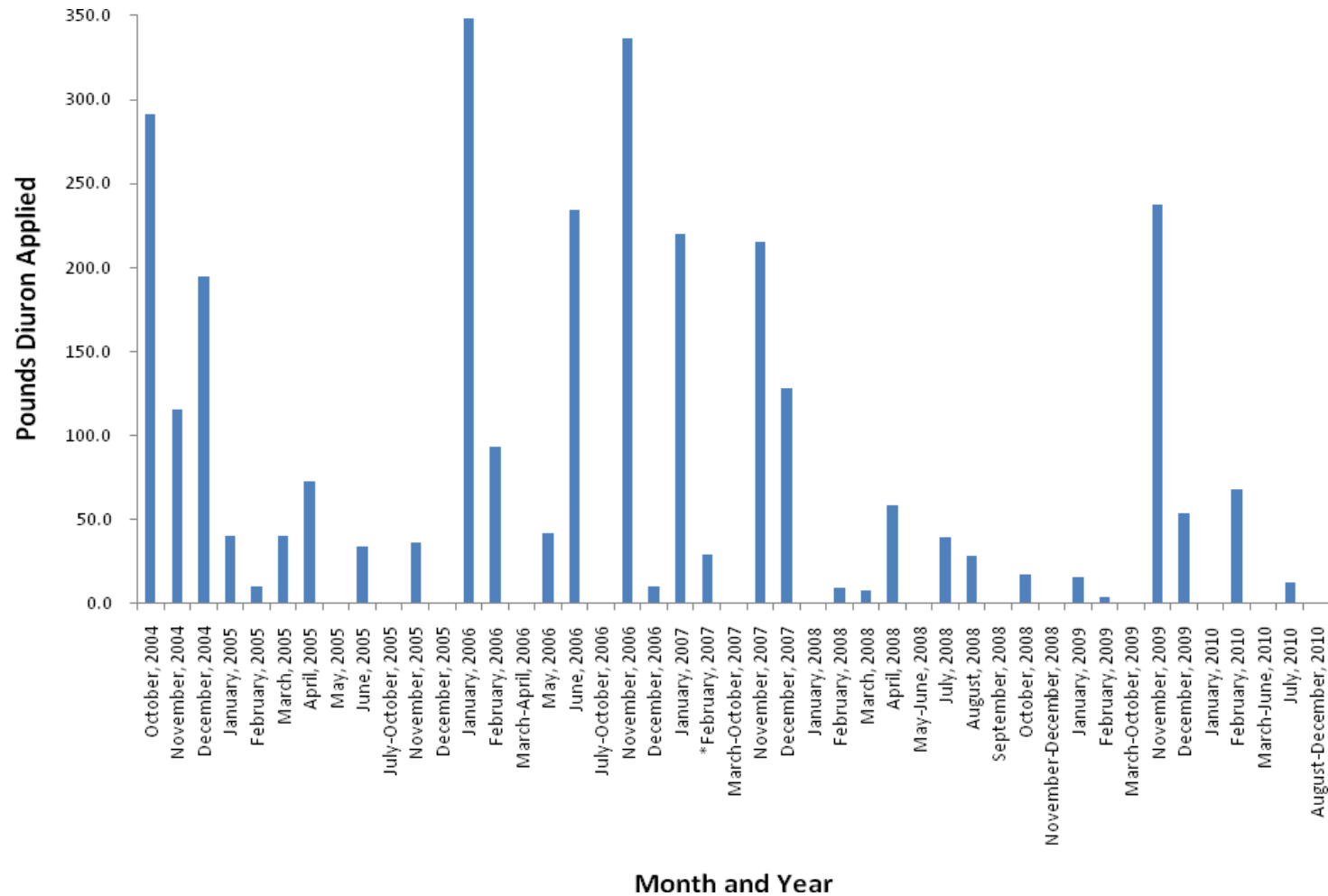


Table I-16. Total pounds of AI for diuron based on PUR data from 2004-2010 within the Dry Creek @ Wellsford Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
DIURON	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	10.1
	ALMOND	DUPONT DIREX 4L HERBICIDE	2.6
	GRAPES, WINE	DIREX 4L	799.2
		DIURON 4L	215.6
		DUPONT DIREX 4L HERBICIDE	412.7
	PASTURES (ALL OR UNSPEC)	DIREX 4L	169.6
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	1292.7
		DUPONT DIREX 4L HERBICIDE	133.4
		KARMEX DF HERBICIDE	8.0
ALFALFA -Total Pounds Diuron Applied			10.1
ALMOND - Total Pounds Diuron Applied			2.6
GRAPES - Total Pounds Diuron Applied			1427.4
PASTURES - Total Pounds Diuron Applied			169.6
WALNUT - Total Pounds Diuron Applied			1434.2
Total Pounds Diuron Applied (2004-2010)			3043.9

Management of diuron in this watershed should focus on providing information to the 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. Improved and additional water management practices should reduce or eliminate diuron exceedances.

Priority D Constituents

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

***Selenastrum capricornutum* toxicity**

S. capricornutum toxicity was monitored for but did not occur in February 2010 sampling at Dry Creek. Total and dissolved copper and diuron were monitored during the February 2010 sampling event for their potential adverse effects on algae; none of these constituents exceeded their WQTLs.

S. capricornutum toxicity occurred once during the 2008 storm season and was associated with an exceedance of copper. Copper exceedances and *Selenastrum* toxicity can be closely tied as copper is used as an algaecide as well as a fungicide.

As discussed in the 2010 MPUR, the Coalition's strategy for eliminating *S. capricornutum* toxicity involves contacting growers individually as well as conducting outreach regarding the retention of storm water runoff rather than discharging to drainage canals and creeks. If both copper and diuron can be prevented from entering storm water the Coalition believes that *S. capricornutum* toxicity can also be reduced or eliminated. If the Coalition finds that diuron and copper exceedances are eliminated and *S. capricornutum* toxicity persists, then additional herbicides will be targeted for outreach and management.

Hyaella azteca toxicity

As a result of 2008 monitoring, *H. 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.

Sediment monitoring occurred at Dry Creek @ Wellsford Rd in September 2010. The sample was not toxic to *H. azteca*. No exceedances of MPM constituents occurred in this subwatershed during the September 2010 monitoring. Sediment monitoring was not conducted at Dry Creek during 2009.

Priority E Constituents

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

Several DO and *E. coli* exceedances continued to occur throughout 2010 sampling. There was a single pH exceedance in November 2010. These constituents will remain low priority but will be discussed during individual contacts with growers and annual grower meetings.

Evaluation

This subwatershed is one of the first three priority site subwatersheds within the ESJWQC. Therefore, the Coalition has focused its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Dry Creek subwatershed has been to target growers with crops located adjacent to the waterway and whose agricultural practices may result in the discharge or drift of pesticides into the creek. Outreach includes grower notification of exceedances and the need for meetings, outreach and education regarding management practices, tracking of the implementation of management practices, and providing information to growers on studies of the efficacy of those management practices. The Coalition believes that because land use in this subwatershed is predominately orchards and vineyards, outreach aimed toward orchard and vineyard management practices will target the appropriate audience and result in the greatest improvement of water quality.

Individual grower surveys documenting current management practices and follow up contacts assessing planned implementation strategies have been completed and returned for 100% of the targeted growers. The Summary of Implemented Management Practice section of this report summarizes the results of these surveys.

Both the overall acres treated and pounds of chlorpyrifos applied have decreased since 2005, which may be a result of many factors including educating growers about alternative products. Usage of chlorpyrifos has decreased in the months of July and August, when the largest number of exceedances have occurred historically. Despite this, chlorpyrifos exceeded the WQTL in Dry Creek in July 2010 although the exceedance was traced to a new member that had joined so recently that the Coalition was unaware of their existence. This grower applied chlorpyrifos to parcels adjacent to the creek and consequently these applications were assumed to be associated with the July 2010 exceedance. The

Coalition has now contacted the grower to discuss management practices. The Coalition expects to see a reduction in chlorpyrifos use and exceedances due to the additional contact.

In 2011, Assessment Monitoring is scheduled where all high priority constituents will be monitored monthly. This will further indicate if a change in management practices has resulted in long-term improvements in water quality. Outreach in the Dry Creek subwatershed will continue through 2011 and any additional water quality issues will be addressed.

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 the relative contribution of water quality impairments from the upstream portion of the Duck Slough subwatershed to the overall waterway. 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 (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

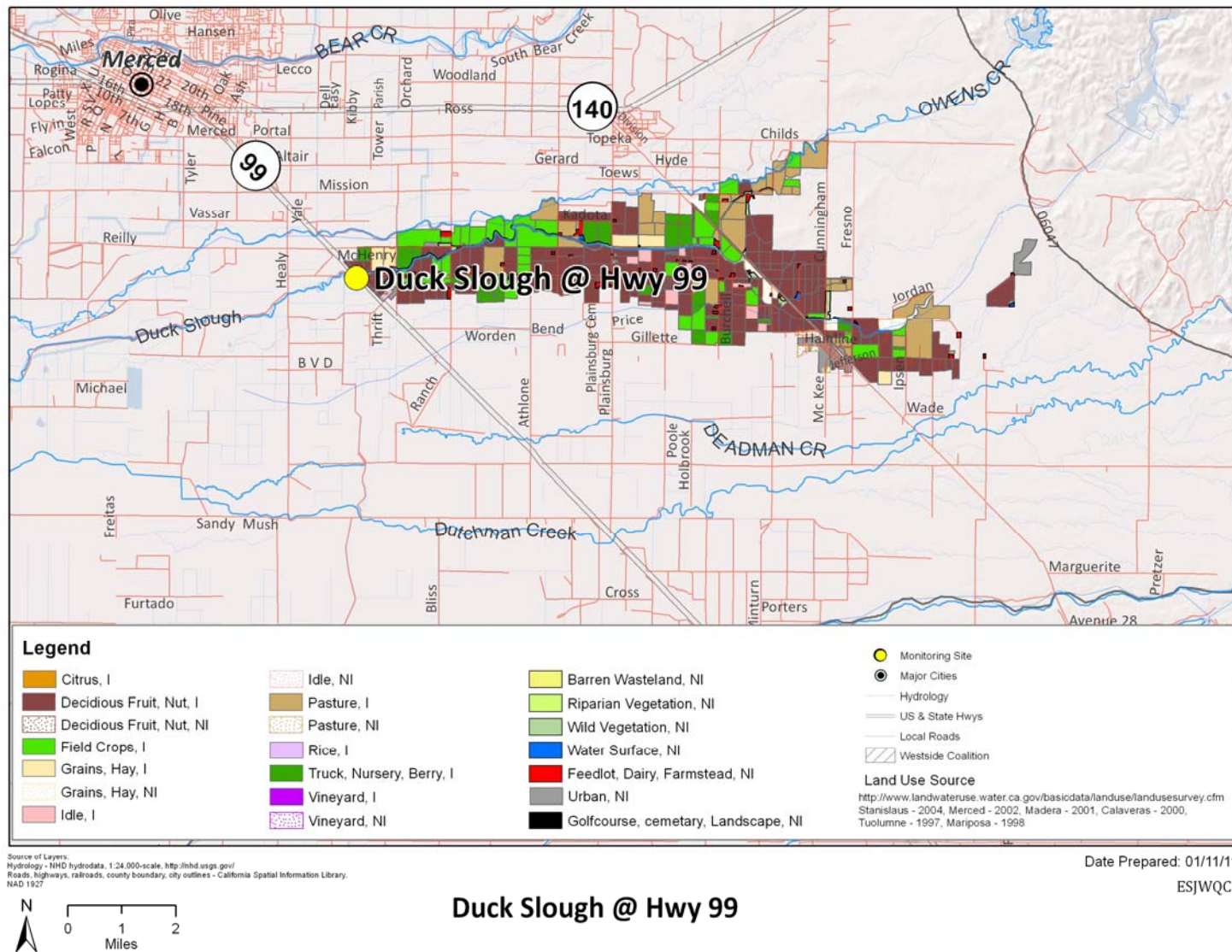
Table II-1. Coordinates of the Duck Slough site subwatershed sampling locations.

SAMPLE SITE	STATION CODE	TARGET LATITUDE	TARGET LONGITUDE
Duck Slough @ Hwy 99*	535XDSAHN	37.2501	-120.4100
Duck Slough @ Whealan Rd ^U	535XDSAWH	37.2615	-120.3433

*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 was initiated 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 and 2010. The constituents sampled at this location from 2005-2010 are listed in Table II-3.

Management Plan Monitoring occurred at Duck Slough @ Hwy 99 in 2007 through 2010 for copper, chlorpyrifos and *S. capricornutum* toxicity (Table II-4, Table II-5, Table II-6 and Table II-7). Duck Slough was monitored twice a month in 2007, at additional upstream locations in 2008, and during months of historical exceedances in 2009 and 2010.

Duck Slough is listed as an impaired waterbody on the 2008 Central Valley Basin Plan 303d list for chlorpyrifos, *E. coli*, sediment toxicity and unknown water column 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				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	2	6	NA	NA	NA	6	NA	NA	1	5	NA
Events Not Sampled	NA	0	0	0	0	0	0	0	0	NA	NA	NA	0	NA	NA	0	0	NA
Total	NA	2	5	2	5	2	6	2	6	NA	NA	NA	6	NA	NA	1	5	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				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER*	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	<i>E. coli</i>	2	5	2	5	2	6	2	6									
NA	Dissolved Oxygen	2	6	3	6	3	10	3	7				6			1	5	
NA	Specific Conductivity	2	6	3	6	3	10	3	7				6			1	5	
NA	pH	2	6	3	6	3	10	3	7				6			1	5	
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									
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				3	

METHOD	ANALYTE	2005		2006		2007		2008			2009				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER*	STORM*	IRRIGATION	FALL*	WINTER*	STORM	IRRIGATION	FALL*
EPA 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									
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			1	4	
EPA 200.8	Lead				5	2	6	2	6									
EPA 200.8	Molybdenum																	

METHOD	ANALYTE	2005		2006		2007		2008			2009				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER*	STORM*	IRRIGATION	FALL*	WINTER*	STORM	IRRIGATION	FALL*
EPA 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			1	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			1	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	<i>Ceriodaphnia dubia</i>	2	5	2	6	2	7	2	6									
EPA 821/R-02-012	<i>Pimephales promelas</i>	2	5	2	5	2	7	2	6									
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>	2	7	2	5	2	7	2	7				1			1	1	
EPA 600/R-99-064	<i>Hyalella azteca</i>			1	1	1	1	1	2									

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

Table II-4. Duck Slough site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and copper. "X" indicates what constituents were 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 what constituents were sampled.

SAMPLE SITE	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 *S. capricornutum* toxicity. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	<i>S. CAPRICORNUTUM</i>	COPPER	CHLORPYRIFOS
Duck Slough @ Hwy 99	21-Apr-09	MPM	X		
Duck Slough @ Hwy 99	19-May-09	MPM			X
Duck Slough @ Hwy 99	16-Jun-09	MPM		X	
Duck Slough @ Hwy 99	21-Jul-09	MPM		X	X
Duck Slough @ Hwy 99	18-Aug-09	MPM		X	
Duck Slough @ Hwy 99	22-Sep-09	MPM		X	X

Table II-7. Duck Slough site subwatershed. 2010 Management Plan sampling schedule for chlorpyrifos, copper and *S. capricornutum* toxicity. "X" indicates what constituents were sampled.

SITE NAME	YEAR	TYPE	<i>S. CAPRICORNUTUM</i>	COPPER	CHLORPYRIFOS
Duck Slough @ Hwy 99	20-Apr-10	MPM	X	X	
Duck Slough @ Hwy 99	18-May-10	MPM			X
Duck Slough @ Hwy 99	15-Jun-10	MPM		X	
Duck Slough @ Hwy 99	20-Jul-10	MPM	X	X	X
Duck Slough @ Hwy 99	17-Aug-10	MPM		X	
Duck Slough @ Hwy 99	14-Sept-10	MPM		X	X

Exceedance History

Sampling at Duck Slough @ Hwy 99 from 2005 through 2010 has resulted in exceedances of the WQTL for field and physical parameters, *E. coli*, metals, and chlorpyrifos. Toxicity in the water column to *C. dubia* and *S. capricornutum* and sediment toxicity to *H. azteca* also occurred at this monitoring site (Table II-8). During ambient water monitoring at Duck Slough @ Hwy 99 (including upstream sampling at Duck Slough @ Whealan Rd), exceedances of the WQTL for numerous field, physical, inorganic and organic parameters occurred including DO (2), pH (3), and *E. coli* (12) (Table II-8). 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 *C. dubia* once and to *S. capricornutum* three times. Sediment toxicity to *H. azteca* occurred twice, both during the 2008 irrigation season (Table II-8). However, sediment toxicity to *H. azteca* is not prioritized because both toxic samples were from the same sampling event (sample and resample to test for persistence).

No exceedances of the chlorpyrifos WQTL occurred at Duck Slough @ Hwy 99 during MPM in 2010.

All exceedances are listed in Table II-8 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 provided in the bottom row of Table II-8 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR). The highest priority constituents in the Duck Slough @ Hwy 99 subwatershed are chlorpyrifos (A/B), copper (C), and toxicity to *S. capricornutum* (D).

Table II-8. All exceedances experienced in samples collected from locations within the Duck Slough site subwatershed July 2004 through September 2010 (sorted by season and date).

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

SAMPLE SITE	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	PH, <6.5 AND >8.5 UNITS	E. COLI, > 235 MPN/100 ML	COPPER, TOTAL, > 1,300 µG/L	LEAD, TOTAL, > 15 µG/L	CHLORPYRIFOS, > 0.015 µG/L	C. DUBIA, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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			77
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)					

SAMPLE SITE	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	pH, <6.5 AND >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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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							
Duck Slough @ Hwy 99	Irrigation	4/29/2008			280						86
Duck Slough @ Hwy 99	Irrigation	5/7/2008									5
<i>Duck Slough @ Whealan Rd</i>	<i>Irrigation</i>	<i>6/24/2008</i>				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)				
<i>Duck Slough @ Whealan Rd</i>	<i>Irrigation</i>	<i>8/26/2008</i>				3.4 (1.9)					
Duck Slough @ Hwy 99	Sediment	8/28/2008								84	
Duck Slough @ Hwy 99	Irrigation	9/30/2008						0.034			
<i>Duck Slough @ Whealan Rd</i>	<i>Irrigation</i>	<i>9/30/2008</i>				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

NP¹ – Not prioritized; both toxic samples were from the same sampling event (sample and resample to test for persistence).

2007 - 2010 Management Plan Monitoring Results

Management Plan Monitoring results for chlorpyrifos, copper and *S. capricornutum* toxicity from 2007 through 2010 are discussed below and included in Table II-9.

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 below the WQTL (0.015 µg/L) in samples collected during normal monitoring in July, 2007 (0.011 µg/L). Samples collected one week later, on July 31, 2007, exceeded the WQTL (0.042 µg/L), see 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-9).

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 (Table II-5). Chlorpyrifos was detected at both Duck Slough @ Hwy 99 and Duck Slough @ Whealan Rd during July monitoring and exceeded the chlorpyrifos WQTL at Duck Slough @ Highway 99 during September monitoring (0.034 µg/L). 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 as a part of MPM; normal monitoring did not occur in this subwatershed during 2009 (Table II-6). There were no exceedances or detections of chlorpyrifos in samples collected from Duck Slough during 2009.

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

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

2010

Duck Slough @ Hwy 99 MPM for copper, chlorpyrifos, and *S. capricornutum* toxicity occurred during the 2010 irrigation season; normal monitoring did not occur in this subwatershed during 2010 (Table II-7). None of the MPM samples collected were toxic to *S. capricornutum* and there were no exceedances or detections of chlorpyrifos or copper at Duck Slough @ Hwy 99 during the irrigation season of 2010.

2011

Management Plan Monitoring is scheduled to occur in 2011 for copper (February, April and June-September), chlorpyrifos (May, July and September), lead (April-August) and *S. capricornutum* toxicity (April and July).

Table II-9. Duck Slough site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results. 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
	<i>S. capricornutum</i> toxicity (% control)	222	NA	NA	NA	NA	NA
2010 MPM (@ Hwy 99)	Date	4/20/10	5/18/10	6/15/10	7/20/10	8/17/10	9/14/10
	Chlorpyrifos (µg/L)	NA	0.0048	NA	<0.003	NA	<0.003
	Copper, total (µg/L)	2.6	NA	2.3	2.7	5.1	2
	Copper, dissolved (µg/L)	1.2	NA	1.2	0.63	0.48	0.46
	<i>S. capricornutum</i> toxicity (% control)	1846	NA	NA	378	NA	NA

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

A- Additional Monitoring conducted in 2007.

US- Upstream Monitoring conducted in 2008.

*Additional monitoring was initiated in June 2007; therefore no sample was collected for scheduled May additional monitoring.

Load Calculations

Loads were calculated for the chlorpyrifos and copper detections (Table II-10) based on the following formula:

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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.

Very few discharge measurements have been taken at the Duck Slough @ Hwy 99 site since it is usually too deep to wade. Table II-10, indicates exceedances and/or detections which occurred when discharge was measured during a sampling event.

Table II-10. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured in the Duck Slough @ Hwy99 site subwatershed (sorted by analyte and date).
Upstream site is italicized.

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
<i>Duck Slough @ Whealan Rd</i>	<i>Chlorpyrifos</i>	<i>07/29/08</i>	<i>18.73</i>	<i>0.0081</i>	<i>4.30</i>
Duck Slough @ Hwy 99	Copper	07/12/06	58.3	2.7	4457.38
Duck Slough @ Hwy 99	Copper	09/18/07	0	6.9	0
<i>Duck Slough @ Whealan Rd</i>	<i>Copper</i>	<i>04/29/08</i>	<i>5.73</i>	<i>3.5</i>	<i>567.90</i>
<i>Duck Slough @ Whealan Rd</i>	<i>Copper</i>	<i>06/24/08</i>	<i>22.15</i>	<i>73</i>	<i>45787.17</i>
<i>Duck Slough @ Whealan Rd</i>	<i>Copper</i>	<i>07/29/08</i>	<i>18.73</i>	<i>3</i>	<i>1591.13</i>
<i>Duck Slough @ Whealan Rd</i>	<i>Copper</i>	<i>08/26/08</i>	<i>21.6</i>	<i>3.4</i>	<i>2079.60</i>
<i>Duck Slough @ Whealan Rd</i>	<i>Copper</i>	<i>09/30/08</i>	<i>7.56</i>	<i>3.7</i>	<i>792.08</i>

Source Identification and Outreach

The Coalition addressed source identification in the 2010 Management Plan Update Report and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides—PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007 and 2008, the Coalition conducted additional and upstream MPM during those months in which exceedances had occurred in previous years to better characterize water quality the subwatershed. During 2009 and 2010, MPM continued at the Duck Slough @ Hwy 99 site during those months in which exceedances occurred in previous years to continue to assess water quality in the subwatershed as outreach took place.

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

Priority A/B Constituents

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

Chlorpyrifos

Four exceedances of the chlorpyrifos WQTL (0.015 µg/L) have occurred during the irrigation season in this subwatershed from 2005 through 2010 (May, twice in July, and September); there were no exceedances in 2009 and 2010 (Table II-8). The Coalition used a combination of monitoring data and evaluation of PUR data to identify possible sources.

All PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds AI applied, and acres treated (Table II-11, Figure II-2). The greatest amount of chlorpyrifos applied was in 2005 (4,790 lbs AI) with the lowest amount applied in 2007 (662 lbs AI). In 2010, there was significantly less use compared to previous years; only 295 lbs of active ingredient were applied to 466 acres. Over the years,

the greatest amounts of chlorpyrifos use occurred in the months of March, May and July, and this trend continued in 2010. 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 (Table II-12). The highest application rates in the Duck Slough subwatershed are associated with almonds and alfalfa. The largest amount of chlorpyrifos applied from 2005 through 2010 was to almonds (5,881 lbs AI) followed by alfalfa (1,791 lbs AI). The most common product used within this subwatershed containing chlorpyrifos was Lorsban.

Table II-11. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for August 2004 through December 2010 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
August, 2004	1	29.9	20.0
January, 2005	4	76.9	38.1
March, 2005	14	408.7	695.0
June, 2005	2	50.0	30.0
July, 2005	17	4226.8	812.0
September, 2005	1	28.0	14.0
January, 2006	6	119.7	59.0
March, 2006	3	56.1	151.0
May, 2006	13	706.5	433.0
June, 2006	1	137.6	69.0
July, 2006	5	570.2	508.0
August, 2006	5	199.9	136.0
September, 2006	2	145.6	80.0
January, 2007	2	29.9	15.0
March, 2007	15	370.0	433.8
April, 2007	3	28.8	57.4
June, 2007	1	19.9	10.0
July, 2007	1	10.2	10.0
August, 2007	4	204.0	261.3
March, 2008	15	290.4	347.5
May, 2008	8	674.8	442.0
June, 2008	1	10.2	8.0
July, 2008	6	261.8	522.9
August, 2008	7	264.0	426.5
March, 2009	1	57.5	136.0
May, 2009	4	825.9	632.0
July, 2009	2	70.1	140.0
September, 2009	2	25.9	103.4
March, 2010	9	216.9	261.5
July, 2010	3	61.1	169.0
September, 2010	1	17.5	35.0
Summaries by Year			
2004 Total	1	29.9	20.0
2005 Total	38	4790.4	1589.1
2006 Total	35	1935.5	1436.0

MONTH/YEAR	NUMBER OF CHLORPYRIFOS APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
2007 Total	26	662.8	787.6
2008 Total	37	1501.2	1746.9
2009 Total	9	979.4	1011.4
2010 Total	13	295.5	465.5
Total	159	10194.7	7056.5

Figure II-2. Pounds of chlorpyrifos applied within the Duck Slough @ Hwy 99 site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

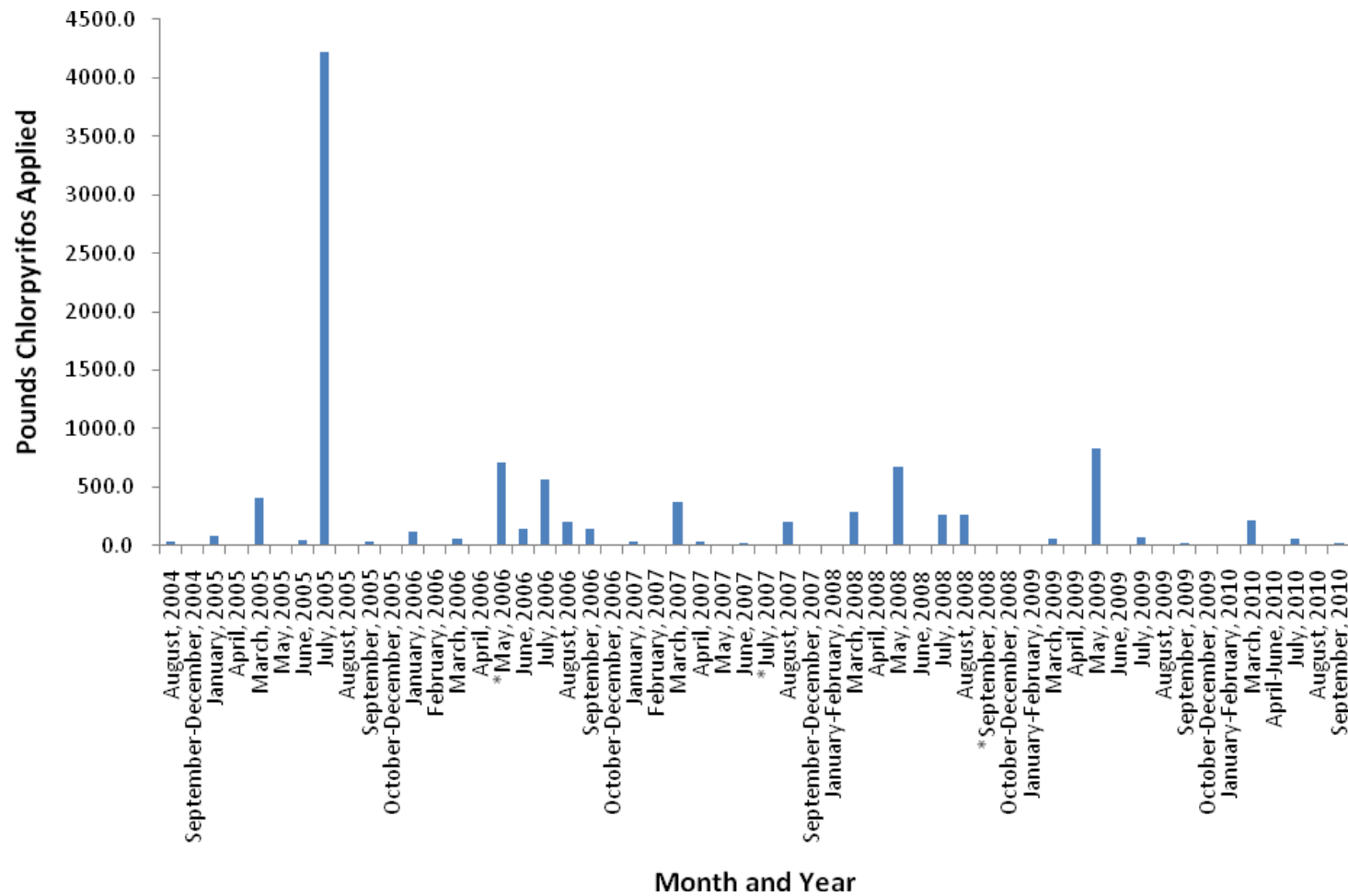


Table II-12. Total pounds AI for chlorpyrifos based on PUR data from 2004-2010 within the Duck Slough @ Hwy 99 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	COBALT	57.5
		GOVERN 4E INSECTICIDE	184.6
		LOCK-ON INSECTICIDE	472.4
		LORSBAN 4E INSECTICIDE	63.9
		LORSBAN 4E-HF	658.1
		LORSBAN 4E-HF INSECTICIDE	63.4
		LORSBAN-4E	42.4
		NUFOS 4E	221.2
		WHIRLWIND	27.5
	ALMOND	CHLORPYRIFOS 4E AG	84.7
		GOVERN 4E INSECTICIDE	499.0
		LORSBAN 4E INSECTICIDE	175.7
		LORSBAN 4E-HF	1102.6
		LORSBAN-4E	3619.1
		NUFOS 4E	20.3
		WHIRLWIND	379.9
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	131.8
		LORSBAN 15G GRANULAR INSECTICIDE	1451.3
		LORSBAN-4E	23.5
		NUFOS 4E	10.2
	PEACH	CHLORPYRIFOS 4E AG	76.9
		LORSBAN 4E-HF	121.6
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	15.2
		LORSBAN 4E-HF	71.8
		LORSBAN-4E	619.9
ALFALFA - Total Pounds Chlorpyrifos Applied			1791.1
ALMOND - Total Pounds Chlorpyrifos Applied			5881.4
CORN - Total Pounds Chlorpyrifos Applied			1616.8
PEACH - Total Pounds Chlorpyrifos Applied			198.5
WALNUT - Total Pounds Chlorpyrifos Applied			706.8
Total Pounds Chlorpyrifos Applied (2004 - 2010)			10194.7

The Coalition found that parcels associated with past chlorpyrifos exceedances are located in close proximity to Duck Slough suggesting that drift could play a major role in generating the exceedances. Management of chlorpyrifos in this watershed has focused on providing information on a targeted basis to growers to encourage the proper management of irrigation tailwater and spray drift.

Growers are targeted for outreach prior to the irrigation season and heavy application periods. Growers are encouraged to review their operation to determine if irrigation return flows are managed properly. Owners with orchards are instructed to evaluate their applications to minimize spray drift. Row crop

farmers are advised of methods to better manage their irrigation tailwater and storm water runoff, where as outreach efforts to orchard and vineyard growers focus on reducing spray drift and improving orchard and vineyard water management.

Coalition outreach since 2007 includes grower meetings and the mailing/distribution of information such as available funding for management practice implementation. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of the Management Plan Update Report.

In accordance with the Coalition's Management Plan strategy, individual contacts with targeted growers began in May 2009 and continued through August 2009. Targeted members were identified by the use of chlorpyrifos and parcels that have the potential to drain or drift to the creek. Of the 10,695 irrigated acres in the Duck Slough @ Hwy 99 subwatershed, the Coalition 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 *S. capricornutum*.

The Coalition has contacted all 24 targeted members, representing 4,016 acres or 38% of the irrigated acreage in the subwatershed. On February 19, 2010, the Coalition hosted a follow up to the 2009 Individual Contacts Grower Meeting. Using the Coalition's Interactive Survey Devices, growers were polled to determine what additional management practices were implemented in 2009 and if additional practices were planned for 2010. Members unable to attend the meeting were asked to participate in a phone interview with a Coalition representative between March and August 2010 to report their newly implemented management practices. Of the initial 24 targeted growers, two members were not required to participate in follow up contacts. Two other members have been unresponsive to repeated attempts by the Coalition to schedule a follow up phone interview and are in the process of being dropped from the Coalition. To date, 20 members have completed their follow-up and the Coalition assessment of implemented management practices is included in the Summary of Implemented Management Practices section of this report. Of the two or more management practices recommended, newly implemented management practices to acreages in the Duck Slough @ Hwy 99 include: reduced amount of water used in surface irrigation (32%), microirrigation system (11%), other not specified (19%), install device to control discharge (20%), shut off outside nozzles during spray (18%).

The Coalition will continue to assess water quality as Duck Slough @ Hwy 99 is scheduled for MPM in 2011 during those months of historical exceedances. If any additional exceedances occur, the Coalition will discuss with the Regional Board action for outreach that may include contacting other viable sources of WQTL exceedances such as dairy operations and/or contact new members to the Coalition.

Priority C Constituents

Copper is the only priority C constituent in the Duck Slough @ Hwy 99 subwatershed.

Copper

Exceedances of the hardness based copper WQTL have occurred numerous times in this subwatershed from 2005 through 2008 (Table II-8) based on results from total copper analysis. Starting in 2009, copper analysis was based on the dissolved fraction only. There were no exceedances during 2009 or 2010 monitoring.

PUR data are reviewed for the number of monthly copper applications, pounds AI applied, and acres treated (Table II-13, 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 lbs AI) and the lowest amount applied was in 2010 (2,176 lbs AI). The greatest use of copper occurred in the months of January 2005, 2006 and 2010 and in December 2008 and 2009, respectively (Table II-13, 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 amount of copper applied was associated with almonds, peaches and walnuts (Table II-14). The largest amount of copper applied from 2005 through 2010 was to walnuts (5,701 lbs AI) followed by almonds (5,477 lbs AI), see Table II-14. The most common products containing copper used within this subwatershed were Kocide and DuPont™ Kocide (Table II-14).

Table II-13. Number of copper applications, total pounds applied and total acres treated by month for August 2004-December 2010 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
August, 2004	3	214.3	191.2
January, 2005	12	1568.7	376.1
February, 2005	5	514.8	159.7
March, 2005	3	369.9	81.0
April, 2005	26	1363.2	483.3
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	21.0
November, 2005	1	69.1	45.0
December, 2005	5	1122.8	153.0
January, 2006	12	1872.3	321.0
February, 2006	9	814.0	251.0
March, 2006	4	288.0	360.0
April, 2006	12	1038.3	263.5
May, 2006	9	935.4	367.0
August, 2006	1	113.0	103.0
December, 2006	2	539.0	70.0
January, 2007	9	1502.7	223.0
February, 2007	8	533.7	280.0
March, 2007	3	309.2	115.0
April, 2007	10	422.9	147.5
May, 2007	1	8.3	33.0

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
December, 2007	5	247.0	88.0
January, 2008	6	826.5	136.0
February, 2008	2	650.3	42.0
April, 2008	1	27.7	15.0
May, 2008	5	318.9	165.5
June, 2008	1	17.9	25.8
November, 2008	1	166.0	60.0
December, 2008	3	901.0	100.0
January, 2009	2	847.7	102.0
February, 2009	1	35.6	58.0
April, 2009	12	596.1	294.5
May, 2009	6	303.2	170.5
August, 2009	1	69.3	30.0
November, 2009	1	77.0	10.0
December, 2009	6	1266.3	168.0
January, 2010	6	1178.9	149.3
February, 2010	3	22.9	51.0
March, 2010	7	160.9	137.0
April, 2010	12	670.3	359.0
May, 2010	8	143.7	188.0
Summaries by Year			
2004 Total	3	214.3	191.2
2005 Total	68	5753.6	1736.1
2006 Total	49	5600.0	1735.5
2007 Total	36	3023.9	886.5
2008 Total	19	2908.1	544.3
2009 Total	29	3195.1	833.0
2010 Total	36	2176.8	884.3
Total	240	22871.7	6810.9

Figure II-3. Pounds of copper applied within the Duck Slough @ Hwy 99 site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

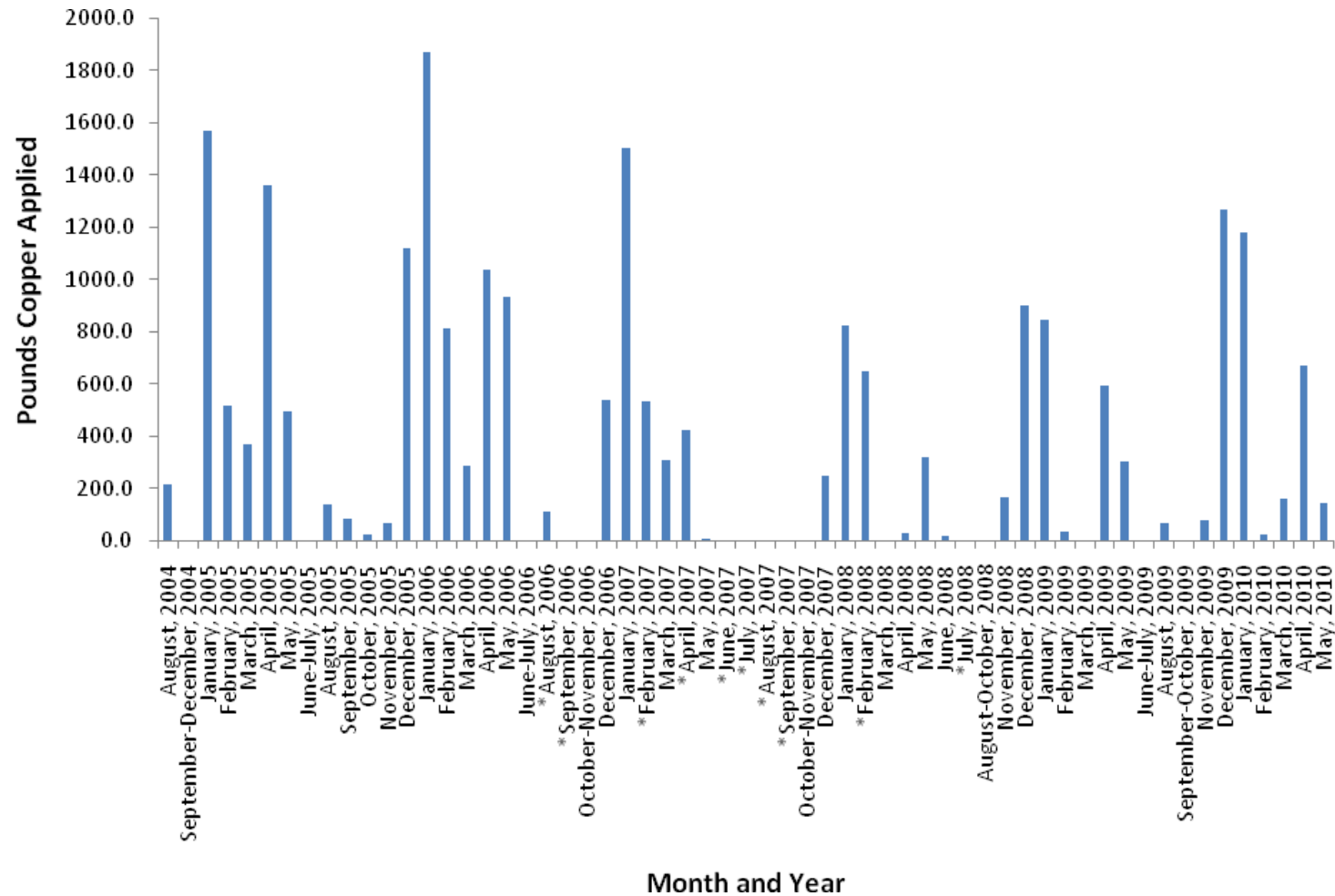


Table II-14. Total pounds AI for copper based on PUR data from 2004-2010 within the Duck Slough @ Hwy 99 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 2000	63.8
	ALMOND	BASIC COPPER 53	220.5
		COOKE BLUESTONE	8.3
		CUPROFIX ULTRA 40 DISPERS	1132.5
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	117.8
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	59.0
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	35.6
		KOCIDE 101	887.0
		KOCIDE 2000	228.7
		KOCIDE DF	853.5
		NORDOX 75 WG	1934.7
	APRICOT	BASIC COPPER 53	58.8
		KOCIDE 2000	118.4
		KOCIDE DF	122.8
	CHERRY	NU-COP 50DF	154.0
	N-OUTDR CONTAINER/FLD GRWN PLANTS	BASIC COPPER 53	1519.0
		CUPROFIX ULTRA 40 DISPERS	113.8
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	53.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	497.9
		KOCIDE 101	473.6
	NECTARINE	BASIC COPPER 53	98.0
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	27.7
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	42.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	23.1
		KOCIDE 101	1155.0
		KOCIDE 2000	201.8
	PEACH	BASIC COPPER 53	3155.6
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	172.2
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	8.7
		KOCIDE 101	154.0
		KOCIDE DF	762.0
	PEPPERS (FRUITING VEGETABLE), (BELL, CHILI, ETC.)	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	64.1
		KOCIDE 101	121.3
		KOCIDE DF	27.0
	PISTACHIO (PISTACHE NUT)	CUPROFIX DISPERS DRY FLOWABLE FUNGICIDE/BACTERICIDE FOR TURF AND ORNAMENTAL USE	8.3
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	80.7
		KOCIDE 101	154.0
	PRUNE	NORDOX 75 WG	519.2
	TOMATO	CHAMPION WETTABLE POWDER	69.3

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	19.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	210.5
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	58.9
		KOCIDE 101	422.2
		KOCIDE 2000	883.6
		KOCIDE DF	78.9
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DUPONT GX-569 FUNGICIDE/BACTERICIDE	213.0
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	874.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	789.8
		KOCIDE 101	1498.1
		KOCIDE 2000	1518.5
		KOP-HYDROXIDE 50W	396.6
		NORDOX 75 WG	151.0
		NU-COP 50DF	259.9
ALFALFA - Total Pounds Copper Applied			63.8
ALMOND - Total Pounds Copper Applied			5477.6
APRICOT - Total Pounds Copper Applied			300.0
CHERRY - Total Pounds Copper Applied			154.0
N-OUTDR CONTAINER - Total Pounds Copper Applied			2657.6
NECTARINE - Total Pounds Copper Applied			1547.8
PEACH - Total Pounds Copper Applied			4252.4
PEPPERS - Total Pounds Copper Applied			212.4
PISTACHIO - Total Pounds Copper Applied			8.3
PLUM - Total Pounds Copper Applied			234.7
PRUNE - Total Pounds Copper Applied			519.2
TOMATO - Total Pounds Copper Applied			1742.8
WALNUT - Total Pounds Copper Applied			5701.2
Total Pounds Copper Applied (2004-2010)			22871.7

In the 2009 MPUR, the Coalition determined future outreach should focus on providing information to growers located adjacent to Duck Slough to encourage the retention of water and sediment on the fields, especially during the dormant season when copper is known to enter the waterway. This strategy is consistent with the Coalition's management plan strategy outlined above. Orchard operators are advised to manage storm water runoff occurring after copper applications. No copper exceedances occurred in 2009 or 2010 during the months this site was sampled for MPM.

Priority D Constituents

Water column toxicity to *S. capricornutum* is listed as priority D constituent under the Duck Slough @ Hwy 99 management plan.

***Selenastrum capricornutum* toxicity**

Toxicity to *S. capricornutum* occurred from samples collected in July 2005 and in April 2008 and was persistent in the resample collected in May 2008. Although there were no copper exceedances

associated with *S. capricornutum* toxicity, the Coalition elected to list water column toxicity to *S. capricornutum* 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 and no toxicity occurred during the April and July 2010 MPM.

As discussed in the 2010 MPUR, the Coalition's strategy for eliminating *S. capricornutum* toxicity involves focusing on copper by individually contacting growers as well as conducting outreach regarding the retention of storm water and irrigation tailwater runoff rather than discharging to drainage canals and creeks. If the Coalition finds that copper exceedances are eliminated but *S. capricornutum* toxicity persists, then additional herbicides will be targeted for outreach and management.

Priority E Constituents

The following priority E constituents are listed under the Duck Slough @ Hwy 99 management plan: 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 with growers and annual grower meetings.

Evaluation

Duck Slough @ Hwy 99 is one of the first three priority site subwatersheds within the ESJWQC. Therefore, the Coalition has focused its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (considering changes in water quality over time).

The Coalition's strategy for the Duck Slough subwatershed has been to target growers located adjacent to the waterway and whose agricultural practices may result in the discharge or drift of pesticides into the creek. Outreach focus has been on both aerial application and tailwater retention. 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 grower surveys documenting current management practices and follow up contacts assessing planned implementation strategies have been completed by 100% of targeted growers. The Summary of Implemented Management Practice section of this report summarizes the results of these contacts. The Coalition will continue outreach in the subwatershed.

The Coalition will continue to assess water quality as Duck Slough @ Hwy 99 is scheduled for MPM in 2011 during those months of historical exceedances. Any additional water quality issues will be discussed with the Regional Board and outreach may then include dairy and new member contacts.

III. PRAIRIE FLOWER DRAIN

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Nitrate / Nitrate + Nitrite

Priority D

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

Priority E

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

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 land use 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 (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

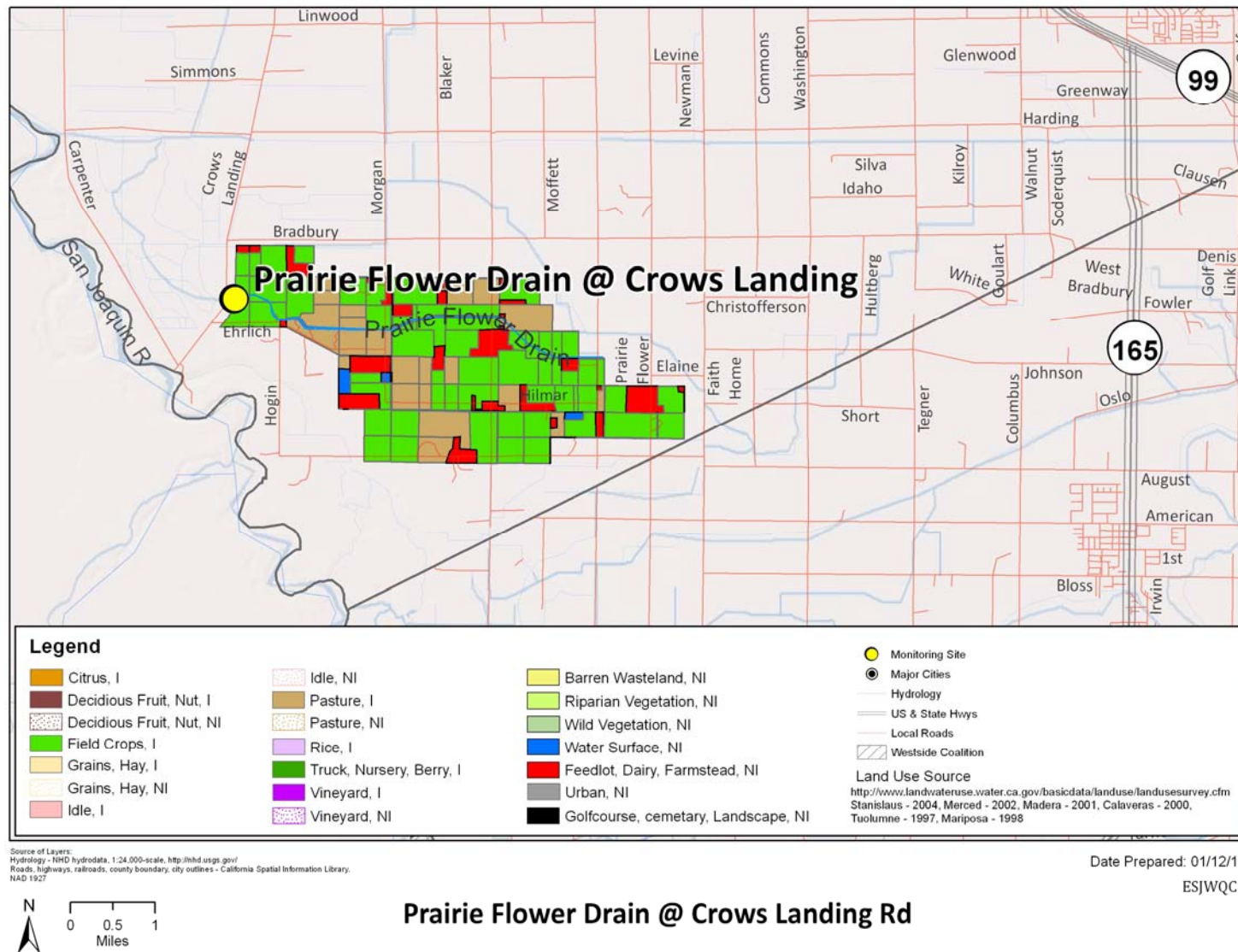
Table III-1. Coordinates of the Prairie Flower Drain site subwatershed sampling locations.

SAMPLE SITE	STATION CODE	TARGET LATITUDE	TARGET LONGITUDE
Prairie Flower Drain @ Crows Landing Road*	535XPFDCL	37.4422	-121.00236
Prairie Flower Drain @ Morgan Rd ^U	535XPFDMR	37.4379	-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

Monitoring of ambient water began at Prairie Flower Drain @ Crows Landing Rd during the storm season of 2005 and continued uninterrupted through 2010 (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 remains a Core Monitoring location under the new MRPP. In 2011 this site will be monitored for all Assessment Monitoring constituents.

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 *C. dubia* and *P. promelas* in 2008 (Table III-5). Management Plan Monitoring for 2009 occurred at Prairie Flower Drain @ Crows Landing Rd for chlorpyrifos and toxicity to *S. capricornutum* (Table III-6). Management Plan Monitoring for 2010 occurred at Prairie Flower Drain @ Crows Landing Rd for chlorpyrifos and for toxicity to *C. dubia*, *S. capricornutum* and *H. azteca* (Table III-7).

Prairie Flower Drain is not considered impaired under the proposed Basin Plan and is not listed on the 2008 Basin Plan 303d list. However the section of the San Joaquin River which receives water from Prairie Flower Drain (through the Harding 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				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	3
Events Not Sampled	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	NA	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	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				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	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	1	3	5	3
EPA 160.2	Suspended Solids							1		2	2	2	6	2	1	3	5	3
EPA 180.1	Turbidity	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	3
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	1	3	5	3
SM 9223 B	<i>E. coli</i>	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	3
NA	Dissolved Oxygen	2	5	4	6	3	13	5	10	2	2	2	6	2	1	3	5	3
NA	Specific Conductivity	2	5	4	6	3	13	5	10	2	2	2	6	2	1	3	5	3
NA	pH	2	5	4	6	3	13	5	10	2	2	2	6	2	1	3	5	3
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									
EPA 8081A	Methoxychlor				5	2	6	2	6									
Organophosphates																		

METHOD	ANALYTE	2005		2006		2007		2008			2009				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 8141A	Azinphos methyl				5	2	6	2	6									
EPA 8141A	Chlorpyrifos	2	5	2	5	2	8	2	6				1				2	
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									
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	Molybdenum																	

METHOD	ANALYTE	2005		2006		2007		2008			2009				2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 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	1	3	5	3
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	3	6	2	2	1	1				3	3
EPA 354.1	Nitrite as N				5	2	6	2	6									
EPA 353.2	Nitrate + Nitrite as N							1		2	2	2	6	2	1	3	5	3
EPA 365.2	Orthophosphate as P				5	2	6	3	6	2	2	1	1				3	3
EPA 365.2	Phosphate as P				5	2	6	3	6	2	2	2	6	2	1	3	5	3
Toxicity																		
EPA 821/R-02-012	<i>Ceriodaphnia dubia</i>	2	5	3	5	2	8	2	6								1	
EPA 821/R-02-012	<i>Pimephales promelas</i>	2	5	2	6	2	8	2	6									
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>	2	5	2	5	2	8	4	8				2			3	1	
EPA 600/R-99-064	<i>Hyalella azteca</i>		5	1	1	1	3	1	2								1	

Table III-4. Prairie Flower Drain @ Crows Landing Rd. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and *P. promelas* toxicity. "X" indicates what constituents were 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, *C. dubia* toxicity, and *P. promelas* toxicity. "X" indicates what constituents were 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 *S. capricornutum* toxicity. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	SELENASTRUM CAPRICORNUTUM	CHLORPYRIFOS
Prairie Flower Drain @ Crows Landing Rd	21-Apr-09	MPM	X	
Prairie Flower Drain @ Crows Landing Rd	19-May-09	MPM	X	
Prairie Flower Drain @ Crows Landing Rd	18-Aug-09	MPM		X

Table III-7. Prairie Flower Drain site subwatershed. 2010 Management Plan sampling schedule for chlorpyrifos and *S. capricornutum*, *C. dubia* and *H. azteca* toxicity. "X" indicates what constituents were sampled.

SITE NAME	YEAR	TYPE	CHLORPYRIFOS	C. DUBIA	S. CAPRICORNUTUM	H. AZTECA
Prairie Flower Drain @ Crows Landing Rd	19-Jan-10	MPM			X	
Prairie Flower Drain @ Crows Landing Rd	23-Feb-10	MPM			X	
Prairie Flower Drain @ Crows Landing Rd	20-Apr-10	MPM			X	
Prairie Flower Drain @ Crows Landing Rd	18-May-10	MPM			X	
Prairie Flower Drain @ Crows Landing Rd	17-Aug-10	MPM	X			
Prairie Flower Drain @ Crows Landing Rd	14-Sept-10	MPM	X	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 in the Prairie Flower Drain site subwatershed (Table III-8). Samples collected over the entire five years of monitoring at the Prairie Flower Drain sample site resulted in exceedances of DO (20), pH (6), SC (77), TDS (56), *E. coli* (42), nitrate (23), nitrite (1), nitrate + nitrite (27), ammonia (6), chlorpyrifos (4), and one each of arsenic, dimethoate, and malathion. Water column toxicity has occurred twice to *C. dubia*, nine times to *S. capricornutum* and twice to *P. promelas*. Sediment toxicity to *H. azteca* has occurred six times.

During 2010, exceedances detected during NM and MPM included DO (1), specific conductivity (11), TDS (11), *E. coli* (11), ammonia (4), and nitrate + nitrite (12). One water sample tested toxic *S. capricornutum*.

All exceedances are listed in Table III-8 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-8 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR). The highest priority constituents in the Prairie Flower Drain subwatershed are chlorpyrifos (A/B), Nitrate/Nitrite (C) and toxicity to *C. dubia* and *H. azteca* (D).

Table III-8. All exceedances experienced in samples collected from locations within the Prairie Flower Drain site subwatershed February 2005 through December 2010 (sorted by season and date).

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

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	pH, 6.5-8.5 UNITS	SPECIFIC CONDUCTIVITY, >700 μ S/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 μ G/L	CHLORPYRIFOS, >0.015 μ G/L	DIMETHOATE, >1 μ G/L	MALATHION, >0 μ G/L	C. DUBIA, (% CONTROL)	P. PROMELAS, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
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		

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	PGGOLVEDNUTMMRIC	SPECIFIC CONDUCTIVITY, >700 μ S/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 μ G/L	CHLORPYRIFOS, >0.015 μ G/L	DIMETHOATE, >1 μ G/L	MALATHION, >0 μ G/L	C. DUBIA, (% CONTROL)	P. PROMELAS, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
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										
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									88	
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									71	
Prairie Flower Drain @ Crows Landing Rd	Storm	1/30/2008			2944														
Prairie Flower Drain @ Crows Landing Rd	Storm	2/26/2008			2722	1600			28									39	
Prairie Flower Drain @ Crows Landing Rd	Sediment	3/4/2008			2639														

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, >1 µG/L	MALATHION, >0 µG/L	C. DUBIA, (% CONTROL)	P. PROMELAS, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
Prairie Flower Drain @ Crows Landing Rd	Irrigation	4/22/2008			2548	1700	370		23									29	
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													56	
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/20/2008			2526	1600	610		26									61	
Prairie Flower Drain @ Morgan Rd	Irrigation	5/20/2008	1.17		2026				22										
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/27/2008			2273													88	
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								

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, >1 µG/L	MALATHION, >0 µG/L	C. DUBIA, (% CONTROL)	P. PROMELAS, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
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							30	
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								
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								
Prairie Flower Drain @ Crows Landing Rd	Storm	1/19/2010			1837	1300	2400				43							56	
Prairie Flower Drain @ Crows Landing Rd	Storm	2/23/2010			2833	1700	440				32								
Prairie Flower Drain @ Crows Landing Rd	Winter	3/23/2010			2833	1700	1400				31								
Prairie Flower Drain @ Crows Landing Rd	Storm	4/20/2010			2399	1500	1300				33								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	5/18/2010			2428	1500	460				35								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	6/15/2010	4.25		2703	1600	820				29								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	7/20/2010			2556	1500	260				26								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	8/17/2010			2776	1700	870				24								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	9/14/2010									12								

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, >1 µG/L	MALATHION, >0 µG/L	C. DUBIA, (% CONTROL)	P. PROMELAS, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
Prairie Flower Drain @ Crows Landing Rd	Fall	10/19/2010			1795	1100	580				20								
Prairie Flower Drain @ Crows Landing Rd	Fall	11/16/2010			2710	1700	460				42								
Prairie Flower Drain @ Crows Landing Rd	Fall	12/14/2010			2688	1700	>2400				40								
Constituent Priority			E	E	E	E	E	E	C	NP	C	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

NP¹ – Not prioritized; both toxic samples were from the same sampling event (sample and resample to test for persistence).

2007 - 2010 Management Plan Monitoring Results

Management Plan Monitoring results from 2007 through 2010 are discussed below and included in Table III-9 for chlorpyrifos, nitrate, and toxicity to *C. dubia* and *P. promelas* from 2007 through 2009. The 2009 MPM results also include toxicity to *S. capricornutum*.

2007

In 2007, MPM was implemented at the Prairie Flower Drain monitoring site for chlorpyrifos and *P. promelas* toxicity. The site was monitored monthly for chlorpyrifos and *P. promelas* toxicity. Additional MPM occurred for *P. promelas* toxicity in July and for chlorpyrifos in August and September of 2007 (Table III-9). In August, the normal monitoring sample did not contain chlorpyrifos above the detection limit however the additional sample (collected two weeks later) contained 0.094 µg/L of chlorpyrifos. No toxicity to *P. promelas* occurred in the samples collected in 2007.

2008

Upstream MPM for chlorpyrifos, nitrate, and toxicity to *C. dubia* and *P. promelas* occurred during the 2008 irrigation season at Prairie Flower Drain @ Morgan Road. Table III-9 provides monitoring results for chlorpyrifos, nitrate, *C. dubia*, and *P. promelas* 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 *C. dubia* or *P. promelas* during the 2008 irrigation season.

2009

Management Plan Monitoring at Prairie Flower Drain @ Crows Landing Rd for chlorpyrifos resulted in no detections in 2009. Table III-9 provides monitoring results for chlorpyrifos and *S. capricornutum* toxicity from all MPM events during 2009. Monitoring for *S. capricornutum* toxicity in April and May resulted in toxic samples in May. A Toxicity Identification Evaluation (TIE) was initiated on May 27, 2009 and it was concluded that cationic metal(s) and ammonia were the cause of toxicity to *S. capricornutum*.

2010

Management Plan Monitoring for chlorpyrifos, *C. dubia* toxicity, *S. capricornutum* toxicity and *H. azteca* toxicity occurred during January, February, April, May, August and September of 2010. Table III-9 provides monitoring results for chlorpyrifos, *C. dubia* toxicity, *S. capricornutum* toxicity and *H. azteca* toxicity from all MPM events during 2010. Management Plan Monitoring during January for *S. capricornutum* resulted in toxicity. The reduction in growth of the sample was not below 50% so a TIE was not initiated.

2011

During 2011 Prairie Flower Drain @ Crows Landing Rd is scheduled to be monitored for Assessment Monitoring which will include all high priority constituents. Management Plan Monitoring in 2011 includes chlorpyrifos (August-September), *C. dubia* toxicity (March and September), *S. capricornutum* toxicity (January-February and April-May) and *H. azteca* toxicity (March and September). This site will return to Core Monitoring in 2012.

Table III-9. Prairie Flower Drain site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

MONTH:		JANUARY	FEBRUARY	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Crows Landing Rd)	Date	NA	NA	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	<0.003	<0.003	<0.003	0.009	<0.003	<0.003
	Nitrate (mg/L)	NA	NA	25	41	32	13	16	9.8
	<i>C. dubia</i> toxicity (% Control)	NA	NA	100	90	95	100	100	0
	<i>P. promelas</i> toxicity (% Control)	NA	NA	97.5	100	100	97.5	100	100
2007 MPM A (@ Crows Landing Rd)	Date	NA	NA	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	0.094	<0.003
	<i>P. promelas</i> toxicity (% Control)	NA	NA	NA	NA	NA	100	NA	NA
2008 NM (@ Crows Landing Rd)	Date	NA	NA	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	NA	NA	<0.003	<0.003	<0.003	<0.003	0.024	<0.003
	Nitrate (mg/L)	NA	NA	23	26	19	11	13	33
	<i>C. dubia</i> toxicity (% Control)	NA	NA	100	95	100	95	100	95
	<i>P. promelas</i> toxicity (% Control)	NA	NA	100	100	100	100	100	100
2008 MPM US (@ Morgan Rd)	Date	NA	NA	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	NA	NA	<0.003	<0.003
	Nitrate (mg/L)	NA	NA	35	22	30	0.053	20	29
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	100
	<i>P. promelas</i> toxicity (% Control)	NA	NA	NA	NA	NA	100	NA	NA
2009 MPM (@ Crows Landing Rd)	Date	NA	NA	4/21/09	5/19/09	NA	NA	8/18/09	NA
	Chlorpyrifos (µg/L)	NA	NA	<0.003	<0.003	NA	NA	<0.003	NA
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	248	30	NA	NA	NA	NA
2010 MPM (@ Crows Landing Rd)	Date	1/19/10	2/23/10	4/20/10	5/18/10	NA	NA	8/17/10	9/14/10
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	0.014	<0.003
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	100
	<i>H. azteca</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	114
	<i>S. capricornutum</i> toxicity (% Control)	56	340	281	96	NA	NA	NA	NA

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

A- Additional Monitoring conducted in 2007.

US- Upstream Monitoring conducted in 2008.

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed (Table III-10) based on the following formula:

$$\text{Load} = \text{Discharge (cfs)} \times 28.317 \text{ L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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-10. Instantaneous load calculations for chlorpyrifos where discharge was measured in the Prairie Flower site subwatershed (sorted by analyte and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION $\mu\text{g/L}$	LOADING RATE $\mu\text{g/SEC}$
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	08/17/05	0	0.029	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	09/21/05	0	0.018	0
Prairie Flower Drain @ Crows Landing Rd*	Chlorpyrifos	09/21/05	0	0.018	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	07/13/06	0	0.014	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	07/17/07	2.32	0.009	0.59
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	08/19/08	4.67	0.024	3.17
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	08/17/10	1.34	0.014	0.53

*Field Duplicate

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides—PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007 and 2008, the Coalition conducted additional and upstream MPM during those months in which exceedances had occurred in previous years to better characterize water quality the subwatershed. During 2009 and 2010, MPM continued at the Prairie Flower Drain @ Crows Landing Rd site during months when exceedances occurred in previous years to continue to assess water quality in the subwatershed as outreach in the area progressed.

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

Priority A/B Constituents

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

Chlorpyrifos

Four exceedances of the chlorpyrifos WQTL have occurred at this site, once during the month of September (2005) and three times during the month of August (2005, 2007, 2008), (Table III-8). There were no exceedances during 2009 or 2010 MPM.

All PUR data are reviewed for the number of monthly applications and pounds of active ingredient applied and the acres treated. The number of chlorpyrifos applications, amount of chlorpyrifos applied, and acres treated decreased in 2009 and 2010 compared to 2005 and 2008 levels, in particular for the month of July during which most applications occur (Table III-11 and Figure III-2). The greatest use of chlorpyrifos occurred in 2008 (740 lbs AI) with the lowest use was in 2010 (80 lbs AI), see Table III-11. Exceedances do not always occur in months with the highest applications (Figure III-2).

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications. Only two crops receive applications of chlorpyrifos in the subwatershed, alfalfa and corn, with corn receiving the largest amount (2,008 lbs AI, alfalfa - 489 lbs AI), (Table III-12). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table III-12)

Table III-11. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for August 2004 through December 2010 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
August, 2004	5	321.0	321.0
September, 2004	1	22.5	30.0
March, 2005	1	61.0	120.0
July, 2005	5	256.6	312.0
August, 2005	8	415.7	485.0
March, 2006	1	19.9	40.0
July, 2006	4	194.2	191.0
August, 2006	3	147.4	207.0
May, 2008	2	212.1	140.0
July, 2008	6	437.8	561.0
August, 2008	4	90.5	89.0
March, 2009	1	76.3	150.0
July, 2009	2	142.3	140.0
August, 2009	1	20.3	20.0
March, 2010	2	14.4	56.0
July, 2010	1	9.4	18.0
August, 2010	1	56.3	60.0
Summaries by Year			
2004 Total	6	343.5	351.0
2005 Total	14	733.3	917.0
2006 Total	8	361.5	438.0
2008 Total	12	740.4	790.0
2009 Total	4	238.9	310.0
2010 Total	4	80.1	134.0
Total	48	2497.7	2940.0

*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 2004-2010. Asterisk (*) denotes months with exceedances. No use of chlorpyrifos was reported for 2007.

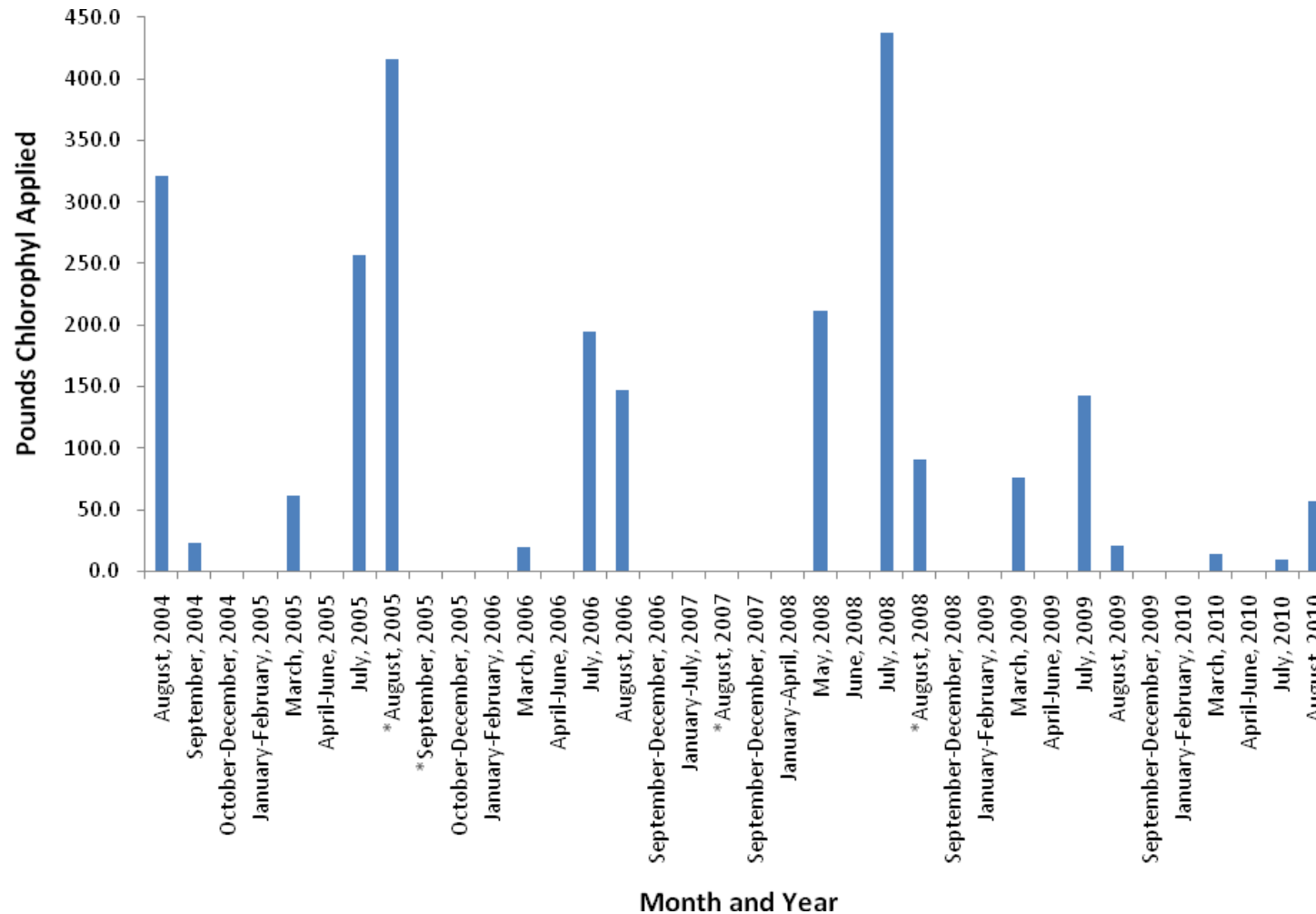


Table III-12. Total pounds AI for chlorpyrifos based on PUR data from 2004-2010 within the Prairie Flower Drain @ Crows Landing Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	317.5
		LORSBAN 4E-HF	19.9
		NUFOS 4E	137.3
		WARHAWK	14.4
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	93.8
		GOVERN 4E INSECTICIDE	212.1
		LORSBAN 4E-HF	37.4
		LORSBAN ADVANCED	65.7
		LORSBAN-4E	46.0
		NUFOS 4E	1553.6
ALFALFA - Total Pounds Chlorpyrifos Applied			489.1
CORN - Total Pounds Chlorpyrifos Applied			2008.7
Total Pounds Chlorpyrifos Applied (2004 - 2010)			2497.7

*No applications of chlorpyrifos reported for 2007

In the 2009 MPUR, the Coalition determined the most probable source of chlorpyrifos in the Prairie Flower Drain was 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 MPUR). 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 Coalition members in this subwatershed. The Coalition designed outreach to affect an increase in relevant and effective management practice implementation in member parcels. Growers of row crops have been targeted for outreach prior to the irrigation season and heavy application periods and have been advised of methods to better manage their irrigation tailwater and storm water runoff.

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

In accordance with the Coalition's Management Plan strategy, individual contacts with targeted growers began June, 2009 and continued through September, 2009. Targeted growers were selected based on their crop type, pesticide usage, and the potential for discharge to the creek. Of the 3,611 irrigated acres in Prairie Flower Drain subwatershed that have the potential to drain directly to the creek, the Coalition produced a final list of 11 target members representing 865 acres of irrigated direct drainage.

Coalition representatives met with growers to discuss management practices and 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 with growers 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 *C. dubia*, *S. capricornutum*, and *H. azteca*.

To date, the Coalition has contacted all 11 targeted members. On February 17, 2010, the Coalition hosted a follow up meeting to the 2009 Individual Contacts Grower Meeting. Members who attended the meeting provided information as to which recommended management practices had been implemented. Members unable to attend the meeting were asked to report their newly implemented management practices via a phone call with a Coalition representative between March 1 and August 4, 2010. All 11 targeted growers have completed their follow-ups and the Coalition assessment of implemented management practices is included in the Summary of Implemented Management Practices section of this report. Of the 11 targeted members (except for one member), all required a follow up meeting. Of the 10 members requiring a follow up meeting, the following management practices were implemented to acreages in the Prairie Flower Drain subwatershed: install device to control discharge (43%), reduce amount of water used in surface irrigation (27%), use of polyacrylamide (15%), and drainage basin/sediment pond installation (15%).

The Coalition will continue to assess water quality as Prairie Flower Drain @ Crows Landing Rd is scheduled for Assessment Monitoring during 2011 when every constituent will be analyzed during each month of the year. Any additional water quality issues will be discussed with the Regional Board and further outreach may be recommended, potentially including dairy and new member contacts.

Priority C Constituents

Nitrate + Nitrite/Nitrate are listed as priority C constituents under the Prairie Flower Management Plan. 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 2010. 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 from 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 the more likely sources.

Priority D Constituents

Water toxicity to *C. dubia* and sediment toxicity to *H. azteca* are listed as priority D constituents in the Prairie Flower Drain management plan.

Ceriodaphnia dubia toxicity

Toxicity to *C. dubia* was not monitored during 2009, but was monitored in September 2010 and no toxicity occurred. *C. dubia* toxicity occurred once during March 2006 and once during September 2007. The 2007 toxicity was associated with an exceedance of chlorpyrifos in August. Consequently, the Coalition's strategy for eliminating *C. dubia* toxicity is to focus on chlorpyrifos. If chlorpyrifos is prevented from entering waterways throughout the irrigation season, the Coalition believes that *C. dubia* toxicity can also be reduced or eliminated.

Hyalella azteca toxicity

Sediment toxicity to *H. azteca* has occurred during the September 2005 and May 2006 sampling events. 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. As of 2009, the Coalition tests for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity. Toxicity to *H. azteca* was not monitored during 2009. However, in 2010 sediment toxicity was monitored as part of MPM in September; no toxicity occurred.

Priority E Constituents

The following priority E constituents are listed under the Prairie Flower Drain management plan: ammonia, DO, pH, SC, TDS, *E. coli*, and water column toxicity to *S. capricornutum*.

Exceedances of ammonia, DO, pH, SC, TDS, and *E. coli* continued to occur during 2010 monitoring. Toxicity to *S. capricornutum* has occurred several times at the site, usually in the winter or early irrigation months, but has not been associated with an herbicide or metal exceedance. Toxicity to *S. capricornutum* occurred once during January 2010 MPM, and was again not associated with an herbicide or metal exceedance. These constituents will remain low priority but are discussed during individual contacts with growers and during annual grower meetings.

Evaluation

The Prairie Flower Drain subwatershed is one of the first three priority site subwatersheds within the ESJWQC. Therefore, the Coalition has focused its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Prairie Flower Drain subwatershed has been to target growers who have the potential to discharge into the drain. Outreach includes grower notification, management practice education, tracking of the implementation of management practices, and providing information on special studies of management practice efficacy.

Individual grower surveys documenting current management practices and follow up contacts assessing planned implementation strategies have been completed and returned representing 100% of the

targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts.

Both the acres treated and pounds of chlorpyrifos applied have decreased overall since 2005. A decrease was seen between 2008 usage and 2010 usage, which may further demonstrate that recent Coalition outreach has had an impact. Additionally, usage of chlorpyrifos decreased in the months of July and August, when the most exceedances have historically occurred. Also encouraging was the absence of chlorpyrifos exceedances during 2010 MPM.

In 2011, Assessment Monitoring is scheduled where all high priority constituents will be monitored monthly. The Coalition will continue with outreach in the Prairie Flower Drain subwatershed. Any additional water quality issues will be discussed with the Regional Board and further outreach may be recommended, potentially including dairy and new member contacts.

HIGH PRIORITY SITE SUBWATERSHEDS (2010 -2012)

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*

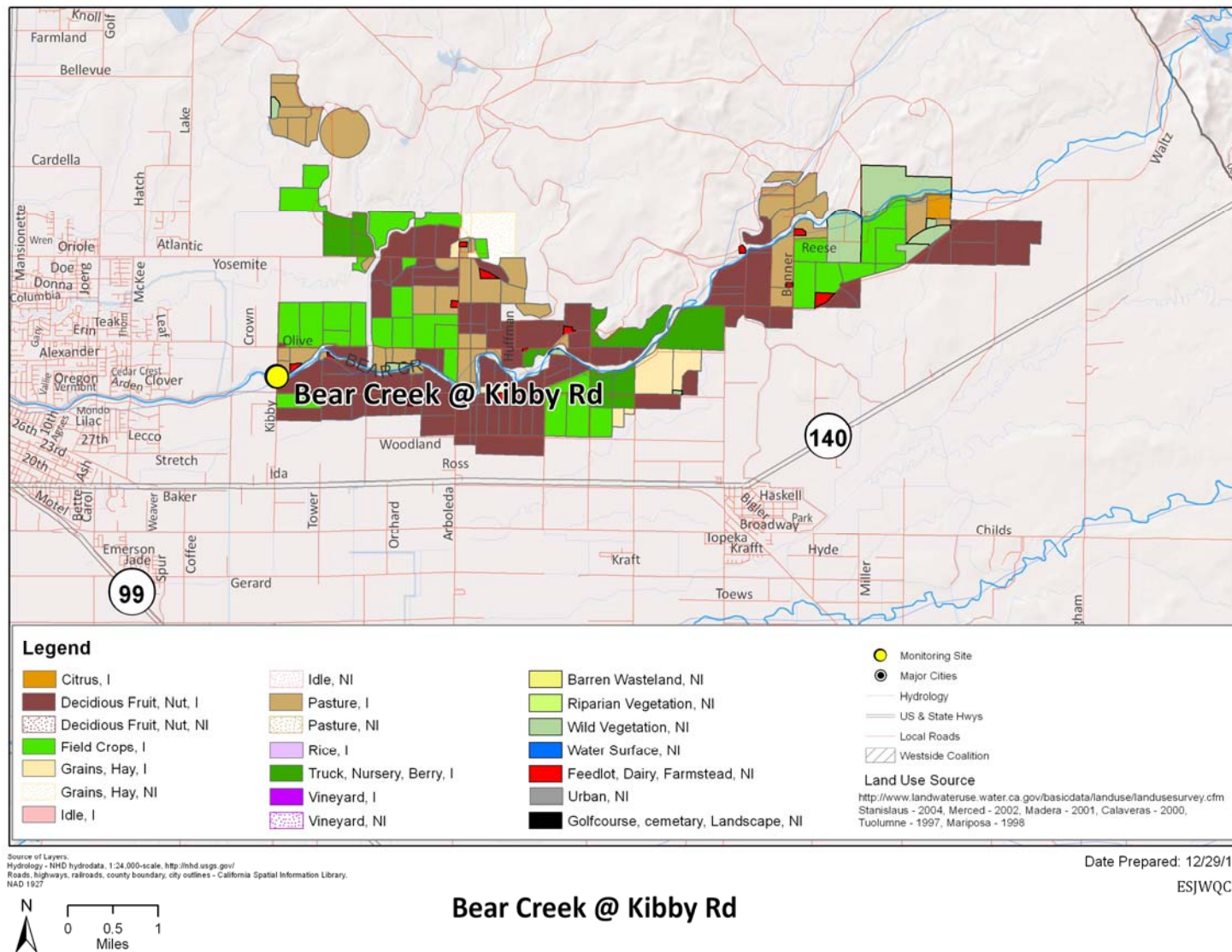
Description of Bear Creek @ Kibby Rd Site Subwatershed

Bear Creek @ Kibby Road (6,740 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 (sample site), 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.

SAMPLE SITE	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

Monitoring of ambient water at Bear Creek @ Kibby Rd 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. Bear Creek @ Kibby Rd is not scheduled for Assessment Monitoring until 2025-2026. The constituents monitored at this location from 2005-2010 are listed in Table IV-3.

Management Plan Monitoring for the Coalition at Bear Creek @ Kibby Rd occurred in 2008 (May and July) and included additional sampling for chlorpyrifos and *C. dubia* toxicity (Table IV-4). There were no samples collected at this site during 2009. The Coalition conducted MPM for chlorpyrifos, copper and *C. dubia* toxicity again starting in May 2010 (Table IV-5). Included in the following section is a summary of exceedances experienced at this site (Table IV-6). High priority monitoring began at Bear Creek in 2010.

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

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

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	1	5	2	5	2	6	2	6	NA	NA	NA	NA	NA	NA	NA	3	NA
Events Not Sampled	NA	1	0	0	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	0	NA
Total	NA	2	5	2	5	2	6	2	6	NA	NA	NA	NA	NA	NA	NA	3	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			2009	2010				
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER*	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	<i>E. coli</i>	1	5	2	5	2	6	2	6							
NA	Dissolved Oxygen	1	6	3	6	3	7	3	10					3		
NA	Specific Conductivity	1	6	3	6	3	7	3	10					3		
NA	pH	1	6	3	6	3	7	3	10					3		
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							
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					2		
EPA 8141A	Diazinon				5	2	6	2	6							

METHOD	ANALYTE	2005		2006		2007		2008			2009	2010			
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER*	STORM*	IRRIGATION	FALL*
EPA 8141A	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						
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					1	
EPA 200.8	Lead				5	2	6	2	6						
EPA 200.8	Molybdenum														
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						

METHOD	ANALYTE	2005		2006		2007		2008			2009	2010				
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER*	STORM*	IRRIGATION	FALL*	
Metals (Dissolved)																
EPA 200.8	Cadmium															
EPA 200.8	Copper													1		
EPA 200.8	Lead															
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	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	<i>Ceriodaphnia dubia</i>	1	6	2	6	2	8	2	8					2		
EPA 821/R-02-012	<i>Pimephales promelas</i>	1	6	2	5	2	7	2	6							
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>	1	6	2	5	2	7		7							
EPA 600/R-99-064	<i>Hyalella azteca</i>		5	1	1	1	1	1	2							

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

Table IV-4. Bear Creek @ Kibby Rd site subwatershed. 2008 Management Plan additional (A) sampling schedule for chlorpyrifos and *C. dubia* toxicity. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	CHLORPYRIFOS	<i>CERIODAPHNIA DUBIA</i>
Bear Creek @ Kibby Rd	7-May-08	A	X	X
Bear Creek @ Kibby Rd	8-Jul-08	A	X	X

Table IV-5. Bear Creek @ Kibby Rd site subwatershed. 2010 Management Plan additional (A) sampling schedule for chlorpyrifos, copper and *C. dubia* toxicity. "X" indicates what constituents were sampled.

SITE NAME	DATE	TYPE	<i>CERIODAPHNIA DUBIA</i>	COPPER	CHLORPYRIFOS
Bear Creek @ Kibby Rd	18-May-10	MPM	X		X
Bear Creek @ Kibby Rd	20-Jul-10	MPM	X		X
Bear Creek @ Kibby Rd	17-Aug-10	MPM		X	

Exceedance History

During Coalition monitoring from 2005 to 2008, 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-6). During ambient water monitoring several exceedances occurred, including DO (2), pH (3), *E. coli* (7), arsenic (1), copper (4), chlorpyrifos (2), and DDT (1). Water column toxicity occurred three times to *C. dubia* and twice to *S. capricornutum* including a resample of initial toxicity. Sediment toxicity to *H. azteca* has occurred twice.

No exceedances occurred at Bear Creek during MPM sampling in 2010.

All exceedances are listed in Table IV-6 by season and date and are based on WQTLs listed in the introduction to the ESJWQC Management Plan. Using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR), priorities were assigned to management plan constituents and are listed in the bottom row of Table IV-6. The highest priority constituents in the Bear Creek subwatershed are chlorpyrifos (A), copper (C), and toxicity to *C. dubia* and *H. azteca* (D).

Table IV-6. All exceedances experienced in samples collected from locations within the Bear Creek site subwatershed March 2005 through August 2010 (sorted by season and date).

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

SAMPLE SITE	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	pH, 6.5-8.5 UNITS	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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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										4
Bear Creek @ Kibby Rd	Irrigation	5/7/2008										21
Bear Creek @ Kibby Rd	Irrigation	6/24/2008				17						

SAMPLE SITE	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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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

NP¹ – Not prioritized; both toxic samples were from the same sampling event (sample and resample to test for persistence).

2008-2010 Management Plan Monitoring Results

Management Plan Monitoring results from 2008 and 2010 are included in Table IV-7 for chlorpyrifos and toxicity to *C. dubia*. MPM did not occur during 2009. Toxicity to *C. dubia* 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-6).

2008

In 2008, Bear Creek @ Kibby Rd was monitored for chlorpyrifos and *C. dubia* toxicity from April through September, along with additional MPM conducted in May and July (Table IV-7). During both normal monitoring and MPM in 2008, no detection of chlorpyrifos was indicated for any of the irrigation months, and there was no indication of toxicity to *C. dubia*. 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 monitoring in 2009.

2010

Management Plan Monitoring for chlorpyrifos, copper, and *C. dubia* toxicity was conducted during the 2010 irrigation season (Table IV-5). There were no exceedances experienced during MPM 2010 (Table IV-7).

2011

In 2011, MPM is scheduled for copper (January, February and August), chlorpyrifos (May and July) and toxicity to *C. dubia* (May and July).

Table IV-7. Bear Creek @ Kibby Rd site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results. 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
	<i>C. dubia</i> 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
	<i>C. dubia</i> toxicity (% Control)	NA	100	NA	95	NA	NA
2010 MPM (@ Kibby Rd)	Date	NA	5/18/10	NA	7/20/10	8/17/10	NA
	Copper, total (µg/L)	NA	NA	NA	NA	1.2	NA
	Copper, dissolved (µg/L)	NA	NA	NA	NA	0.46	NA
	Chlorpyrifos (µg/L)	NA	<0.003	NA	<0.003	NA	NA
	<i>C. dubia</i> toxicity (% Control)	NA	100	NA	100	NA	NA

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

Load Calculations

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

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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-8. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured in the Bear Creek site subwatershed (sorted by analyte and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION $\mu\text{G/L}$	LOADING RATE $\mu\text{G/SEC}$
Bear Creek @ Kibby Rd*	Copper	04/17/07	29.13	2	1649.75
Bear Creek @ Kibby Rd	Copper	04/17/07	29.13	2.1	1732.24
Bear Creek @ Kibby Rd	Copper	08/21/07	56.1	1.6	2541.73
Bear Creek @ Kibby Rd	Copper	09/18/07	51.02	1.7	2456.05
Bear Creek @ Kibby Rd	Copper	04/29/08	113.34	1.1	3530.39
Bear Creek @ Kibby Rd	Copper	05/27/08	147.77	1.4	5858.16
Bear Creek @ Kibby Rd	Copper	08/26/08	94.9	7.1	19079.71
Bear Creek @ Kibby Rd	Copper	09/30/08	33.1	1.3	1218.48

*Field Duplicate

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides—PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2008, the Coalition conducted additional MPM during those months in which exceedances had occurred in previous years to better characterize water quality the subwatershed. During 2010, MPM resumed at the Bear Creek @ Kibby Rd site during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Bear Creek @ Kibby Rd subwatershed was assigned high priority status in 2010, the Coalition has actively engaged in grower outreach and education to address the subwatershed's priority constituents. The Coalition organized meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

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

Chlorpyrifos

Two water samples contained chlorpyrifos above the WQTL of 0.015 µg/L from 2006 through 2010 (May 2006 and July 2007) (Table IV-6). Chlorpyrifos was omitted from the monitoring schedule in October 2008 when the Coalition began monitoring under a new MRPP. In 2009, no MPM took place at this site. Starting in May 2010, MPM continued and chlorpyrifos was monitored during months of past exceedances, no exceedances of the chlorpyrifos WQTL occurred. The Coalition used a combination of monitoring data and evaluation of PUR data to identify possible sources of past exceedances.

In every high priority subwatershed, PUR data are reviewed for the number of monthly applications, pounds of active ingredient applied, and acres treated (Table IV-9, Figure IV-2). The amount of chlorpyrifos applied within the subwatershed in 2010 (672 lbs AI) increased 100% from 2009 (328 lbs). However the largest amount of chlorpyrifos was applied in 2008 (1,817 lbs AI, see Table IV-9, Figure IV-2). The months with the greatest amount of chlorpyrifos use from 2005 through 2010 were May, June, and July (Table IV-9, Figure IV-2). Not all past exceedances occurred during months of the greatest amount of use (Figure IV-2).

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications. The highest application rates and highest percentage of overall chlorpyrifos used in the subwatershed (40%) from 2005 through 2010 was to almonds (2582 lbs AI) and walnuts (2071 lbs AI) (Table IV-10). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table IV-10).

Table IV-9. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for August 2004 through December 2010 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
August, 2004	3	298.2	220.0
March, 2005	1	39.6	99.0
May, 2005	5	347.0	178.0
June, 2005	2	49.9	25.0
July, 2005	2	70.0	35.0
August, 2005	1	55.8	30.0
September, 2005	1	18.8	10.0
May, 2006	11	980.6	520.0
June, 2006	4	154.9	78.0
July, 2006	3	403.6	200.0
August, 2006	1	111.4	61.0
May, 2007	9	363.3	196.0
June, 2007	1	29.9	15.0
July, 2007	5	518.7	264.0
August, 2007	2	175.8	90.0
September, 2007	1	76.3	75.0

February, 2008	3	492.5	265.0
May, 2008	2	40.0	20.0
June, 2008	18	729.1	485.0
July, 2008	6	458.4	352.0
August, 2008	2	97.4	106.0
May, 2009	3	134.8	165.0
July, 2009	2	193.4	103.0
March, 2010	3	172.7	94.0
June, 2010	7	500.1	382.7
Summaries by Year			
2004 Total	3	298.2	220.0
2005 Total	12	581.0	377.0
2006 Total	19	1650.5	859.0
2007 Total	18	1164.1	640.0
2008 Total	31	1817.4	1228.0
2009 Total	5	328.2	268.0
2010 Total	10	672.8	476.7
Total	98	6512.2	4068.7

Figure IV-2. Pounds of chlorpyrifos applied within the Bear Creek site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

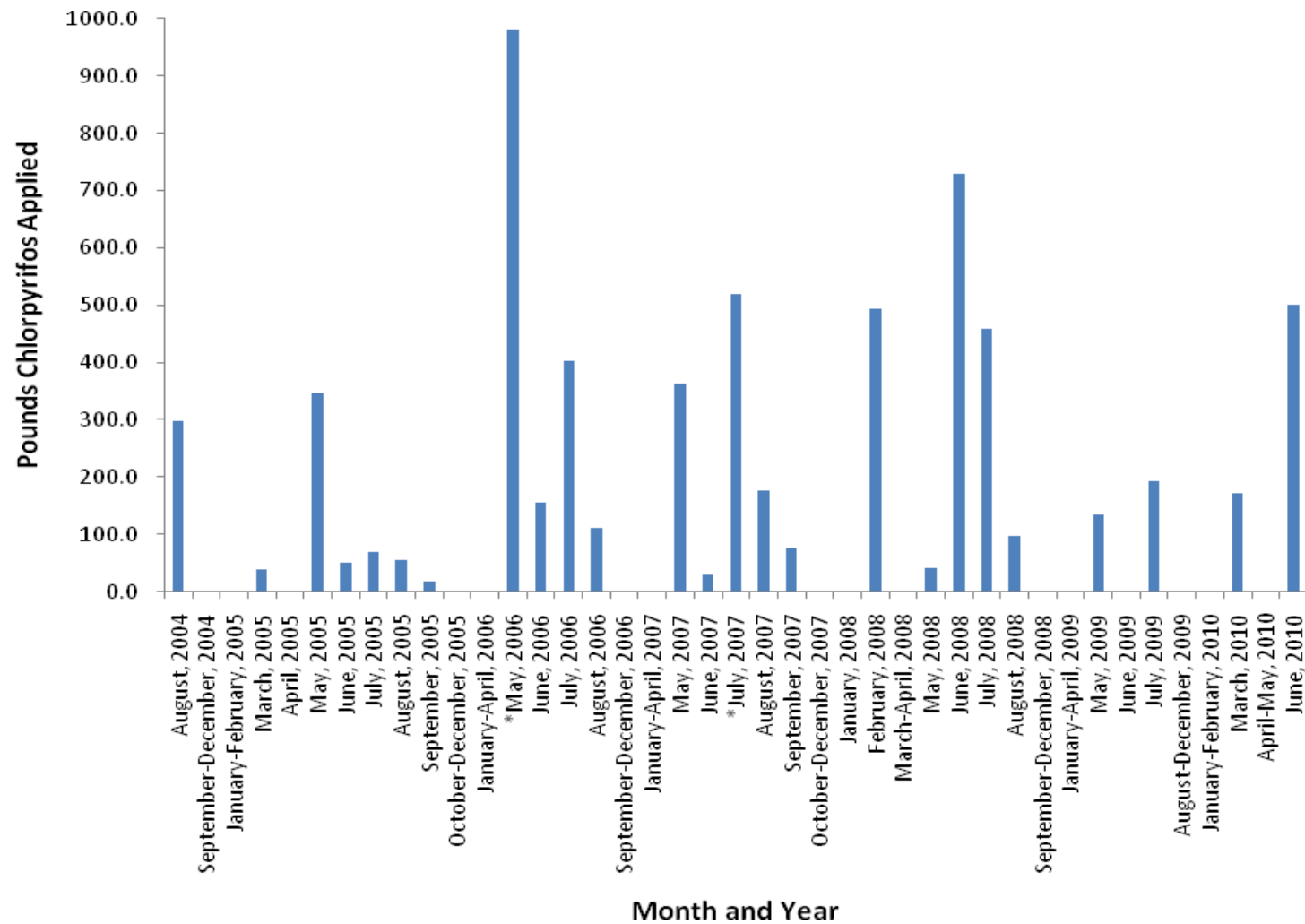


Table IV-10. Total pounds AI for chlorpyrifos based on PUR data from 2004-2010 within the Bear Creek @ Kibby Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	CHLORPYRIFOS 4E AG	39.6
	ALMOND	GOVERN 4E INSECTICIDE	997.9
		LORSBAN 4E INSECTICIDE	80.1
		LORSBAN 4E-HF	517.4
		LORSBAN-4E	843.0
		WHIRLWIND	144.0
	CORN (FORAGE - FODDER)	LORSBAN 4E-HF	113.6
		NUFOS 4E	883.9
		SAURUS	663.6
	PEACH	LORSBAN-4E	158.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	58.2
		LORSBAN 4E INSECTICIDE	40.0
		LORSBAN 4E-HF	506.4
		LORSBAN ADVANCED	193.4
		LORSBAN-4E	1272.9
ALFALFA - Total Pounds Chlorpyrifos Applied			39.6
ALMOND - Total Pounds Chlorpyrifos Applied			2582.5
CORN - Total Pounds Chlorpyrifos Applied			1661.2
PEACH - Total Pounds Chlorpyrifos Applied			158.0
WALNUT - Total Pounds Chlorpyrifos Applied			2071.0
Total Pounds Chlorpyrifos Applied (2004 - 2010)			6512.2

As described in the 2010 MPUR, exceedances of the WQTL for chlorpyrifos occurred in months with the highest application rates, thus the Coalition suspects a combination of spray drift and irrigation tailwater discharge are the cause of chlorpyrifos in the waterways. Growers are encouraged to review their operation to determine if irrigation return flows are managed properly. Owners with orchards are requested to evaluate their applications to minimize spray drift. Row crop farmers are advised of methods to better manage their irrigation tailwater and storm water runoff, whereas outreach efforts to orchard growers focus on encouraging management practices to reduce spray drift and improve orchard and vineyard water management.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information, such as funding available for management practice implementation. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report.

In accordance with the Coalition's Management Plan strategy, individual contacts with targeted growers began in June 2010. The Coalition focused outreach efforts on growers owning parcels with the potential to drain to the creek and those applying chlorpyrifos with the potential for spray drift. The Coalition developed a list of 14 targeted members that represented 1292 of the 4179 acres with the potential to discharge to the creek. Coalition representatives met with growers on their property to discuss the Bear Creek Management Plan and offer management practice recommendations specific to

the parcel and land owner/operator. 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 exceedances of copper, DO, *E. coli*, and pH WQTLs exceedances as well as toxicity to *C. dubia*.

To date, the Coalition has contacted all 14 targeted members, representing 1,292 acres or 31% of the total direct drainage acreage of the subwatershed. Of the 14 targeted members, recommended management practices to acreages in the Bear Creek subwatershed include: recirculation/tailwater return system (62%), and drainage basin/sediment pond (38%). Based on the exact timing of each individual meeting and/or the grower's resources, some owners will not be able to implement recommended management practices until during or after the 2011 irrigation season. In addition, long term structural Best Management Practices (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 in April of 2011 will determine what practices were implemented during the first irrigation year of high priority monitoring. Growers who 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 of high priority monitoring.

To evaluate the management practice process, the Coalition monitored for high priority constituents at Bear Creek @ Kibby Rd during months of past exceedances in 2010 and there were no exceedances experienced. In 2011, Bear Creek @ Kibby Rd is scheduled to continue MPM. The Coalition will work to complete targeted grower outreach but will continue to conduct outreach on a grower group level in 2011. The Coalition will continue to assess water quality at Bear Creek @ Kibby Rd during MPM in 2011.

Priority C Constituents

The only priority C constituent at Bear Creek @ Kibby Rd is copper.

Copper

Copper exceeded the hardness based WQTL four times in this subwatershed from 2005 through 2010. 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 monitoring in 2009; however, MPM samples were collected in 2010 for copper analysis and did not exceed the WQTL. In 2011, MPM samples are scheduled to be collected in January, February and August.

PUR data are reviewed for the number of monthly applications, pounds of active ingredient applied, and acres treated (Table IV-11, Figure IV-3). The amount of copper applied within the subwatershed decreased annually from 2005 through 2008, subsequently the amount of copper applied then increased in 2009 and 2010 (Table IV-11, Figure IV-3). Between 2005 through 2010, the greatest amount of copper applied was in the months of January, February, April and May (Table IV-11, Figure IV-3). Not all exceedances occurred during months of the greatest amount of use (Figure IV-3).

The Coalition uses PUR data to assess which crops receive the most applications of copper. The largest amount of copper applied from 2005 through 2010 was associated with almond, peach, and walnut

orchards (Table IV-12). Peach orchards received the greatest overall amount (lbs applied) of copper by far (12,150 lbs AI). The most common products containing copper used within this subwatershed were DuPont™ Kocide and Kocide (Table IV-12).

Table IV-11. Number of copper applications, total pounds applied and total acres treated by month for August 2004 through December 2010 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 OF AI APPLIED	ACRES TREATED
September, 2004	1	41.6	27.0
October, 2004	1	62.4	27.0
January, 2005	2	1178.9	175.0
February, 2005	3	307.2	121.0
March, 2005	4	818.6	174.0
April, 2005	8	1748.0	325.5
May, 2005	8	1762.6	603.0
November, 2005	1	26.9	40.0
January, 2006	6	2290.7	493.0
February, 2006	4	1212.1	244.0
March, 2006	2	51.9	95.0
April, 2006	11	1614.5	499.0
May, 2006	3	323.8	186.0
June, 2006	2	142.0	88.0
October, 2006	2	150.6	140.0
January, 2007	3	1111.0	275.0
February, 2007	1	729.9	116.9
March, 2007	7	965.3	242.0
April, 2007	12	1772.9	374.0
February, 2008	3	2752.6	291.9
March, 2008	8	809.7	320.0
April, 2008	8	815.6	260.0
October, 2008	1	67.5	80.0
January, 2009	3	2709.1	291.9
February, 2009	1	62.9	15.0
March, 2009	1	122.7	38.0
April, 2009	2	1562.2	128.0
May, 2009	1	91.5	34.0
September, 2009	2	132.8	177.8
January, 2010	3	2710.2	311.8
February, 2010	2	493.3	175.5
March, 2010	5	1072.5	335.1
April, 2010	8	925.4	327.9
May, 2010	4	323.1	205.0
Summaries by Year			
2004 Total	2	104.0	54.0
2005 Total	26	5842.2	1438.5
2006 Total	30	5785.7	1745.0
2007 Total	23	4579.1	1007.9
2008 Total	20	4445.4	951.9
2009 Total	10	4681.1	684.7

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
2010 Total	22	5524.5	1355.3
Total	133	30961.9	7237.3

Figure IV-3. Pounds of copper applied within the Bear Creek @ Kibby Rd site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

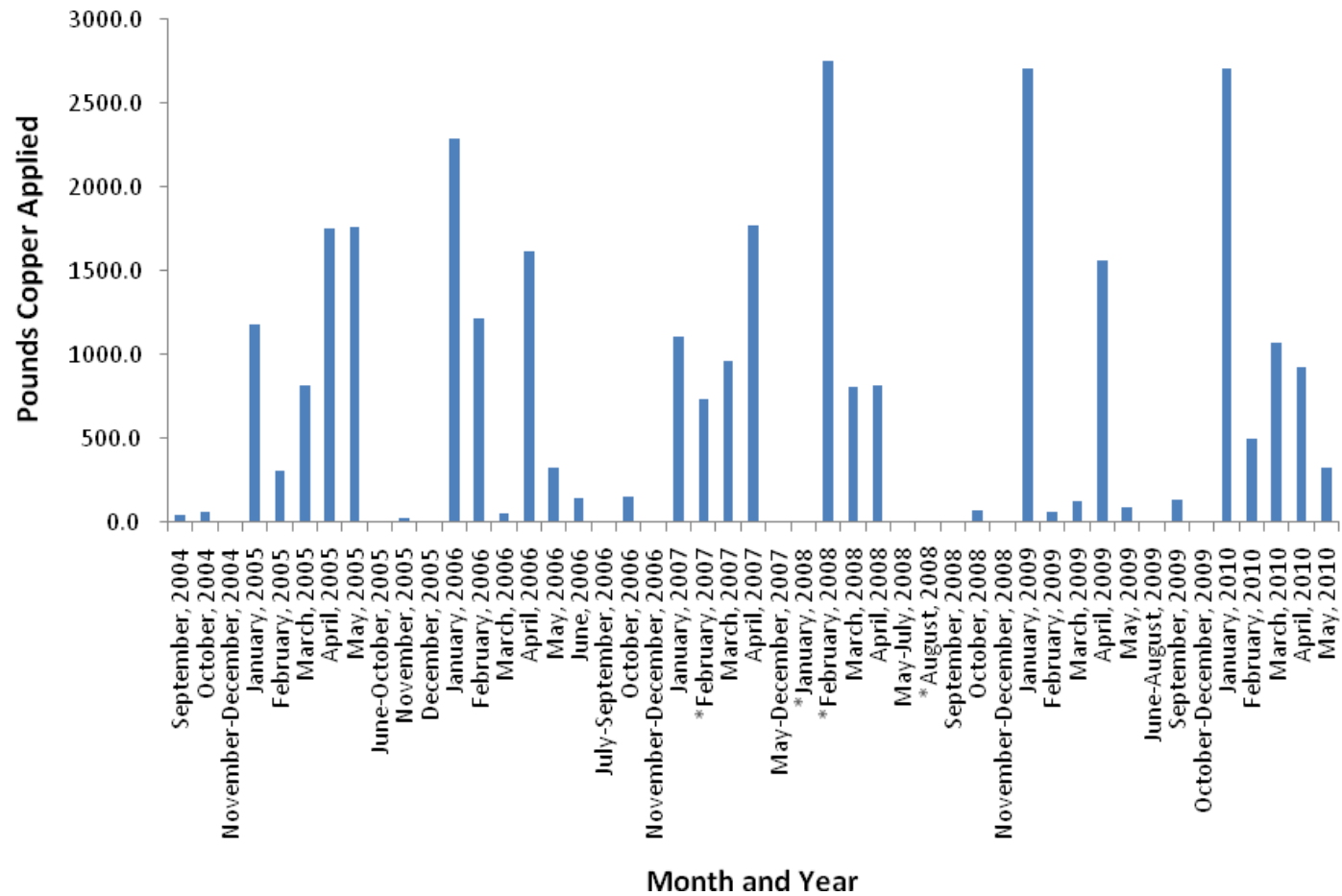


Table IV-12. Total pounds AI for copper based on PUR data from 2004-2010 within the Bear Creek @ Kibby Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 2000	48.4
	ALMOND	CUPROFIX ULTRA 40 DISPERSS	1726.9
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1533.3
		KOCIDE 101	61.6
		KOCIDE 2000	798.9
		KOCIDE DF	337.7
		NORDOX 75 WG	62.9
		BASIC COPPER 53	5292.0
	PEACH	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	895.8
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	1010.5
		KOCIDE DF	2410.0
		NORDOX	395.9
		NORDOX 75 WG	2146.3
	PRUNE	NORDOX 75 WG	1141.0
	TOMATO	CHAMP FLOWABLE	3.5
		CHAMP FORMULA 2 FLOWABLE	155.8
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	148.5
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	208.5
		KOCIDE 101	41.6
		KOCIDE 2000	896.3
		NU-COP 50DF	62.4
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1144.5
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	378.0
		HYDROX	542.1
		KENTAN DF	576.2
		KOCIDE 101	323.4
		KOCIDE 2000	1674.5
		KOCIDE DF	1061.0
		NORDOX	21.2
		NORDOX 75 WG	42.0
		NU-COP 50DF	5821.2
ALFALFA - Total Pounds Copper Applied			48.4
ALMOND - Total Pounds Copper Applied			4521.3
PEACH - Total Pounds Copper Applied			12150.5
TOMATO - Total Pounds Copper Applied			1141.0
PRUNE - Total Pounds Copper Applied			1516.5
WALNUT - Total Pounds Copper Applied			11584.1
Total Pounds Copper Applied (2004 - 2010)			30961.9

The Coalition determined that outreach should focus on providing information to specific growers located adjacent to Bear 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 under the chlorpyrifos outreach section. Orchard operators have been advised to consider

water retention and management to prevent copper from entering the waterway during irrigation and winter runoff events.

Priority D Constituents

The Bear Creek Management Plan includes *C. dubia* water column toxicity as priority D constituents

Ceriodaphnia dubia toxicity

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

Priority E Constituents

The following priority E constituents are listed under the Bear Creek @ Kibby Rd site Subwatershed Management Plan: DO, *E. coli*, and pH.

There were no exceedances for any constituents experienced during 2010 monitoring. 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 just completed its first year of focused outreach (2010-2012). Therefore, the Coalition has focused its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Bear Creek subwatershed has been to target growers adjacent to the waterway that have the potential to discharge into the creek. Focus has been 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 have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. In April 2011, the Coalition will initiate follow up contacts to identify newly implemented practices and future monitoring to evaluate water quality improvement.

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

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, with deciduous nut orchards 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 (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

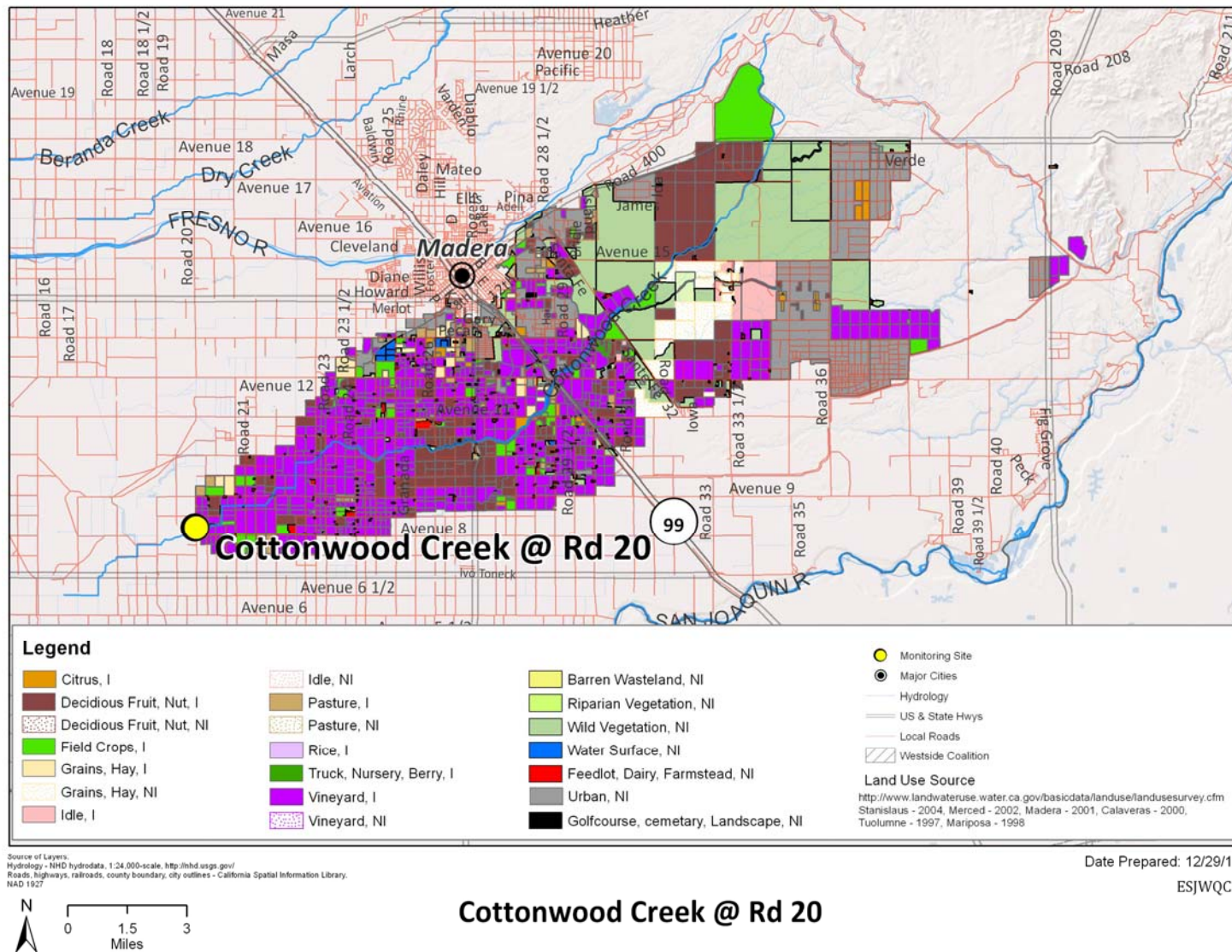
Table V-1. Coordinates of the Cottonwood Creek site subwatershed sampling locations.

SAMPLE SITE	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

Monitoring of ambient water at Cottonwood Creek @ Rd 20 was initiated during the storm season of 2005 continuing through 2010 (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 2005-2010 are listed in Table V-3. Due to toxic *S. capricornutum* samples in April 2008 and May 2008, Cottonwood Creek @ Rd 20 is also monitored monthly for *S. capricornutum* toxicity (the two toxicities that occurred in May 2008 were considered the same event since one was a resample one week later to test for persistence), 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 conducted MPM for copper starting again in April 2010 (Table V-6).

Cottonwood Creek was 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 copper (April-September), and for chlorpyrifos, diazinon and diuron (January and February) in 2010.

Cottonwood Creek is one of the second group of high priority subwatersheds. Cottonwood Creek is listed as an impaired waterbody for *E. coli* and unknown toxicity in the 2008 Central Valley Basin Plan 303d list. The source of these impairments is listed as unknown.

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

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	2	5	2	5	0	5	1	5	0	0	2	3	2	0	2	5	1
Events Not Sampled	NA	0	0	0	0	2	1	2	1	2	2	0	3	0	1	1	0	2
Total	NA	2	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	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 Cottonwood 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				2010				
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	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		2	5	1
EPA 160.2	Suspended Solids											2	3	2		2	5	1
EPA 180.1	Turbidity	2	5	2	5		5	2	5			2	3	2		2	5	1
EPA 405.1	BOD				1		2											
EPA 415.1	Total Organic Carbon	2	5	2	5		5	2	5			2	3	2		2	5	1
Walkley-Black	Total Organic Carbon (sediment)												1				1	
SM 9223	<i>E. coli</i>	2	5	2	6		5	2	5			2	3	2		2	5	1
ASTM D422	Grain size (sediment)												1				1	
NA	Dissolved Oxygen	2	5	3	5		7	3	6			2	3	2		2	5	1
NA	Specific Conductivity	2	5	3	5		7	3	6			2	3	2		2	5	1
NA	pH	2	5	3	5		7	3	6			2	3	2		2	5	1
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							1		
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									

METHOD	ANALYTE	2005		2006		2007		2008		2009				2010				
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 8081A	Endrin				5		5	2	5									
EPA 8081A	Methoxychlor				5		5	2	5									
Organophosphates																		
EPA 8141A	Azinphos methyl				5		5	2	5									
EPA 8141A	Chlorpyrifos	2	5	2	5		5	2	5							1		
EPA 8141A	Diazinon	2	5	2	5		5	2	5							1		
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							1		
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		2	5	1
EPA 619	Simazine				5		5	2	5			1	2	2		2	5	1
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									

METHOD	ANALYTE	2005		2006		2007		2008		2009				2010				
		STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 200.8	Copper				5		6	2	5							1	5	
EPA 200.8	Lead				5		5	2	5									
EPA 200.8	Molybdenum																	
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															1	5	
EPA 200.8	Lead																	
EPA 200.8	Nickel																	
EPA 200.8	Zinc																	
Nutrients																		
SM 2340 C	Hardness as CaCO3				5		6	2	5							1	5	
EPA 300.0	Nitrate as N				5		5	2	5									
EPA 350.2	Ammonia as N				5		5	2	5			2	3	2		2	5	1
EPA 351.3	Nitrogen, Total Kjeldahl				5		5	2	5			1					3	1
EPA 354.1	Nitrite as N				5		5	2	5									
EPA 353.2	Nitrate + Nitrite as N											2	3	2		2	5	1
EPA 365.2	Orthophosphate as P				5		5	2	5			1					3	1
EPA 365.2	Phosphate as P				5		5	2	5			2	3	2		2	5	1
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		2	5	1
EPA 821/R-02-013	Selenastrum capricornutum	2	5	2	5		6		6			1	3	2		2	5	1
EPA 600/R-99-064	Hyalella azteca		5	1	1		1	1	1				1				1	

Table V-4. Cottonwood Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for copper. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	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 what constituents were 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

Table V-6. Cottonwood Creek site subwatershed. 2010 Management Plan sampling schedule for copper, chlorpyrifos, diazinon and diuron. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	COPPER	CHLORPYRIFOS	DIAZINON	DIURON
Cottonwood Creek @ Rd 20	19-Jan-10	MPM		X	X	X
Cottonwood Creek @ Rd 20	23-Feb-10	MPM		X	X	X
Cottonwood Creek @ Rd 20	20-Apr-10	MPM	X			
Cottonwood Creek @ Rd 20	18-May-10	MPM	X			
Cottonwood Creek @ Rd 20	15-Jun-10	MPM	X			
Cottonwood Creek @ Rd 20	20-Jul-10	MPM	X			
Cottonwood Creek @ Rd 20	17-Aug-10	MPM	X			
Cottonwood Creek @ Rd 20	14-Sept-10	MPM	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-7). During ambient water monitoring within Cottonwood Creek (including the upstream sampling at Cottonwood Creek @ Hwy 145) in 2005-2010, exceedances of field, physical, inorganic and organic constituents have occurred including DO (19), pH (1), *E. coli* (16), total copper (13), dissolved copper (3), total lead (3), chlorpyrifos (3), cyanazine (1), diazinon (1), simazine (1), and diuron (2) (Table V-7).

During 2010, exceedances detected during monitoring included DO (4), *E. coli* (2), dissolved copper (3) and chlorpyrifos (1) (Table V-7).

All exceedances are listed in Table V-7 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 (see Figure 4 on page 23 of the 2011 MPUR), priorities were assigned to management plan constituents and are listed in the bottom row of Table V-7. The highest priority constituents in the Cottonwood Creek subwatershed are chlorpyrifos and diazinon (A/B) as well as copper and diuron (C).

Table V-7. All exceedances experienced in samples collected from locations within the Cottonwood Creek site subwatershed February 2005 through December 2010 (sorted by season and date).

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

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 mg/L	pH, 6.5-8.5 UNITS	E. COLI, >235 MPN/100 mL	COPPER, DISSOLVED ¹ µg/L	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, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
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)									

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	pH, 6.5-8.5 UNITS	E. COLI, >235 MPN/100 mL	COPPER, DISSOLVED ¹ µG/L	COPPER, TOTAL >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, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
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)									
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)								5	
Cottonwood Creek @ Rd 20	Irrigation	5/7/2008													4	
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											

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	pH, 6.5-8.5 UNITS	E. COLI, >235 MPN/100 ML	COPPER, DISSOLVED ¹ µG/L	COPPER, TOTAL >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, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)	H. AZTECA, (% CONTROL)
Cottonwood Creek @ Rd 20	Storm	1/19/2010							0.21							
Cottonwood Creek @ Rd 20	Storm	4/20/2010	6.36			3.1 (2.17)										
Cottonwood Creek @ Rd 20	Irrigation	5/18/2010				3.6 (2.36)										
Cottonwood Creek @ Rd 20	Irrigation	6/15/2010			2000											
Cottonwood Creek @ Rd 20	Irrigation	7/20/2010	6.80													
Cottonwood Creek @ Rd 20	Irrigation	8/17/2010	6.04			5.3 (4.9)										
Cottonwood Creek @ Rd 20	Irrigation	9/14/2010	6.44													
Cottonwood Creek @ Rd 20	Fall	10/19/2010			290											
Constituent Priority			E	NP	E	C	C	E	A/B	NP	A/B	C	NP	NP	NP ²	NP

¹Dissolved not analyzed until October 2008.

NP- Not prioritized. Fewer than two exceedances for this constituent at this site within three years and currently no TMDL for constituent

NP² – Not prioritized; both toxic samples were from the same sampling event (sample and resample to test for persistence).

2007 - 2010 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table V-8 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 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-4). The April sample had detectable amounts of copper (3.9 µg/L) however the concentration was not an exceedance. Cottonwood Creek was dry in September and therefore there are no results for NM or MPM.

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. Exceedances of the copper WQTL occurred in samples collected during April and August at the normal monitoring site, but not the upstream monitoring site.

2009

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

2010

Management Plan Monitoring for chlorpyrifos, diazinon and diuron took place in January and February and monitoring for copper took place during every month of the 2010 irrigation season months (April through September). Copper exceedances occurred in April, May and August 2010 (Table V-7).

2011

During 2011, Cottonwood Creek @ Rd 20 is scheduled for Assessment Monitoring where all high priority constituents will be monitored monthly. Management Plan Monitoring for 2011 includes copper (January-February and April-September), chlorpyrifos (January and February), diazinon (February) and diuron (January and February). Cottonwood Creek @ Rd 20 will return to Core Monitoring in 2012.

Table V-8. Cottonwood Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

	MONTH:	JANUARY	FEBRUARY	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Rd 20)	Date	NA	NA	4/24/07	5/29/07	6/26/07	7/24/07	8/21/07	9/18/07
	Copper (µg/L)	NA	NA	3.9	6.7	4.3	5.4	5.2	Dry
2007 MPM A (@Rd 20)	Date	NA	NA	NA	NA	6/19/07	NA	NA	9/25/07
	Copper (µg/L)	NA	NA	NA	NA	6.7	NA	NA	Dry
2008 NM (@ Rd 20)	Date	NA	NA	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Copper (µg/L)	NA	NA	8 (6.9)	4.9	4.5	4.8	4.4 (3.7)	Dry
2008 MPM US (@ Hwy 145)	Date	NA	NA	NA	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Copper (µg/L)	NA	NA	NA	2.4	39	2.3	2.1	Dry
2010 MPM (@ Rd 20)	Date	1/19/10	2/23/10	4/20/10	5/18/10	6/15/10	7/20/10	8/17/10	9/14/10
	Copper, total (µg/L)	NA	NA	4.2	5.1	10	5.6	6.6	8.5
	Copper, dissolved (µg/L)	NA	NA	3.1	3.6	3.2	2.8	5.3	3.5
	Chlorpyrifos (µg/L)	0.21	Dry	NA	NA	NA	NA	NA	NA
	Diuron (µg/L)	<0.20	Dry	NA	NA	NA	NA	NA	NA
	Diazinon (µg/L)	<0.004	Dry	NA	NA	NA	NA	NA	NA

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

A- Additional Monitoring conducted in 2007.

US- Upstream Monitoring conducted in 2008.

Load Calculations

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

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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-9. Instantaneous load calculations for chlorpyrifos, copper, diazinon and diuron where discharge was measured in the Cottonwood Creek site subwatershed (sorted by analyte and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Cottonwood Creek @ Rd 20	Chlorpyrifos	03/15/06	0	0.011	0
Cottonwood Creek @ Rd 20*	Chlorpyrifos	03/15/06	0	0.012	0
Cottonwood Creek @ Rd 20	Chlorpyrifos	07/11/06	1.96	0.014	0.78
Cottonwood Creek @ Rd 20	Chlorpyrifos	07/24/07	0	0.007	0

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Cottonwood Creek @ Rd 20	Chlorpyrifos	01/25/08	3.05	0.019	1.64
Cottonwood Creek @ Rd 20	Chlorpyrifos	02/25/08	0.22	0.036	0.22
Cottonwood Creek @ Rd 20	Chlorpyrifos	01/19/10	0	0.21	0
Cottonwood Creek @ Rd 20	Copper	05/16/06	2.33	4.4	290.31
Cottonwood Creek @ Rd 20*	Copper	05/16/06	2.33	4.8	316.70
Cottonwood Creek @ Rd 20	Copper	06/13/06	2.66	8	602.59
Cottonwood Creek @ Rd 20	Copper	07/11/06	1.96	5.3	294.16
Cottonwood Creek @ Rd 20	Copper	08/08/06	12.92	4.1	1500.01
Cottonwood Creek @ Rd 20	Copper	09/12/06	38.2	5.5	5949.40
Cottonwood Creek @ Rd 20	Copper	04/24/07	28.24	3.9	3118.72
Cottonwood Creek @ Rd 20	Copper	06/19/07	0.59	6.7	111.94
Cottonwood Creek @ Rd 20*	Copper	07/24/07	0	5.1	0
Cottonwood Creek @ Rd 20	Copper	07/24/07	0	5.4	0
Cottonwood Creek @ Rd 20	Copper	01/25/08	3.05	24	2072.80
Cottonwood Creek @ Rd 20	Copper	02/25/08	0.22	21	130.82
Cottonwood Creek @ Rd 20	Copper	04/29/08	8.26	8	1871.19
Cottonwood Creek @ Rd 20	Copper	05/27/08	17.41	4.9	2415.69
Cottonwood Creek @ Highway 145	Copper	05/27/08	20.01	2.4	1359.90
Cottonwood Creek @ Rd 20	Copper	06/24/08	0.08	4.5	10.19
Cottonwood Creek @ Highway 145	Copper	06/24/08	60.24	39	66526.83
Cottonwood Creek @ Rd 20	Copper	07/29/08	0.16	4.8	21.75
Cottonwood Creek @ Highway 145	Copper	07/29/08	35.03	2.3	2281.47
Cottonwood Creek @ Rd 20	Copper	08/26/08	0.79	4.4	98.43
Cottonwood Creek @ Highway 145	Copper	08/26/08	10.85	2.1	645.20
Cottonwood Creek @ Rd 20	Copper	04/20/10	12.68	4.2	1508.05
Cottonwood Creek @ Rd 20	Copper	05/18/10	12.42	5.1	1793.66
Cottonwood Creek @ Rd 20	Copper	06/15/10	0	10	0
Cottonwood Creek @ Rd 20	Copper	07/20/10	12.97	5.6	2056.72
Cottonwood Creek @ Rd 20	Copper	08/17/10	14.29	6.6	2670.69
Cottonwood Creek @ Rd 20	Copper	09/14/10	3.82	8.5	919.45
Cottonwood Creek @ Rd 20	Copper (D)	04/20/10	12.68	3.1	1113.08
Cottonwood Creek @ Rd 20	Copper (D)	05/18/10	12.42	3.6	1266.11
Cottonwood Creek @ Rd 20	Copper (D)	06/15/10	0	3.2	0
Cottonwood Creek @ Rd 20	Copper (D)	07/20/10	12.97	2.8	1028.36
Cottonwood Creek @ Rd 20	Copper (D)	08/17/10	14.29	5.3	2144.64
Cottonwood Creek @ Rd 20	Copper (D)	09/14/10	3.82	3.5	378.60
Cottonwood Creek @ Rd 20	Diazinon	02/28/06	0.26	0.02	0.15
Cottonwood Creek @ Rd 20*	Diazinon	02/28/06	0.26	0.023	0.17
Cottonwood Creek @ Rd 20	Diazinon	01/25/08	3.05	0.06	5.18
Cottonwood Creek @ Rd 20	Diazinon	02/25/08	0.22	0.24	1.50
Cottonwood Creek @ Rd 20	Diuron	04/24/07	28.24	0.85	679.72
Cottonwood Creek @ Rd 20	Diuron	01/25/08	3.05	68	5872.95
Cottonwood Creek @ Rd 20	Diuron	02/25/08	0.22	65	404.93
Cottonwood Creek @ Rd 20	Diuron	04/29/08	8.26	0.63	147.36
Cottonwood Creek @ Rd 20	Diuron	05/27/08	17.41	0.23	113.39

*Field Duplicate

Copper (D)-Dissolved Copper

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007 and 2008, the Coalition conducted additional MPM during the months when exceedances historically occurred to better characterize water quality in the subwatershed. During 2010, MPM continued at the Cottonwood Creek @ Rd 20 site during months when exceedances occurred in previous years to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Cottonwood Creek @ Rd 20 subwatershed became high priority in 2010, the Coalition has actively engaged in grower outreach and education to address the subwatershed's priority constituents. The Coalition has organized meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos and diazinon are both priority A/B constituents listed under the Cottonwood Creek @ Rd 20 Management Plan.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L three times from 2005 through 2010 (January and February 2008 and January 2010). 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 was monitored in January and February. The Coalition evaluated both monitoring and PUR data to identify possible sources.

All PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds of active ingredient applied, and acres treated. The PUR from the Cottonwood Creek subwatershed area were reviewed for chlorpyrifos use (Table V-10, Figure V-2). The greatest use occurred in 2006 (7,977 lbs AI) with the lowest use occurring in 2009 (566 lbs AI). In 2005, 2007, 2008 and 2010 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-10, Figure V-2). The most recent chlorpyrifos use prior to the 2008 January and February chlorpyrifos exceedances occurred in August 2007; no use was reported from September 2007 through February 2008. The most recent use preceding the January 2010 chlorpyrifos exceedance was in October 2009 (Figure V-2).

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications. The top three application rates of chlorpyrifos in the Cottonwood Creek subwatershed were associated with almonds, oranges, and vineyards/grapes (Table V-11). The largest amount of chlorpyrifos applied from 2004 through 2010 was to almond orchards (11,244 lbs AI) followed by orange groves (3,407 lbs AI) and vineyards/grapes (2,142 lbs AI) (Table V-11). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table V-11).

Table V-10. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for August 2004 through December 2010 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 OF AI APPLIED	ACRES TREATED
August, 2004	2	1.5	2.0
September, 2004	5	694.6	155.0
February, 2005	2	405.8	203.0
March, 2005	1	0.4	0.1
May, 2005	1	245.2	41.0
June, 2005	1	6.0	80.0
July, 2005	17	1631.3	865.0
August, 2005	11	1198.8	311.1
September, 2005	16	628.2	212.0
February, 2006	3	353.1	181.0
March, 2006	2	131.9	71.0
May, 2006	21	4107.6	1179.0
June, 2006	4	277.4	166.5
July, 2006	17	1586.3	792.5
August, 2006	10	784.6	220.8
September, 2006	7	244.4	88.5
October, 2006	4	492.5	110.0
March, 2007	1	326.0	163.0
May, 2007	1	14.9	8.0
July, 2007	8	369.9	197.2
August, 2007	3	75.8	38.0
October, 2007	2	115.3	45.0
March, 2008	1	326.0	163.0
July, 2008	20	1128.8	482.0
August, 2008	14	662.6	344.0
October, 2008	2	40.4	10.0
July, 2009	2	156.9	67.0
August, 2009	2	146.8	73.0
October, 2009	5	262.9	140.0
May, 2010	2	362.6	337.0
June, 2010	1	300.5	80.0
July, 2010	3	569.8	320.0
September, 2010	2	22.0	11.7
October, 2010	4	308.1	171.0
Summaries by Year			
2004 Total	7	696.1	157.0
2005 Total	49	4115.8	1712.2
2006 Total	68	7977.9	2809.2
2007 Total	15	901.9	451.2
2008 Total	37	2157.9	999.0
2009 Total	9	566.7	280.0
2010 Total	12	1563.0	919.7
Total	197	17979.1	7328.3

Figure V-2. Pounds of chlorpyrifos applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

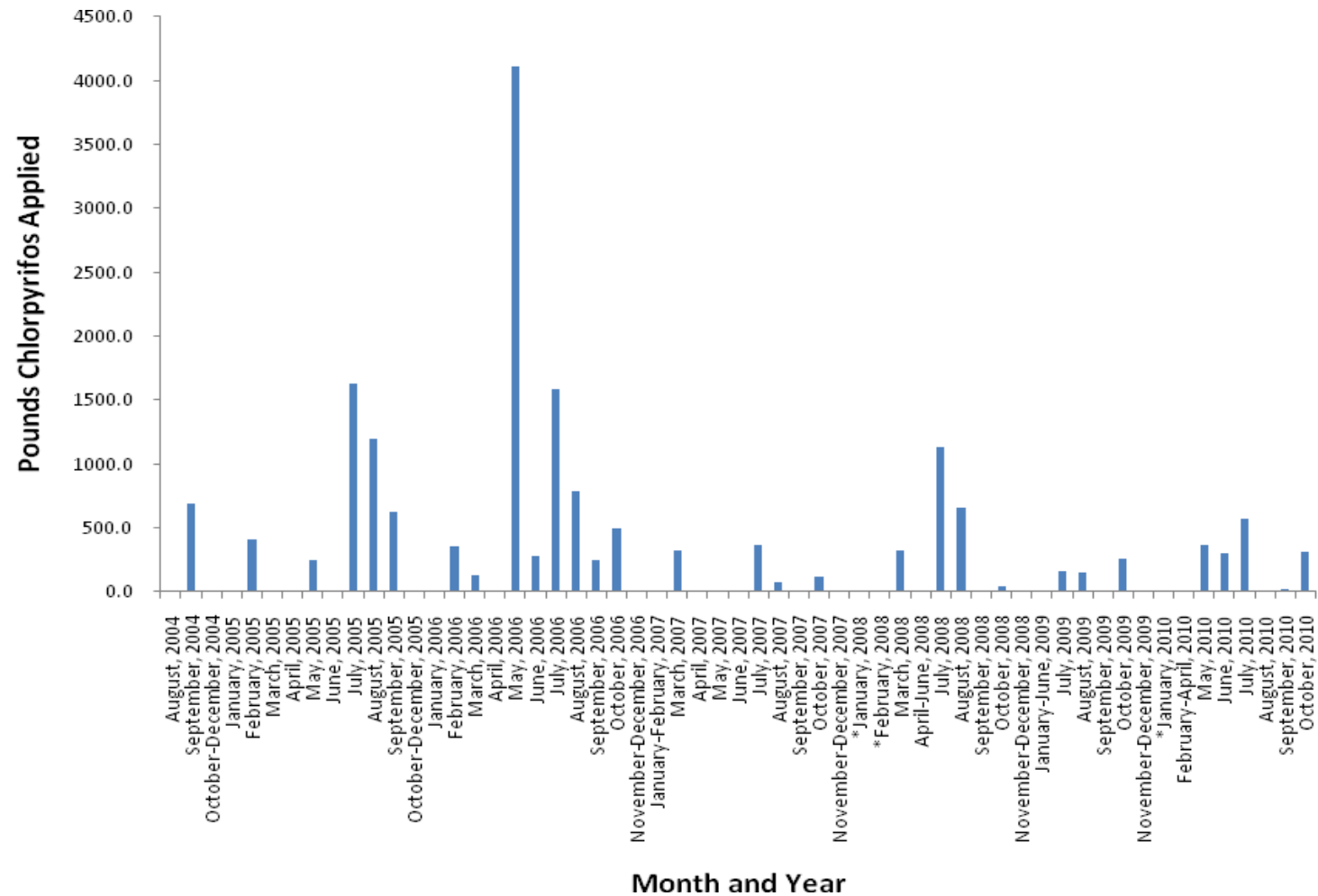


Table V-11. Total pound AI for chlorpyrifos based on PUR data from 2004-2010 within the Cottonwood Creek @ Rd 20 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LORSBAN-4E	23.7
	ALMOND	CHLORPYRIFOS 4E AG	0.4
		GOVERN 4E INSECTICIDE	2413.0
		LORSBAN 4E-HF	970.0
		LORSBAN ADVANCED	413.2
		LORSBAN-4E	6696.3
		NUFOS 4E	707.7
		WARHAWK	44.4
	CHERRY	LORSBAN 4E INSECTICIDE	27.1
	CORN (FORAGE - FODDER)	LORSBAN 4E-HF	117.6
	GRAPE (RAISIN, WINE)	LORSBAN 4E INSECTICIDE	1304.2
		LORSBAN 4E-HF	79.8
		LORSBAN ADVANCED	577.9
		LORSBAN-4E	180.3
	ORANGE (ALL OR UNSPEC)	CHLORPYRIFOS 4E AG	6.6
		GOVERN 4E INSECTICIDE	793.9
		LORSBAN 4E-HF	936.7
		LORSBAN-4E	1669.8
	TANGELO	LORSBAN 4E-HF	199.4
		LORSBAN-4E	306.6
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	GOVERN 4E INSECTICIDE	140.4
		LORSBAN-4E	185.8
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	80.8
		LORSBAN 4E-HF	22.4
		LORSBAN-4E	81.3
ALFALFA- Total Pounds Chlorpyrifos Applied			23.7
ALMOND - Total Pounds Chlorpyrifos Applied			11244.9
CHERRY - Total Pounds Chlorpyrifos Applied			27.1
CORN - Total Pounds Chlorpyrifos Applied			117.6
GRAPE - Total Pounds Chlorpyrifos Applied			2142.1
ORANGE - Total Pounds Chlorpyrifos Applied			3407.0
TANGELO - Total Pounds Chlorpyrifos Applied			506.0
TANGERINE - Total Pounds Chlorpyrifos Applied			326.2
WALNUT - Total Pounds Chlorpyrifos Applied			184.6
Total Pounds Chlorpyrifos Applied (2004-2010)			17979.1

The Coalition has determined the most probable source of chlorpyrifos in the Cottonwood Creek waterway to be spray drift from adjacent orchards. Cottonwood Creek has sandy soils and a large percentage of the adjacent acreage is orchards. Consequently, it is likely that the exceedances of chlorpyrifos that occurred in 2008 were due to spray drift. Although no use was reported in December,

January or February preceding the exceedances, applications of chlorpyrifos during this time of year would be either for Vine mealy bug control (applied to grapes) or dormant sprays (applied to orchards like cherries). The same assumption can be made concerning the January 2010 chlorpyrifos exceedance. There was no application associated with this exceedance and there were no applications reported since October 2009. Consequently, outreach efforts focus on encouraging management practices aimed at reducing spray drift and also improving orchard and vineyard water management. Outreach efforts are directed toward management practices designed to reduce spray drift and increase effective management of parcels adjacent to the creek.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information, such as available funding for management practice implementation. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of the MPUR.

In accordance with the Coalition's Management Plan strategy, individual contacts with targeted growers began in November 2009. Targeted growers were selected based on the potential of their agricultural practices to cause pesticide drainage or drift to the creek. In the Cottonwood Creek subwatershed, 25 targeted growers representing 5,768 acres were contacted with the potential to drain or drift directly into the creek. Coalition representatives met with growers on their property to discuss the Cottonwood Creek Management Plan and recommend management practices specific to the parcel and land owner/operator. This gave the Coalition a chance to better assess currently used management practices as well as review planned management practice implementation. Individual contacts focused mainly on chlorpyrifos exceedances however, all water quality results were reviewed and discussed including diazinon, copper, diuron, *E. coli*, DO, and lead exceedances.

To date, the Coalition has contacted all 25 targeted members, representing 5,768 acres or 45% of the subwatershed direct drainage acreage. Of the 25 targeted members, recommended management practices to acreages in the Cottonwood Creek subwatershed include: control timing of pump/drain into waterway from storm water (27%), and spray when wind is blowing away from waterbodies (73%). 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.

The Coalition is scheduled to follow up with growers in April of 2011 to determine what practices were implemented during the first year of high priority monitoring. Growers who 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 of high priority monitoring. During 2011, Cottonwood Creek @ Rd 20 is scheduled to be monitored for Assessment Monitoring constituents and the Coalition will continue to assess water quality.

Diazinon

Concentrations of diazinon in samples have exceeded the WQTL (0.1 µg/L) on February 25, 2008 (Table V-7). Diazinon was omitted from the monitoring schedule in October 2008. In 2010, MPM for diazinon began again in January and no exceedances of the diazinon WQTL occurred.

All PUR data are reviewed for the number of monthly diazinon applications, pounds of active ingredient applied, and acres treated (Table V-12, Figure V-3). Overall, the amount of diazinon applied within the

subwatershed has decreased since 2005. The amount of diazinon used in 2005 was 975 lbs AI compared to 196 lbs AI in 2010. Diazinon use generally occurs between December and March during dormant sprays. The exceedance that occurred in February 2008 was the month of greatest diazinon use in 2008 (Figure V-3).

The Coalition also uses PUR data to assess which crops receive the most applications of diazinon. The largest amounts applied are associated with peaches, plums, almonds, and nectarines (Table V-13). The largest amount of applied diazinon from 2005 through 2010 was to almond and peach orchards (Table V-13). Diazinon was applied to peach, plum, almond, cherry and fig orchards prior to the February 2008 exceedance.

Table V-12. Number of diazinon applications, total pounds applied and total acres treated by month for August 2004 through December 2010 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 OF AI APPLIED	ACRES TREATED
January, 2005	7	367.9	184.0
February, 2005	8	399.8	200.0
May, 2005	6	5.8	4.2
June, 2005	2	162.5	50.0
July, 2005	1	4.0	4.0
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	40.0
January, 2007	13	777.9	394.7
February, 2007	1	20.0	10.0
March, 2007	1	42.0	28.0
January, 2008	6	222.7	114.5
February, 2008	8	383.8	300.5
March, 2008	1	42.0	28.0
December, 2009	2	134.9	68.0
January, 2010	6	176.6	96.5
February, 2010	1	19.9	10.0
Summaries by Year			
2005 Total	25	975.7	478.0
2006 Total	29	942.2	613.5
2007 Total	15	839.9	432.7
2008 Total	15	648.4	443.0
2009 Total	2	134.9	68.0
2010 Total	7	196.5	106.5
Total	93	3737.7	2141.7

*No diazinon was applied in 2004.

Figure V-3. Pounds of diazinon applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances. No diazinon was applied in 2004.

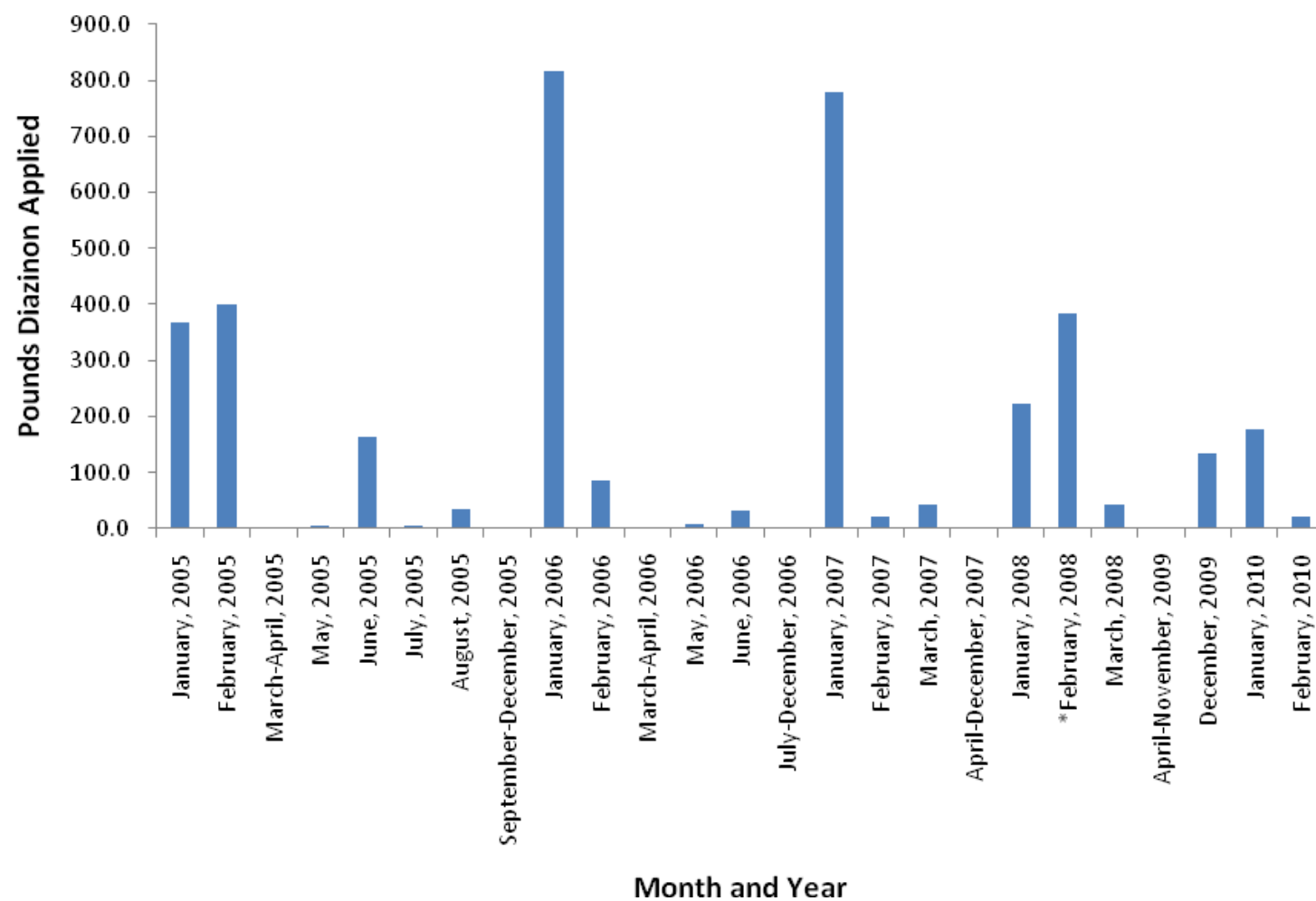


Table V-13. Total pound AI for diazinon based on PUR data from 2005-2010 within the Cottonwood Creek @ Rd 20 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
DIAZINON	ALMOND	CLEAN CROP DIAZINON AG500 INSECTICIDE	417.9
		DIAZINON AG 500	234.2
		GOWAN DIAZINON 4E	106.0
	APPLE	DIAZINON 50W	0.4
	APRICOT	DIAZINON 50W	4.7
	CHERRY	CLEAN CROP DIAZINON AG500 INSECTICIDE	39.4
		DIAZINON AG500 INSECTICIDE	19.9
		DIAZOL 50 W	20.0
		GOWAN DIAZINON 4E	20.0
	FIG	DIAZOL AG 500	67.0
	GRAPES, WINE	GOWAN DIAZINON 50 WSB	39.8
	NECTARINE	DIAZINON 50W	4.3
		DIAZINON AG 500	79.4
		GOWAN DIAZINON 4E	212.4
	PEACH	CLEAN CROP DIAZINON AG500 INSECTICIDE	661.9
		DIAZINON 50W	4.3
		DIAZINON AG 500	238.1
		DIAZOL 50 W	73.0
		GOWAN DIAZINON 4E	758.0
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	CLEAN CROP DIAZINON AG500 INSECTICIDE	146.9
		DIAZINON 50W	4.8
		DIAZINON AG 500	95.3
		GOWAN DIAZINON 4E	60.0
	PRUNE	DIAZINON 50W	93.8
		DIAZINON AG500 INSECTICIDE	182.2
		DIAZOL 50 W	42.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOWAN DIAZINON 4E	112.5
ALMOND - Total Pounds Diazinon Applied			758.0
APPLE - Total Pounds Diazinon Applied			0.4
APRICOT - Total Pounds Diazinon Applied			4.7
CHERRY - Total Pounds Diazinon Applied			99.3
FIG - Total Pounds Diazinon Applied			67.0
GRAPES - Total Pounds Diazinon Applied			39.8
NECTARINE - Total Pounds Diazinon Applied			296.0
PEACH - Total Pounds Diazinon Applied			1735.2
PLUM - Total Pounds Diazinon Applied			306.9
PRUNE - Total Pounds Diazinon Applied			318.0
WALNUT - Total Pounds Diazinon Applied			112.5
Total Pounds Diazinon Applied (2005-2010)			3737.7

Applications of diazinon in January 2008 were associated with the February 2008 exceedance; however months with higher application rates did not have exceedances. The 2008 exceedance was most likely due to spray drift from parcels directly next to the creek. Therefore, the Coalition focuses its outreach to target 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. Orchard operators are advised to manage storm water runoff to prevent the winter exceedances. Individual contacts which occurred 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

Water samples from Cottonwood Creek @ Rd 20 had exceedances for copper and diuron priority C constituents.

Copper

Copper in water samples has exceeded the hardness based WQTL numerous times in this subwatershed from 2005 through 2010 based on total and dissolved copper analyses. The Coalition began monitoring for both the total and dissolved copper fractions in October 2008 to better characterize copper contamination in the subwatershed.

Additional and upstream MPM confirmed that copper is a water quality concern throughout the subwatershed during most times of the year. The Coalition began MPM monitoring for copper (both total and dissolved) in April 2010. During 2011, Cottonwood Creek is scheduled to be monitored for Assessment Monitoring constituents in every month.

The PUR data are reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table V-14, 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 2006 was 31,591 lbs as compared to 15,497 lbs in 2010. The greatest amount of copper use has been inconsistent from month to month between 2005 and 2010. The greatest amount of applied copper in 2010 was in January. Not all exceedances occurred during months of the greatest use (Figure V-4).

The crops associated with the largest amount of copper applied from 2005 through 2010 were grapes (64,507 lbs AI), almonds and oranges (Table V-15). The most common products containing copper used within this subwatershed are DuPont™ Kocide and Kocide (Table V-15).

Table V-14. Number of copper applications, total pounds applied and total acres treated by month for August 2004 through December 2010 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 OF AI APPLIED	ACRES TREATED
October, 2004	7	807.0	328.1
November, 2004	18	2315.0	564.8
December, 2004	4	508.7	190.0
January, 2005	21	3147.4	704.3
February, 2005	17	2121.8	391.0
March, 2005	78	5544.1	4534.7
April, 2005	111	6509.6	5140.2

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
May, 2005	8	133.6	142.0
June, 2005	10	710.2	561.0
August, 2005	9	1473.7	487.0
September, 2005	3	705.0	235.0
October, 2005	8	1464.9	278.0
November, 2005	21	1645.3	420.7
December, 2005	1	276.3	60.0
January, 2006	48	8582.9	2205.8
February, 2006	24	1357.6	307.2
March, 2006	16	1144.1	993.6
April, 2006	237	12968.4	13377.6
May, 2006	45	2657.9	2294.1
June, 2006	9	640.3	450.0
July, 2006	3	281.6	107.0
August, 2006	3	393.8	190.0
September, 2006	1	108.0	36.0
October, 2006	9	1567.0	380.8
November, 2006	14	1212.7	478.3
December, 2006	5	677.2	183.5
January, 2007	23	2444.0	829.7
February, 2007	7	715.2	363.0
March, 2007	77	3404.8	3981.4
April, 2007	49	2094.1	2428.1
May, 2007	8	120.8	138.8
July, 2007	9	1017.0	684.2
August, 2007	2	82.5	30.0
September, 2007	6	590.1	266.0
October, 2007	4	1044.0	393.8
November, 2007	8	578.4	248.5
December, 2007	3	328.1	76.0
January, 2008	45	7245.7	3127.8
February, 2008	12	875.5	313.5
March, 2008	46	1328.0	2370.0
April, 2008	102	4659.1	5423.0
June, 2008	14	269.3	136.0
August, 2008	10	405.4	344.0
October, 2008	10	812.2	288.0
November, 2008	12	2920.6	1202.0
January, 2009	9	1380.5	576.0
February, 2009	1	22.6	10.0
March, 2009	39	851.5	1764.4
April, 2009	64	2168.9	3290.5
May, 2009	7	184.8	186.0
August, 2009	3	201.0	76.0

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
September, 2009	3	4944.5	217.0
October, 2009	16	1552.2	890.0
November, 2009	7	1462.3	452.0
December, 2009	8	214.4	220.0
January, 2010	46	8368.4	2548.3
February, 2010	4	355.6	71.0
March, 2010	83	3477.2	4730.0
April, 2010	52	1918.5	2499.3
May, 2010	3	142.1	85.3
June, 2010	1	33.7	40.0
July, 2010	1	67.5	80.0
August, 2010	3	157.5	120.0
September, 2010	3	101.5	80.0
October, 2010	2	108.0	72.0
November, 2010	4	767.5	196.9
Summaries by Year			
2004 Total	29	3630.7	1082.9
2005 Total	287	23731.9	12953.9
2006 Total	414	31591.4	21003.9
2007 Total	196	12419.0	9439.5
2008 Total	251	18515.7	13204.2
2009 Total	157	12982.6	7681.9
2010 Total	202	15497.7	10522.8
Total	1536	118369.0	75888.9

Figure V-4. Pounds of copper applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

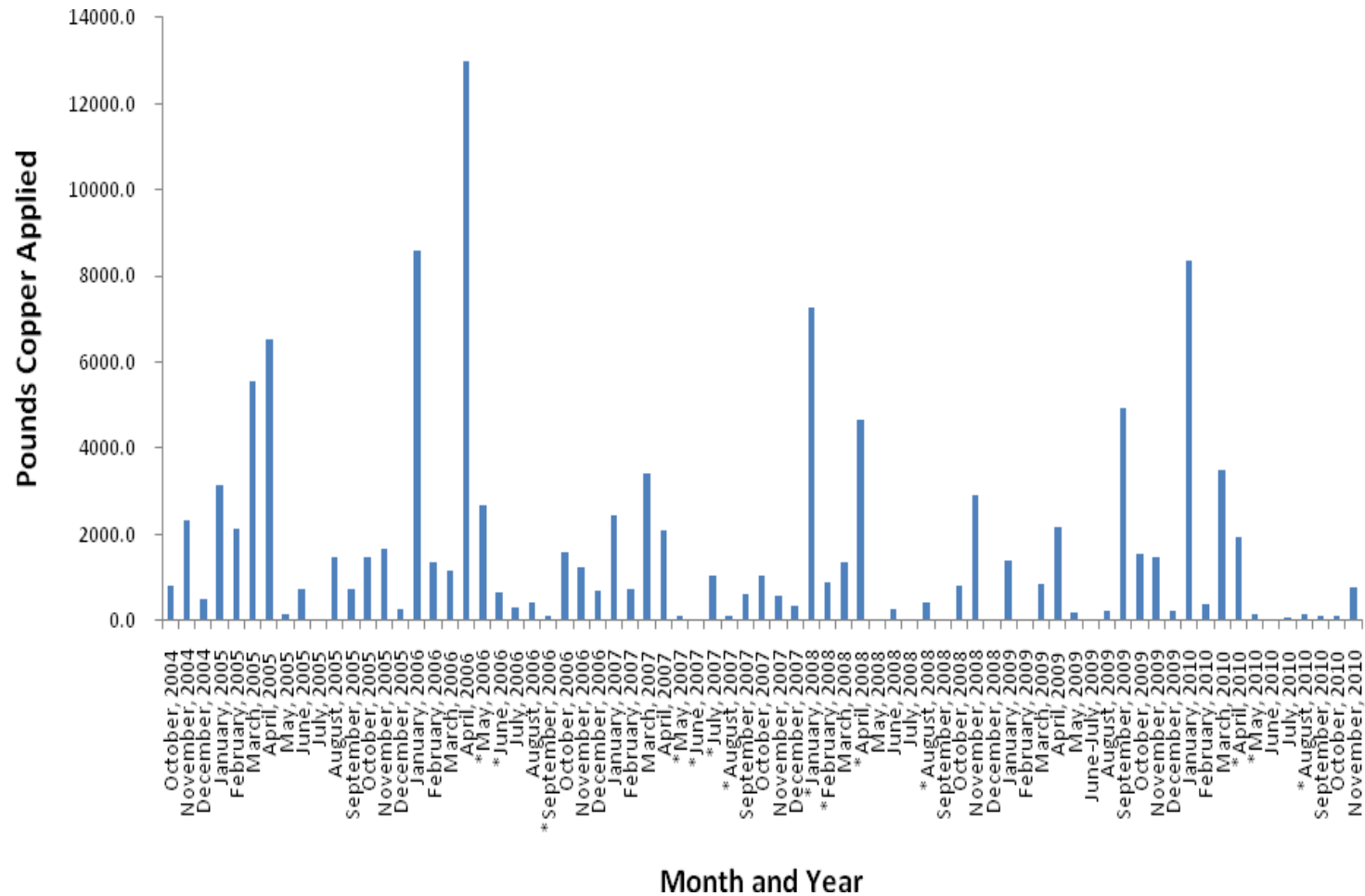


Table V-15. Total pound AI for copper based on PUR data from 2004-2010 within the Cottonwood Creek @ Rd 20 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	UNKNOWN	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	46.8
	ALFALFA	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2.4
	ALMOND	CHAMP DRY PRILL	4752.0
		CHAMP FORMULA 2 FLOWABLE	8552.0
		CUPROFIX ULTRA 40 DISPERSS	165.1
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2328.8
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	2275.2
		KOCIDE 101	649.9
		KOCIDE 2000	1652.4
		KOCIDE DF	2124.4
		NORDOX 75 WG	1036.2
		TRIANGLE BRAND COPPER SULFATE CRYSTAL	217.8
	APPLE	KOCIDE 2000	0.3
		NU-COP 50DF	8.9
	APRICOT	KOCIDE 2000	3.6
		NU-COP 50DF	27.7
	CHERRY	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	40.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	9.2
		KOCIDE DF	122.8
	GRAPE (RAISIN, WINE)	BRITZ COPPER SULFUR 15-25 DUST	11618.1
		CHAMP FORMULA 2 FLOWABLE	10711.1
		CHAMPION FLOWABLE	8.4
		CHAMPION WETTABLE POWDER	2182.7
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	3435.0
		COPPER SULFATE CRYSTALS	269.3
		CSC COPPER SULFUR DUST	1846.1
		CUPROFIX ULTRA 40 DISPERSS	1192.1
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	4040.8
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	6204.8
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	184.7
		HYDROX	92.4
		IAP COPPER SULFUR 15-25 DUST	37.5
		KOCIDE 101	1947.9
		KOCIDE 2000	10351.2
		KOCIDE 4.5 LF	1142.4
		KOCIDE DF	3383.6
		NORDOX	832.5

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		NORDOX 75 WG	3088.3
		NU-COP 50 WP	921.8
		NU-COP 50DF	702.5
		NU-COP HB	192.5
		STRETCH FUNGICIDE	1.9
		ZINC COPOSIL SULFUR 15-30 DUST	120.0
	NECTARINE	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	534.4
		KOCIDE 2000	288.2
		KOCIDE DF	491.2
		NU-COP 50DF	107.8
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	CHAMP FORMULA 2 FLOWABLE	371.9
	OLIVE (ALL OR UNSPEC)	CHAMP FORMULA 2 FLOWABLE	185.9
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	387.4
	ONION (DRY, SPANISH, WHITE, YELLOW, RED, ETC.)	NORDOX 75 WG	9.1
	ORANGE (ALL OR UNSPEC)	BASIC COPPER 53	2000.0
		BASIC COPPER SULFATE	693.0
		BLUE SHIELD DF	30.8
		COP-O-ZINC	825.3
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	27.7
		HYDROX	9.6
		KOCIDE 20/20	2681.1
		KOCIDE DF	2101.4
		NORDOX	4178.1
		NU-COP 50DF	1027.6
	PEACH	CHAMP FORMULA 2 FLOWABLE	77.2
		CUPROFIX ULTRA 40 DISPERSS	76.8
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	2062.6
		KOCIDE 2000	487.4
		KOCIDE DF	2683.2
		NORDOX 75 WG	201.4
		NU-COP 50DF	266.4
		STRETCH FUNGICIDE	0.7
	PISTACHIO	KOCIDE 2000	242.1
		TRIANGLE BRAND COPPER SULFATE CRYSTAL	79.2
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	393.4
		KOCIDE 2000	3.2
		KOCIDE DF	368.4
		NU-COP 50DF	129.4
	PRUNE	KOCIDE 101	77.0
	STONE FRUIT	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	13.2

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
	TANGELO	BASIC COPPER 53	250.9
		COP-O-ZINC	175.0
		KOCIDE 20/20	617.1
		KOCIDE DF	226.0
		NORDOX	940.0
		NU-COP 50DF	215.6
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	CHAMPION WETTABLE POWDER	431.2
		CUPROFIX ULTRA 40 DISPERSS	626.5
		NORDOX	1316.9
	TOMATOES, FOR PROCESSING/CANNING	KOCIDE 2000	80.7
		KOCIDE DF	36.8
	VEGETABLE	NEUDORFF CUEVA FUNGICIDE CONCENTRATE	2.1
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHAMP DRY PRILL	324.9
		KOCIDE DF	337.7
		NORDOX 75 WG	1152.3
UNKNOWN - Total Pounds Copper Applied			46.8
ALFALFA - Total Pounds Copper Applied			2.4
ALMOND - Total Pounds Copper Applied			23753.9
APPLE - Total Pounds Copper Applied			9.2
APRICOT - Total Pounds Copper Applied			31.3
CHERRY - Total Pounds Copper Applied			172.4
GRAPE - Total Pounds Copper Applied			64507.6
NECTARINE - Total Pounds Copper Applied			1421.6
N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL - Total Pounds Copper Applied			371.9
OLIVE - Total Pounds Copper Applied			573.3
ONION - Total Pounds Copper Applied			9.1
ORANGE - Total Pounds Copper Applied			13574.5
PEACH - Total Pounds Copper Applied			5855.6
PISTACHIO - Total Pounds Copper Applied			321.3
PLUM - Total Pounds Copper Applied			894.4
PRUNE - Total Pounds Copper Applied			77.0
STONE FRUIT - Total Pounds Copper Applied			13.2
TANGELO - Total Pounds Copper Applied			2424.5
TANGERINE - Total Pounds Copper Applied			2374.7
TOMATO - Total Pounds Copper Applied			117.5
VEGETABLE - Total Pounds Copper Applied			2.1
WALNUT - Total Pounds Copper Applied			1814.8
Total Pounds Copper Applied (2004-2010)			118369.0

The Coalition will continue with its management plan strategy. Orchard and vineyard operators are advised to manage irrigation tailwater and management to prevent copper from entering the waterway with runoff. Storm runoff management relevant to copper applications is also discussed to prevent the winter exceedances. Individual contacts that occurred 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 2010 (January and February 2008). Diuron MPM began in January 2010.

All PUR data are reviewed for the number of monthly diuron applications, pounds of active ingredient applied, and acres treated (Table V-16, Figure V-5). There has been a general decrease in diuron use since 2005. The amount of diuron used in 2005 was 4,438 lbs compared to 1,176 lbs in 2010. Neither 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 largest amount of diuron applied from 2005 through 2010 was associated with grapes (including wine and raisin) and oranges (Table V-17).

Table V-16. Number of diuron applications, total pounds applied and total acres treated by month for August 2004 through December 2010 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 OF AI APPLIED	ACRES TREATED
October, 2004	3	114.5	88.0
November, 2004	2	169.0	98.0
December, 2004	8	595.9	557.0
January, 2005	4	129.7	83.3
February, 2005	19	1033.2	473.0
March, 2005	28	783.6	659.2
April, 2005	12	322.5	328.3
May, 2005	1	12.0	6.0
October, 2005	3	112.0	109.0
November, 2005	4	558.0	279.0
December, 2005	25	1487.7	671.4
January, 2006	9	580.8	392.7
February, 2006	37	1540.5	1740.2
March, 2006	17	961.4	545.1
April, 2006	3	126.0	83.0
November, 2006	16	603.5	957.2
December, 2006	7	542.9	338.0
January, 2007	7	200.9	370.0
February, 2007	8	466.1	360.4
March, 2007	16	704.3	556.0
April, 2007	2	16.0	26.0
August, 2007	1	10.0	5.0
September, 2007	1	246.8	403.0
November, 2007	3	321.2	176.5

MONTH/YEAR	NUMBER OF DIURON APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
December, 2007	6	557.9	153.8
February, 2008	15	1068.7	532.3
March, 2008	17	1223.9	647.9
April, 2008	2	370.0	240.0
November, 2008	16	263.0	1052.0
January, 2009	12	564.2	340.0
February, 2009	12	417.0	330.3
March, 2009	5	104.0	222.0
November, 2009	8	569.2	327.7
December, 2009	3	38.5	44.0
January, 2010	3	81.7	125.0
February, 2010	12	781.0	386.3
March, 2010	8	246.3	183.0
November, 2010	3	67.5	90.0
Summaries by Year			
2004	13	879.3	743.0
2005	96	4438.6	2609.2
2006	89	4355.1	4056.2
2007	44	2523.1	2050.7
2008	50	2925.5	2472.2
2009	40	1692.8	1264.0
2010	26	1176.5	784.3
Total	358	17991.0	13979.6

Figure V-5. Pounds of diuron applied within the Cottonwood Creek @ Rd 20 site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

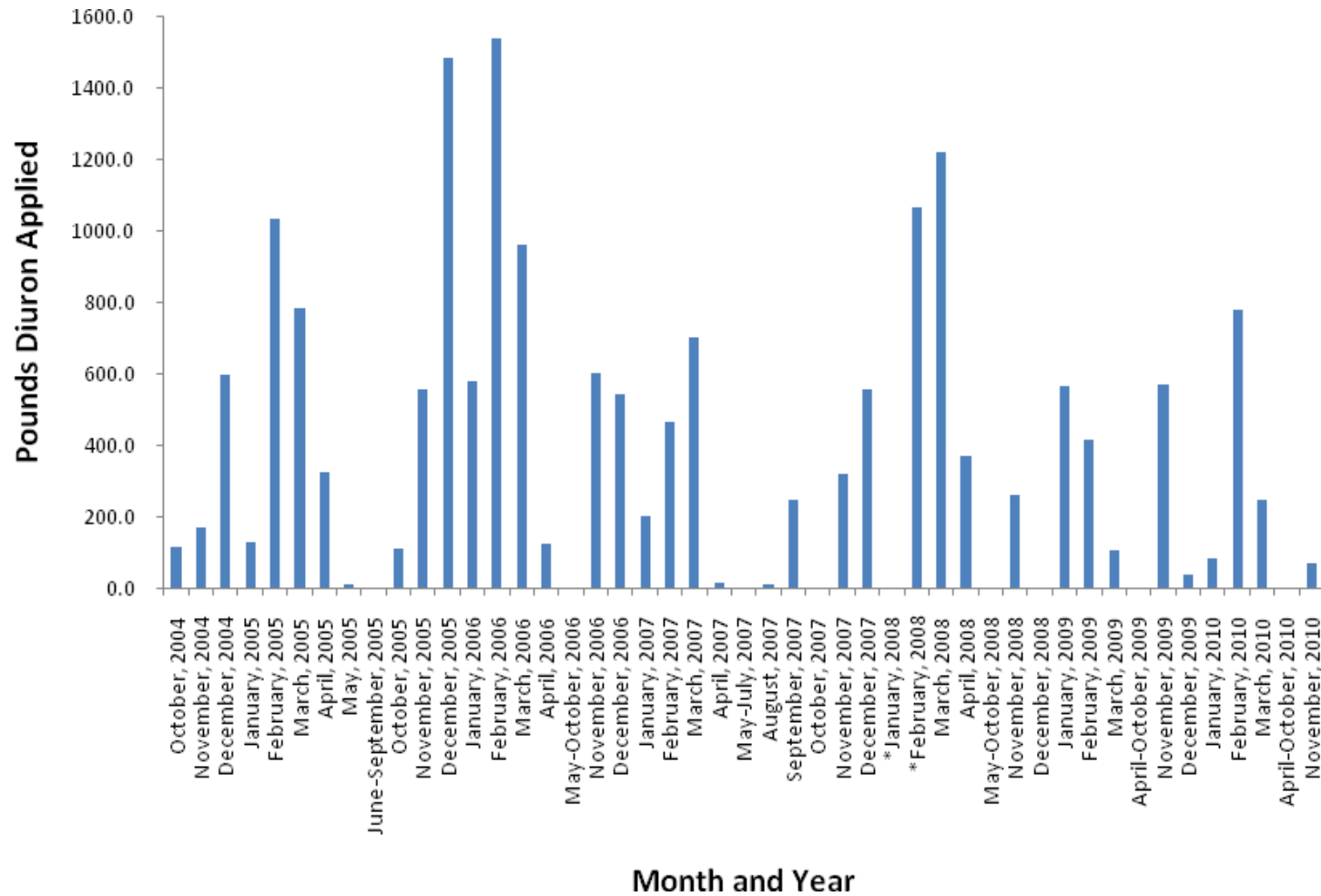


Table V-17. Total pounds AI for diuron based on PUR data from 2004-2010 within the Cottonwood Creek @ Rd 20 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
DIURON	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIURON 80 DF HERBICIDE	200.0
		DREXEL DIURON 80 HERBICIDE	1193.6
		DUPONT DIREX 4L HERBICIDE	120.0
	COTTON, GENERAL	ADIOS COTTON DEFOLIANT	14.8
		GINSTAR EC COTTON DEFOLIANT	13.6
	GRAPE (RAISIN, WINE)	DIREX 4L	58.1
		DIREX 80DF	547.9
		DIURON 4L	43.1
		DIURON 4L HERBICIDE	6.6
		DIURON 80 DF HERBICIDE	71.2
		DIURON 80 WP WEED KILLER	16.8
		DREXEL DIURON 4L HERBICIDE	220.5
		DREXEL DIURON 80 HERBICIDE	778.2
		DU PONT KARMEX	29.2
		DU PONT KARMEX DF HERBICIDE	859.2
		DUPONT DIREX 4L HERBICIDE	30.7
		DUPONT KARMEX DF HERBICIDE	409.8
		DUPONT KARMEX XP HERBICIDE	84.8
		KARMEX DF HERBICIDE	586.0
		KARMEX XP HERBICIDE	1971.9
	OLIVE (ALL OR UNSPEC)	DU PONT KARMEX	12.8
	ORANGE (ALL OR UNSPEC)	DIREX 80DF	1742.7
		DU PONT KROVAR I DF HERBICIDE	691.6
		DUPONT KARMEX XP HERBICIDE	240.0
		KARMEX DF HERBICIDE	464.0
		KARMEX XP HERBICIDE	153.0
	TANGELO	DU PONT KROVAR I DF HERBICIDE	536.0
		KARMEX XP HERBICIDE	9.6
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, ETC.)	DU PONT KROVAR I DF HERBICIDE	208.4
		DUPONT KARMEX XP HERBICIDE	644.3
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	84.6
ALFALFA -Total Pounds Diuron Applied			1513.6
COTTON - Total Pounds Diuron Applied			28.4
GRAPES - Total Pounds Diuron Applied			5714.1
OLIVE - Total Pounds Diuron Applied			12.8
ORANGE - Total Pounds Diuron Applied			3291.3
TANGELO - Total Pounds Diuron Applied			545.6
TANGERINE - Total Pounds Diuron Applied			852.7
WALNUT - Total Pounds Diuron Applied			84.6
Total Pounds Diuron Applied (2004-2010)			12043.1

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. Improved and additional management practices should reduce or eliminate diuron exceedances.

Priority E Constituents

The following priority E constituents are listed under the Cottonwood Creek Management Plan: DO, *E. coli*, and lead.

Several DO and *E. coli* exceedances occurred throughout 2010 sampling. There were no exceedances of the lead WQTL. 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 high priority site subwatersheds within the ESJWQC and just completed its first year of focused outreach (2010-2012). Therefore, the Coalition has focused its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Cottonwood Creek subwatershed has been to target growers along or adjacent to the waterway that have the potential to discharge into the creek. Focus has been on implementing management practices that retain water on the grower's property and minimizing spray drift. Outreach includes grower notification, management practice outreach and education, tracking management practice implementation, and providing information on special studies of management practice efficacy.

Individual grower surveys documenting current management practice implementations and assessing future planned implementations have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. In April 2011, the Coalition will initiate follow up contacts to identify newly implemented practices and future monitoring to evaluate water quality improvement.

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

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
- *Ceriodaphnia dubia* water column toxicity

Priority E

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

Description of Duck Slough @ Gurr Rd Site Subwatershed

Duck Slough @ Gurr Road (21,083 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 waste water effluent 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 (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

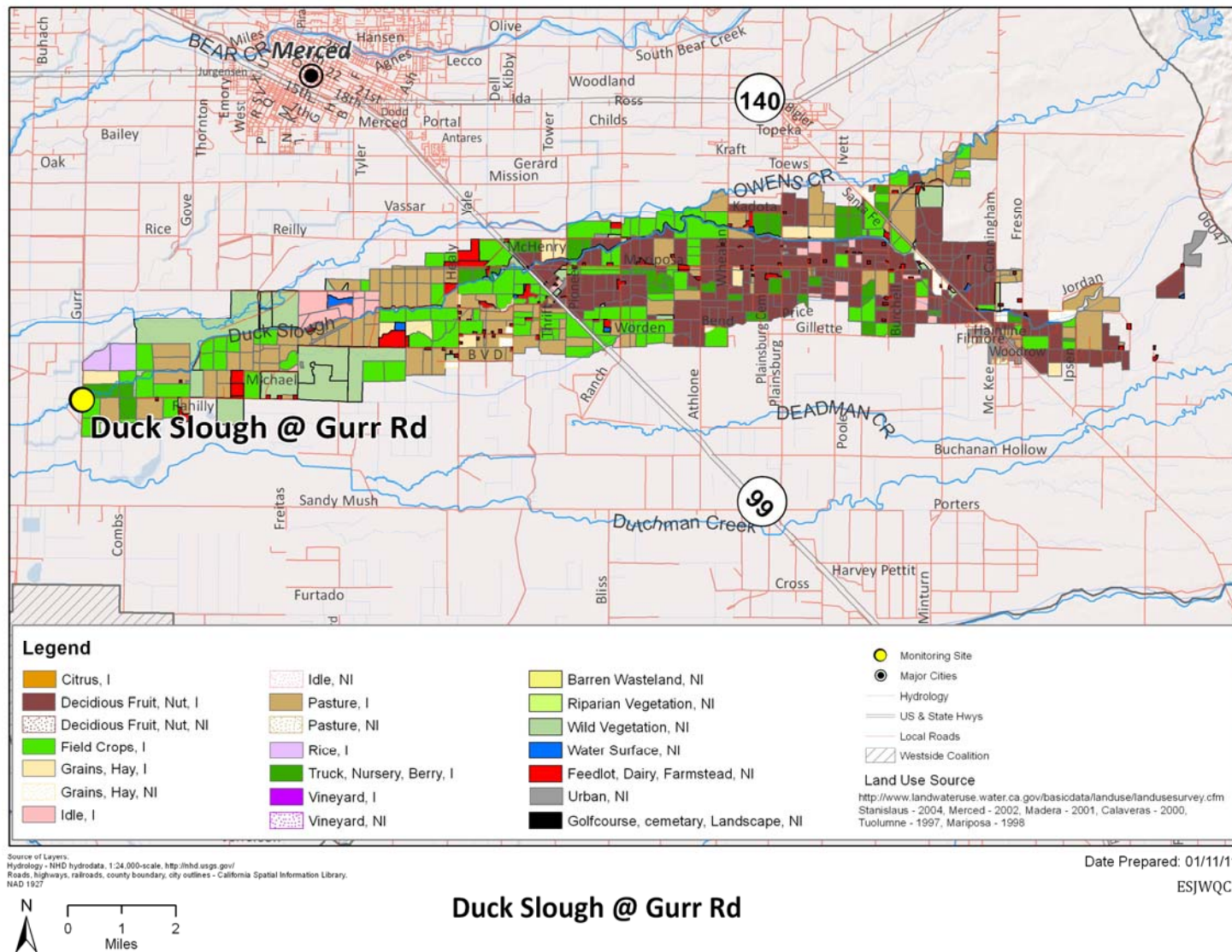
Table VI-1. Coordinates of the Duck Slough site subwatershed sampling locations.

SAMPLE SITE	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

Monitoring of ambient water at Duck Slough @ Gurr Rd was initiated during the irrigation season of 2004 and the site has been monitored through 2010 (Table VI-2). Duck Slough @ Gurr Rd continued to be monitored as a Core Site in 2010 and will be monitored for Assessment monitoring constituents in 2011. The constituents sampled at this location from 2004-2010 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 *S. capricornutum* toxicity (Table VI-4 and VI-5). Duck Slough was monitored twice a month in June and July 2007. 2008 upstream MPM occurred at Duck Slough @ Hwy 59 for copper in June, for copper and *S. capricornutum* toxicity in July, and for *S. capricornutum* toxicity in September, and at North Slough @ Hwy 59 for copper and *S. capricornutum* toxicity in July and for *S. capricornutum* toxicity in September (Table VI-5).

There were no MPM samples collected in 2009.

Starting in January 2010, the Coalition began additional MPM during January, February and March (previously MPM was limited to irrigation months). Duck Slough MPM samples were collected in 2010 for copper (January-February and June-July), chlorpyrifos (April and July 2010), toxicity to *S. capricornutum* (July and September) and sediment toxicity to *H. azteca* (September) (Table VI-6).

Duck Slough @ Gurr Rd began high priority monitoring starting in 2010. Duck Slough is considered impaired under the 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				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	3	2	5	2	5	2	6	2	6	0	2	2	6	2	1	3	5	2
Events Not Sampled	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1
Total	3	2	5	2	5	2	6	2	6	2	2	2	6	2	1	3	5	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				2010			
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	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	1	3	5	2
EPA 160.2	Suspended Solids								1			2	2	6	2	1	3	5	2
EPA 180.1	Turbidity	3	2	5	2	6	3	6	3	6		2	2	6	2	1	3	5	2
EPA 405.1	BOD					2	3	2											
EPA 415.1	Total Organic Carbon (sediment)	2	2	5	1	6	3	6	3	6		2	2	6	2	1	3	5	2
SM 9223	<i>E. coli</i>	3	2	5	2	6	3	6	3	6		2	2	6	2	1	3	5	2
ASTM D422	Grain size (sediment)																	1	
NA	Dissolved Oxygen	3	2	5	5	5	3	10	4	7		2	2	6	2	1	3	5	2
NA	Specific Conductivity	3	2	5	5	5	3	10	4	7		2	2	6	2	1	3	5	2
NA	pH	3	2	5	5	5	3	10	4	7		2	2	6	2	1	3	5	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	1	3	5	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									

METHOD	ANALYTE	2004	2005		2006		2007		2008			2009				2010			
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 8081A	Methoxychlor					5	2	6	2	6									
Organophosphates																			
EPA 8141A	Azinphos methyl					5	2	7	3	6		2	1	2					
EPA 8141A	Chlorpyrifos	3	2	5	2	5	2	7	3	6		2	1	2			1	1	
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)																			

METHOD	ANALYTE	2004	2005		2006		2007		2008			2009				2010			
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 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			2	2	
EPA 200.8	Lead					6	3	6	3	6		2	1	1					
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			2	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			2	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	1	3	5	2
EPA 351.3	Nitrogen, Total Kjeldahl					6	3	6	3	6		2	1	1				3	2
EPA 354.1	Nitrite as N					6	3	6	2	6									
EPA 353.2	Nitrate + Nitrite as N								1			2	2	6	2	1	3	5	2
EPA 365.2	Orthophosphate as P					6	3	6	3	6		2	1	1				3	2
EPA 365.2	Phosphate as P					6	3	6	3	6		2	2	6	2	1	3	5	2
Sediment Pesticides																			
EPA 8270M NCI_SIM	Bifenthrin																	1	
EPA 8270M NCI_SIM	Chlorpyrifos																	1	
EPA 8270M NCI_SIM	Cyfluthrin																	1	
EPA 8270M NCI_SIM	Cyhalothrin, lambda																	1	
EPA 8270M	Cypermethrin																	1	

METHOD	ANALYTE	2004	2005		2006		2007		2008			2009				2010			
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
NCI_SIM																			
EPA 8270M NCI_SIM	Deltamethrin: Tralomethrin																	1	
EPA 8270M NCI_SIM	Esfenvalerate/ Fenvalerate																	1	
EPA 8270M NCI_SIM	Fenpropathrin																	1	
EPA 8270M NCI_SIM	Permethrin																	1	
Toxicity																			
EPA 821/R-02-012	<i>Ceriodaphnia dubia</i>	3	2	5	4	5	3	7	2	7									
EPA 821/R-02-012	<i>Pimephales promelas</i>	3	2	5	2	5	3	7	2	7									
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>	3	2	5	2	5	3	8	2	7								2	
EPA 600/R-99-064	<i>Hyalella azteca</i>	2		5	1	1	1	1	1	2								1	

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

SAMPLE SITE	DATE	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 what constituents were sampled.

SAMPLE SITE	DATE	TYPE	COPPER	<i>S. CAPRICORNUTUM</i> 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

Table VI-6. Duck Slough site subwatershed. 2010 Management Plan sampling schedule for chlorpyrifos, copper, *S. capricornutum* and *H. azteca* toxicity. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	COPPER	CHLORPYRIFOS	<i>S. CAPRICORNUTUM</i> TOXICITY	<i>H. AZTECA</i> TOXICITY
Duck Slough @ Gurr Rd	19-Jan-10	MPM	X			
Duck Slough @ Gurr Rd	23-Feb-10	MPM	X			
Duck Slough @ Gurr Rd	20-Apr-10	MPM		X		
Duck Slough @ Gurr Rd	15-Jun-10	MPM	X			
Duck Slough @ Gurr Rd	20-Jul-10	MPM	X	X	X	
Duck Slough @ Gurr Rd	14-Sept-10	MPM			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 Duck Slough @ Gurr Rd site subwatershed (Table VI-7). Samples collected over the entire six years (2004 through 2010) of monitoring resulted in exceedances at the normal monitoring and upstream MPM sites, including DO (6), pH (5), SC (3), TDS (1), *E. coli* (20), nitrate + nitrite (91), copper (9), lead (4), carbofuran (1), chlorpyrifos (1), and thiobencarb (2). Water column toxicity has occurred five times, three times to *C. dubia* and twice to *S. capricornutum*. Sediment toxicity to *H. azteca* has occurred six times.

During 2010, exceedances detected at the normal monitoring site included pH (1), *E. coli* (1) and sediment toxicity to *H. azteca* (1).

All exceedances are listed in Table VI-7 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 (see Figure 4 on page 23 of the 2011 MPUR), priorities were assigned to management plan constituents and are listed in the bottom row of Table VI-7. The highest priority constituents in the Duck Slough @ Gurr Road subwatershed are chlorpyrifos (A/B), copper (C), and toxicity to *S. capricornutum* and *H. azteca* (D).

Table VI-7. All exceedances experienced in samples collected from locations within the Duck Slough site subwatershed February 2005 through December 2010 (sorted by season and date).

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

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7 MG/L	PH, 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 ¹ , 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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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										74
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											

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 ¹ , 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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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											
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															74
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														

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 ¹ , 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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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			121 5	340											
Duck Slough @ Gurr Rd	Storm	12/15/2009				>2400											
Duck Slough @ Gurr Rd	Irrigation	7/20/2010		5.41													
Duck Slough @ Gurr Rd	Irrigation	9/14/2010														70	
Duck Slough @ Gurr Rd	Fall	10/19/2010				250											
Constituent Priority			E	E	E	E	E	NP	C	C	E	NP	A/B	NP ²	D	D	D

¹Dissolved not analyzed until October 2008.

NP- Not prioritized. Fewer than two exceedances for this constituent at this site within three years and currently no TMDL for constituent

NP² - Not Prioritized; thiobencarb is used only by rice and therefore all exceedances are turned over to the Rice Coalition.

2007 - 2010 Management Plan Monitoring Results

Management Plan Monitoring results for Duck Slough @ Gurr Rd as well as normal monitoring results are included in Table VI-8 for 2007 through 2010 for thiobencarb, copper (dissolved and total), chlorpyrifos, *S. capricornutum* toxicity and *H. azteca*. 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

During 2007, thiobencarb, chlorpyrifos and copper were monitored under the Duck Slough Management Plan. Duck Slough @ Gurr Rd was monitored monthly for thiobencarb, chlorpyrifos, and copper and additional MPM occurred for these constituents in June (except for chlorpyrifos) and July. There were no exceedances of chlorpyrifos during the irrigation season of 2007 (Table VI-8). Exceedances of the copper WQTL based on hardness occurred in MPM and NM samples collected in June (Table VI-8). Thiobencarb did not exceed the WQTL in any 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 waterbodies (Table VI-8). The water upstream of the bridge was dammed and was not flowing downstream although a pipe was discharging water into a 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 19, 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 *S. capricornutum* toxicity. The upstream location North Slough @ Hwy 59 was dry during both its scheduled MPM events in July and September (Table VI-8). Copper was detected in every sample collected during 2008, including from the upstream site Duck Slough @ Hwy 59. There was no toxicity to *S. capricornutum* experienced during normal monitoring and MPM.

2009

In 2009, normal monitoring was conducted at Duck Slough @ Gurr Rd. Both total and dissolved copper fractions were monitored at Duck Slough @ Gurr Rd during April and May 2009. Copper was detected in both fractions in April and exceeded the hardness based WQTL in May. Duck Slough @ Gurr Rd was not scheduled for MPM in 2009.

2010

Management Plan Monitoring for copper (dissolved and total), chlorpyrifos, *S. capricornutum* toxicity, and *H. azteca* toxicity was conducted during the 2010 irrigation season. In addition, MPM for copper occurred at Duck Slough @ Gurr Rd in January and February 2010. Toxicity to *H. azteca* occurred in the September MPM sample (Table VI-8).

2011

During 2011 Duck Slough @ Gurr Rd is scheduled to be monitored for Assessment Monitoring where all high priority constituents will be analyzed monthly. In 2011, MPM includes copper (January-February and May-July), chlorpyrifos (July), *C. dubia* toxicity (February and March), *S. capricornutum* toxicity (July and September), and *H. azteca* toxicity (September). This site will return to Core Monitoring in 2012.

Table VI-8. Duck Slough @ Gurr Rd. Normal monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

MONTH:		JANUARY	FEBRUARY	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Gurr Rd)	Date	NA	NA	4/24/07	5/29/07	6/26/07	7/24/07	8/21/07	9/18/07
	Chlorpyrifos (µg/L)	NA	NA	<0.003	<0.003	<0.003	0.007	<0.003	0.009
	Copper (µg/L)	NA	NA	4.6	5.3	4.6	4	4.8	5.5
	Thiobencarb (µg/L)	NA	NA	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
2007 MPM A (@ Gurr Rd)	Date	NA	NA	NA	NA	6/19/07	6/19/07 ^{US}	7/31/07	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	NA	0.007	NA
	Copper (µg/L)	NA	NA	NA	NA	5.4	15	8.6	NA
	Thiobencarb (µg/L)	NA	NA	NA	NA	<0.06	<0.06	<0.06	NA
2008 NM (@ Gurr Rd)	Date	NA	NA	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Copper (µg/L)	NA	NA	2.7	7.1	4.0	5.4	3.5	6.1
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	175	309	459	350	262	263
2008 MPM US (@ Hwy 59^{US})	Date	NA	NA	NA	NA	6/24/08	7/29/08	NA	9/30/08
	Copper (µg/L)	NA	NA	NA	NA	12	18	NA	NA
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	NA	NA	NA	271	NA	131
2008 MPM US (North Slough @ Hwy 59^{US})	Date	NA	NA	NA	NA	NA	7/29/08	NA	9/30/08
	Copper (µg/L)	NA	NA	NA	NA	NA	Dry	NA	Dry
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	NA	NA	NA	Dry	NA	Dry
2009 NM (@ Gurr Rd)	Date	NA	NA	4/21/09	5/19/09	6/16/09	7/21/09	8/18/09	9/22/09
	Copper, total (µg/L)	NA	NA	3.3	15	NA	NA	NA	NA
	Copper, dissolved (µg/L)	NA	NA	2.6	7.3	NA	NA	NA	NA
2010 MPM (@ Gurr Rd)	Date	1/19/10	2/23/10	4/20/10	5/18/10	6/15/10	7/20/10	8/17/10	9/14/10
	Copper, total (µg/L)	10	5.4	NA	NA	3.3	3.6	NA	NA
	Copper, dissolved (µg/L)	2	4.4	NA	NA	1.2	1.0	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	<0.003	NA	NA	<0.003	NA	NA
	<i>S. capricornutum</i> toxicity (% Control)	NA	NA	NA	NA	NA	542	NA	423
	<i>H. azteca</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	70

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

A- Additional Monitoring conducted in 2007.

US- Upstream Monitoring conducted in 2008.

^UUpstream of bridge on Gurr Rd

Load Calculations

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

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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-9. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured in the Duck Slough @ Gurr Rd site subwatershed (sorted by analyte and date). Upstream site is italicized.

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION $\mu\text{G/L}$	LOADING RATE $\mu\text{G/SEC}$
Duck Slough @ Gurr Rd	Chlorpyrifos	08/08/06	6.62	0.014	2.62
Duck Slough @ Gurr Rd	Chlorpyrifos	07/24/07	1.78	0.007	0.35
Duck Slough @ Gurr Rd	Chlorpyrifos	07/31/07	3.25	0.007	0.64
Duck Slough @ Gurr Rd	Chlorpyrifos	09/18/07	5.2	0.009	1.33
Duck Slough @ Gurr Rd	Chlorpyrifos	07/29/08	0.4	0.011	0.12
Duck Slough @ Gurr Rd	Chlorpyrifos	01/20/09	0.23	0.012	0.08
Duck Slough @ Gurr Rd	Copper	05/17/06	2.29	2.9	188.05
Duck Slough @ Gurr Rd	Copper	06/14/06	1.61	120	5470.84
Duck Slough @ Gurr Rd	Copper	07/12/06	10.93	14	4333.07
Duck Slough @ Gurr Rd	Copper	08/08/06	6.62	3.8	712.34
Duck Slough @ Gurr Rd*	Copper	09/13/06	0.96	4	108.74
Duck Slough @ Gurr Rd	Copper	09/13/06	0.96	4.1	111.46
Duck Slough @ Gurr Rd*	Copper	02/12/07	298.79	44	372276.80
Duck Slough @ Gurr Rd*	Copper	02/12/07	298.79	46	389198.48
Duck Slough @ Gurr Rd	Copper	02/12/07	298.79	47	397659.31
Duck Slough @ Gurr Rd	Copper	02/28/07	321.45	11	100127.50
Duck Slough @ Gurr Rd	Copper	04/24/07	1.88	4.6	244.89
Duck Slough @ Gurr Rd	Copper	05/29/07	1.02	5.3	153.08
Duck Slough @ Gurr Rd	Copper	06/19/07	0	15	0
Duck Slough @ Gurr Rd	Copper	06/19/07	0.99	5.4	151.38
Duck Slough @ Gurr Rd	Copper	06/26/07	1.12	4.6	145.89
Duck Slough @ Gurr Rd	Copper	07/24/07	1.78	4	201.62
Duck Slough @ Gurr Rd	Copper	07/31/07	3.25	8.6	791.46
Duck Slough @ Gurr Rd	Copper	08/21/07	1.38	4.8	187.57
Duck Slough @ Gurr Rd	Copper	09/18/07	5.2	5.5	809.87
Duck Slough @ Gurr Rd*	Copper	09/18/07	5.2	6.4	942.39
Duck Slough @ Gurr Rd	Copper	04/29/08	0.56	2.7	42.82
Duck Slough @ Gurr Rd	Copper	05/27/08	0.43	7.1	86.45
Duck Slough @ Gurr Rd*	Copper	05/27/08	0.43	7.3	88.89
Duck Slough @ Gurr Rd	Copper	06/24/08	0.65	4	73.62
<i>Duck Slough @ Hwy 59</i>	<i>Copper</i>	<i>06/24/08</i>	<i>0.64</i>	<i>12</i>	<i>217.47</i>
Duck Slough @ Gurr Rd	Copper	07/29/08	0.4	5.4	61.16
<i>Duck Slough @ Hwy 59</i>	<i>Copper</i>	<i>07/29/08</i>	<i>0.47</i>	<i>18</i>	<i>239.56</i>
Duck Slough @ Gurr Rd	Copper	08/26/08	1.1	3.5	109.02

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Duck Slough @ Gurr Rd	Copper	09/30/08	0.21	6.1	36.27
Duck Slough @ Gurr Rd	Copper	12/16/08	0.31	1.2	10.53
Duck Slough @ Gurr Rd	Copper	01/20/09	0.23	0.4	2.61
Duck Slough @ Gurr Rd	Copper	02/07/09	2.57	11	800.52
Duck Slough @ Gurr Rd	Copper	03/17/09	0	6.3	0
Duck Slough @ Gurr Rd	Copper	04/21/09	0.67	3.3	62.61
Duck Slough @ Gurr Rd	Copper	05/19/09	0.19	15	80.70
Duck Slough @ Gurr Rd	Copper	01/19/10	0	12	0
Duck Slough @ Gurr Rd	Copper	02/23/10	3.07	5.4	469.44
Duck Slough @ Gurr Rd	Copper	06/15/10	5.97	3.3	557.87
Duck Slough @ Gurr Rd	Copper	07/20/10	21.67	3.6	2209.07
Duck Slough @ Gurr Rd	Copper (D)	12/16/08	0.31	0.3	2.63
Duck Slough @ Gurr Rd	Copper (D)	01/20/09	0.23	0.2	1.30
Duck Slough @ Gurr Rd	Copper (D)	02/07/09	2.57	7.6	553.09
Duck Slough @ Gurr Rd	Copper (D)	03/17/09	0	4.6	0
Duck Slough @ Gurr Rd	Copper (D)	04/21/09	0.67	2.6	49.33
Duck Slough @ Gurr Rd	Copper (D)	05/19/09	0.19	7.3	39.28
Duck Slough @ Gurr Rd	Copper (D)	01/19/10	0	2	0
Duck Slough @ Gurr Rd	Copper (D)	02/23/10	3.07	4.4	382.51
Duck Slough @ Gurr Rd	Copper (D)	06/15/10	5.97	1.2	202.86
Duck Slough @ Gurr Rd	Copper (D)	07/20/10	21.67	1	613.63

*Field Duplicate

Copper (D)-Dissolved Copper

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007 and 2008, the Coalition conducted additional MPM during the months when exceedances historically occurred to better characterize water quality the subwatershed. During 2010, MPM continued at the Duck Slough @ Gurr Rd site during months when exceedances historically occurred to continue to assess water quality in the subwatershed as outreach in the area progressed.

Since the Duck Slough @ Gurr Rd subwatershed became high priority in 2010, the Coalition has actively engaged in outreach and education to address the subwatershed's priority constituents. The Coalition has organized meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

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

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015 µg/L once in July, 2004. Starting in 2010, as part of the MPM schedule, chlorpyrifos was monitored for in April and July.

All PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds of active ingredient applied, and acres treated (Table VI-10, Figure VI-2). The amount of chlorpyrifos applied within the subwatershed has fluctuated over the years. The greatest chlorpyrifos use occurred in 2005 (5,383 lbs AI), and has generally decreased since. The lowest use was in 2007 (1,216 lbs AI). In 2010, 1,800 lbs of chlorpyrifos was applied, making 2010 the third lowest year in pounds AI applied since 2004. 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, March of 2007 and June of 2010 (Table VI-10, 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 (Table VI-11). The highest application rates of chlorpyrifos in the Duck Slough @ Gurr Rd subwatershed are associated with alfalfa, almonds, and corn. The largest amount of chlorpyrifos applied from 2004 through 2010 was to almonds, followed by alfalfa and corn. The most common product containing chlorpyrifos applied within the subwatershed was Lorsban (Table VI-11).

Table VI-10. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2004 through December 2010 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 OF AI APPLIED	ACRES TREATED
January, 2004	4	88.0	43.6
April, 2004	7	94.1	222.0
May, 2004	1	77.9	60.0
June, 2004	2	152.1	76.0
July, 2004	6	333.5	214.0
August, 2004	8	414.1	544.0
September, 2004	2	66.6	66.0
January, 2005	4	76.9	38.1
March, 2005	18	585.0	984.5
June, 2005	5	209.0	188.0
July, 2005	18	4282.9	868.0
August, 2005	4	131.5	260.5
September, 2005	2	97.9	105.0
January, 2006	6	119.7	59.0
March, 2006	5	105.9	336.0

MONTH/YEAR	NUMBER OF CHLORPYRIFOS APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
May, 2006	13	706.5	433.0
June, 2006	1	137.6	69.0
July, 2006	6	585.1	528.0
August, 2006	9	402.2	448.0
September, 2006	8	425.9	413.1
January, 2007	2	29.9	15.0
March, 2007	40	999.4	2112.6
April, 2007	3	28.8	57.4
June, 2007	1	19.9	10.0
July, 2007	3	139.0	185.0
March, 2008	26	416.7	846.5
May, 2008	14	1015.3	669.0
June, 2008	1	10.2	8.0
July, 2008	10	339.1	739.3
August, 2008	23	632.7	1283.2
September, 2008	2	34.6	98.0
March, 2009	14	298.6	754.0
April, 2009	1	31.7	42.2
May, 2009	3	815.4	624.0
July, 2009	10	370.5	563.0
August, 2009	7	246.7	403.0
September, 2009	4	57.2	227.4
March, 2010	21	369.4	933.9
June, 2010	13	655.7	874.3
July, 2010	15	413.3	691.2
August, 2010	7	282.9	395.1
September, 2010	5	79.5	278.0
Summaries by Year			
2004 Total	30	1226.2	1225.6
2005 Total	51	5383.2	2444.1
2006 Total	48	2482.8	2286.1
2007 Total	49	1216.9	2380.0
2008 Total	76	2448.5	3644.0
2009 Total	39	1820.1	2613.6
2010 Total	61	1800.8	3172.5
Total	354	16378.5	17766.0

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

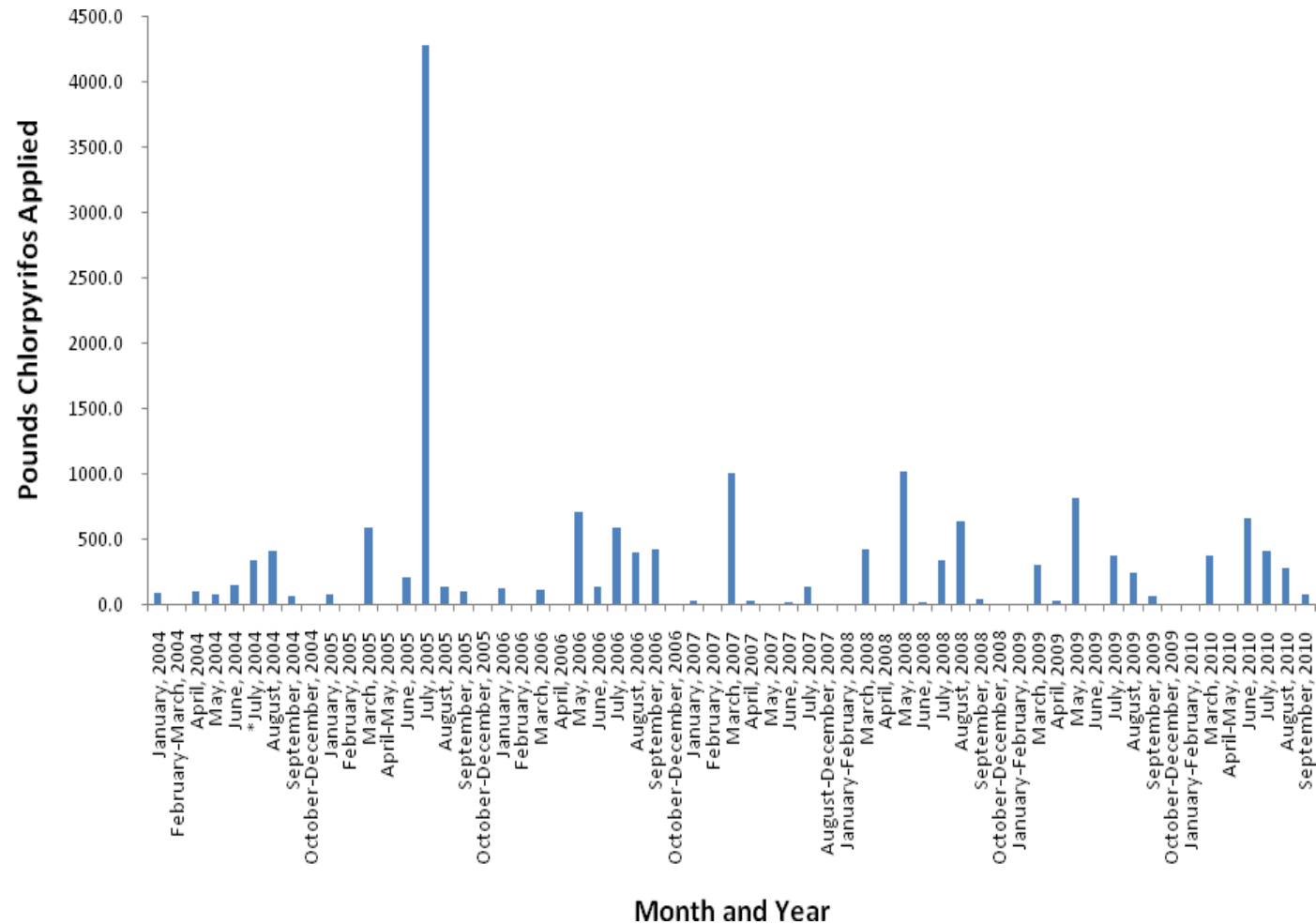


Table VI-11. Total pound AI for chlorpyrifos based on PUR data from 2004-2010 within the Duck Slough @ Gurr Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	COBALT	140.0
		GOVERN 4E INSECTICIDE	807.1
		LOCK-ON INSECTICIDE	942.5
		LORSBAN 4E INSECTICIDE	63.9
		LORSBAN 4E-HF	995.2
		LORSBAN 4E-HF INSECTICIDE	63.4
		LORSBAN ADVANCED	9.4
		LORSBAN-4E	585.3
		NUFOS 4E	642.5
		WARHAWK	19.4
		WHIRLWIND	206.2
	ALMOND	CHLORPYRIFOS 4E AG	130.3
		GOVERN 4E INSECTICIDE	499.0
		LORSBAN 4E INSECTICIDE	175.7
		LORSBAN 4E-HF	1480.6
		LORSBAN-4E	3619.1
		NUFOS 4E	20.3
		WHIRLWIND	379.9
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	117.0
		GOVERN 4E INSECTICIDE	287.9
		LORSBAN 15G GRANULAR INSECTICIDE	1859.2
		LORSBAN 4E-HF	181.3
		LORSBAN-4E	55.2
		NUFOS 4E	201.3
		SAURUS	655.7
	COTTON, GENERAL	CHLORPYRIFOS 4E AG	257.1
		GOVERN 4E INSECTICIDE	59.1
		LORSBAN 4E-HF	89.6
		LORSBAN ADVANCED	161.1
		NUFOS 4E	217.1
	PEACH	CHLORPYRIFOS 4E AG	164.9
		LORSBAN 4E-HF	121.6
	SORGHUM (FORAGE - FODDER)	GOVERN 4E INSECTICIDE	50.5
	SUGARBEET, GENERAL	LORSBAN 4E-HF	69.9
		LORSBAN-4E	215.1
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	15.2
		LORSBAN 4E-HF	71.8
		LORSBAN-4E	748.1
ALFALFA - Total Pounds Chlorpyrifos Applied			4475.1
ALMOND - Total Pounds Chlorpyrifos Applied			6305.0

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		CORN - Total Pounds Chlorpyrifos Applied	3357.6
		COTTON - Total Pounds Chlorpyrifos Applied	783.9
		PEACH - Total Pounds Chlorpyrifos Applied	286.5
		SORGHUM - Total Pounds Chlorpyrifos Applied	50.5
		SUGAR BEETS - Total Pounds Chlorpyrifos Applied	285.0
		WALNUT - Total Pounds Chlorpyrifos Applied	835.0
		Total Pounds Chlorpyrifos Applied (2004 - 2010)	16378.5

The Coalition has determined the most probable source of chlorpyrifos in the Duck Slough @ Gurr Rd waterway to be spray drift from adjacent orchards. Growers are encouraged to review their farming operation to determine if their aerial applications could result in spray drift. Operations with row crop are advised of methods to better manage their irrigation tailwater and storm water runoff, whereas outreach efforts to orchard growers focus on encouraging management practices to reduce spray drift and improve orchard and vineyard water management.

Since 2007, Coalition outreach has included meetings and the mailing/distribution of information, such as funding available for management practice implementation. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of the MPUR.

In accordance with the Coalition's Management Plan strategy, individual contacts with targeted growers began June 2010. Targeted growers were selected based on the potential to drain or drift to the creek and those applying chlorpyrifos. Using these criteria, a list of six targeted growers was created comprising 2,656 acres in the subwatershed. Coalition representatives met with growers on their property to discuss the Duck Slough @ Gurr Rd Management Plan and offer 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 review planned management practice implementation. Individual contacts focused mainly on chlorpyrifos exceedances however, all water quality results were reviewed and discussed including copper, DO, *E. coli*, pH, SC, TDS, and lead as well as toxicity to *C. dubia*, *S. capricornutum*, and *H. azteca*.

To date, the Coalition has contacted all six targeted members. Of the six members, recommended management practices to acreages in the Duck Slough @ Gurr Rd subwatershed include: recirculation/tailwater return system (34%), drainage basins/sediment ponds (33%), and use of polyacrylamide (33%). Based on the exact timing of each individual meeting and 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 in April of 2011 to determine what practices were implemented during the first year of high priority monitoring. Growers who 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 second year of high priority monitoring. The Coalition anticipates that changes in management practices by members that have parcels with

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.

In 2011, Duck Slough @ Gurr Rd is scheduled to be monitored for Assessment Monitoring and the Coalition will continue to assess water quality.

Priority C Constituents

The only priority C constituent listed at Duck Slough @ Gurr Rd is copper.

Copper

Samples containing copper have exceeded the hardness based WQTL nine times from 2006 through 2010. As of October 2008, the Coalition began to analyze for both total and dissolved fractions of copper. 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-7).

Upstream MPM at the Hwy 59 location did not result in exceedances of the copper WQTL. The Coalition began MPM monitoring for copper (both total and dissolved) in January, February, June and July 2010. During 2011, Duck Slough @ Gurr Rd is scheduled to be monitored for Assessment Monitoring constituents.

PUR data are reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table VI-12, Figure VI-3). The amount of copper applied within the subwatershed decreased continually each year from 2005 to 2008 with a slight increase occurring in 2009 and 2010. The largest amount of copper applied was in 2005 (12,952 lbs AI) while the smallest amount applied was in 2008 (3,039 lbs AI). The amount of copper applied in 2010 was 4,013 lbs AI. The month with the greatest amount of copper use has varied over time. 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 and April in 2010 (Table VI-12, Figure VI-3). Not all exceedances occurred during months of the greatest amount of use (Figure VI-3).

The largest amount of copper applied from 2004 through 2010 was associated with almonds, peaches, rice, tomatoes and walnuts (Table VI-13). The most common products containing copper applied within the subwatershed were DuPont Kocide™ and Kocide (Table VI-13).

Table VI-12. Number of copper applications, total pounds applied and total acres treated by month for January 2004 through December 2010 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 OF AI APPLIED	ACRES TREATED
January, 2004	21	2826.7	707.6
February, 2004	6	428.8	194.0
March, 2004	3	758.7	135.0
April, 2004	4	86.0	37.3
August, 2004	3	214.3	191.2

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
September, 2004	1	263.4	143.0
October, 2004	4	1328.3	575.0
November, 2004	2	550.1	224.0
January, 2005	12	1568.7	376.1
February, 2005	5	514.8	159.7
March, 2005	3	369.9	81.0
April, 2005	26	1363.2	483.3
May, 2005	12	641.9	414.5
June, 2005	10	7053.8	475.0
August, 2005	3	139.8	127.8
September, 2005	2	82.4	74.7
October, 2005	1	25.8	21.0
November, 2005	1	69.1	45.0
December, 2005	5	1122.8	153.0
January, 2006	12	1872.3	321.0
February, 2006	9	814.0	251.0
March, 2006	4	288.0	360.0
April, 2006	12	1038.3	263.5
May, 2006	14	1197.8	613.7
June, 2006	1	105.2	100.0
August, 2006	1	113.0	103.0
October, 2006	2	255.6	166.0
December, 2006	2	539.0	70.0
January, 2007	9	1502.7	223.0
February, 2007	8	533.7	280.0
March, 2007	3	309.2	115.0
April, 2007	10	422.9	147.5
May, 2007	2	145.0	163.0
December, 2007	5	247.0	88.0
January, 2008	6	826.5	136.0
February, 2008	2	650.3	42.0
March, 2008	1	8.1	5.0
April, 2008	2	108.3	65.0
May, 2008	5	318.9	165.5
June, 2008	1	17.9	25.8
September, 2008	1	42.4	92.0
November, 2008	1	166.0	60.0
December, 2008	3	901.0	100.0
January, 2009	2	847.7	102.0
February, 2009	1	35.6	58.0
April, 2009	12	596.1	294.5
May, 2009	5	157.9	125.5
August, 2009	1	69.3	30.0
November, 2009	1	77.0	10.0
December, 2009	6	1266.3	168.0
January, 2010	6	1178.9	149.3
February, 2010	6	119.7	112.5
March, 2010	10	222.3	180.5
April, 2010	21	1586.3	667.1

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
May, 2010	20	906.3	732.8
Summaries by Year			
2004 Total	44	6456.4	2207.1
2005 Total	80	12952.2	2411.1
2006 Total	57	6223.3	2248.2
2007 Total	37	3160.6	1016.5
2008 Total	22	3039.2	691.3
2009 Total	28	3049.9	788.0
2010 Total	63	4013.6	1842.2
Total	331	38895.1	11204.3

Figure VI-3. Pounds of copper applied within the Duck Slough @ Gurr Rd site subwatershed by month for 2004-2010. Asterisk (*) denotes months with exceedances.

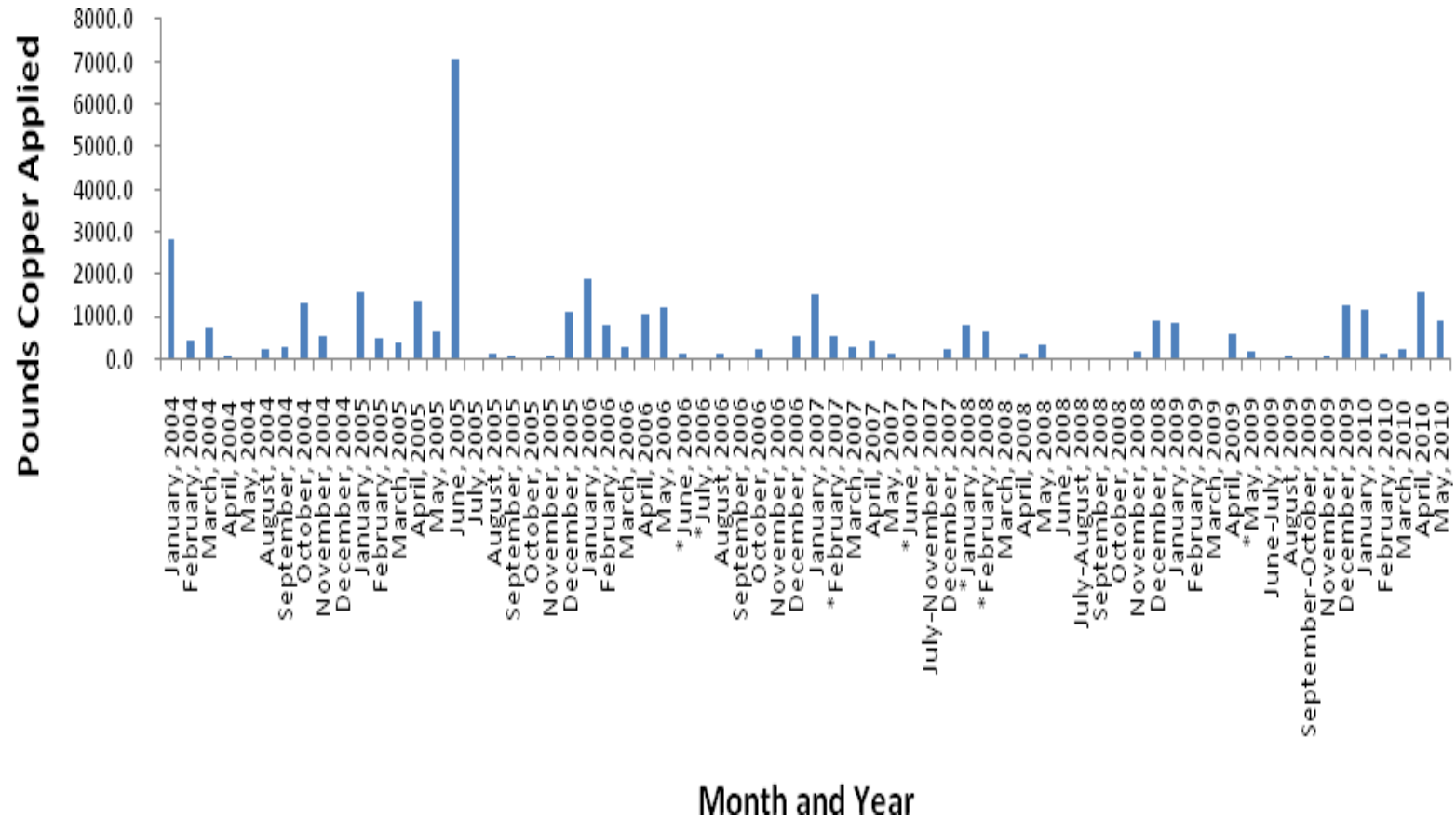


Table VI-13. Total pound AI for copper based on PUR data from 2004-2010 within the Duck Slough @ Gurr Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	KOCIDE 2000	63.8
	ALMOND	BASIC COPPER 53	220.5
		BASICOP	307.4
		CHAMPION WETTABLE POWDER	80.1
		COOKE BLUESTONE	8.3
		CUPROFIX ULTRA 40 DISPERSS	1132.5
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	214.7
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	91.3
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	35.6
		KOCIDE 101	887.0
		KOCIDE 2000	750.5
		KOCIDE DF	1899.7
		KOP-HYDROXIDE 50W	776.2
		NORDOX 75 WG	2297.2
	APRICOT	BASIC COPPER 53	58.8
		KOCIDE 2000	118.4
		KOCIDE DF	122.8
	CHERRY	NU-COP 50DF	154.0
	N-OUTDR CONTAINER/FLD GRWN PLANTS	BASIC COPPER 53	1519.0
		CUPROFIX ULTRA 40 DISPERSS	113.8
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	53.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	497.9
		KOCIDE 101	473.6
	NECTARINE	BASIC COPPER 53	98.0
		CHAMPION WETTABLE POWDER	24.1
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	27.7
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	42.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	23.1
		KOCIDE 101	1155.0
		KOCIDE 2000	201.8
	PEACH	BASIC COPPER 53	3155.6
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	172.2
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	8.7
		KOCIDE 101	154.0
		KOCIDE DF	788.7
	PEPPERS (FRUITING VEGETABLE), (BELL,CHILI, ETC.)	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	64.1
		KOCIDE 101	121.3
		KOCIDE DF	27.0
	PISTACHIO (PISTACHE NUT)	CUPROFIX DISPERSS DRY FLOWABLE FUNGICIDE/BACTERICIDE FOR TURF AND	8.3

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		ORNAMENTAL USE	
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	80.7
		KOCIDE 101	154.0
	PRUNE	KOCIDE DF	110.5
		NORDOX 75 WG	1056.1
	RICE (ALL OR UNSPEC)	COPPER-Z 4/4	492.1
		TRIANGLE BRAND COPPER SULFATE CRYSTAL	7053.8
		BLUE SHIELD WP	127.8
	TOMATO	CHAMPION WETTABLE POWDER	155.3
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	19.4
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	275.9
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	410.8
		KOCIDE 101	422.2
		KOCIDE 2000	1040.7
		KOCIDE DF	892.4
		NU-COP 50 WP	127.8
		NU-COP 50DF	1760.1
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	213.0
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	729.1
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	1010.9
		KOCIDE 101	1719.9
		KOCIDE 2000	1518.5
		KOP-HYDROXIDE 50W	396.6
		NORDOX 75 WG	151.0
		NU-COP 50DF	1028.7
		ALFALFA - Total Pounds Copper Applied	63.8
		ALMOND - Total Pounds Copper Applied	8700.9
		APRICOT - Total Pounds Copper Applied	300.0
		CHERRY - Total Pounds Copper Applied	154.0
		N-OUTDR CONTAINER - Total Pounds Copper Applied	2657.6
		NECTARINE - Total Pounds Copper Applied	1571.9
		PEACH - Total Pounds Copper Applied	4279.2
		PEPPERS - Total Pounds Copper Applied	212.4
		PISTACHIO - Total Pounds Copper Applied	8.3
		PLUM - Total Pounds Copper Applied	234.7
		PRUNE - Total Pounds Copper Applied	1166.7
		RICE - Total Pounds Copper Applied	7545.8
		TOMATO - Total Pounds Copper Applied	5232.4
		WALNUT - Total Pounds Copper Applied	6767.6
		Total Pounds Copper Applied (2004-2010)	38895.1

The Coalition will continue with its management plan strategy outlined above. Orchard and vineyard operators are advised to consider the retention of irrigation water to prevent copper from entering the waterway with runoff. Storm water runoff management is also discussed to prevent the winter exceedances.

Priority D Constituents

The following priority D constituents are listed under the Duck Slough @ Gurr Rd Management Plan: *S. capricornutum* and *C. dubia* water column toxicity and sediment toxicity to *H. azteca*. Toxicity was not experienced during 2009 monitoring. However, in 2010 sediment toxicity occurred in samples collected in September. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Selenastrum capricornutum toxicity

Toxicity to *S. capricornutum* has only been experienced twice at Duck Slough @ Gurr Rd, once in September 2004 and again in July 2007. The July toxicity is associated with a copper exceedance that occurred in the prior month, but toxicity was not persistent in the July 2007 resample (Table VI-7).

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

Ceriodaphnia dubia toxicity

C. dubia toxicity was experienced in storm samples collected in February and March of 2006 (Table VI-7). The February and March toxicity events were not associated with any other exceedances. Toxicity to *C. dubia* has not been associated with the presence of pesticides or metals in the past. The Coalition did not perform testing for *C. dubia* toxicity in 2009. The Coalition will monitor this site for *C. dubia* toxicity during March 2011.

Hyalella azteca toxicity

Sediment toxicity to *H. azteca* occurred in August 2004, July 2005, and in August 2008. Toxicity was persistent in the 2008 resample that occurred in October 2008. No sediment toxicity occurred during 2009 sampling.

The Coalition has initiated MPM 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. Duck Slough @ Gurr Rd MPM sediment samples collected in September 2010 resulted in toxicity to *H. azteca* with 70% survival compared to the control (Table VI-7).

Priority E Constituents

The following priority E constituents are listed under the Duck Slough @ Gurr Road Management Plan: DO, pH, SC, TDS, *E. coli* and lead. These constituents will remain low priority but are discussed during individual contacts and annual grower meetings.

Evaluation

Duck Slough @ Gurr Rd is one of the second four high priority site subwatersheds within the ESJWQC and just completed its first year of focused outreach. Therefore, the Coalition has focused its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Duck Slough subwatershed has been to target growers with parcels located along or adjacent to the waterway that have the potential to discharge into the waterway. Focus will be on tailwater management and minimizing spray drift. Outreach includes grower notification, management practice outreach and education, tracking the implementation of management practices, and providing information on special studies of management practice efficacy.

Individual grower surveys documenting current management practices and assessing planned implementation have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practices section of this report summarizes the results of these contacts. In April 2011, the Coalition will initiate follow up contacts to identify newly implemented practices and future monitoring to evaluate water quality improvement.

In 2011, Assessment Monitoring is scheduled where all high priority constituents will be monitored monthly.

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*

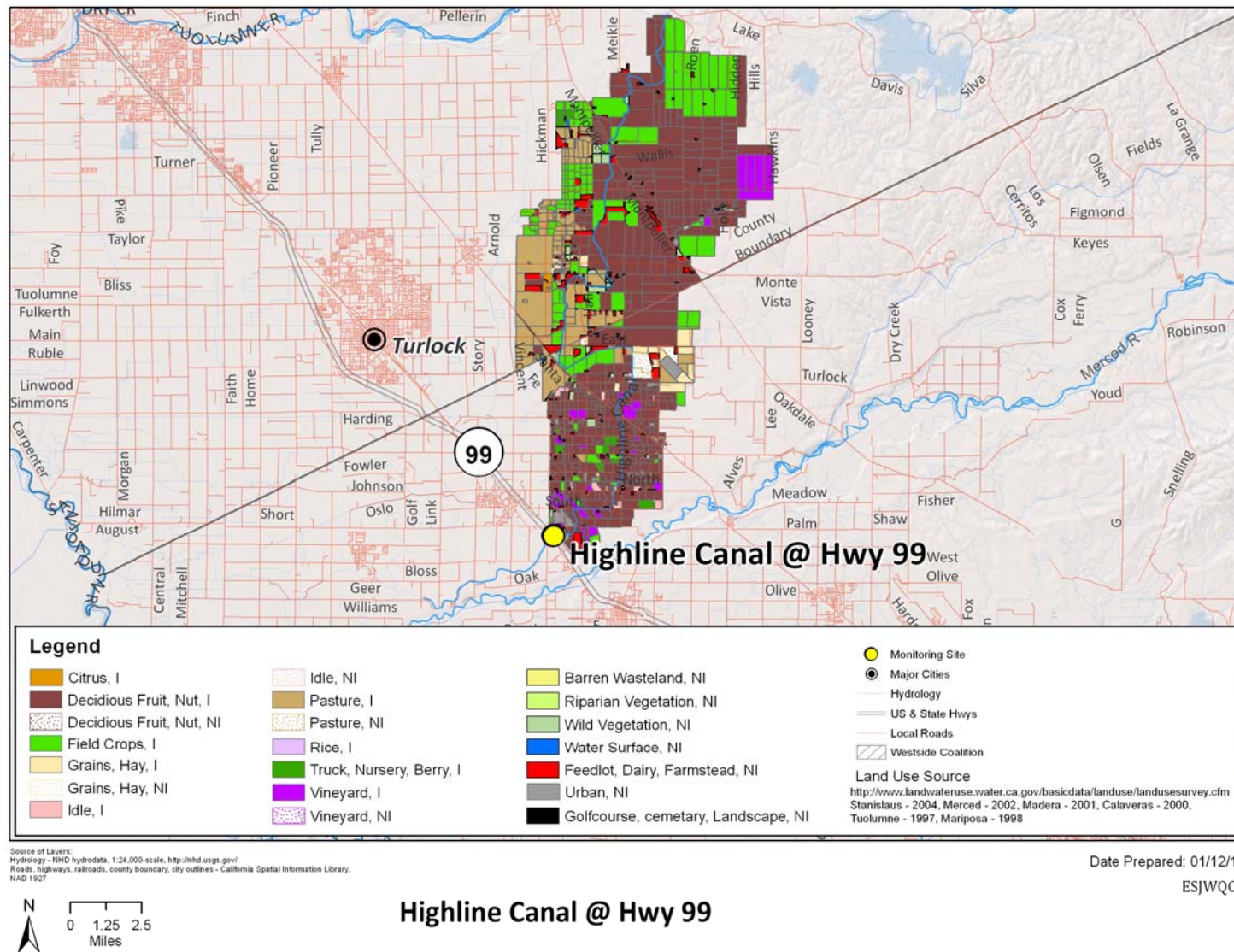
Description of Highline Canal @ Hwy 99 Site Subwatershed

Highline Canal @ Highway 99 (11,571 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.

SAMPLE SITE	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

Monitoring of ambient water at the Highline Canal @ Highway 99 site was initiated in the 2005 irrigation season and monitoring has continued through 2010 (Table VII-2). Highline Canal @ Hwy 99 will remain a Core Monitoring location under the current MRPP. It will be monitored for Assessment Monitoring constituents in 2011. Specific information on the analyses conducted across each of the monitoring seasons is provided below (Table VII-3).

Management Plan Monitoring occurred at Highline Canal for *C. dubia* toxicity only in 2007 then for *C. dubia* toxicity, chlorpyrifos, and copper in 2008 (Table VII-4, Table VII-5). The site was also monitored for these constituents from April through September in 2007 and 2008. Management Plan Monitoring in 2009 occurred for *S. 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.

In 2010 MPM took place for chlorpyrifos, diuron, copper, *S. capricornutum* toxicity and sediment toxicity to *H. azteca* (Table VII-7).

Highline Canal @ Hwy 99 is a high priority subwatershed. High priority monitoring at the Highline Canal @ Hwy 99 subwatershed began in 2010. Highline Canal is considered an impaired waterbody under the 2008 Basin Plan and is listed on the 303d list for chlorpyrifos, simazine, water toxicity, and sediment toxicity. Agriculture is listed as the potential source for the chlorpyrifos, simazine and water toxicity impairments; sediment toxicity is listed with an unknown source.

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

	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Events Sampled	NA	NA	5	2	5	1	6	2	6	0	0	2	6	1	1	3	5	2
Events Not Sampled	NA	NA	0	0	0	1	0	1	0	2	2	0	0	1	0	0	0	1
Total	NA	NA	5	2	5	2	6	3	6	2	2	2	6	2	1	3	5	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				2010			
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	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	1	3	5	2
EPA 160.2	Suspended Solids										2	6	1	1	3	5	2
EPA 180.1	Turbidity	5	2	5	1	6	2	6			2	6	1	1	3	5	2
EPA 405.1	BOD			1	1	2											
EPA 415.1	Total Organic Carbon	5	2	5	1	6	2	6			2	6	1	1	3	5	2
SM 9223	<i>E. coli</i>	5	2	5	1	6	2	6			2	6	1	1	3	5	2
NA	Dissolved Oxygen	6	5	5	1	8	4	13			2	6	1	1	3	5	2
NA	Specific Conductivity	6	5	5	1	8	4	13			2	6	1	1	3	5	2
NA	pH	6	5	5	1	8	4	13			2	6	1	1	3	5	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							2		
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									
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			2	1	

METHOD	ANALYTE	2005	2006		2007		2008			2009				2010			
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
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							2		
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									
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							3	3	
EPA 200.8	Lead			5	1	6	2	6									
EPA 200.8	Molybdenum																
EPA 200.8	Nickel			5	1	6	2	6									
EPA 200.8	Selenium			5	1	2	2	6									

METHOD	ANALYTE	2005	2006		2007		2008			2009				2010			
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 200.8	Zinc			5	1	6	2	6									
Metals(Dissolved)																	
EPA 200.8	Cadmium																
EPA 200.8	Copper														3	3	
EPA 200.8	Lead																
EPA 200.8	Nickel																
EPA 200.8	Zinc																
Nutrients																	
SM 2340 C	Hardness as CaCO3			5	1	6	2	10									
EPA 300.0	Nitrate as N			5	1	6	2	6							3	3	
EPA 350.2	Ammonia as N			5	1	6	2	6			2	6	1	1	3	5	2
EPA 351.3	Nitrogen, Total Kjeldahl			5	1	6	2	6			1	1				3	2
EPA 353.2	Nitrate + Nitrite as N										2	6	1	1	3	5	2
EPA 354.1	Nitrite as N			5	1	6	2	6									
EPA 365.2	Orthophosphate as P			5	1	6	2	6			1	1				3	2
EPA 365.2	Phosphate as P			5	1	6	2	6			2	6	1	1	3	5	2
Toxicity																	
EPA 0821/R-02-012	<i>Ceriodaphnia dubia</i>	6	3	6	1	8	2	7									
EPA 0821/R-02-012	<i>Pimephales promelas</i>	5	2	5	1	7	2	7									
EPA 0821/R-02-013	<i>Selenastrum capricornutum</i>	5	3	5	1	7	2	7				1			3	1	
EPA 600/R-99-064	<i>Hyalella azteca</i>	5	1	2		1	1	2								1	

Table VII-4. Highline Canal @ Hwy 99. 2007 Management Plan additional (A) sampling schedule for *C. dubia*. "X" indicates what constituents were 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 *C. dubia*. "X" indicates what constituents were 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 *S. capricornutum*. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	CHLORPYRIFOS	SELENASTRUM CAPRICORNUTUM
Highline Canal @ Hwy 99	21-Apr-09	MPM		X
Highline Canal @ Hwy 99	19-May-09	MPM		X
Highline Canal @ Hwy 99	21-Jul-09	MPM	X	

Table VII-7. Highline Canal @ Hwy 99. 2010 Management Plan sampling schedule for copper, chlorpyrifos, diuron, *H. azteca* and *S. capricornutum* toxicity. "X" indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	COPPER	CHLORPYRIFOS	DIURON	H. AZTECA	S. CAPRICORNUTUM
Highline Canal @ Hwy 99	19-Jan-10	MPM	X	X	X		X
Highline Canal @ Hwy 99	23-Feb-10	MPM	X	X	X		X
Highline Canal @ Hwy 99	20-Apr-10	MPM	X				X
Highline Canal @ Hwy 99	18-May-10	MPM					X
Highline Canal @ Hwy 99	15-Jun-10	MPM	X				
Highline Canal @ Hwy 99	20-Jul-10	MPM	X	X			
Highline Canal @ Hwy 99	17-Aug-10	MPM	X				
Highline Canal @ Hwy 99	14-Sept-10	MPM				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-8). Samples collected over the five years (2005 through 2010) 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* (10), ammonia (2), copper (7), lead (7), chlorpyrifos (5), and diuron (2). Water column toxicity occurred eight times; four times each to *C. dubia* and to *S. capricornutum*. Sediment toxicity to *H. azteca* occurred six times.

During 2010, the only WQTL exceedances that occurred were for *E. coli* (2) (Table VII-8).

All exceedances are listed in Table VII-8 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-8 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR). Constituents that are the highest priority in the Highline Canal @ Highway 99 subwatershed are chlorpyrifos (A/B), copper (C), diuron (C), and toxicity to *S. capricornutum*, *C. dubia*, and *H. azteca* (D).

Table VII-8. All exceedances experienced in samples collected within the Highline Canal @ Hwy 99 site subwatershed March 2005 through December 2010 (sorted by season and date).

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

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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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				2
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)					

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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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)						72
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													63
Highline Canal @ Hwy 99	Irrigation	5/7/2008		8.69											
Highline Canal @ Hwy 99	Irrigation	5/20/2008				240									76
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									

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, (% CONTROL)	H. AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
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											
Highline Canal @ Hwy 99	Storm	1/19/2010				1700									
Highline Canal @ Hwy 99	Storm	2/23/2010				790									
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 - 2010 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table VII-9 for chlorpyrifos, diuron, copper, water column toxicity to *C. dubia* and *S. capricornutum* and sediment toxicity to *H. azteca* for 2007 through 2010.

2007

Highline Canal @ Hwy 99 was sampled monthly for toxicity to *C. dubia* and twice in September as a part of additional MPM (Table VII-9). No toxicity occurred in any sample collected (Table VII-9). 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 from April through September. Management Plan Monitoring occurred for copper, chlorpyrifos and *C. dubia* toxicity (Table VII-9). 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 (0.021 µg/L, Table VII-9). Toxicity to *C. dubia* did not occur in any samples collected in 2008. Toxicity to *S. capricornutum* occurred in February, April, and May of 2008 are all associated with copper detections.

2009

Highline Canal @ Hwy 99 was a Core Monitoring site during 2009. Management Plan Monitoring also occurred for chlorpyrifos (July) and toxicity to *S. capricornutum* (April and May). No detections of chlorpyrifos and no toxicity to *S. capricornutum* occurred during 2009 MPM.

2010

Management Plan Monitoring for copper, chlorpyrifos, *S. capricornutum* toxicity, and *H. azteca* toxicity took place during the 2010 irrigation season and MPM for copper, chlorpyrifos, diuron and *S. capricornutum* toxicity during January and February also occurred. There were no exceedances of the WQTL in any of the MPM samples collected during 2010.

2011

During 2011 Highline Canal @ Hwy 99 is scheduled for Assessment Monitoring where all high priority constituents will be analyzed monthly. In 2011, MPM includes copper (January-February, April and June-August), chlorpyrifos (January-February and July), diuron (January-February) *S. capricornutum* toxicity (January and March-May) and *H. azteca* toxicity (March and September). This site will return to Core Monitoring in 2012.

Table VII-9. Highline Canal @ Hwy 99. Normal monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

MONTH:		JANUARY	FEBRUARY	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Hwy 99)	Date	NA	NA	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/11/07
	<i>C. dubia</i> toxicity (% Control)	NA	NA	90	100	100	95	100	100
2007 MPM (@ Hwy 99)	Date	NA	NA	NA	NA	NA	NA	NA	9/25/07
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	100
2008 NM (@ Hwy 99)	Date	NA	NA	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Copper (µg/L)	NA	NA	1.8	1.6	1.2	1.2	1.0	1.1
	Chlorpyrifos (µg/L)	NA	NA	<0.003	<0.003	<0.003	0.021	<0.003	<0.003
	<i>C. dubia</i> toxicity (% Control)	NA	NA	100	100	100	100	100	100
2008 MPM (@ Hwy 99)	Date	NA	NA	4/29/08	5/7/08	6/3/08	7/8/08	8/5/08	9/9/08
	Copper (µg/L)	NA	NA	1.4	NA	1.5	1.7	1.6	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	<0.003	NA	NA
	<i>C. dubia</i> toxicity (% Control)	NA	NA	NA	100	NA	NA	NA	100
2009 MPM (@ Hwy 99)	Date	NA	NA	4/21/09	5/19/09	NA	7/21/09	NA	NA
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	NA	<0.003	NA	NA
	<i>S. capricornutum</i> toxicity(% Control)	NA	NA	428	222	NA	NA	NA	NA
2010 MPM (@ Hwy 99)	Date	1/19/10	2/23/10	4/20/10	5/18/10	6/15/10	7/20/10	8/17/10	9/14/10
	Copper, total (µg/L)	5.7	7.8	2.2	NA	1.2	1.3	1.2	NA
	Copper, dissolved (µg/L)	2.5	6.3	0.89	NA	0.65	0.48	0.52	NA
	Chlorpyrifos (µg/L)	<0.003	<0.003	NA	NA	NA	<0.003	NA	NA
	Diuron (µg/L)	0.86	1.7	NA	NA	NA	NA	NA	NA
	<i>S. capricornutum</i> toxicity (% Control)	661	543	526	255	NA	NA	NA	NA
	<i>H. azteca</i> toxicity (% Control)	NA	NA	NA	NA	NA	NA	NA	108

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

Load Calculations

Loads have been calculated for all chlorpyrifos detections in the site subwatershed (Table VII-10) based on the following formula:

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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-10. Instantaneous load calculations for chlorpyrifos, copper and diuron where discharge was measured in the Highline Canal @ Hwy 99 site subwatershed (sorted by analyte and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Highline Canal @ Hwy 99	Chlorpyrifos	03/01/06	0	0.021	0
Highline Canal @ Hwy 99	Chlorpyrifos	07/12/06	111.81	0.012	37.99
Highline Canal @ Hwy 99*	Chlorpyrifos	07/17/07	56.81	0.015	24.13
Highline Canal @ Hwy 99	Chlorpyrifos	07/17/07	56.81	0.017	27.35
Highline Canal @ Hwy 99	Chlorpyrifos	01/24/08	55.88	0.019	30.06
Highline Canal @ Hwy 99	Chlorpyrifos	02/26/08	6.91	0.0076	1.49
Highline Canal @ Hwy 99	Chlorpyrifos	07/21/09	118.93	0.093	313.20
Highline Canal @ Hwy 99	Copper	05/17/06	82.45	1.8	4202.53
Highline Canal @ Hwy 99	Copper	06/14/06	90.82	1.7	4371.97
Highline Canal @ Hwy 99	Copper	07/12/06	111.81	1.6	5065.80
Highline Canal @ Hwy 99	Copper	08/09/06	162.04	1.3	5965.03
Highline Canal @ Hwy 99	Copper	09/13/06	72.64	1.3	2674.03
Highline Canal @ Hwy 99	Copper	02/11/07	55.43	3	4708.83
Highline Canal @ Hwy 99	Copper	04/17/07	22.54	11	7020.92
Highline Canal @ Hwy 99	Copper	05/15/07	60.6	1.4	2402.41
Highline Canal @ Hwy 99	Copper	06/19/07	84.28	2.4	5727.74
Highline Canal @ Hwy 99*	Copper	07/17/07	56.81	3.1	4986.94
Highline Canal @ Hwy 99	Copper	07/17/07	56.81	3.2	5147.80
Highline Canal @ Hwy 99	Copper	08/14/07	81.98	1.9	4410.71
Highline Canal @ Hwy 99	Copper	09/11/07	33.38	1.5	1417.83
Highline Canal @ Hwy 99	Copper	01/24/08	55.88	37	58547.10
Highline Canal @ Hwy 99	Copper	02/26/08	6.91	81	15849.31
Highline Canal @ Hwy 99	Copper	04/29/08	34.66	1.4	1374.05
Highline Canal @ Hwy 99	Copper	05/20/08	81.42	1.6	3688.91
Highline Canal @ Hwy 99	Copper	06/03/08	57.91	1.5	2459.76
Highline Canal @ Hwy 99	Copper	08/19/08	37.45	1	1060.47
Highline Canal @ Hwy 99	Copper	01/19/10	0	5.7	0
Highline Canal @ Hwy 99	Copper	02/23/10	0	7.8	0
Highline Canal @ Hwy 99	Copper (D)	01/19/10	0	2.5	0
Highline Canal @ Hwy 99	Copper (D)	02/23/10	0	6.3	0
Highline Canal @ Hwy 99	Diuron	02/11/07	55.43	25	39240.28
Highline Canal @ Hwy 99	Diuron	01/24/08	55.88	3.2	5063.53
Highline Canal @ Hwy 99	Diuron	02/26/08	6.91	0.43	84.14
Highline Canal @ Hwy 99	Diuron	01/19/10	0	0.86	0
Highline Canal @ Hwy 99	Diuron	02/23/10	0	1.7	0

*Field Duplicate
Copper (D)-Dissolved Copper

Source Identification and Outreach

The Coalition addressed source identification in the 2010 MPUR and, in the following sections, considers 2010 monitoring results and PUR data as it expands upon that discussion. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007 and 2008, the Coalition conducted additional MPM during the months when exceedances occurred in previous years to better characterize water quality the

subwatershed. During 2009 and 2010, MPM continued at the Highline Canal @ Hwy 99 site during months when exceedances occurred in previous years.

Since the Highline Canal @ Hwy 99 subwatershed became high priority in 2010, the Coalition has actively engaged in grower outreach and education to address the subwatershed's priority constituents. The Coalition has organized meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings with targeted members have informed growers about management practices as well as assessed current and expected future implementation of additional management practices.

Priority A/B Constituents

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

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015 µg/L five times in this subwatershed since 2005 (March 2006, July 2007, 2008, and 2009, and January 2008). In 2010, MPM for chlorpyrifos occurred in January, February and July. There were no exceedances of chlorpyrifos during 2010.

All PUR data are reviewed for the number of monthly chlorpyrifos applications, pounds of active ingredient applied, and acres treated (Table VII-11, Figure VII-2). The PUR data from Highline Canal @ Hwy 99 subwatershed area were reviewed for chlorpyrifos use. The amount of chlorpyrifos applied within the subwatershed decreased significantly from 2007 (17,020.3 lbs AI) to 2010 (889.1 lbs AI). The greatest amount of chlorpyrifos applied in 2005 and 2009 was during May, while July received the most chlorpyrifos in 2006, 2007, 2008 and 2010 (Table VII-11, 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 (Table VII-12). The largest amount of chlorpyrifos from 2005 through 2010 was to almonds and walnuts, followed by corn. The most common product containing chlorpyrifos applied within the subwatershed was Lorsban (Table VII-12).

Table VII-11. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2005 through December 2010 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 OF AI APPLIED	ACRES TREATED
January, 2005	14	768.3	549.2
March, 2005	5	231.9	492.2
April, 2005	2	360.2	360.0
May, 2005	17	6208.7	1686.0
June, 2005	19	1313.8	778.0
July, 2005	42	3632.3	2094.0
August, 2005	20	2815.7	2271.0
September, 2005	2	33.9	17.0

MONTH/YEAR	NUMBER OF CHLORPYRIFOS APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
November, 2005	4	1444.7	724.6
January, 2006	7	2041.1	1035.0
May, 2006	13	2535.4	2007.0
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	42.0
March, 2007	1	110.6	217.4
April, 2007	1	6.2	20.0
May, 2007	15	1835.6	1621.0
June, 2007	8	3971.9	1435.0
July, 2007	34	8965.4	5372.3
August, 2007	3	298.1	386.4
October, 2007	3	1832.5	915.3
May, 2008	5	467.1	348.0
June, 2008	2	121.8	75.0
July, 2008	16	684.7	503.0
August, 2008	19	1035.1	654.5
September, 2008	2	31.9	20.0
May, 2009	4	433.5	376.0
June, 2009	2	40.2	35.0
July, 2009	12	361.2	209.0
August, 2009	10	175.6	146.0
May, 2010	1	18.8	25.0
July, 2010	18	675.3	432.5
August, 2010	8	194.9	185.0
Summaries by Year			
2005 Total	125	16809.6	8972.0
2006 Total	91	15252.5	10699.6
2007 Total	65	17020.3	9967.4
2008 Total	44	2340.7	1600.5
2009 Total	28	1010.5	766.0
2010 Total	27	889.1	642.5
Total	380	53322.6	32648.0

Figure VII-2. Pounds of chlorpyrifos applied within the Highline Canal @ Hwy 99 site subwatershed by month for 2005-2010. Asterisk (*) denotes months with exceedances.

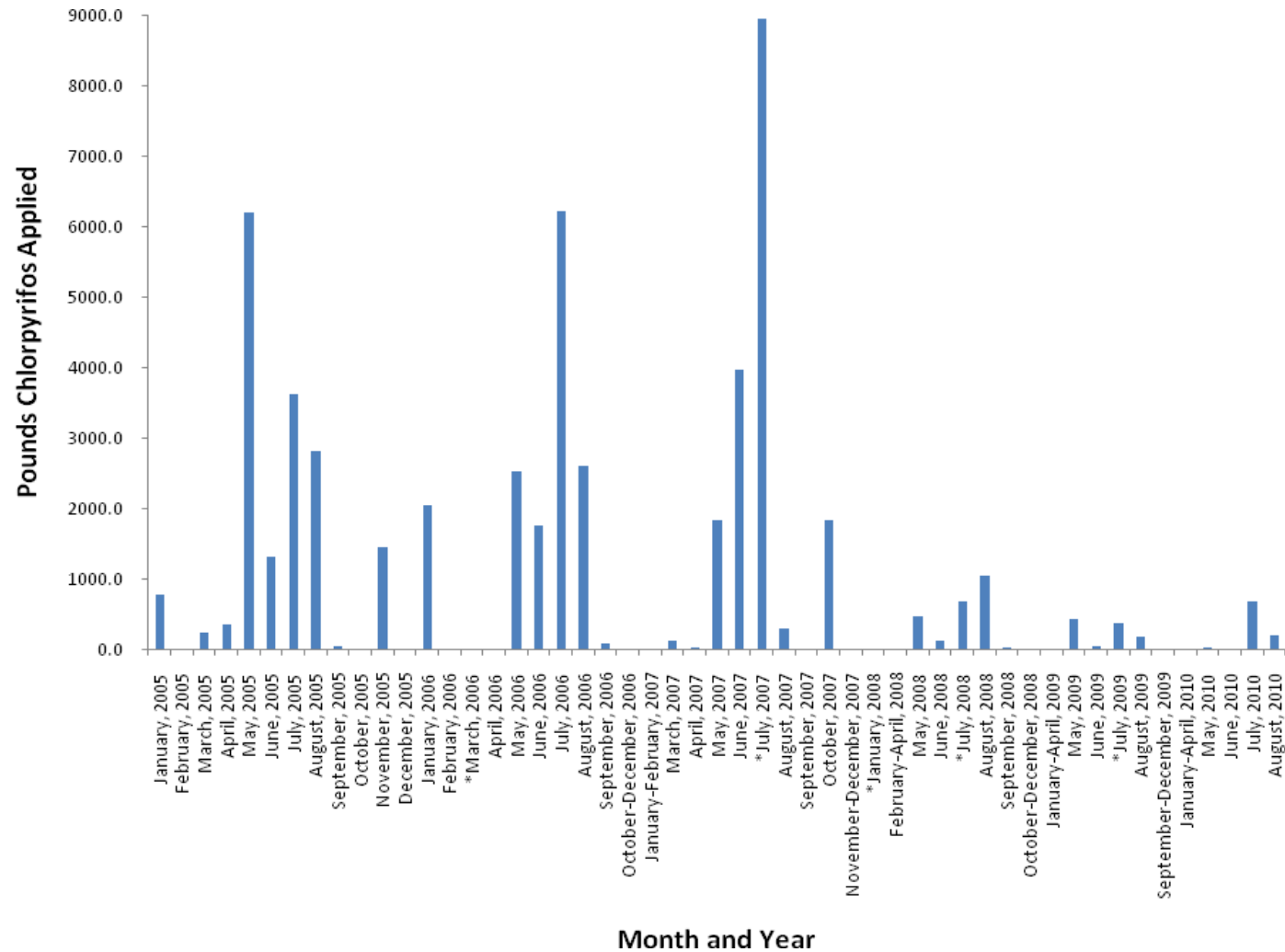


Table VII-12. Total pounds AI for chlorpyrifos based on PUR data from 2005-2010 within the Highline Canal @ Hwy 99 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED	
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	3.0	
		LORSBAN 4E-HF	10.0	
		NUFOS 4E	332.6	
	ALMOND	CHLORPYRIFOS 4E AG	871.2	
		DURSBAN 4E INSECTICIDE	20.2	
		GOVERN 4E INSECTICIDE	4134.1	
		LORSBAN 4E INSECTICIDE	478.8	
		LORSBAN 4E-HF	5124.1	
		LORSBAN 50W WETTABLE POWDER INSECTICIDE	30.0	
		LORSBAN ADVANCED	157.3	
		LORSBAN-4E	28921.0	
		NUFOS 4E	1257.7	
		WHIRLWIND	329.9	
		CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	200.3
			GOVERN 4E INSECTICIDE	60.6
	LORSBAN 15G GRANULAR INSECTICIDE		81.7	
	LORSBAN 4E INSECTICIDE		120.0	
	LORSBAN 4E-HF		793.9	
	LORSBAN-4E		957.5	
	NUFOS 4E		1156.7	
	WARHAWK		326.2	
	GRAPES (WINE)	LORSBAN 4E-HF	3277.3	
	PEACH	CHLORPYRIFOS 4E AG	118.7	
		LORSBAN 4E-HF	41.7	
		LORSBAN-4E	36.0	
	SORGHUM MILO	NUFOS 4E	4.3	
	SWEET POTATO	LORSBAN 15G GRANULAR INSECTICIDE	93.2	
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	270.2	
		GOVERN 4E INSECTICIDE	246.4	
		LORSBAN 4E-HF	763.6	
		LORSBAN ADVANCED	42.3	
		LORSBAN-4E	2509.7	
		NUFOS 4E	518.6	
		WHIRLWIND	34.0	
ALFALFA -Total Pounds Chlorpyrifos Applied			345.5	
ALMOND - Total Pounds Chlorpyrifos Applied			41324.3	
CORN - Total Pounds Chlorpyrifos Applied			3696.9	
GRAPES - Total Pounds Chlorpyrifos Applied			3277.3	
PEACH - Total Pounds Chlorpyrifos Applied			196.4	
SORGHUM MILO - Total Pounds Chlorpyrifos Applied			4.3	

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		SWEET POTATO - Total Pounds Chlorpyrifos Applied	93.2
		WALNUT - Total Pounds Chlorpyrifos Applied	4384.8
		Total Pounds Chlorpyrifos Applied (2005-2010)	53322.6

The Coalition has determined the most probable source of chlorpyrifos in the Highline Canal @ Hwy 99 waterway to be spray drift and irrigation drainage from adjacent fields. In this subwatershed, chlorpyrifos exceedances often occurred in July (2007-2009), but have also occurred during storm monitoring (January 2008 and March 2006) (Table VII-8). Consequently, outreach efforts focus both on encouraging management practices aimed at reducing spray drift and improving water management. The Coalition targeted growers applying chlorpyrifos and also those owning parcels with the potential to drain to the canal. Growers are encouraged to review their farming operations to determine if irrigation return flows are managed properly. Owners operating orchards are encouraged to evaluate their aerial applications to minimize spray drift.

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

In accordance with the Coalition's Management Plan strategy, individual contacts with targeted growers began in November 2009. Targeted growers were selected based on the potential to drain or drift to the canal and those applying chlorpyrifos. Using these criteria, 10 targeted growers, representing 368 acres, were contacted. Coalition representatives met with growers on their property to discuss the Highline Canal Management Plan and offer 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 copper, diuron, ammonia, pH, SC, TDS, *E. coli*, and lead WQTLs exceedances as well as toxicity to *C. dubia*, *S. capricornutum* and *H. azteca*.

To date, the Coalition has contacted all 10 targeted members representing 368 acres or 33% of the total subwatershed direct drainage acreage. Of these 10 members, there were no recommended management practices for the Highline Canal @ Hwy 99 subwatershed.

The Coalition will follow up with growers in April of 2011 to determine if there any practices were implemented during the first irrigation year of high priority monitoring. Highline Canal @ Hwy 99 is being monitored for Assessment Monitoring constituents during 2011 and these results will be reviewed to further evaluate the management practice process.

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 2010. Copper exceedances occurred five times during 2007 (February, April, and June-August), and

twice in 2008 (January and February) (Table VII-8). The Coalition began monitoring for both the total and dissolved copper fractions in October 2008 to better characterize copper contamination in the subwatershed.

Samples collected from Highline Canal @ Lombardy Rd (located upstream) have exceeded the WQTL for copper numerous times in the past indicating that copper is a water quality concern throughout the canal. Both Highline Canal @ Hwy 99 and Highline Canal @ Lombardy Rd are scheduled for Assessment Monitoring during 2011 which will allow for a better evaluation of copper in the canal during all months of the year.

The PUR data are reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table VII-13, Figure VII-3). The amount of copper applied within the subwatershed decreased annually from 2006 through 2009 and then increased in 2010. The month of January consistently receives the greatest amount of copper applied. 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 greatest quantity of copper. The largest amount of copper applied from 2005 through 2010 was associated with almonds, peaches and walnuts (Table VII-14). The most common products containing copper used within this subwatershed are DuPont™ Kocide and Kocide (Table VII-14).

Table VII-13. Number of copper applications, total pounds applied and total acres treated by month for January 2005 through December 2010 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 OF AI APPLIED	ACRES TREATED
January, 2005	63	21059.0	5037.3
February, 2005	101	5123.9	4325.2
March, 2005	35	3319.9	1511.2
April, 2005	41	5387.7	2321.7
May, 2005	18	2139.3	678.0
June, 2005	2	100.1	45.0
August, 2005	2	176.3	63.0
September, 2005	1	8.6	4.0
October, 2005	2	9.1	8.0
November, 2005	20	15983.3	3993.1
December, 2005	59	14774.6	1746.1
January, 2006	79	90658.2	13310.0
February, 2006	96	10879.8	5316.1
March, 2006	21	1152.6	1374.1
April, 2006	25	2544.1	665.0
May, 2006	22	2701.2	1545.4
August, 2006	2	191.1	63.0
November, 2006	12	12148.1	3039.6
December, 2006	17	2809.6	267.1

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
January, 2007	71	28619.7	5279.8
February, 2007	50	4993.0	2280.9
March, 2007	55	3895.0	2407.8
April, 2007	49	5184.6	1172.0
May, 2007	10	1388.2	310.1
September, 2007	1	18.5	6.0
November, 2007	13	9223.5	2452.0
December, 2007	26	3182.7	432.1
January, 2008	31	8127.0	865.4
February, 2008	49	3733.2	1229.6
March, 2008	42	2405.4	1163.2
April, 2008	4	139.9	93.0
May, 2008	1	9.2	5.0
July, 2008	2	135.0	63.0
December, 2008	25	3298.2	406.9
January, 2009	24	4650.5	576.9
February, 2009	52	3077.1	963.7
March, 2009	17	550.4	396.0
April, 2009	14	847.4	219.0
May, 2009	5	401.6	63.0
June, 2009	2	191.2	64.0
July, 2009	2	153.7	63.0
December, 2009	25	4222.0	413.3
January, 2010	33	10562.6	1089.7
February, 2010	99	7474.7	2437.2
March, 2010	39	885.4	986.1
April, 2010	16	1153.7	261.5
May, 2010	5	81.0	29.0
July, 2010	4	340.5	135.0
August, 2010	2	187.5	63.0
October, 2010	1	26.9	25.0
Summaries by Year			
2005 Total	344	68081.6	19732.6
2006 Total	274	123084.7	25580.3
2007 Total	275	56505.2	14340.7
2008 Total	154	17847.9	3826.1
2009 Total	141	14093.8	2758.9
2010 Total	199	20712.4	5026.4
Total	1387	300325.6	71265.0

Figure VII-3. Pounds of copper applied within the Highline Canal @ Hwy 99 site subwatershed by month for 2005-2010. Asterisk (*) denotes months with exceedances.

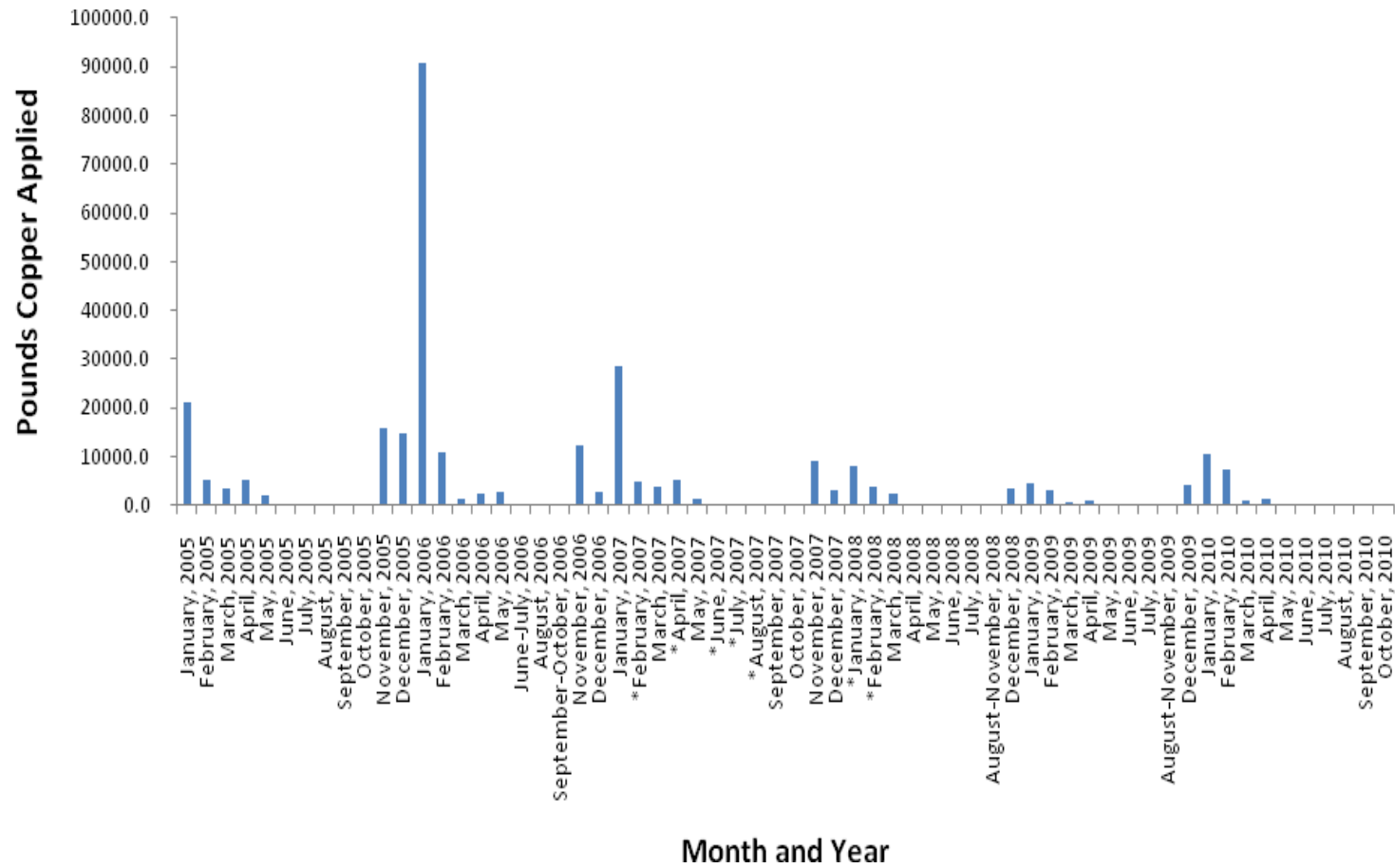


Table VII-14. Total pounds AI for copper based on PUR data from 2005-2010 within the Highline Canal @ Hwy 99 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	ALMOND	BASIC COPPER 53	103275.5
		BASICOP	1229.1
		CHAMP FORMULA 2 FLOWABLE	9727.5
		CHAMPION WETTABLE POWDER	6061.4
		CUPROFIX DISPERS	7.4
		CUPROFIX ULTRA 40 DISPERS	1338.7
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	5251.8
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	73.7
		HYDROX	4350.5
		KOCIDE 101	12471.0
		KOCIDE 2000	4366.7
		KOCIDE DF	8957.9
		NORDOX	56.4
		NORDOX 75 WG	21578.2
		NU-COP 50 WP	6190.8
		NU-COP 50DF	33197.2
	APRICOT	KOCIDE DF	310.1
	CHERRY	BASIC COPPER 53	19.6
		CHAMPION WETTABLE POWDER	23.1
	GRAPE (RAISIN, WINE)	BASIC COPPER 53	230.3
		CHAMP FORMULA 2 FLOWABLE	1860.1
		CHAMPION WETTABLE POWDER	10.8
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	502.4
		COCS 15 SULFUR 25 DUST	82.5
		IAP COPPER SULFUR 15-25 DUST	790.5
		KOCIDE 4.5 LF	318.4
		KOCIDE 606 FLOWABLE AGRICULTURAL FUNGICIDE	713.8
	N-OUTDR CONTAINER/FLD GRWN PLANTS	CHAMPION WETTABLE POWDER	2501.5
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	26.9
		KOCIDE 2000	242.6
		NU-COP 50 WP	90.1
		NU-COP 50DF	46.2
	PEACH	BASIC COPPER 53	34272.6
		CHAMPION WETTABLE POWDER	641.4
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	535.0
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	286.4
		KOCIDE 101	1121.1
		KOCIDE 2000	104.3

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		KOCIDE DF	1978.3
		NORDOX 75 WG	8963.9
		NU-COP 50 WP	40.0
		NU-COP 50DF	2470.9
	PISTACHIO	CUPROFIX ULTRA 40 DISPERSS	81.1
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	BASIC COPPER 53	1215.2
		CHAMP FORMULA 2 FLOWABLE	1170.9
		CHAMPION WETTABLE POWDER	386.5
		CUPROFIX ULTRA 40 DISPERSS	298.6
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	9.2
		DUPONT KOCIDE 101 FUNGICIDE/BACTERICIDE	78.5
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1808.2
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	95.8
		KENTAN DF	559.1
		KOCIDE 101	5672.0
		KOCIDE 2000	5748.0
		KOCIDE DF	2039.7
		NORDOX 75 WG	3922.3
		NU-COP 50DF	924.0
ALMOND - Total Pounds Copper Applied		218133.8	
APRICOT - Total Pounds Copper Applied		310.1	
CHERRY - Total Pounds Copper Applied		42.7	
GRAPES - Total Pounds Copper Applied		4508.8	
N-OUTDR CONTAINER - Total Pounds Copper Applied		2907.3	
PEACH - Total Pounds Copper Applied		50413.9	
PISTACHIO - Total Pounds Copper Applied		81.1	
WALNUT - Total Pounds Copper Applied		23928.0	
Total Pounds Copper Applied (2005-2010)		300325.6	

Diuron

Concentrations of diuron have exceeded the WQTL twice in this subwatershed (February 2007 and January 2008), see Table VII-8. During 2011, Highline Canal @ Hwy 99 is scheduled for Assessment Monitoring where every constituent will be monitored each month of the year.

All PUR data are reviewed for the number of monthly diuron applications, pounds active ingredient applied, and acres treated (Table VII-15, Figure VII-4). Between 2005 and 2010 there has been a sharp decline in applications of diuron in the Highline Canal subwatershed (550 lbs AI applied in 2005 and 0 lbs AI applied in 2010). The months with the largest amount of pounds applied are usually January and December, however April received the most pounds applied in 2009 (Table VII-15, Figure VII-4).

The lowest amount applied between 2005 and 2009 was in April 2009; it was the only month that received applications during that entire year (Table VII-15, Figure VII-4). Diuron was applied to alfalfa,

walnuts, and corn in this subwatershed, and alfalfa and walnuts received the most pounds applied (Table VII-16).

Table VII-15. Number of diuron applications, total pounds applied and total acres treated by month for January 2005 through December 2010 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 OF AI APPLIED	ACRES TREATED
January, 2005	4	106.0	151.0
October, 2005	2	59.1	40.0
November, 2005	2	44.5	73.0
December, 2005	4	341.1	242.4
January, 2006	2	67.2	46.0
October, 2006	1	30.0	20.0
November, 2006	2	27.1	65.0
December, 2006	1	318.8	217.4
January, 2007	3	122.6	104.4
February, 2007	2	66.3	46.0
March, 2007	1	17.8	40.0
April, 2007	2	33.4	75.0
June, 2007	1	0.5	14.0
November, 2007	2	12.6	63.0
December, 2007	1	320.7	217.4
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	12	573.8	559.8
2009 Total	2	15.3	104.9
Total	32	1582.9	1519.5

*No diuron PUR data reported for 2008 and 2010.

Figure VII-4. Pounds of diuron applied within the Highline Canal @ Hwy 99 site subwatershed by month for 2005-2010. Asterisk (*) denotes months with exceedances. No diuron PUR data was reported for 2008 and 2010.

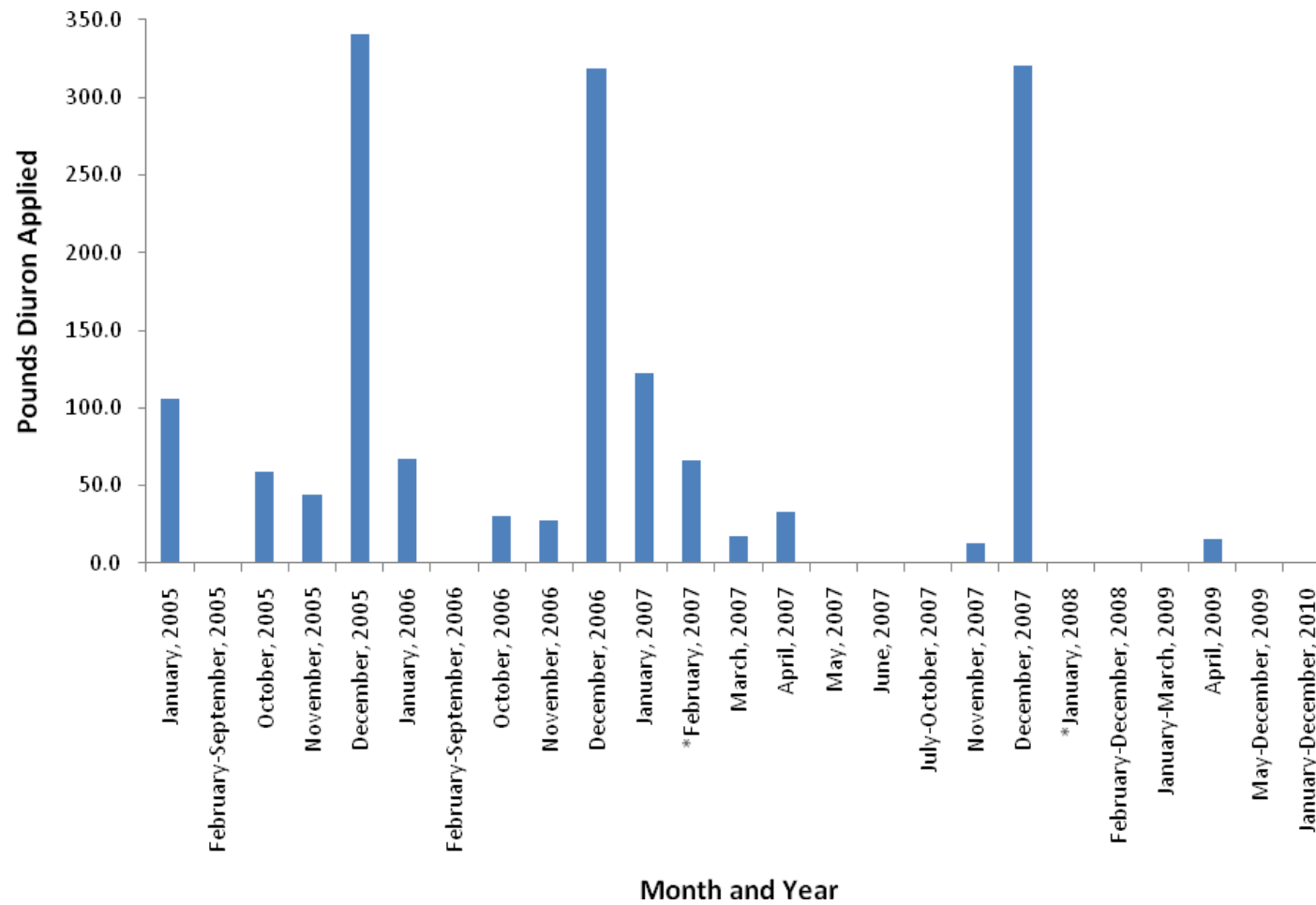


Table VII-16. Total pounds AI for diuron based on PUR data from 2005-2010 within the Highline Canal @ Hwy 99 subwatershed. No diuron PUR data reported for 2008 and 2010.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
DIURON	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	DIREX 4L	1077.4
	CORN (FORAGE - FODDER)	DU PONT KARMEX DF HERBICIDE	0.5
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	DIREX 4L	340.6
		DREXEL DIURON 4L HERBICIDE	136.5
		DUPONT DIREX 4L HERBICIDE	27.9
ALFALFA -Total Pounds Diuron Applied			1077.4
CORN -Total Pounds Diuron Applied			0.5
WALNUT - Total Pounds Diuron Applied			504.9
Total Pounds Diuron Applied (2005-2010)			1582.9

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. Improved and additional water management practices should reduce or eliminate diuron exceedances.

Priority D Constituents

Priority D constituents in the Highline Canal @ Hwy 99 subwatershed are water column toxicity to *C. dubia* and *S. capricornutum* and sediment toxicity to *H. azteca*.

Ceriodaphnia dubia toxicity

Toxicity to *C. dubia* 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 *C. dubia* did not occur during 2008. There was no MPM for *C. dubia* toxicity scheduled during 2010.

The Coalition's strategy for eliminating *C. dubia* toxicity will involve focusing on chlorpyrifos by controlling the movement of chlorpyrifos to the canal. If chlorpyrifos can be prevented from entering waterways throughout the irrigation season, the Coalition believes that *C. dubia* toxicity can also be reduced or eliminated.

Selenastrum capricornutum toxicity

Water column toxicity to *S. capricornutum* occurred March 2006 and February, April, and May 2008. The February 2008 storm toxicity coincided with an exceedance of the copper WQTL.

The Coalition's strategy for eliminating *S. capricornutum* toxicity involves 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 *S. capricornutum* toxicity can also be reduced or eliminated. There were no exceedances of the copper WQTL and also no water column toxicity associated with *S. capricornutum* during 2010 monitoring at Highline Canal @ Hwy 99.

Hyaella azteca toxicity

Sediment toxicity to *H. azteca* 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 as determined by resampling. Sediment toxicity was monitored as part of MPM during September 2010 and no toxicity occurred. In 2011, Highline Canal @ Hwy 99 is scheduled for Assessment Monitoring where sediment will be analyzed during both the March and September sampling events.

Priority E Constituents

The following priority E constituents are listed under the Highline Canal @ Hwy 99 Management Plan: ammonia, pH, SC, TDS, *E. coli*, and lead. Two *E. coli* exceedances (January and February) were the only exceedances of the priority E constituents experienced during 2010 monitoring. 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 high priority site subwatersheds within the ESJWQC and has just completed its first year of focused outreach. The Coalition has focused its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Highline Canal subwatershed has been to target growers with parcels located adjacent to the waterway and who may discharge or drift into the canal. Focus continues to be on water retention management practices and minimizing spray drift. Outreach includes grower notification, management practice outreach and education, tracking of management practices, and providing information on special studies of management practice efficacy.

Individual grower surveys documenting current management practice implementations and assessing future planned implementations have been completed and returned representing 100% of targeted growers. The Summary of Implemented Management Practice section of this report summarizes the results of these contacts. In April 2011, the Coalition will initiate follow up contacts to identify newly implemented practices and future monitoring to evaluate water quality improvement.

In 2011, Assessment Monitoring is scheduled where all high priority constituents will be monitored monthly.

HIGH PRIORITY SITE SUBWATERSHEDS (2011 -2013)

VIII. BERENDA SLOUGH ALONG AVE 18 ½

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority D

- *Selenastrum capricornutum* water column toxicity

Priority E

- DO
- *E. coli*

Description of Berenda Slough along Ave 18 ½ Site Subwatershed

Berenda Slough along Avenue 18 ½ (25,006 irrigated acres) flows from Berenda Reservoir south and west through northern Madera County and, when flows are sufficient, empties into the Eastside Bypass. Generally Berenda Slough does not confluence with the Bypass due to insufficient flow. The sampling site is located directly south of the city of Chowchilla. This sampling location also has an upstream site, Berenda Slough @ Rd 19; sampling locations and coordinates are provided in Table VIII-1. The primary agriculture in the site subwatershed is orchards and vineyards with small amounts of pasture and field crops (Figure VIII-1).

Table VIII-1. Coordinates of the Berenda Slough site subwatershed sampling locations.

SAMPLE SITE	STATION CODE	TARGET LATITUDE	TARGET LONGITUDE
Berenda Slough along Ave 18 1/2*	545XBSAAE	37.0182	-120.3265
Berenda Slough @ Rd 19 ^U	545XBSARN	37.1214	-120.2021

*Original ESJWQC sampling site

^UUpstream sites

Legend

Citrus, I	Idle, NI	Barren Wasteland, NI	Monitoring Site
Deciduous Fruit, Nut, I	Pasture, I	Riparian Vegetation, NI	Major Cities
Deciduous Fruit, Nut, NI	Pasture, NI	Wild Vegetation, NI	Hydrology
Field Crops, I	Rice, I	Water Surface, NI	US & State Hwys
Grains, Hay, I	Truck, Nursery, Berry, I	Feedlot, Dairy, Farmstead, NI	Local Roads
Grains, Hay, NI	Vineyard, I	Urban, NI	Westside Coalition
Idle, I	Vineyard, NI	Golfcourse, cemetery, Landscape, NI	Land Use Source

Source of Layers:
 Hydrology - NHD hydrodata, 1:24,000-scale, <http://nhd.usgs.gov/>
 Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library, NAD 1927

Land Use Source
<http://www.landwateruse.water.ca.gov/basicdata/landuse/landusesurvey.cfm>
 Stanislaus - 2004, Merced - 2002, Madera - 2001, Calaveras - 2000, Tuolumne - 1997, Mariposa - 1998

Berenda Slough along Ave 18 1/2

Date Prepared: 01/18/1
 ESJWQC

Subwatershed Monitoring History

Monitoring at Berenda Slough first began in May 2006 and continued through the 2008 irrigation season (Table VIII-2). Twelve monitoring events during this time period resulted in no samples due to lack of flow: both 2007 storm events, two 2007 irrigation, and all 2008 events. Berenda Slough was not scheduled for monitoring from 2009 through 2010 (Table VIII-3).

Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and continued through 2008. Additional sampling in 2007 at Berenda Slough along Ave 18 ½ occurred for chlorpyrifos (Table VIII-4) and upstream monitoring in 2008 at Berenda Slough @ Rd 19 occurred for chlorpyrifos and *S. capricornutum* toxicity (Table VIII-5).

Sampling at Berenda Slough along Ave. 18 ½ did not occur in 2009 or 2010.

Berenda Slough is listed under the 2008 Central Valley Basin Plan 303d list of impaired waterbodies for chlorpyrifos. The potential source for the impairment caused by chlorpyrifos is agriculture.

Table VIII-2. Berenda Slough along Ave 18 1/2 sampling events per season and year.

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

Table VIII-3. Number of analyses performed per analyte in each sampling season for the Berenda Slough along Ave 18 ½ sample site.

Only environmental samples with a sample replicate and lab replicate of one are listed.

METHOD	ANALYTE	2006	2007		2008		2009		2010
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER-FALL*
Field and Physical Parameters									
EPA 110.2	Color	5		4					
EPA 160.1	Dissolved Solids	5		4					
EPA 160.2	Suspended Solids								
EPA 180.1	Turbidity	5		4					
EPA 405.1	BOD	1		1					
EPA 415.1	Total Organic Carbon	5		4					
SM 9223	<i>E. coli</i>	5		4					
NA	Dissolved Oxygen	5		7					
NA	Specific Conductivity	5		7					
NA	pH	5		7					
Carbamates									
EPA 8321A	Aldicarb	5		4					
EPA 8321A	Carbaryl	5		4					
EPA 8321A	Carbofuran	5		4					
EPA 8321A	Diuron	5		4					
EPA 8321A	Linuron	5		4					
EPA 8321A	Methiocarb	5		4					
EPA 8321A	Methomyl	5		4					
EPA 8321A	Oxamyl	5		4					
Organochlorines									
EPA 8081A	DDD(p,p')	5		4					
EPA 8081A	DDE(p,p')	5		4					
EPA 8081A	DDT(p,p')	5		4					
EPA 8081A	Dicofol	5		4					
EPA 8081A	Dieldrin	5		4					
EPA 8081A	Endrin	5		4					
EPA 8081A	Methoxychlor	5		4					
Organophosphates									
EPA 8141A	Azinphos methyl	5		5					
EPA 8141A	Chlorpyrifos	5		5					
EPA 8141A	Demeton-s								
EPA 8141A	Diazinon	5		5					
EPA 8141A	Dichlorvos								
EPA 8141A	Dimethoate	5		5					
EPA 8141A	Disulfoton	5		5					
EPA 8141A	Malathion	5		5					
EPA 8141A	Methamidophos	5		4					
EPA 8141A	Methidathion	5		5					
EPA 8141A	Molinate	5		5					
EPA 8141A	Parathion, Methyl	5		5					
EPA 8141A	Phorate	5		5					
EPA 8141A	Phosmet	5		5					

METHOD	ANALYTE	2006	2007		2008		2009		2010
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER-FALL*
EPA 8141A	Thiobencarb	5		5					
Pyrethroids									
EPA 8081A	Bifenthrin	5		4					
EPA 8081A	Cyfluthrin, total	5		4					
EPA 8081A	Cyhalothrin, lambda, total	5		4					
EPA 8081A	Cypermethrin, total	5		4					
EPA 8081A	Esfenvalerate/ Fenvalerate, total	5		4					
EPA 8081A	Permethrin, total	5		4					
Triazines									
EPA 547M	Glyphosate	5		4					
EPA 549.2M	Paraquat dichloride	5		4					
EPA 619	Atrazine	5		4					
EPA 619	Cyanazine	5		4					
EPA 619	Simazine	5		4					
Toxicity									
EPA 821/R-02-012	<i>Ceriodaphnia dubia</i>	6		4					
EPA 821/R-02-012	<i>Pimephales promelas</i>	5		4					
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>	5		6					
EPA 600/R-99-064	<i>Hyalella azteca</i>	1		1					

*Site not sampled during the 2008 fall season, and 2009 and 2010 sampling years.

Table VIII-4. Berenda Slough along Ave 18 1/2 . 2007 Management Plan additional (A) monitoring schedule for chlorpyrifos. X = indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	CHLORPYRIFOS
Berenda Slough along Ave 18 ½	24-Jul-07	A	x
Berenda Slough along Ave 18 ½	18-Sept-07	A	x

Table VIII-5. Berenda Slough @ Rd 19. 2008 Management Plan Monitoring. U = upstream sampling. X = indicates what constituents were sampled.

SAMPLE SITE	DATE	TYPE	CHLORPYRIFOS	<i>SELENASTRUM CAPRICORNUTUM</i>
Berenda Slough at Rd 19	27-May-08	U		x
Berenda Slough at Rd 19	29-July-08	U	x	x
Berenda Slough at Rd 19	30-Sept-08	U	x	

Exceedance History

Exceedances of WQTLs include eight DO, two *E. coli*, three chlorpyrifos, and one diuron. Samples collected were toxic to *C. dubia* once and to *S. capricornutum* twice (Table VIII-6). The only exceedance recorded at the upstream sampling location was of DO (Table VIII-6).

All exceedances are listed in Table VIII-6 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 VIII-6 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR).

Table VIII-6. Exceedances experienced in samples collected from the Berenda Slough along Ave 18 ½ Coalition monitoring site May 2006 through September 2008 (sorted by season and date).

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

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7mg/L	<i>E. COLI</i> , >235 MPN/100 mL	CHLORPYRIFOS, >0.015 µg/L	DIURON, >2 µg/L	<i>C. DUBIA</i> , (% CONTROL)	<i>S. CAPRICORNUTUM</i> , (% CONTROL)
Berenda Slough along Ave 18 1/2	Irrigation	5/16/2006						
Berenda Slough along Ave 18 1/2	Irrigation	6/13/2006	5.49	460				
Berenda Slough along Ave 18 1/2	Irrigation	7/11/2006	6.54		0.043			
Berenda Slough along Ave 18 1/2	Irrigation	8/8/2006						
Berenda Slough along Ave 18 1/2	Irrigation	9/12/2006			0.14		40	
Berenda Slough along Ave 18 1/2	Irrigation	5/29/2007	1.75			3.4		78
Berenda Slough along Ave 18 1/2	Irrigation	6/5/2007	3.07					
Berenda Slough along Ave 18 1/2	Irrigation	6/26/2007	5.2	390				
Berenda Slough along Ave 18 1/2	Irrigation	7/24/2007	6.37		0.028			12
Berenda Slough along Ave 18 1/2	Irrigation	7/31/2007	4.72					70
Berenda Slough along Ave 18 1/2	Irrigation	8/21/2007	6.13					
Berenda Slough @ Rd 19	Irrigation	7/29/2008	1.10					
Constituent Priority			E	E	A/B	NP	NP	D

2007-2010 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table VIII-7 for chlorpyrifos and water column toxicity to *S. capricornutum* for 2007 through 2008.

2007

Additional MPM was conducted in July and September 2007 for chlorpyrifos (Table VIII-4). No chlorpyrifos was detected in the July samples, and the September samples were not collected because the site was dry (Table VIII-7). One week prior to the July MPM, an exceedance occurred on July 24, 2007 for chlorpyrifos (Table VIII-6).

2008

Upstream MPM occurred at the Berenda Slough @ Rd 19 sampling location in 2008 (Table VIII-5). The Coalition monitored for *S. capricornutum* toxicity (May and July) and chlorpyrifos (July and September) during 2008, however; only the July event occurred because the sample site was dry in May and September of 2008 (Table VIII-7). No exceedances were detected during the July 2008 MPM.

2009-2010

Monitoring for MPM did not occur at Berenda Slough during 2009 through 2010.

2011

During 2011, Berenda Slough @ Rd 18 ½ is scheduled for Assessment Monitoring where all high priority constituents will be analyzed monthly. In 2011, MPM includes chlorpyrifos (July and September) and *S. capricornutum* toxicity (May and July). In 2012, Assessment Monitoring will take place again at this location.

Table VIII-7. Berenda Slough along Ave 18 ½. Normal Monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

MONTH:		APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (along Ave 18 ½)	Date	4/24/2007	5/29/2007	6/26/2007	7/24/2007	8/21/2007	9/18/2007
	Chlorpyrifos (µg/L)	Site dry	<0.003	<0.003	0.028	<0.003	Site dry
2007 MPM A (along Ave 18 ½)	Date	NA	NA	NA	7/31/2007	NA	9/25/2007
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	Site dry
2008 NM (along Ave 18 ½)	Date	4/29/2008	5/27/2008	6/24/2008	7/29/2008	8/26/2008	9/30/2008
	Chlorpyrifos (µg/L)	Site dry	Site dry	Site dry	Site dry	Site dry	Site dry
	<i>S. Capricornutum</i> toxicity (% Control)	Site dry	Site dry	Site dry	Site dry	Site dry	Site dry
2008 MPM US (@ Rd 19)	Date	NA	5/27/2008	NA	7/29/2008	NA	9/30/2008
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	NA	Site dry
	<i>S. Capricornutum</i> toxicity (% Control)	NA	Site dry	NA	283	NA	NA

NA - Not applicable, site not sampled during this month.

NM- Normal Monitoring

MPM- Management Plan Monitoring

A- Additional Monitoring conducted in 2007.

US- Upstream Monitoring conducted in 2008

Load Calculations

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

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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 VIII-8. Instantaneous load calculations for chlorpyrifos where discharge was measured in the Berenda Slough site subwatershed (sorted by analyte and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION $\mu\text{G/L}$	LOADING RATE $\mu\text{G/SEC}$
Berenda Slough along Ave 18 1/2	Chlorpyrifos	07/11/06	0	0.043	0
Berenda Slough along Ave 18 1/2	Chlorpyrifos	09/12/06	18.54	0.14	73.50
Berenda Slough along Ave 18 1/2	Chlorpyrifos	07/24/07	0	0.028	0

Source Identification and Outreach

The Coalition considers past monitoring results and associated PUR data to address source identification. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007, the Coalition conducted additional MPM during the months when exceedances historically occurred to better characterize water quality the subwatershed. The Coalition also conducted upstream MPM in 2008, but the upstream location was dry two of the three scheduled monitoring months.

The Berenda Slough subwatershed is a high priority subwatershed as of 2011 and will remain so through 2013. The Coalition will actively engage in grower outreach and education to address Berenda Slough Management Plan's highest priority constituents. The Coalition has begun to organize grower meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings with targeted members are planned to inform growers about management practices as well as to assess current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos is the only A/B constituent for the Berenda Slough subwatershed.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015 $\mu\text{g/L}$ three times in this subwatershed. Exceedances of chlorpyrifos were associated with the irrigation seasons of 2006 and 2007 (Table VIII-6). During 2011,

Berenda Slough along Ave 18 ½ is scheduled to be monitored for Assessment Monitoring constituents where chlorpyrifos will be monitored on a monthly basis.

All PUR data are reviewed for the number of monthly applications, pounds of active ingredient applied, and the acres treated (Table VIII-9, Figure VIII-2). The PUR data from the Berenda Slough along Ave 18 ½ subwatershed area were reviewed for chlorpyrifos use. The greatest amount of chlorpyrifos use occurred in 2006 (20,053 lbs AI) with the lowest amount of use occurring in 2010 (2,346 lbs AI). The greatest chlorpyrifos use has occurred consistently in the months of July and August (Table VIII-9, Figure VIII-2).

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications (Table VIII-10). The largest amount of chlorpyrifos applied from 2006 through 2010 was to almonds (36,140 lbs AI) followed by grapes (1,584 lbs AI). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table VIII-10).

Table VIII-9. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for 2006 through 2010 in the Berenda Slough along Ave 18 ½ 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, 2006	1	109.7	55
April, 2006	4	529.7	290
May, 2006	19	3731.5	2213.5
June, 2006	9	550.9	307.5
July, 2006	63	7660.1	3943
August, 2006	20	7367.0	2453
September, 2006	3	104.9	105
January, 2007	1	562.9	320
May, 2007	9	2305.1	1144
July, 2007	31	3937.4	2053
August, 2007	3	589.0	298
September, 2007	1	38.4	38
March, 2008	3	875.3	471
April, 2008	3	320.8	160
June, 2008	6	266.8	274.2
July, 2008	10	249.9	322
August, 2008	5	110.8	304.2
October, 2008	6	793.6	398
March, 2009	1	13.7	6.75
April, 2009	1	9.6	4
May, 2009	3	905.7	449
June, 2009	11	694.9	344
July, 2009	13	2216.7	1383.9
August, 2009	12	2764.5	1368.8
October, 2009	3	437.6	233
March, 2010	1	40.0	20
April, 2010	2	16.1	39

MONTH/YEAR	NUMBER OF CHLORPYRIFOS APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
May, 2010	1	10.1	32
June, 2010	4	672.6	367.5
July, 2010	3	1146.6	573
August, 2010	2	108.0	72
October, 2010	2	283.6	151
November, 2010	1	69.5	37
Summaries by Year			
2006 Total	119	20053.7	9367
2007 Total	45	7432.8	3853
2008 Total	33	2617.1	1929.4
2009 Total	44	7042.8	3789.4
2010 Total	16	2346.4	1291.5
Total	257	39492.7	20230.3

Figure VIII-2. Pounds of chlorpyrifos applied within the Berenda Slough along Ave 18 ½ site subwatershed by month for 2006-2010. Asterisk (*) denotes months with exceedances.

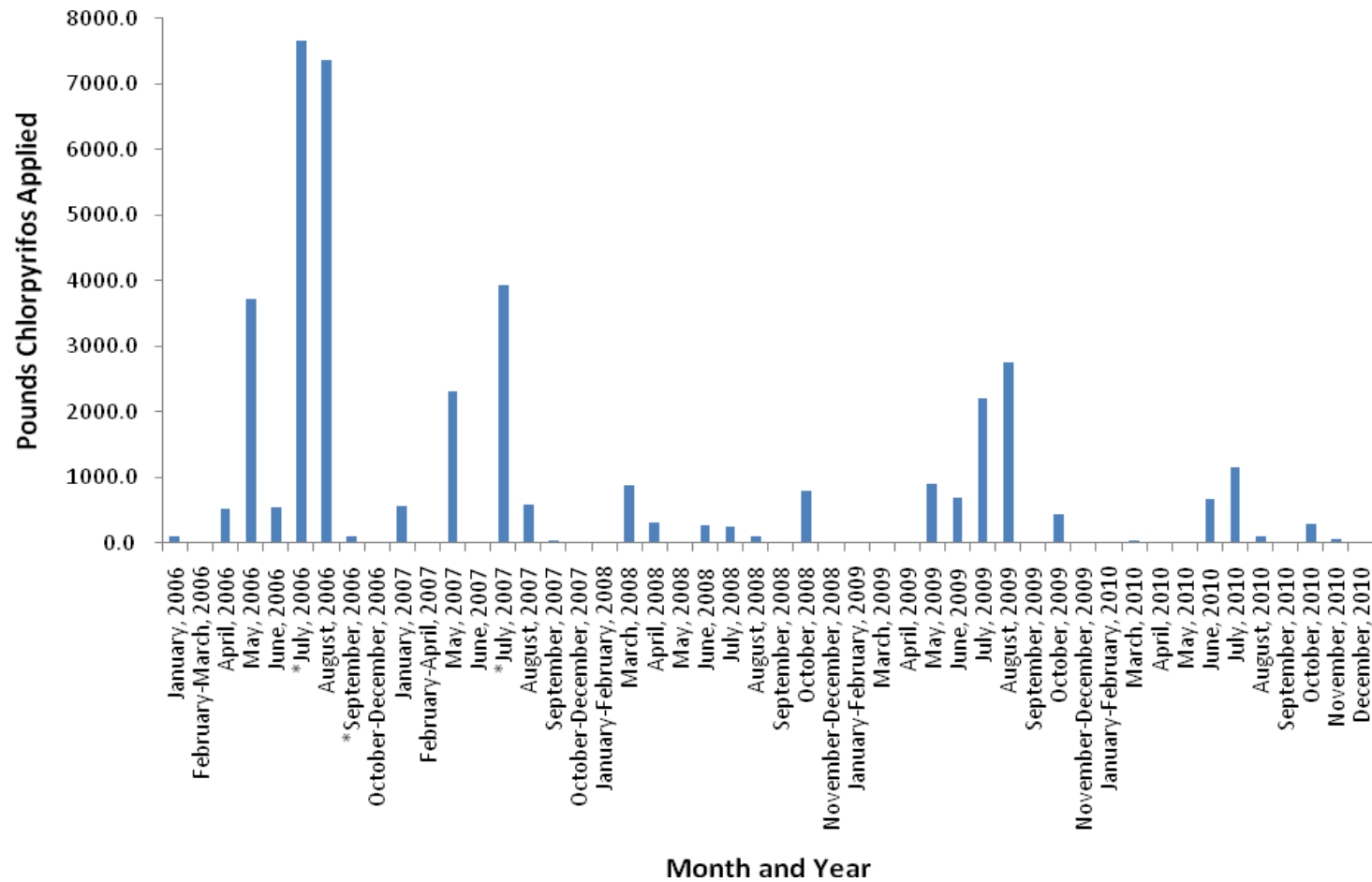


Table VIII-10. Total pounds active ingredient (AI) for chlorpyrifos based on PUR data from 2006-2010 within the Berenda Slough along Ave 18 ½ subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA	LOCK-ON INSECTICIDE	74.1
		LORSBAN 4E-HF	74.7
		LORSBAN-4E	15.8
	ALMOND	CHLORPYRIFOS 4E AG	703.6
		GOVERN 4E INSECTICIDE	20629.3
		LORSBAN 4E INSECTICIDE	224.6
		LORSBAN 4E-HF	1981.9
		LORSBAN ADVANCED	67.6
		LORSBAN-4E	6443.5
		NUFOS 4E	2185.5
		WARHAWK	2108.4
		WHIRLWIND	1795.7
	CORN (FORAGE - FODDER)	GOVERN 4E INSECTICIDE	262.6
		LORSBAN 4E-HF	47.9
		LORSBAN-4E	187.1
		NUFOS 4E	38.6
	GRAPES, WINE	LORSBAN 4E-HF	793.6
		LORSBAN ADVANCED	790.6
	PRUNE	NUFOS 4E	13.7
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	LORSBAN 4E-HF	1036.8
		LORSBAN ADVANCED	16.9
ALFALFA - Total Pounds Chlorpyrifos Applied			164.7
ALMOND - Total Pounds Chlorpyrifos Applied			36140.1
CORN - Total Pounds Chlorpyrifos Applied			536.2
GRAPES - Total Pounds Chlorpyrifos Applied			1584.2
PRUNE - Total Pounds Chlorpyrifos Applied			13.7
WALNUT - Total Pounds Chlorpyrifos Applied			1053.7
Total Pounds Chlorpyrifos Applied (2006-2010)			39492.7

The Coalition noted in the 2008 Management Plan that the chlorpyrifos concentrations found in Berenda Slough were most likely the result of tailwater transporting chlorpyrifos to the slough. Because the chlorpyrifos concentrations were well above the WQTL, it is unlikely they were the result of spray drift. Furthermore, as discussed above, PUR data indicated large numbers of applications and large amounts of active ingredient were applied throughout the subwatershed prior to the 2006 and 2007 exceedances. The highest chlorpyrifos concentration was the September 2006 exceedance which was associated with the only *C. dubia* toxicity in the subwatershed's history. Toxicity identification evaluation results indicated the cause of toxicity was a metabolically activated pesticide such as chlorpyrifos.

Monitoring results and PUR data indicate that management of chlorpyrifos in this watershed should focus on farming operations to determine if irrigation return flows are managed properly (specifically, growers with the potential to drain to the creek). Row crop farmers will be advised of methods to better manage their irrigation tailwater and storm water runoff, whereas outreach efforts to orchard

and vineyard growers will focus on encouraging management practices to reduce spray drift and also to improve orchard and vineyard water management.

Since 2007, general Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of this report. Targeted growers were selected based on their crop type, pesticide usage, and the potential of their parcel to drain to Berenda Slough.

The Coalition began conducting individual meetings with targeted growers in the third priority subwatersheds during the winter of 2011. Although meetings are focusing mainly on chlorpyrifos exceedances, all water quality results are reviewed and discussed including *S. capricornutum* toxicity, which may be related to diuron exceedances, and exceedances of *E. coli* and DO. The Coalition contacted 22 members accounting for 4,337 acres of targeted direct drainage.

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

Management Plan Monitoring is scheduled to resume at Berenda Slough along Ave 18 1/2 in 2011 during those months when exceedances occurred historically. The Coalition plans to conduct MPM through 2013 to evaluate improvements in water quality as recommended management practice implementation occurs.

Priority D Constituents

S. capricornutum toxicity was experienced twice in the 2007 irrigation season; once in May and once in July, which included a resample in July that was also toxic. An exceedance of diuron was associated with the May 2007 toxicity event, but there were no exceedances of diuron associated with the July toxicity event. There were no exceedances of copper associated with any of the toxicity events.

Since the May 2007 toxicity was associated with diuron, preventing irrigation return flows would be effective in reducing or eliminating *S. capricornutum* toxicity. The Coalition will continue with outreach as explained under the chlorpyrifos section to address the toxicity.

Priority E Constituents

E. coli and DO are the priority E constituents are listed under the Berenda Slough along Ave. 18 1/2 Site Subwatershed Management Plan.

Two exceedances of the *E. coli* WQTL occurred; one in June 2006 and one in July 2007. Berenda Slough site subwatershed was not sampled during the 2006 *E. coli* study, so potential sources are not known.

The Coalition will discuss DO and *E. coli* during individual contacts and at group grower meetings, but these constituents will remain a low priority.

Evaluation

Berenda Slough along Ave 18 ½ is one of the third four priority site subwatersheds within the ESJWQC and is in its first year of focused outreach (2011 through 2013). The Coalition will focus its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Berenda Slough subwatershed is to focus on providing information on a watershed level to growers to review their operation and determine if irrigation return flows are managed properly. The Coalition has targeted growers with crops located adjacent to the waterway and whose agricultural practices may result in the discharge or drift of pesticides into the waterway. In the Berenda Slough subwatershed, almond and walnut growers should be targeted for outreach especially prior to the irrigation season. Outreach includes grower notification, management practice outreach and education, tracking of management practice implementation, and providing information on special studies of management practice efficacy.

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

In 2011, Assessment Monitoring is scheduled where all high priority constituents will be monitored monthly.

IX. DRY CREEK @ ROAD 18

Management Plan Constituents

Priority A/B

- Chlorpyrifos
- Diazinon

Priority C

- Copper
- Diuron

Priority D

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

Priority E

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

Description of Dry Creek @ Road 18 Site Subwatershed

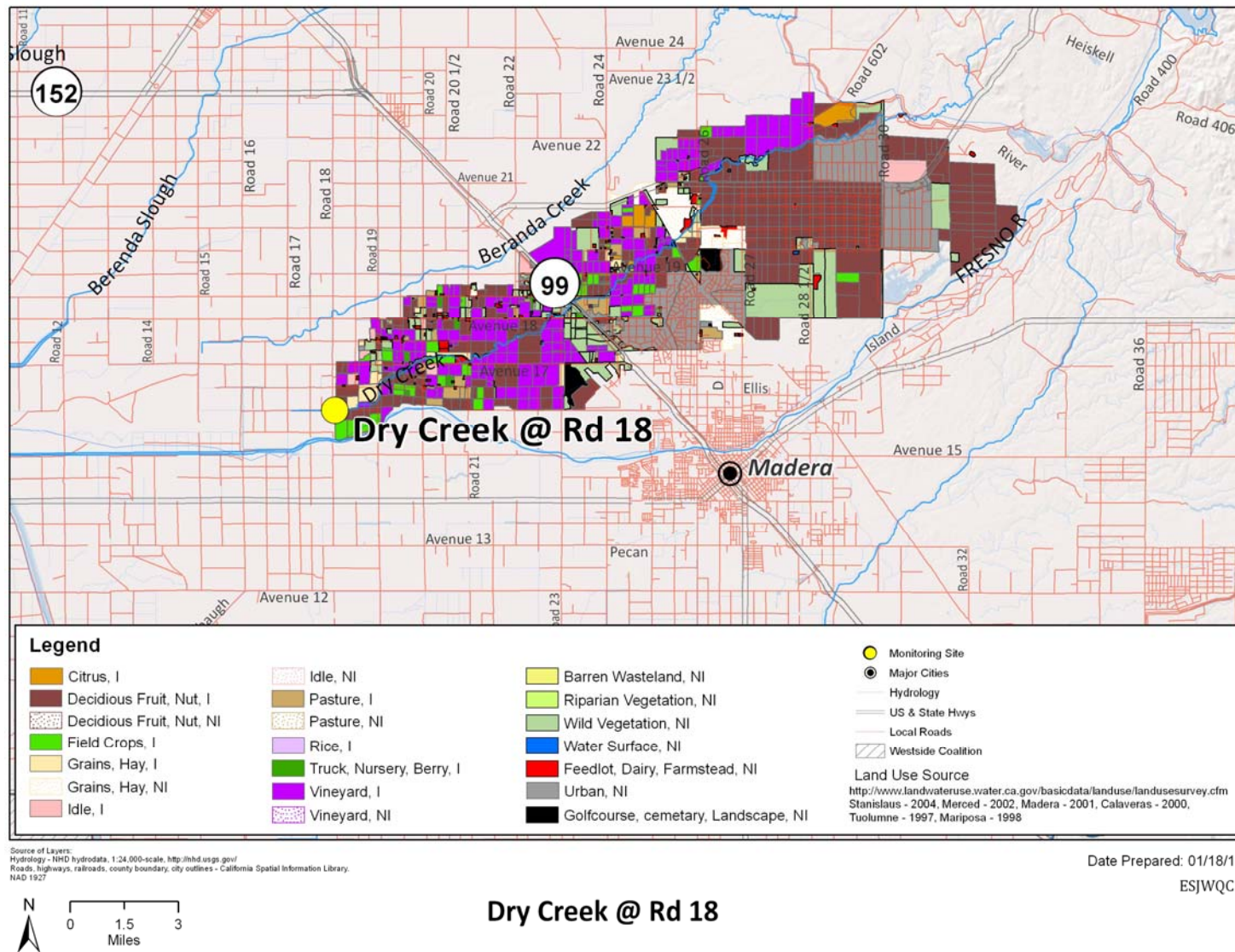
Dry Creek @ Road 18 (22,086 irrigated acres) originates in the Sierra foothills and flows to the north of the city of Madera eventually draining into the San Joaquin River through various channels and irrigation ditches. Deciduous orchards are the primary irrigated agriculture in the upper portion of the site subwatershed whereas vineyards are predominately located in the lower portions (Figure IX-1). There are field crops scattered throughout the site subwatershed (Figure IX-1). Table IX-1 includes the station name (sample site name), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table IX-1. Sampling locations within the Dry Creek site subwatershed.

STATION NAME	STATION CODE	TARGET LAT	TARGET LONG
Dry Creek at Rd 18*	545XDCARE	36.9818	-120.2206
Dry Creek @ Rd 22 ^U	545XDCART	37.0057	-120.1471
Dry Creek @ Rd 28 1/2 ^U	545XDCATE	37.0679	-120.0292

*Original ESJWQC sampling site
UUpstream sites

Figure IX-1. Site subwatershed map of land use for the Dry Creek @ Rd 18 sample site.



Subwatershed Monitoring History

Monitoring within the Dry Creek subwatershed at Dry Creek @ Rd 18 was initiated during the irrigation season of 2005. In 2006, one storm event sample was not collected due to an insufficient flow at the site and one storm event in 2007 was unable to be sampled due to Dry Creek containing shallow, isolated pools of stagnant water. The site was dry during the final irrigation sampling event of 2007 (Table IX-2). Table IX-3 lists all of the constituents sampled by year/season. During the 2007 storm sampling event, sediment was not collected due to the site being dry (Table IX-3).

Monitoring occurred at Dry Creek @ Rd 18 during the storm and irrigation seasons of 2008. During 2008, two storm events were targeted, but samples could not be collected during one of the storm events due to lack of water. In the irrigation season, samples were not collected during one sampling event due to lack of water.

Dry Creek @ Rd 18 was not scheduled for monitoring during 2009 through 2010. In 2011, Dry Creek @ Rd 18 is scheduled for MPM for *S. capricornutum* toxicity (January, February and May), copper (January, February and April through September), chlorpyrifos (February, April and July), diazinon (February), diuron (January and February), *H. azteca* toxicity (March and September) and lead (May, June, August and September). Assessment Monitoring will begin at this site in 2012.

Dry Creek is currently listed under the 2008 Central Valley Basin Plan 303d list of impaired waterbodies for chlorpyrifos, diazinon, *E. coli* and unknown water toxicity. The potential source for the chlorpyrifos and diazinon impairment is listed as agriculture.

Table IX-2. Dry Creek @ Rd 18 sampling events per season per year.

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

Table IX-3. Number of analyses performed per analyte in each sampling season and year for the Dry Creek @ Rd 18 sample site.

Only environmental samples with a sample replicate and lab replicate number of one are listed.

METHOD	ANALYTE	2005	2006		2007		2008			2009	2010
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER-FALL*
Field and Physical Parameters											
EPA 110.2	Color	2		5	1	5	2	5			
EPA 160.1	Dissolved Solids	2		5	1	5	2	5			
EPA 160.2	Suspended Solids										
EPA 180.1	Turbidity	2		5	1	5	2	5			
EPA 405.1	BOD			1	1	2					
EPA 415.1	Total Organic Carbon	2		5	1	5	2	5			
SM 9223	<i>E. coli</i>	2		6	1	5	2	5			
NA	Dissolved Oxygen	2	1	6	1	9	3	6			
NA	Specific Conductivity	2	1	6	1	9	3	6			
NA	pH	2	1	6	1	9	3	6			
Carbamates											
EPA 8321A	Aldicarb			5	1	5	2	5			
EPA 8321A	Carbaryl			5	1	5	2	5			
EPA 8321A	Carbofuran			5	1	5	2	5			
EPA 8321A	Diuron			5	1	5	2	5			
EPA 8321A	Linuron			5	1	5	2	5			
EPA 8321A	Methiocarb			5	1	5	2	5			
EPA 8321A	Methomyl			5	1	5	2	5			
EPA 8321A	Oxamyl			5	1	5	2	5			
Organochlorines											
EPA 8081A	DDD(p,p')			5	1	5	2	5			
EPA 8081A	DDE(p,p')			5	1	5	2	5			
EPA 8081A	DDT(p,p')			5	1	5	2	5			
EPA 8081A	Dicofol			5	1	5	2	5			
EPA 8081A	Dieldrin			5	1	5	2	5			
EPA 8081A	Endrin			5	1	5	2	5			
EPA 8081A	Methoxychlor			5	1	5	2	5			
Organophosphates											
EPA 8141A	Azinphos methyl			5	1	5	2	5			
EPA 8141A	Chlorpyrifos	2		5	1	5	2	5			
EPA 8141A	Demeton-s										
EPA 8141A	Diazinon	2		5	1	5	2	5			
EPA 8141A	Dichlorvos										
EPA 8141A	Dimethoate			5	1	5	2	5			
EPA 8141A	Disulfoton			5	1	5	2	5			
EPA 8141A	Malathion			5	1	5	2	5			
EPA 8141A	Methamidophos			5	1	5	2	5			
EPA 8141A	Methidathion			5	1	5	2	5			
EPA 8141A	Molinate			5	1	5	2	5			
EPA 8141A	Parathion, Methyl			5	1	5	2	5			
EPA 8141A	Phorate			5	1	5	2	5			
EPA 8141A	Phosmet			5	1	5	2	5			

METHOD	ANALYTE	2005	2006		2007		2008			2009	2010
		IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER-FALL*
EPA 8141A	Thiobencarb			5	1	5	2	5			
Pyrethroids											
EPA 8081A	Bifenthrin	1		5	1	5	2	5			
EPA 8081A	Cyfluthrin, total	1		5	1	5	2	5			
EPA 8081A	Cyhalothrin, lambda, total	2		5	1	5	2	5			
EPA 8081A	Cypermethrin, total	2		5	1	5	2	5			
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2		5	1	5	2	5			
EPA 8081A	Permethrin, total	2		5	1	5	2	5			
Triazines											
EPA 547M	Glyphosate			5	1	5	2	5			
EPA 549.2M	Paraquat dichloride			5	1	5	2	5			
EPA 619	Atrazine			5	1	5	2	5			
EPA 619	Cyanazine			5	1	5	2	5			
EPA 619	Simazine			5	1	5	2	5			
Metals (Total)											
EPA 200.8	Arsenic			5	1	5	2	5			
EPA 200.8	Boron			5	1	5	2	5			
EPA 200.8	Cadmium			5	1	5	2	5			
EPA 200.8	Copper			5	1	8	2	5			
EPA 200.8	Lead			5	1	5	2	5			
EPA 200.8	Molybdenum										
EPA 200.8	Nickel			5	1	5	2	5			
EPA 200.8	Selenium			5	1	2	2	5			
EPA 200.8	Zinc			5	1	6	2	5			
Nutrients											
SM 2340 C	Hardness as CaCO3			5	1	8	2	5			
EPA 300.0	Nitrate as N			5	1	5	2	5			
EPA 350.2	Ammonia as N			5	1	5	2	5			
EPA 351.3	Nitrogen, Total Kjeldahl			5	1	5	2	5			
EPA 353.2	Nitrate + Nitrite as N										
EPA 354.1	Nitrite as N			5	1	5	2	5			
EPA 365.2	Orthophosphate as P			5	1	5	2	5			
EPA 365.2	Phosphate as P			5	1	5	2	5			
Toxicity											
EPA 821/R-02-012	<i>Ceriodaphnia dubia</i>	2		6	1	5	2	4			
EPA 821/R-02-012	<i>Pimephales promelas</i>	2		5	1	5	2	6			
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>	2		5	1	6	3	5			
EPA 600/R-99-064	<i>Hyalella azteca</i>	1	1	1		1	1	1			

*Site not sampled during the 2008 fall season, and 2009 and 2010 sampling years.

Table IX-4. Dry Creek @ Rd 18. 2007 Management Plan additional (A) monitoring schedule for copper. X = indicates the constituent sampled.

SAMPLE SITE	DATE	TYPE	COPPER
Dry Creek @ Rd 18	26-Jun-07	A	x
Dry Creek @ Rd 18	24-Jul-07	A	x
Dry Creek @ Rd 18	21-Aug-07	A	x
Dry Creek @ Rd 18	18-Sept-07	A	x

Table IX-5. Dry Creek @ Rd 22 and Dry Creek @ Rd 28 1/2. 2008 Management Plan Monitoring. U = upstream sampling. X = constituents sampled.

SAMPLE SITE	DATE	TYPE	CHLORPYRIFOS	COPPER
Dry Creek @ Rd 22	29-Apr-08	U	x	x
Dry Creek @ Rd 22	27-May-08	U		x
Dry Creek @ Rd 22	24-Jun-08	U		x
Dry Creek @ Rd 22	29-Jul-08	U	x	x
Dry Creek @ Rd 28 ½	29-Jul-08	U		x
Dry Creek @ Rd 22	26-Aug-08	U		x
Dry Creek @ Rd 22	30-Sept-08	U		x
Dry Creek @ Rd 28 ½	30-Sept-08	U		x

Exceedance History

In samples collected from 2005 through 2010, exceedances of WQTLs in samples collected from Dry Creek @ Rd 18 include DO (3), pH (3), E. coli (4), total copper (25), lead (5), zinc (1), chlorpyrifos (3), diazinon (2), and diuron (2) (Table IX-6). Water toxicity to *C. dubia* (1) and *S. capricornutum* (4) occurred and sediment toxicity to *H. azteca* was experienced twice (Table IX-6).

All exceedances are listed in Table IX-6 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 IX-6 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR). The highest priority constituents in the Dry Creek @ Rd 18 subwatershed are chlorpyrifos and diazinon (A/B), copper and diuron (C), and toxicity to *S. capricornutum* and *H. azteca* (D) (Table IX-6).

Table IX-6. Exceedances experienced in samples collected from the Dry Creek @ Rd 18 Coalition monitoring site August 2005 through September 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. Upstream site is italicized.

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7MG/L	pH, NONE	E. COLI, >235 MPN/100 ML	COPPER TOTAL, >1,300 µG/L	LEAD, >15 µG/L	ZINC, µG/L	CHLORPYRIFOS, >0.015 µG/L	DIAZINON, >0.1 µG/L	DIURON, >2 µG/L	C. DUBIA, (% CONTROL)	HYALELLA AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
Dry Creek @ Rd 18	Irrigation	8/16/2005		6.48										
Dry Creek @ Rd 18	Irrigation	9/20/2005			500									
Dry Creek @ Rd 18	Storm	5/3/2006											81.25	
Dry Creek @ Rd 18	Irrigation	5/16/2006			1600	4.3 (1.9)	0.36 (0.31)							
Dry Creek @ Rd 18	Irrigation	6/13/2006				6.3 (1.5)	0.27 (0.21)					80		
Dry Creek @ Rd 18	Irrigation	7/11/2006				4.1 (2.4)			0.077					
Dry Creek @ Rd 18	Irrigation	8/8/2006				4.6 (2.2)								
Dry Creek @ Rd 18	Irrigation	9/12/2006	5.61			6.1 (1.1)	0.31 (0.13)	18 (14.1)						
Dry Creek @ Rd 18	Storm	2/11/2007				14 (3.9)				0.13				
Dry Creek @ Rd 18	Irrigation	4/24/2007			1400	17 (15.4)			0.017					
Dry Creek @ Rd 18	Irrigation	5/29/2007				4.7 (2.4)								64
Dry Creek @ Rd 18	Irrigation	6/19/2007				4.9 (1.5)								

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7MG/L	P _H , NONE	E. COLI, >235 MPN/100 mL	COPPER TOTAL, >1,300 µG/L	LEAD, >15 µG/L	ZINC, µG/L	CHLORPYRIFOS, >0.015 µG/L	DIAZINON, >0.1 µG/L	DIURON, >2 µG/L	C. DUBIA, (% CONTROL)	HYALELLA AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
Dry Creek @ Rd 18	Irrigation	6/26/2007				3.6 (1.9)								
Dry Creek @ Rd 18	Irrigation	7/24/2007				5.6 (2.2)								
Dry Creek @ Rd 18	Irrigation	7/31/2007				4.5 (1.5)								
Dry Creek @ Rd 18	Irrigation	8/21/2007				5.5 (1.9)	0.34 (0.31)							
Dry Creek @ Rd 18	Irrigation	8/28/2007		8.53		4.3 (1.9)								
Dry Creek @ Rd 18	Storm1 NM	1/25/2008			>2400	20 (5.9)					21			36
Dry Creek @ Rd 18	Storm2 NM	2/25/2008				33 (5.5)			0.034	0.24	2			77
Dry Creek @ Rd 18	Storm2 RS	3/4/2008												35
Dry Creek @ Rd 18	Irrigation1 NM	4/29/2008				6.8 (3.0)								
Dry Creek @ Rd 18	Irrigation2 NM	5/27/2008				5 (3.5)								
Dry Creek @ Rd 18	Irrigation3 NM	6/24/2008				4 (2.6)								
Dry Creek @ Rd 18	Irrigation4 NM	7/29/2008				5.9 (1.5)								
Dry Creek @ Rd 18	Irrigation5 NM	8/26/2008	5.82			5.1 (1.3)	0.36 (0.17)							
Dry Creek @ Rd 18	Sediment	8/28/2008	5.62										88	
Dry Creek @ Rd 22	Irrigation1 MPM	4/29/2008		8.8		5.2 (3.0)								
Dry Creek @ Rd 22	Irrigation2 MPM	5/27/2008				5.7 (4.1)								

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, <7MG/L	PH, NONE	E. COLI, >235 MPN/100 ML	COPPER TOTAL, >1,300 µG/L	LEAD, >15 µG/L	ZINC, µG/L	CHLORPYRIFOS, >0.015 µG/L	DIAZINON, >0.1 µG/L	DIURON, >2 µG/L	C. DUBIA, (% CONTROL)	HYALELLA AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
Dry Creek @ Rd 22	Irrigation3 MPM	6/24/2008				6.5 (2.6)								
Dry Creek @ Rd 22	Irrigation4 MPM	7/29/2008				7 (2.4)								
Dry Creek @ Rd 28 1/2	Irrigation4 MPM	7/29/2008				5.3 (1.7)								
Dry Creek @ Rd 22	Irrigation5 MPM	8/26/2008				6.5 (1.5)								
Dry Creek @ Rd 22	Irrigation6 MPM	9/30/2008	3.97			36 (8.2)								
Constituent Priority			E	E	E	C	E	NP	A/B	A/B	C	NP	D	D

2007 -2010 Management Plan Monitoring Results

Management Plan Monitoring results are included in Table IX-7 for copper in 2007 and chlorpyrifos and copper in 2008.

2007

MPM was conducted in June, July, August and September 2007 for copper (Table IX-4). The second chlorpyrifos exceedance did not occur until the irrigation season of 2007 and therefore no additional sampling was conducted for chlorpyrifos. The WQTL for copper was exceeded in samples collected from Dry Creek @ Rd 18 during every month of the irrigation season including MPM in June, July, August and September (Table IX-6).

2008

Copper exceedances continued to occur during the 2008 irrigation season, therefore the Coalition conducted upstream monitoring for copper to help determine possible agricultural sources. The Coalition sampled Dry Creek @ Rd 22, which divides the Dry Creek @ Rd 18 subwatershed in half, during all irrigation months for copper (April – September, 2008) (Table IX-5). In addition, to determine if copper was entering from copper mines in the Sierra Nevada foothills, Dry Creek @ Rd 28 ½ was added as an upstream sample site in 2008 MPM and was sampled in July and September, 2008 (Table IX-5).

Since the Coalition was already monitoring for copper upstream of Dry Creek @ Rd 18, samples were also collected for chlorpyrifos analysis in months in which past exceedances occurred (April and July) (Table IX-5).

2009-2010

No MPM occurred from 2009 through 2010 at Dry Creek @ Rd 18.

2011

In 2011 Dry Creek @ Rd 18 is scheduled for MPM for *S. capricornutum* toxicity (January, February and May), copper (January, February and April through September), chlorpyrifos (February, April and July), diazinon (February), diuron (January and February), *H. azteca* toxicity (March and September) and lead (May, June, August and September). Assessment Monitoring will begin at this site in 2012.

Table IX-7. Dry Creek @ Rd 18. Normal Monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

MONTH:		APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
2007 NM (@ Rd 18)	Date	4/24/07	5/29/07	6/26/07	7/24/07	8/21/07	9/18/07
	Copper (µg/L)	17	4.7	3.6	5.6	5.5	Site dry
2007 MPM (@ Rd 18)	Date	NA	NA	6/19/07	7/31/07	8/28/07	9/25/07
	Copper (µg/L)	NA	NA	4.9	4.5	4.3	Site dry
2008 NM (@ Rd 18)	Date	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Copper (µg/L)	6.8	5	4	5.9	5.1	Site dry
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	Site dry
2008 MPM US (@ Rd 22)	Date	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Copper (µg/L)	5.2	5.7	6.5	7	6.5	36
	Chlorpyrifos (µg/L)	<0.003	NA	NA	<0.003	NA	NA
2008 MPM US (@ Rd 28 ½)	Date	NA	NA	NA	7/29/08	NA	9/30/08
	Copper (µg/L)	NA	NA	NA	5.3	NA	Site dry

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

US- Upstream Monitoring conducted in 2008.

Load Calculations

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

Load = Discharge (cfs) X 28.317L/ft³ X Concentration (mg/L X 1000 or µg/L).

The load values for constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual).

The primary purpose for reporting instantaneous loads is to provide a normalization of the concentrations by flow for various constituents at the time the samples were collected.

Table IX-8. Instantaneous load calculations for chlorpyrifos, copper, diazinon and diuron where discharge is measured in the Dry Creek @ Rd 18 site subwatershed (sorted by analyte and date). Upstream site is italicized.

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Dry Creek @ Rd 18	Chlorpyrifos	07/11/06	11.77	0.077	25.66
Dry Creek @ Rd 18	Chlorpyrifos	04/24/07	0	0.017	0
Dry Creek @ Rd 18	Chlorpyrifos	07/24/07	13.39	0.008	3.03
Dry Creek @ Rd 18	Chlorpyrifos	01/25/08	2.56	0.01	0.72
Dry Creek @ Rd 18	Chlorpyrifos	02/25/08	1.44	0.034	1.39
Dry Creek @ Rd 18	Copper	05/16/06	5.35	4.3	651.43
Dry Creek @ Rd 18*	Copper	06/13/06	4.02	5.5	626.09
Dry Creek @ Rd 18	Copper	06/13/06	4.02	6.3	717.16
Dry Creek @ Rd 18	Copper	07/11/06	11.77	4.1	1366.49
Dry Creek @ Rd 18	Copper	08/08/06	18.85	4.6	2455.37
Dry Creek @ Rd 18	Copper	09/12/06	14.97	6.1	2585.82
Dry Creek @ Rd 18	Copper	04/24/07	0	17	0

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SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Dry Creek @ Rd 18	Copper	05/29/07	12.51	4.7	1664.95
Dry Creek @ Rd 18	Copper	06/19/07	7.33	4.9	1017.06
Dry Creek @ Rd 18	Copper	06/26/07	19.06	3.6	1943.00
Dry Creek @ Rd 18	Copper	07/24/07	13.39	5.6	2123.32
Dry Creek @ Rd 18	Copper	07/31/07	5.29	4.5	674.09
Dry Creek @ Rd 18	Copper	08/21/07	4.7	5.5	731.99
Dry Creek @ Rd 18*	Copper	08/21/07	4.7	6.2	825.16
Dry Creek @ Rd 18	Copper	08/28/07	2.66	4.3	323.89
Dry Creek @ Rd 18	Copper	01/25/08	2.56	20	1449.83
Dry Creek @ Rd 18	Copper	02/25/08	1.44	33	1345.62
Dry Creek @ Rd 18	Copper	04/29/08	5.2	6.8	1001.29
Dry Creek @ Rd 18*	Copper	04/29/08	5.2	6.9	1016.01
Dry Creek @ Rd 18	Copper	05/27/08	16.26	5	2302.17
Dry Creek @ Rd 18	Copper	06/24/08	7.47	4	846.11
Dry Creek @ Rd 18	Copper	07/29/08	44.11	5.9	7369.47
Dry Creek @ Rd 18*	Copper	08/26/08	14.86	4.8	2019.79
Dry Creek @ Rd 18	Copper	08/26/08	14.86	5.1	2146.03
Dry Creek at Rd 22	Copper	09/30/08	0	36	0
Dry Creek @ Rd 18	Diazinon	01/25/08	2.56	0.049	3.55
Dry Creek @ Rd 18	Diazinon	02/25/08	1.44	0.24	9.79
Dry Creek @ Rd 18	Diuron	01/25/08	2.56	21	1522.32
Dry Creek @ Rd 18	Diuron	02/25/08	1.44	2.1	85.63
Dry Creek @ Rd 18*	Diuron	04/29/08	5.2	0.36	53.01
Dry Creek @ Rd 18	Diuron	04/29/08	5.2	0.37	54.48

Source Identification and Outreach

The Coalition considers past monitoring results and associated PUR data to address source identification. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2007 and 2008, the Coalition conducted additional MPM during the months in which exceedances historically occurred to better characterize water quality the subwatershed. The Coalition also conducted MPM at the upstream location.

The Dry Creek @ Rd 18 subwatershed is a high priority as of 2011 and will remain as such through 2013. The Coalition will actively engage in grower outreach and education to address Dry Creek's priority constituents. The Coalition has begun to organize meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual meetings with targeted members are planned to inform growers about management practices as well as to assess current and expected implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos and diazinon are listed as A/B constituent for the Dry Creek @ Rd 18 subwatershed.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015 µg/L three times in this subwatershed in the past. Exceedances of the chlorpyrifos WQTL occurred in the irrigation seasons of 2006, 2007 and 2008 (Table IX-6).

All PUR data are reviewed for the number of monthly applications and pounds of active ingredient applied, and the acres treated. The PUR from the Dry Creek @ Rd 18 subwatershed area were reviewed for chlorpyrifos use (Table IX-9, Figure IX-2). The greatest amount of chlorpyrifos use occurred in 2007 (4,293 lbs AI) with the lowest amount of use occurring in 2009 (971 lbs AI). The greatest monthly chlorpyrifos uses occurred in the months of March, July and October (Figure IX-2).

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications of the constituent of concern. The largest amount of chlorpyrifos applied from 2006 through 2010 was to almonds (9,305 lbs AI) followed by grapes (5,381 lbs AI). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table IX-10).

Table IX-9. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2005 – December 2010 in the Dry Creek @ Rd 18 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	175.1	92
March, 2005	3	124.1	62
May, 2005	8	68.1	268
June, 2005	3	67.1	67.1
July, 2005	11	870.5	505
August, 2005	8	213.3	151.7
January, 2006	1	78.0	52
May, 2006	5	726.4	391
June, 2006	5	160.2	226.8
July, 2006	16	2301.2	1168
August, 2006	5	220.8	244.3
September, 2006	2	58.0	58.11
December, 2006	2	1.0	1.13
January, 2007	1	74.3	40
February, 2007	2	61.4	30.8
May, 2007	1	37.2	20
June, 2007	1	65.8	33
July, 2007	23	3319.8	1659.2
August, 2007	4	79.8	144
October, 2007	5	655.5	328.7
January, 2008	2	70.0	35
July, 2008	6	857.6	440
August, 2008	14	357.3	658
October, 2008	10	2172.3	1089.5
March, 2009	2	540.5	270.1
April, 2009	1	37.0	37

MONTH/YEAR	NUMBER OF CHLORPYRIFOS APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
July, 2009	6	156.5	210
August, 2009	1	20.0	16.5
October, 2009	4	217.1	115.6
July, 2010	14	380.7	222
August, 2010	2	98.5	50
October, 2010	5	1361.5	725
November, 2010	5	333.1	177.4
Summaries by Year			
2005 Total	37	1518.1	1145.8
2006 Total	36	3545.6	2141.3
2007 Total	37	4293.7	2255.7
2008 Total	32	3457.3	2222.5
2009 Total	14	971.1	649.2
2010 Total	26	2173.9	1174.4
Total	182	15959.7	9588.9

Figure IX-2. Pounds of chlorpyrifos applied within the Dry Creek @ Rd 18 site subwatershed by month for 2005 -2010. Asterisk (*) denotes months with exceedances.

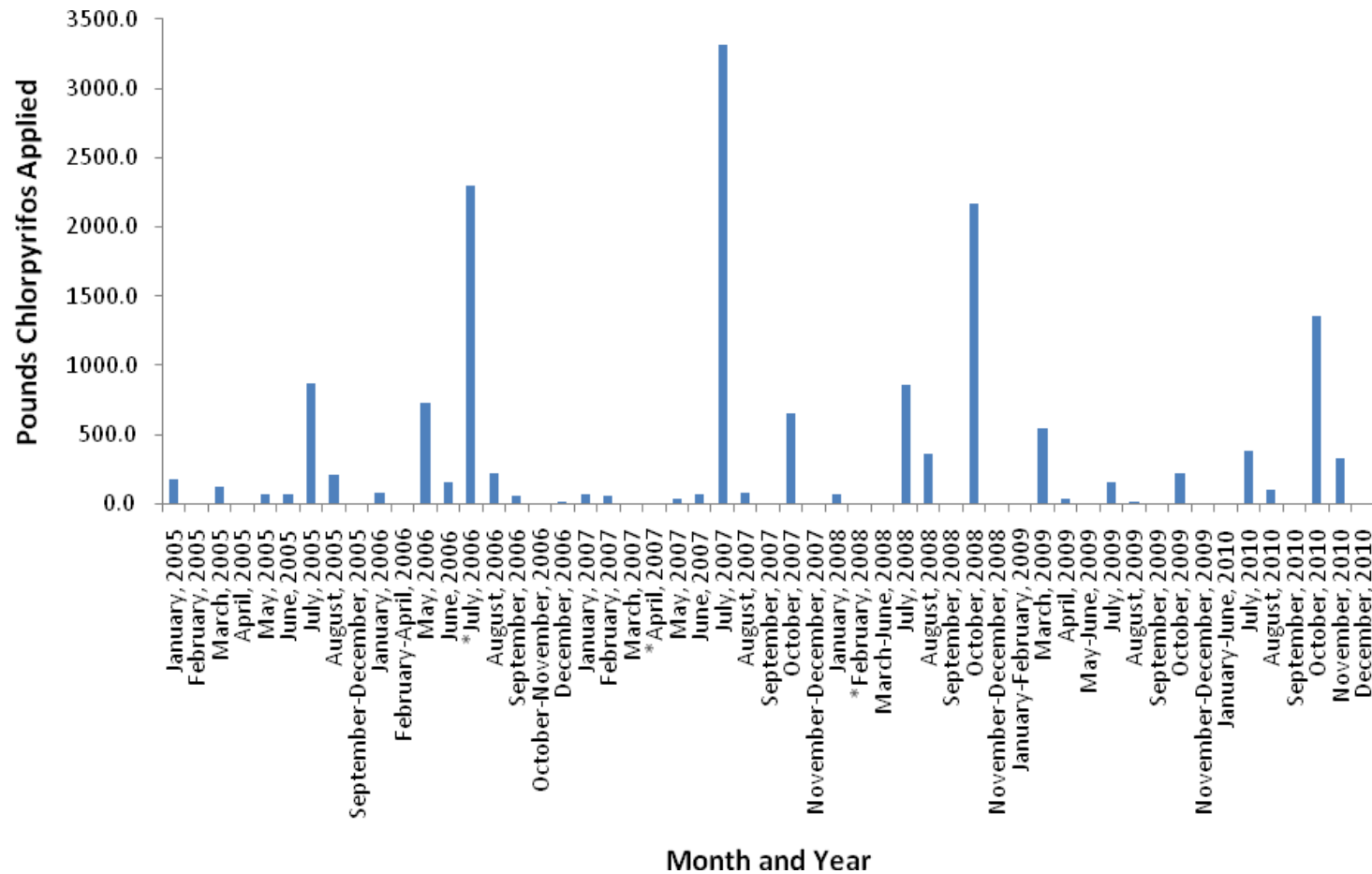


Table IX-10. Total pounds active ingredient (AI) for chlorpyrifos based on PUR data from 2005-2010 within the Dry Creek @ Rd 18 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA	LOCK-ON INSECTICIDE	146.7
		LORSBAN-4E	162.2
	ALMOND	GOVERN 4E INSECTICIDE	1478.2
		LORSBAN 4E INSECTICIDE	320.0
		LORSBAN 4E-HF	1316.9
		LORSBAN-4E	3008.8
		NUFOS 4E	1110.6
		WARHAWK	280.8
		WHIRLWIND	1789.7
		CORN (FORAGE - FODDER)	LORSBAN 4E-HF
	LORSBAN-4E		40.0
	GRAPES, WINE	LORSBAN 4E-HF	2889.1
		LORSBAN ADVANCED	1911.8
		LORSBAN-4E	580.5
	N-GRNHS GRWN CUT FLWRS OR GREENS	WHITMIRE PT 1325 ME DURAGUARD	2.7
	ORANGE (ALL OR UNSPEC)	LORSBAN 4E-HF	126.3
	TANGELO	LORSBAN 4E-HF	119.6
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, SEEDLESS, ETC.)	LORSBAN ADVANCED	10.3
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	GOVERN 4E INSECTICIDE	43.0
LORSBAN 4E-HF		164.5	
LORSBAN ADVANCED		36.6	
LORSBAN-4E		186.1	
ALFALFA - Total Pounds Chlorpyrifos Applied			308.9
ALMOND - Total Pounds Chlorpyrifos Applied			9304.9
CORN - Total Pounds Chlorpyrifos Applied			275.3
GRAPES - Total Pounds Chlorpyrifos Applied			5381.4
GREENHOUSE PLANTS - Total Pounds Chlorpyrifos Applied			2.7
ORANGE - Total Pounds Chlorpyrifos Applied			126.3
TANGELO - Total Pounds Chlorpyrifos Applied			119.6
TANGERINE - Total Pounds Chlorpyrifos Applied			10.3
WALNUT - Total Pounds Chlorpyrifos Applied			430.2
Total Pounds Chlorpyrifos Applied (2005-2010)			15959.7

The Coalition noted in its 2008 Management Plan that the chlorpyrifos concentrations found in Dry Creek @ Rd 18 were most likely the result of tailwater transporting chlorpyrifos to the creek. Consequently, control of irrigation tailwater would eliminate the exceedances. The exceedance in April 2007 was slightly over the WQTL and the lack of a load calculation indicates that there was no or very limited flow in Dry Creek around this date (Table IX-8). However, there were no reported applications in March or April prior to sampling indicating that drift was not the source of the chlorpyrifos (Table IX-9). The exceedance may have been the result of irrigation runoff in March or April mobilizing a small amount of chlorpyrifos and transporting it to the creek. No flow could have maintained the small amount of chlorpyrifos until sampling. The July 2006 exceedance occurred in the months following the

second largest number of applications and the second largest amount of chlorpyrifos applied (Table IX-9, Figure IX-2).

Since 2007, general Coalition outreach has included grower meetings and the mailing/distribution of information. A complete list of Coalition Outreach during 2011 is provided in the Summary of Coalition Outreach Activities section of this report. Targeted growers were selected based on their crop type, pesticide usage, and potential to drain to the creek.

The Coalition began conducting individual contact meetings with targeted growers in the third priority subwatersheds during the winter of 2011. Although meetings are focusing mainly on chlorpyrifos exceedances, all water quality results are reviewed and discussed including *S. capricornutum* toxicity, which may be related to diuron exceedances, and exceedances of *E. coli* and DO. The Coalition contacted 18 members accounting for 4,750 acres of targeted direct drainage.

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

Management Plan Monitoring resumed at Dry Creek @ Rd 18 in 2011 during those months of historical exceedances. The Coalition plans to conduct MPM through 2013 to evaluate improvements in water quality as recommended management practice implementation occurs.

Diazinon

Concentrations of diazinon in samples have exceeded the WQTL (0.1 µg/L) twice in this subwatershed from 2005 through 2008 (February 2007 and February 2008) (Table IX-6). In 2011, MPM for diazinon is scheduled to take place during months of past exceedances. The Coalition evaluates both monitoring and PUR data to identify possible sources.

All PUR data were reviewed for the number of monthly diazinon applications and pounds of active ingredient applied, and the acres treated (Table IX-11, Figure IX-3). The amount of diazinon used in 2005 was 412 lbs AI compared to 439 lbs AI in 2009. Although the pounds of active ingredient applied in 2005 are similar to 2009, the number of applications decreased. Diazinon use generally occurs between December and March during dormant sprays.

The Coalition uses PUR data from each subwatershed to determine which crops receive the most applications of the constituent of concern. The largest amount of diazinon from 2005 through 2010 was to almond (878 lbs AI), see Table IX-12.

Table IX-11. Number of diazinon applications, total pounds applied and total acres treated by month for January 2005 through December 2010 in the Dry Creek @ Rd 18 site subwatershed.

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

MONTH/YEAR*	NUMBER OF DIAZINON APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
January, 2005	6	157.9	122
February, 2005	2	154.7	77.4
June, 2005	1	100	59
February, 2006	3	149.9	110
May, 2006	2	110.0	94
January, 2007	2	179.6	89
May, 2007	4	100.2	130
January, 2008	1	37.7	19
February, 2008	3	387.0	780
January, 2009	1	142.9	72
December, 2009	3	296.5	149.4
Summaries by Year			
2005 Total	9	412.7	258.4
2006 Total	5	259.9	204
2007 Total	6	279.7	219
2008 Total	4	424.7	799
2009 Total	4	439.3	221.4
Total	28	1816.4	1701.8

*No diazinon PUR data reported for 2010.

Figure IX-3. Pounds of diazinon applied within the Dry Creek @ Rd 18 site subwatershed by month for 2005-2010. Asterisk (*) denotes months with exceedances. No diazinon PUR data reported for 2010.

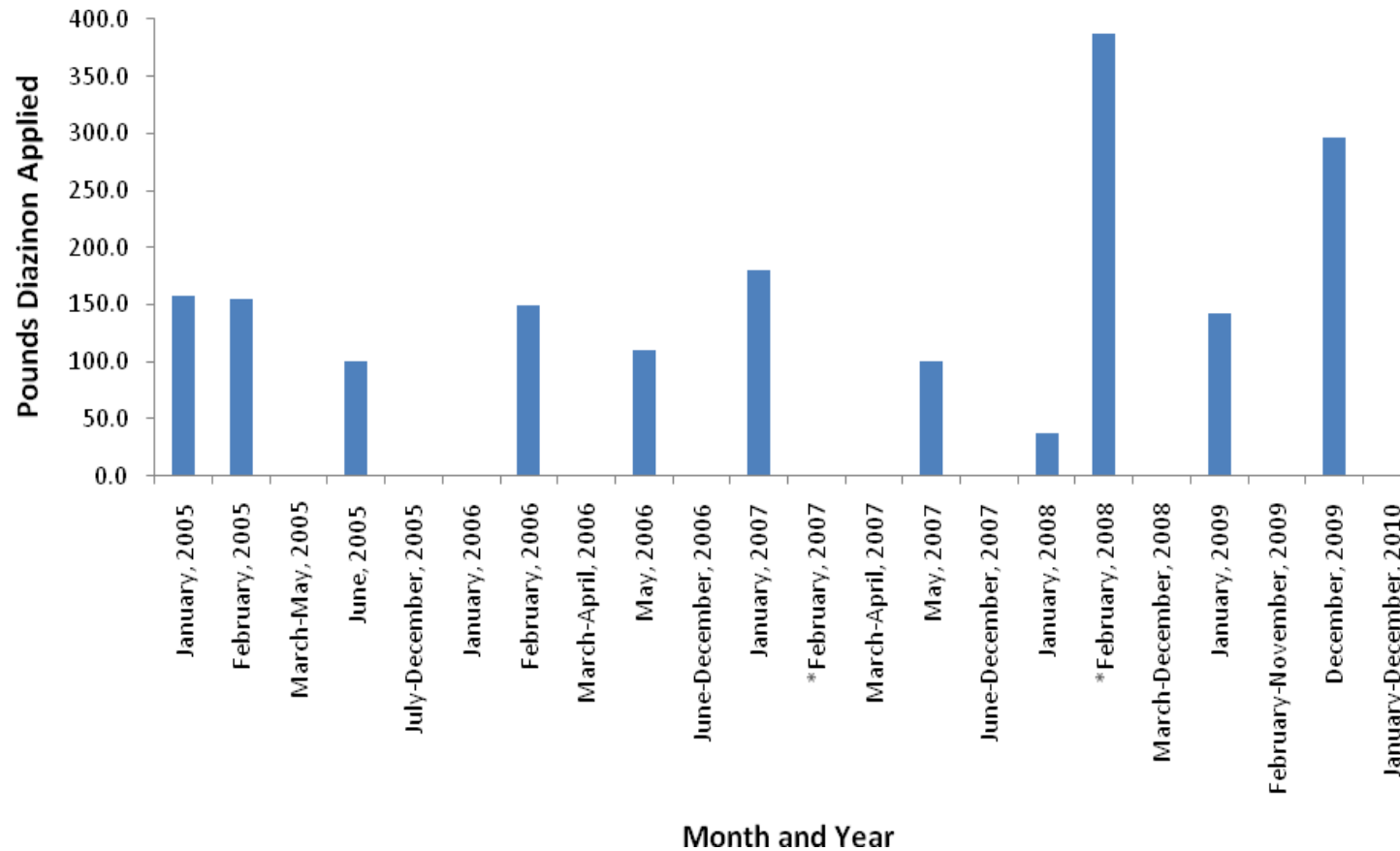


Table IX-12. Total pound active ingredient (AI) for diazinon based on PUR data from 2005-2010 within the Dry Creek @ Rd 18 subwatershed. No diazinon PUR data reported for 2010.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
DIAZINON	ALMOND	CLEAN CROP DIAZINON AG500 INSECTICIDE	253.3
		DIAZINON 50W	30
		DIAZINON AG 500	439.3
		DIAZOL 50 W	1.5
		GOWAN DIAZINON 4E	154.7
	APRICOT	DIAZINON AG 500	75.4
		DIAZINON AG500 INSECTICIDE	37.8
		GOWAN DIAZINON 4E	127.9
	FIG	DIAZOL AG 500	387.0
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	CLEAN CROP DIAZINON 14G	0.6
	PRUNE	DIAZINON 50W	100
		DIAZOL 50 W	192.5
	WATERMELONS	RED-TOP DIAZINON 4 SPRAY	10.0
		WILBUR-ELLIS DIAZINON 4 SPRAY	6.2
ALMOND - Total Pounds Diazinon Applied			878.9
APRICOT - Total Pounds Diazinon Applied			241.2
FIG - Total Pounds Diazinon Applied			387.0
PLUM - Total Pounds Diazinon Applied			0.6
PRUNE - Total Pounds Diazinon Applied			292.5
WATERMELONS - Total Pounds Diazinon Applied			16.2
Total Pounds Diazinon Applied (2005-2010)			1816.4

There were two applications of 189 lbs AI in the month before the February 2007 diazinon exceedance and four applications totaling 425 lbs AI applied in the January and February prior to the February 2008 exceedance. However other months with high application rates did not have exceedances. The exceedances were 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. Orchard operators are advised to consider storm water runoff immediately after diazinon applications to prevent the runoff that can mobilize diazinon and move it to the creek. Individual contacts which occurred within this subwatershed are described under the chlorpyrifos outreach section above and include discussions of diazinon exceedances as well as spray drift and storm water runoff management practices.

Priority C Constituents

The only priority C constituent listed for the Dry Creek @ Rd 18 subwatershed is copper.

Copper

Copper has exceeded the hardness based WQTL 28 times in this subwatershed from 2005 through 2008. Copper was detected in exceedance of the WQTL in every sampling event from the initiation of sampling for metals. As is true across the Coalition region, there were a large number of applications in the

months of January, March, and April and because copper does not degrade, copper applied during the winter may be available for transport to surface waters during the irrigation season (Table IX-13, Figure IX-4). Additionally, there are a large number of copper mines in the Sierra Nevada Mountains which may contribute to the copper load. The Coalition has obtained maps of all mines in the areas above Dry Creek and will sample upstream of agriculture if there is ever significant flow in the slough. Because copper tends to be sediment bound, it is probable that copper was mobilized with the sediment during irrigation and transported to surface waters. The Coalition began monitoring for both the total and dissolved copper fractions in October 2008 to better characterize copper contamination in the subwatershed.

The PUR data are reviewed for the number of monthly copper applications, pounds active ingredient applied, and acres treated (Table IX-13, Figure IX-4). The amount of copper applied within the subwatershed decreased annually from 2006 (19,275 lbs AI) through 2010 (6,350 lbs AI). The month of January consistently received the greatest amount of copper. Not all exceedances occurred during months of the greatest amount of use.

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 2010 was associated with almonds, grapes and oranges (Table IX-14). The most common products containing copper used within this subwatershed are DuPont™ Kocide and Kocide (Table IX-14).

Table IX-13. Number of copper applications, total pounds applied and total acres treated by month for January 2005 through December 2010 in the Dry Creek @ Rd 18 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	31	3992.5	1273.1
February, 2005	11	749.4	131.4
March, 2005	26	2352.9	2164.2
April, 2005	36	4071.2	3148.7
May, 2005	1	0.1	0.2
June, 2005	1	0.2	37
July, 2005	2	32.0	36
August, 2005	1	22.5	10
September, 2005	4	532.5	180
October, 2005	10	2120.9	366.8
November, 2005	1	122.8	40
December, 2005	12	2097.2	472.3
January, 2006	27	4666.6	1431.0
February, 2006	7	733.0	127
March, 2006	10	46.6	36.08
April, 2006	88	6882.6	5747.5
May, 2006	6	201.3	249.9
June, 2006	3	0.6	0.9
August, 2006	1	0.1	0.2
September, 2006	4	1039.6	465.2
October, 2006	18	2212.9	1171.5

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
November, 2006	4	742.8	155.5
December, 2006	11	2748.7	660.1
January, 2007	26	4733.6	1549.9
February, 2007	11	766.8	553.2
March, 2007	14	359.7	390.0
April, 2007	23	1638.7	1458.8
May, 2007	18	802.0	1302.7
June, 2007	6	312.6	531.3
July, 2007	6	634.9	643
September, 2007	5	163.1	99.7
October, 2007	2	67.9	20.5
November, 2007	5	23.3	189.6
December, 2007	5	1324.7	215.7
January, 2008	30	6217.3	1837.7
February, 2008	10	715.4	602.8
March, 2008	9	137.2	192.4
April, 2008	27	2057.9	2203.4
June, 2008	4	1.2	2.4
August, 2008	8	615.8	334.6
November, 2008	14	1917.6	680
December, 2008	2	385.8	228
January, 2009	8	619.7	290.7
March, 2009	3	1.3	2.1
April, 2009	24	1100.1	1785.4
September, 2009	1	0.0	0.0
October, 2009	10	2168.6	610
December, 2009	6	88.8	64.1
January, 2010	19	1772.3	1053.3
February, 2010	1	0.5	0.9
March, 2010	12	363.6	446.0
April, 2010	15	811.5	1729.7
May, 2010	2	1.3	1.6
June, 2010	2	0.6	0.5
July, 2010	4	0.4	0.8
August, 2010	3	771.5	257.8
September, 2010	2	0.2	0.3
October, 2010	3	0.2	0.5
November, 2010	12	2628.2	603.7
Summaries by Year			
2005 Total	136	16094.4	7859.6
2006 Total	179	19274.8	10044.9
2007 Total	121	10827.4	6954.5
2008 Total	104	12048.2	6081.3
2009 Total	52	3978.4	2752.3
2010 Total	75	6350.2	4095.2
Total	667	68573.3	37787.8

Figure IX-4. Pounds of copper applied within the Dry Creek @ Rd 18 site subwatershed by month for 2005-2010. Asterisk (*) denotes month with exceedances.

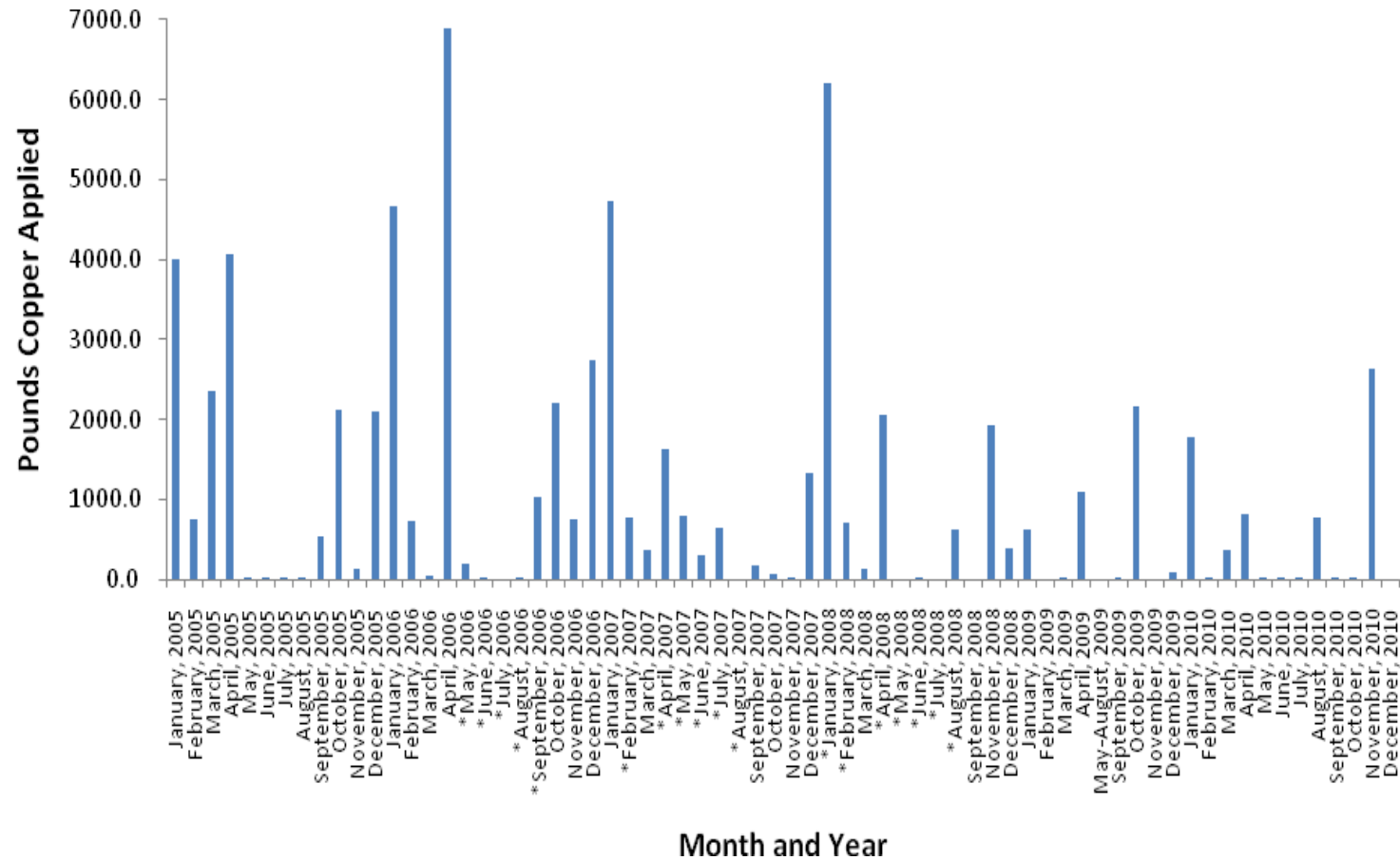


Table IX-14. Total pounds active ingredient (AI) for chlorpyrifos based on PUR data from 2006-2010 within the Berenda Slough along Ave 18 ½ subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	ALMOND	CHAMP DP	82.9
		CHAMP FORMULA 2 FLOWABLE	806.4
		CHAMP FORMULA II DRY FLOWABLE	124.4
		CHIPCO COPPER SULFATE CRYSTALS	732.6
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	156.6
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	3547.2
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	3127.2
		DUPONT KOCIDE DF FUNGICIDE/BACTERICIDE	251.7
		HYDROX	2507.1
		KOCIDE 101	762.3
		KOCIDE 2000	2438.2
		KOCIDE DF	5371.2
		NORDOX	662.6
		NORDOX 75 WG	671.2
		NU-COP 50DF	4824.8
		STRETCH FUNGICIDE	0.7
		TRIANGLE BRAND BASIC COPPER SULFATE	806.0
		TRIANGLE BRAND COPPER SULFATE INSTANT POWDER	1980.0
	APRICOT	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	138.0
		KOCIDE DF	509.6
	FIG	TRIANGLE BRAND BASIC COPPER SULFATE	221.0
	GRAPES, RAISIN	CHAMPION WETTABLE POWDER	77.0
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	504.6
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	244.6
	GRAPES, WINE	BRITZ COPPER SULFUR 15-25 DUST	30.0
		CHAMP FLOWABLE	1450.5
		CHAMP FORMULA 2 FLOWABLE	4395.1
		CHAMPION WETTABLE POWDER	217.1
		CLEAN CROP C-O-C-S 15 SULFUR 25 DUST	555.0
		COCS 15 SULFUR 25 DUST	771.0
		CSC COPPER SULFUR DUST	40.7
		CUPROFIX ULTRA 40 DISPERSS	21.3
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	1722.5
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	2119.3
		KOCIDE 101	3910.8
		KOCIDE 2000	3542.9
		KOCIDE DF	407.7
		NORDOX	90.2
		NORDOX 75 WG	336.4
		NU-COP 50DF	768.5
		STRETCH FUNGICIDE	2.3
	N-GRNHS GRWN CUT FLWRS OR GREENS	CAMELOT	2.9
		PHYTON 27 NEW DIMENSION	4.5
		PHYTON-27 BACTERICIDE & FUNGICIDE	42.7
		PRESCRIPTION TREATMENT BRAND CAMELOT	40.5

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		FUNGICIDE/BATERICIDE	
	N-OUTDR CONTAINER/FLD GRWN PLANTS	CHAMP FORMULA 2 FLOWABLE	7.3
	OLIVE (ALL OR UNSPEC)	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	48.4
		KOCIDE 2000	96.8
		NORDOX	67.7
	ORANGE (ALL OR UNSPEC)	BASIC COPPER 53	588.0
		CUPROFIX ULTRA 40 DISPERSS	1137.6
		KOCIDE DF	2325.8
		NORDOX	1567.9
		NU-COP 50DF	1047.8
	OT-VINE	KOCIDE 2000	0.8
	PEACH	KOCIDE DF	63.9
		NU-COP 50DF	160.2
	PISTACHIO	KOCIDE 2000	100.1
		TRIANGLE BRAND BASIC COPPER SULFATE	97.5
		TRIANGLE BRAND COPPER SULFATE	99.0
		TRIANGLE BRAND COPPER SULFATE CRYSTAL	87.4
		TRIANGLE BRAND COPPER SULFATE INSTANT POWDER	193.9
	PLUM (INCLUDES WILD PLUMS FOR HUMAN CONSUMPTION)	KOCIDE 2000	444.2
		KOCIDE DF	558.1
		NU-COP 50DF	1533.8
	POMEGRANATE	TRIANGLE BRAND COPPER SULFATE CRYSTAL	594.0
	TANGELO	KOCIDE DF	368.4
		NORDOX	225.6
		NU-COP 50DF	184.8
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, SEEDLESS, ETC.)	CUPROFIX ULTRA 40 DISPERSS	4014.5
		NORDOX	1750.7
	UNKNOWN	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	189.4
ALMOND - Total Pounds Copper Applied			28853.2
APRICOT - Total Pounds Copper Applied			647.6
FIG - Total Pounds Copper Applied			221.0
GRAPES, RAISIN - Total Pounds Copper Applied			826.2
GRAPES, WINE - Total Pounds Copper Applied			20381.2
GREENHOUSE PLANTS - Total Pounds Copper Applied			90.6
OUTDOOR CONTAINER PLANTS - Total Pounds Copper Applied			7.3
OLIVE - Total Pounds Copper Applied			212.9
ORANGE - Total Pounds Copper Applied			6667.2
OT-VINE - Total Pounds Copper Applied			0.8
PEACH - Total Pounds Copper Applied			224.0
PISTACHIO - Total Pounds Copper Applied			577.8
PLUM - Total Pounds Copper Applied			2536.1
POMEGRANATE - Total Pounds Copper Applied			594.0
TANGELO - Total Pounds Copper Applied			778.8
TANGERINE - Total Pounds Copper Applied			5765.2
UNKNOWN - Total Pounds Copper Applied			189.4
Total Pounds Copper Applied (2005-2010)			68573.3

The Coalition will continue with its management plan strategy outlined above under the chlorpyrifos outreach section when conducting individual contacts. Orchard and vineyard operators are advised to consider irrigation water retention and management to prevent copper from entering the waterway with runoff. Storm water runoff management has been 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.

Diuron

Concentrations of diuron exceeded the WQTL twice in this subwatershed from 2005 through 2010 (January and February 2008). In 2011 MPM for diuron is scheduled to take place during months of past exceedances.

All PUR data are reviewed for the number of monthly diuron applications, pounds active ingredient applied, and acres treated (Table X-15, Figure IX-5). Diuron use has fluctuated throughout the years since 2005 (971 lbs AI) to 2010 (2594 lbs AI). Neither of the diuron exceedances experience at Dry Creek @ Rd 18 occurred during months of the greatest amount of use (Figure IX-5).

The highest application rates and largest amount of diuron applied from 2005 through 2010 were associated with citrus (including oranges and tangerines), see Table IX-16.

Table IX-15. Number of diuron applications, total pounds applied and total acres treated by month for January 2005 through December 2010 in the Dry Creek @ Rd 18 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
February, 2005	5	142.4	74
March, 2005	8	522.9	326.8
May, 2005	4	160	200
December, 2005	3	146.4	183
February, 2006	3	67.2	28
March, 2006	1	20	13.5
April, 2006	3	47.3	38
October, 2006	2	256	120
February, 2007	3	132.8	99
March, 2007	12	725.6	524.3
October, 2007	5	396.8	248
November, 2007	6	607.4	379.6
February, 2008	5	236.4	116.5
March, 2008	11	840.0	428
April, 2008	2	288	180
November, 2008	18	1580.8	988
February, 2009	2	20	13.5
March, 2009	22	2016	1260
October, 2009	2	401.6	194
November, 2009	9	761.6	436
February, 2010	3	226.7	192
March, 2010	10	1626.4	528

MONTH/YEAR	NUMBER OF DIURON APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
October, 2010	2	160.8	134
November, 2010	9	580.0	483.4
Summaries by Year			
2005 Total	20	971.7	783.8
2006 Total	9	390.5	199.5
2007 Total	26	1862.6	1250.9
2008 Total	36	2945.2	1712.5
2009 Total	35	3199.2	1903.5
2010 Total	24	2593.9	1337.4
Total	150	11963.0	7187.6

Figure IX-5. Pounds of diuron applied within the Dry Creek @ Rd 18 site subwatershed by month for 2005-2010. Asterisk (*) denotes months with exceedances.

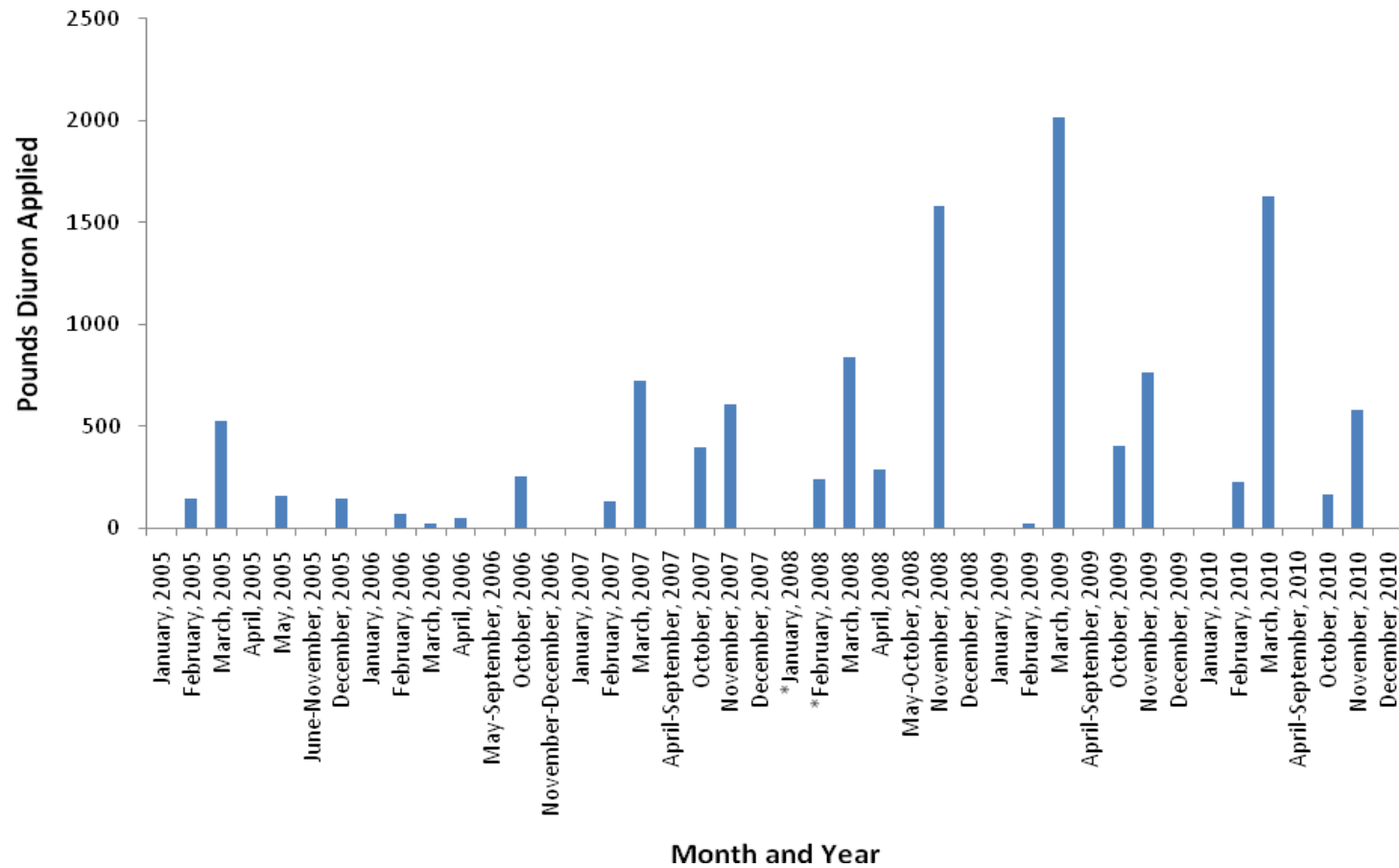


Table IX-16. Total pounds active ingredient (AI) for diuron based on PUR data from 2005-2010 within the Dry Creek @ Rd 18 subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED	
DIURON	ALFALFA	CLEAN CROP DIURON WETTABLE POWDER WEED KILLER	120.0	
		DIURON 4L HERBICIDE	226.7	
		DUPONT DIREX 4L HERBICIDE	25.6	
	GRAPES, RAISIN	DIURON 80 DF HERBICIDE	11.6	
		DREXEL DIURON 80 HERBICIDE	33.1	
		DUPONT KARMEX DF HERBICIDE	14.4	
		DUPONT KARMEX XP HERBICIDE	14.4	
		KARMEX XP HERBICIDE	133.6	
		GRAPES, WINE	CLEAN CROP DIURON WETTABLE POWDER WEED KILLER	78.4
			DIREX 80DF	67.2
	DREXEL DIURON 80 HERBICIDE		219.7	
	DU PONT KARMEX DF HERBICIDE		52.0	
	DUPONT KARMEX DF HERBICIDE		5.6	
	DUPONT KARMEX XP HERBICIDE		5.6	
	KARMEX DF HERBICIDE		15.3	
	KARMEX XP HERBICIDE		32.0	
	ORANGE (ALL OR UNSPEC)	DIREX 80DF	935.4	
		DU PONT KROVAR I DF HERBICIDE	496.0	
		DUPONT KARMEX XP HERBICIDE	752.0	
		KARMEX DF HERBICIDE	1202.9	
		KARMEX XP HERBICIDE	624.0	
	TANGELO	DIREX 80DF	64.0	
	TANGERINE (MANDARIN, SATSUMA, MURCOTT, SEEDLESS, ETC.)	DIREX 80DF	172.8	
		DU PONT KROVAR I DF HERBICIDE	1566.4	
		DUPONT KARMEX XP HERBICIDE	3785.6	
		KARMEX XP HERBICIDE	1308.8	
ALFALFA - Total Pounds Diuron Applied			372.3	
GRAPES, RAISIN - Total Pounds Diuron Applied			207.2	
GRAPES, WINE - Total Pounds Diuron Applied			475.7	
ORANGE - Total Pounds Diuron Applied			4010.2	
TANGELO - Total Pounds Diuron Applied			64.0	
TANGERINE - Total Pounds Diuron Applied			6833.6	
Total Pounds Diuron Applied (2005-2010)			11963.0	

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. Improved and additional water management practices should reduce or eliminate diuron exceedances.

Priority D Constituents

Priority D constituents in the Dry Creek @ Rd 18 subwatershed are; water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca*.

***Selenastrum capricornutum* toxicity**

Toxicity to *S. capricornutum* occurred May 2007 and in January, February and March 2008. Every time toxicity to *S. capricornutum* occurred; there was also an exceedance of the copper WQTL.

The Coalition's strategy for eliminating *S. capricornutum* toxicity involves 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 *S. capricornutum* toxicity can also be reduced or eliminated. During 2011, MPM for *S. capricornutum* toxicity is scheduled to occur during months of past exceedances.

***Hyalella azteca* toxicity**

Sediment toxicity to *H. azteca* occurred in May 2005 and August 2008. Sediment toxicity is scheduled to be monitored as part of MPM during March and September 2011.

Priority E Constituents

The following priority E constituents are listed under the Dry Creek @ Rd 18 Management Plan: DO, pH, *E. coli*, and lead. These constituents will remain low priority but will be discussed during individual contacts and annual grower meetings.

Evaluation

Dry Creek @ Rd 18 is one of the third four high priority site subwatersheds within the ESJWQC and is in its first year of focused outreach. The Coalition will focus its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Dry Creek @ Rd 18 subwatershed is to focus on providing information on a watershed basis to growers to review their operation and determine if irrigation return flows are managed properly, specifically to growers with the potential to drain to the creek. Almond and walnut growers will be targeted for outreach especially prior to the irrigation season. Outreach includes grower notification, management practice outreach and education, tracking of the implementation of management practices, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practice implementation and assess future planned implementations will be completed by the end of July 2011. The Coalition will then assess these results and plan the final stages of outreach including following up with growers to identify newly implemented practices and future monitoring to evaluate water quality improvements.

In 2011, MPM is scheduled during months of past exceedances.

X. LATERAL 2 ½ NEAR KEYES RD

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority E

- pH
- *E. coli*

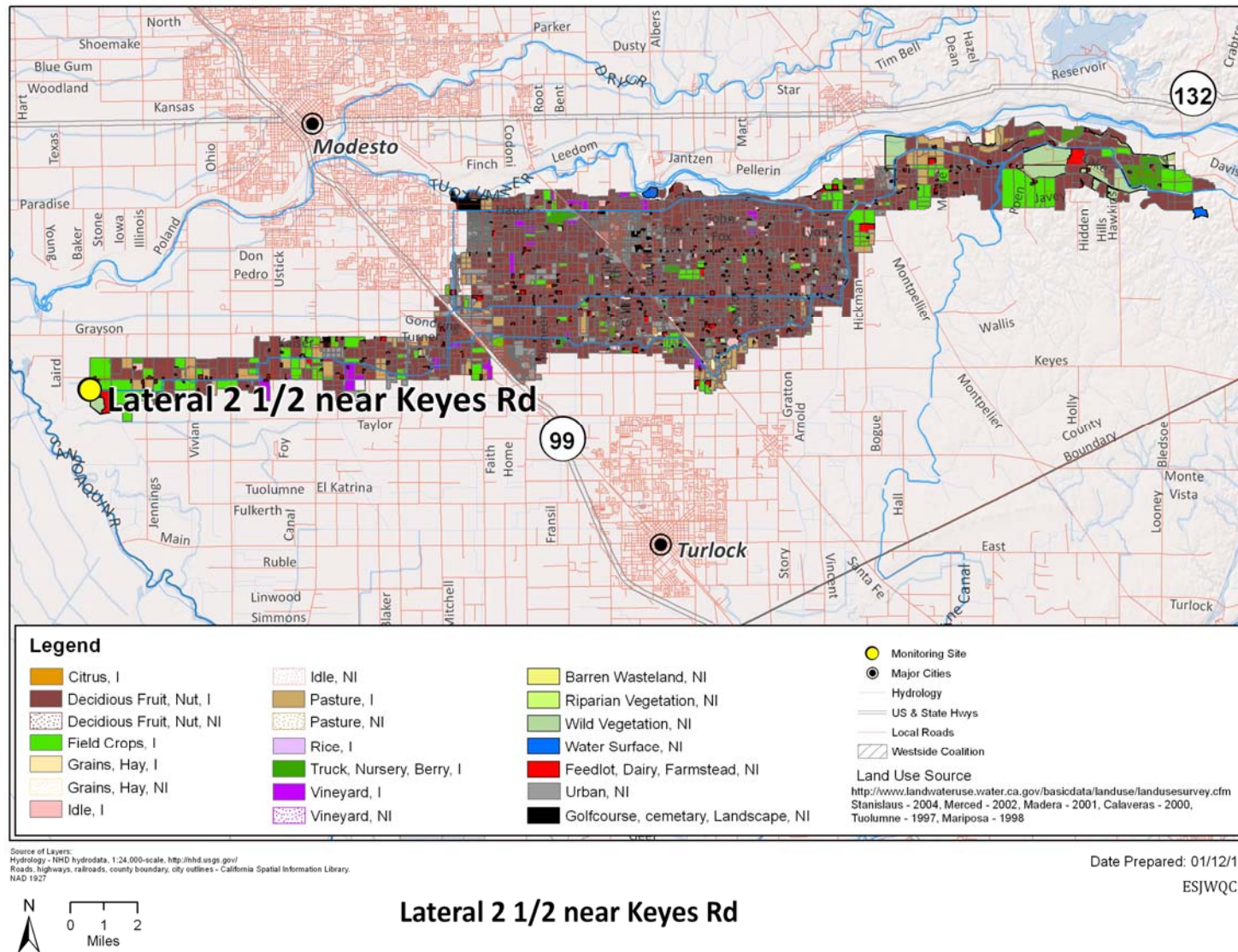
Description of Lateral 2 ½ near Keyes Rd Site Subwatershed

Lateral 2 1/2 near Keyes Rd (30,254 Irrigated acres) – This site subwatershed is located in the western portion of the Coalition region just south of the Tuolumne River and East of the San Joaquin River. The site subwatershed extends east past the City of Modesto to Turlock Lake. The primary agriculture in this site subwatershed is deciduous fruits and nuts but also includes almost all other crops types and land use found in the Coalition Region (Figure X-1). Table X-1 includes the station name (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table X-1. Coordinates of the Lateral 2 ½ near Keyes Rd site subwatershed sampling locations.

SAMPLE SITE	STATION CODE	TARGET LAT	TARGET LONG
Lateral 2 ½ near Keyes Rd	535LTHNKR	37.54780	-121.09274

Figure X-1. Site subwatershed map of land use for the Lateral 2 ½ near Keyes Rd sample site



Subwatershed Monitoring History

Ambient water monitoring conducted at the Lateral 2 ½ near Keyes Rd site subwatershed was initiated in the 2008 fall season and monitoring continued through 2010 (Table X-2). Lateral 2 ½ near Keyes Rd was an Assessment Monitoring location under the current MRPP, in 2011 only MPM will be conducted. Specific information on the analysis conducted across each of the monitoring seasons is provided in Table X-3. Lateral 2 ½ near Keyes Rd will return to Assessment Monitoring in 2029.

Management Plan Monitoring for the Coalition has not occurred at this site yet. Lateral 2 ½ near Keyes Rd is a high priority site beginning in 2011. In 2011 Lateral 2 ½ near Keyes Rd is scheduled for MPM for chlorpyrifos (April and July).

Lateral 2 ½ is not considered an impaired waterbody under the 2008 Basin Plan 303d list. However, the Sacramento/San Joaquin River Delta is listed for a number of constituents including chlorpyrifos, DDT, diazinon, group A pesticides, mercury and unknown toxicity.

Table X-2. Lateral 2 ½ near Keyes Rd sampling events per season per year.

	2004	2005		2006		2007		2008			2009				2010			
	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
Events Sampled	NA	NA	NA	NA	NA	NA	NA	0	NA	2	0	0	6	1	1	1	5	1
Events Not Sampled	NA	NA	NA	NA	NA	NA	NA	1	NA	0	2	2	0	1	0	2	0	2
Total	NA	NA	NA	NA	NA	NA	NA	1	NA	2	2	2	6	2	1	3	5	3

Table X-3. Number of analyses performed per analyte in each sampling season and year for the Lateral 2 ½ near Keyes Rd sample site.

Only environmental samples with a sample replicate and lab replicate number of one are listed.

METHOD	ANALYTE	2008			2009				2010			
		STORM	IRRIGATION*	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
Field and Physical Parameters												
EPA 110.2	Color											
EPA 160.1	Dissolved Solids			2			6	1	1	1	5	1
EPA 160.2	Suspended Solids			2			6	1	1	1	5	1
EPA 180.1	Turbidity			2			6	1	1	1	5	1
EPA 405.1	BOD											
EPA 415.1	Total Organic Carbon			2			6	1	1	1	5	1
Walkley-Black	Total Organic Carbon (sediment)						2		1		1	
SM 9223	<i>E. coli</i>			2			6	1	1	1	5	1
ASTM D422	Grain size (sediment)						2		1		1	
NA	Dissolved Oxygen			2			6	1	1	1	5	1
NA	Specific Conductivity			2			6	1	1	1	5	1
NA	pH			2			6	1	1	1	5	1
Carbamates												
EPA 8321A	Aldicarb			2			6	1	1	1	5	1
EPA 8321A	Carbaryl			2			6	1	1	1	5	1
EPA 8321A	Carbofuran			2			6	1	1	1	5	1
EPA 8321A	Diuron			2			6	1	1	1	5	1
EPA 8321A	Linuron			2			6	1	1	1	5	1
EPA 8321A	Methamidophos										3	1
EPA 8321A	Methiocarb			2			6	1	1	1	5	1
EPA 8321A	Methomyl			2			6	1	1	1	5	1
EPA 8321A	Oxamyl			2			6	1	1	1	5	1
Organochlorines												
EPA 8081A	DDD(p,p')			2			1				3	1
EPA 8081A	DDE(p,p')			2			1				3	1
EPA 8081A	DDT(p,p')			2			1				3	1
EPA 8081A	Dicofol			2			1				3	1
EPA 8081A	Dieldrin			2			1				3	1
EPA 8081A	Endrin			2			1				3	1

METHOD	ANALYTE	2008			2009				2010			
		STORM	IRRIGATION*	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 8081A	Methoxychlor			2			1				3	1
Group A Pesticides												
EPA 8081A	Aldrin			2			1				3	1
EPA 8081A	Chlordane			2			1				3	1
EPA 8081A	Endosulfan I			2			1				3	1
EPA 8081A	Endosulfan II			2			1				3	1
EPA 8081A	HCH, alpha			2			1				3	1
EPA 8081A	HCH, beta			2			1				3	1
EPA 8081A	HCH, delta			2			1				3	1
EPA 8081A	HCH, gamma			2			1				3	1
EPA 8081A	Heptachlor			2			1				3	1
EPA 8081A	Heptachlor epoxide			2			1				3	1
EPA 8081A	Toxaphene			2			1				3	1
Organophosphates												
EPA 8141A	Azinphos methyl			2			6	1	1	1	5	1
EPA 8141A	Chlorpyrifos			2			6	1	1	1	5	1
EPA 8141A	Demeton-s			2			6	1	1	1	5	1
EPA 8141A	Diazinon			2			6	1	1	1	5	1
EPA 8141A	Dichlorvos			2			6	1	1	1	5	1
EPA 8141A	Dimethoate			2			6	1	1	1	5	1
EPA 8141A	Disulfoton			2			6	1	1	1	5	1
EPA 8141A	Malathion			2			6	1	1	1	5	1
EPA 8141A	Methamidophos			2			6	1	1	1	2	
EPA 8141A	Methidathion			2			6	1	1	1	5	1
EPA 8141A	Molinate											
EPA 8141A	Parathion, Methyl			2			6	1	1	1	5	1
EPA 8141A	Phorate			2			6	1		1	5	1
EPA 8141A	Phosmet			2			6	1	1	1	5	1
EPA 8141A	Thiobencarb											
EPA 8141A	Trifluralin			2			6	1	1	1	5	1
Pyrethroids												
EPA 8081A	Bifenthrin											
EPA 8081A	Cyfluthrin, total											

METHOD	ANALYTE	2008			2009				2010			
		STORM	IRRIGATION*	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 8081A	Cyhalothrin, lambda, total											
EPA 8081A	Cypermethrin, total											
EPA 8081A	Esfenvalerate/ Fenvalerate, total											
EPA 8081A	Permethrin, total											
Triazines												
EPA 547M	Glyphosate			2			1				3	1
EPA 549.2M	Paraquat dichloride			2			1				3	1
EPA 619	Atrazine			2			6	1	1	1	5	1
EPA 619	Cyanazine			2			6	1	1	1	5	1
EPA 619	Simazine			2			6	1	1	1	5	1
Metals (Total)												
EPA 200.8	Arsenic			2			1				3	1
EPA 200.8	Boron			2			6	1	1	1	5	1
EPA 200.8	Cadmium			2			1				3	1
EPA 200.8	Copper			2			6	1	1	1	5	1
EPA 200.8	Lead			2			1				3	1
EPA 200.8	Molybdenum			2			1				3	1
EPA 200.8	Nickel			2			6	1	1	1	5	1
EPA 200.8	Selenium			2			6	1	1	1	5	1
EPA 200.8	Zinc			2			6	1	1	1	5	1
Metals (Dissolved)												
EPA 200.8	Cadmium			2			1				3	1
EPA 200.8	Copper			2			6	1	1	1	5	1
EPA 200.8	Lead			2			1				3	1
EPA 200.8	Nickel			2			6	1	1	1	5	1
EPA 200.8	Zinc			2			6	1	1	1	5	1
Nutrients												
SM 2340 C	Hardness as CaCO3			2			6	1	1	1	5	1
EPA 300.0	Nitrate as N											
EPA 350.2	Ammonia as N			2			6	1	1	1	5	1
EPA 351.3	Nitrogen, Total Kjeldahl			2			1				3	1
EPA 353.2	Nitrate + Nitrite as N			2			6	1	1	1	5	1
EPA 354.1	Nitrite as N											

METHOD	ANALYTE	2008			2009				2010			
		STORM	IRRIGATION*	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
EPA 365.2	Orthophosphate as P			2			1				3	1
EPA 365.2	Phosphate as P			2			6	1	1	1	5	1
Toxicity												
EPA 821/R-02-012	<i>Ceriodaphnia dubia</i>			2			6	1	1	1	5	1
EPA 821/R-02-012	<i>Pimephales promelas</i>			2			6	1	1	1	5	1
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>			2			6	1	1	1	5	1
EPA 600/R-99-064	<i>Hyalella azteca</i>						2		1		1	

*Site not sampled during the 2008 irrigation season.

Exceedance History

Since the irrigation season in 2008 and through December 2010 Lateral 2 ½ near Keyes Rd has experienced exceedances of WQTLs including exceedances of pH (4), ammonia (1), nitrate + nitrite (1), *E. coli* (2), chlorpyrifos (3), HCH (1), water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca*. Although all exceedances are listed in Table X-4, only those that have occurred at a site more than once in a three year period will be subject to management plan actions.

In 2010, exceedance of the chlorpyrifos WQTL occurred twice.

All exceedances are listed in Table X-4 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 prioritized in the bottom row of Table X-4 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR). No additional prioritizations were necessary following the exceedances of the 2010 sampling season. The highest priority constituent in the Lateral 2 ½ near Keyes Rd subwatershed is chlorpyrifos (A/B) (Table X-4).

Table X-4. Exceedances experienced in samples collected from Lateral 2 ½ near Keyes October 2008 through December 2010 (sorted by season and date).

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

STATION NAME	SEASON	SAMPLE DATE	pH, NONE	AMMONIA, >1.5 MG/L	NITRATE + NITRITE AS N, >10 MG/L	E. COLI, >235 MPN/100 ML	CHLORPYRIFOS, >0.015 µg/L	HCH, DELTA, >0.0039 µg/L	HYALELLA AZTECA, (% CONTROL)	S. CAPRICORNUTUM, (% CONTROL)
Lateral 2 ½ near Keyes Rd	Fall	10/21/2008	9.57			280				
Lateral 2 ½ near Keyes Rd	Fall	11/11/2008	9.09	0.65 (0.57)		370		0.013		
Lateral 2 ½ near Keyes Rd	Irrigation, Sed	4/21/2009	9.2						90	
Lateral 2 ½ near Keyes Rd	Irrigation	5/19/2009								56
Lateral 2 ½ near Keyes Rd	Irrigation	7/21/2009					0.049			
Lateral 2 ½ near Keyes Rd	Irrigation	8/18/2009			15					
Lateral 2 ½ near Keyes Rd	Fall	10/20/2009	8.68							
Lateral 2 ½ near Keyes Rd	Storm	4/20/2010					0.076			
Lateral 2 ½ near Keyes Rd	Irrigation	7/20/2010					0.061			
Constituent Priority			E	NP	NP	E	A/B	NP	NP	NP

2008-2010 Management Plan Monitoring Results

2008-2010

Assessment Monitoring occurred at Lateral 2 ½ near Keyes Rd from 2008 through 2010. There has been no MPM at the Lateral 2 ½ near Keyes Rd site subwatershed.

2011

Lateral 2 ½ near Keyes Rd is scheduled for MPM for chlorpyrifos (April and July) in 2011. Assessment Monitoring will occur at this site again in 2029.

Load Calculations

Loads have been calculated for all copper detections in the site subwatershed based on the following formula (Table X-5):

$$\text{Load} = \text{Discharge (cfs)} \times 28.317\text{L/ft}^3 \times \text{Concentration (mg/L} \times 1000 \text{ or } \mu\text{g/L)}.$$

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 X-5. Instantaneous load calculations for chlorpyrifos where discharge is measured at the Lateral 2 ½ site subwatershed (sorted by analyte and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION $\mu\text{G/L}$	LOADING RATE $\mu\text{G/SEC}$
Lateral 2 1/2 near Keyes Rd	Chlorpyrifos	04/20/10	10.7	0.076	23.03
Lateral 2 1/2 near Keyes Rd	Chlorpyrifos	07/20/10	9	0.061	15.55
Lateral 2 1/2 near Keyes Rd	Chlorpyrifos	08/17/10	31.92	0.013	11.75

Source Identification and Outreach

The Coalition considers past monitoring results and associated PUR data to address source identification. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. The Coalition has not conducted any additional MPM during the months when exceedances occurred at this site subwatershed yet.

The Lateral 2 ½ near Keyes Rd subwatershed is a high priority as of 2011 and will remain as such through 2013. The Coalition is in the process of grower outreach and education to address the Lateral 2 ½ Management Plan's priority constituents. The Coalition has begun to organize grower meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual grower meetings with targeted members are planned to inform growers about

management practices as well as to assess current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos is the only A/B constituent for the Berenda Slough subwatershed.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015µg/L three times in this subwatershed. Exceedances of chlorpyrifos occurred during the irrigation seasons of 2009 and 2010 (Table X-4). During 2011, Lateral 2 ½ near Keyes Rd is scheduled to have monitoring for chlorpyrifos during months of past exceedances.

All PUR data are reviewed for the number of monthly applications and pounds of active ingredient applied, and the acres treated. The PUR from the Lateral 2 ½ near Keyes Rd subwatershed area were reviewed for chlorpyrifos use (Table X-6, Figure X-2). The greatest amount of chlorpyrifos use occurred in 2009 (10,818 lbs AI) with the lowest amount of use occurring in 2007 (367 lbs AI), see Table X-6, Figure X-2. The greatest chlorpyrifos use has occurred consistently in the month of July (Figure X-2).

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications of the constituent of concern. The largest amount of chlorpyrifos applied from 2007 through 2010 was to walnuts (14,052 lbs AI) followed by almonds (7,740 lbs AI) (Table X-7). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table X-7).

Table X-6. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for September 2007 –December 2010 in the Lateral 2 ½ near Keyes 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
September, 2007	13	99.9	77.7
October, 2007	1	37.6	37
December, 2007	5	229.5	135
January, 2008	3	113.1	56
March, 2008	11	363.9	488.5
April, 2008	1	12.1	6.5
May, 2008	24	1392.1	723.8
June, 2008	10	201.5	136
July, 2008	65	3162.5	1957.3
August, 2008	20	1002.0	611.4
September, 2008	1	55.0	55
January, 2009	7	354.7	188.5
February, 2009	3	305.8	158
March, 2009	13	890.2	425
April, 2009	8	353.3	269.4
May, 2009	62	2811.2	1389.4
June, 2009	10	375.1	192.1
July, 2009	111	4568.9	2713.5
August, 2009	30	1102.9	695.3

MONTH/YEAR	NUMBER OF CHLORPYRIFOS APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
September, 2009	10	46.9	131.5
December, 2009	1	9.4	10
February, 2010	1	76.0	38
March, 2010	21	535.4	1044.6
April, 2010	6	202.8	107
May, 2010	30	1210.4	728.5
June, 2010	38	1689.0	911.8
July, 2010	87	3444.6	1955.9
August, 2010	38	1067.7	766.7
September, 2010	12	288.7	444.7
October, 2010	4	14.8	10.6
Summaries by Year			
2007 Total	19	367.0	249.7
2008 Total	135	6302.2	4034.4
2009 Total	255	10818.4	6172.7
2010 Total	237	8529.4	6007.7
Total	646	26017.0	16464.5

Figure X-2. Pounds of chlorpyrifos applied within the Lateral 2 ½ near Keyes Rd site subwatershed by month for 2007-2010. Asterisk (*) denotes months with exceedances.

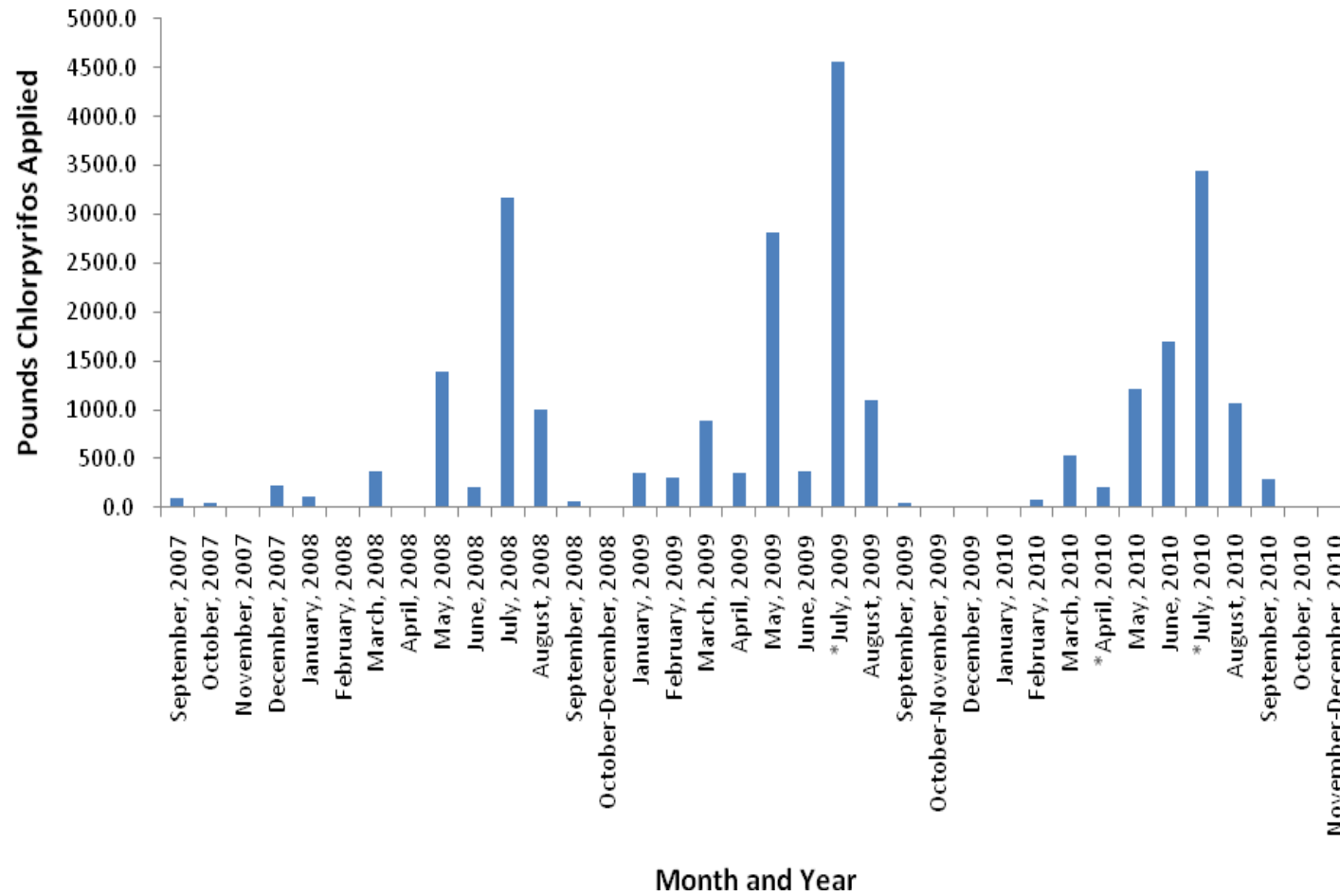


Table X-7. Total pound AI for chlorpyrifos based on PUR data from 2004-2010 within the Lateral 2 ½ near Keyes Rd subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	CHLORPYRIFOS 4E AG	18.9
		COBALT	404.0
		GOVERN 4E INSECTICIDE	18.9
		LOCK-ON INSECTICIDE	247.1
		LORSBAN 4E-HF	67.5
		LORSBAN-4E	23.5
		NUFOS 4E	359.4
		WARHAWK	57.7
	ALMOND	CHLORPYRIFOS 4E AG	146.4
		GOVERN 4E INSECTICIDE	858.3
		LORSBAN 4E INSECTICIDE	58.2
		LORSBAN 4E-HF	813.6
		LORSBAN ADVANCED	1817.2
		LORSBAN-4E	2393.5
		NUFOS 4E	1365.5
		WARHAWK	179.8
		WHIRLWIND	108.5
	APPLE	LORSBAN 4E INSECTICIDE	300.9
		LORSBAN-4E	148.1
		NUFOS 4E	723.9
	CORN FOR/FOD	LORSBAN 4E-HF	228.8
		LORSBAN-4E	84.0
		NUFOS 4E	540.5
		WARHAWK	264.3
	GRAPES, WINE	LORSBAN ADVANCED	157.8
	N-GRNHS PLANT	DURSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	1.1
	N-OUTDR CONTAINER/FLD GRWN PLANTS	DURSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	18.6
	OP-VINE	DURSBAN 50W INSECTICIDE IN WATER SOLUBLE PACKETS	47.6
	PEACH	LORSBAN 4E INSECTICIDE	68.0
		LORSBAN 4E-HF	186.4
		LORSBAN ADVANCED	9.4
		LORSBAN-4E	1.2
	SWEET POTATO	LORSBAN 15G GRANULAR INSECTICIDE	88.2
		LORSBAN ADVANCED	157.8
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	65.7
		GOVERN 4E INSECTICIDE	552.4
		LORSBAN 4E INSECTICIDE	728.6
		LORSBAN 4E-HF	344.3
		LORSBAN ADVANCED	3365.2
		LORSBAN-4E	4893.2
		NUFOS 4E	3197.0
		WARHAWK	190.9
		WHIRLWIND	715.1

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
		ALFALFA - Total Pounds Chlorpyrifos Applied	1197.0
		ALMOND - Total Pounds Chlorpyrifos Applied	7740.9
		APPLE - Total Pounds Chlorpyrifos Applied	1172.9
		CORN - Total Pounds Chlorpyrifos Applied	1117.6
		GRAPES - Total Pounds Chlorpyrifos Applied	157.8
		GREENHOUSE PLANTS - Total Pounds Chlorpyrifos Applied	1.1
		OUTDOOR CONTAINER PLANTS- Total Pounds Chlorpyrifos Applied	18.6
		OP-VINE - Total Pounds Chlorpyrifos Applied	47.6
		PEACH - Total Pounds Chlorpyrifos Applied	265.0
		SWEET POTATO - Total Pounds Chlorpyrifos Applied	246.0
		WALNUT - Total Pounds Chlorpyrifos Applied	14052.5
		Total Pounds Chlorpyrifos Applied (2007-2010)	26017.0

The Coalition has determined that the chlorpyrifos concentrations found in Lateral 2 ½ near Keyes Rd were most likely the result of tailwater transporting chlorpyrifos. Because the chlorpyrifos concentrations were well above the WQTL, it is unlikely they were solely the result of spray drift. Furthermore, as discussed above, PUR data indicate large numbers of applications and large amounts of active ingredient were applied throughout the subwatershed prior to the 2009 and 2010 exceedances.

From reviewing the Lateral 2 ½ near Keyes Rd PUR data it can be determined that the 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 Lateral 2 ½ near Keyes Rd suggesting that drift may play a role in generating the exceedances and should be one of the subjects of focused outreach.

Growers are encouraged to review their operation to determine if irrigation return flows are managed properly. Owners with orchards are requested to evaluate their applications to minimize spray drift. Growers are targeted for outreach prior to the irrigation season and heavy application periods. Row crop farmers are advised of methods to better management their irrigation tailwater and storm water runoff, whereas outreach efforts to orchard and vineyard growers focus on encouraging management practices to reduce spray drift and also to improve orchard and vineyard water management.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information, such as available funding for management practice implementation. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of the Management Plan Update Report.

The Coalition began conducting individual contact meetings with targeted growers in the third priority subwatersheds during the winter of 2011. Although meetings focus mainly on chlorpyrifos exceedances, all water quality results are reviewed and discussed including water column and sediment toxicity. The Coalition contacted 27 members accounting for 1,845 acres of targeted direct drainage within the subwatershed.

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

Management Plan Monitoring is scheduled at Lateral 2 ½ near Keyes Rd in 2011 during months when previous exceedances occurred. The Coalition plans to conduct MPM through 2013 to evaluate improvements in water quality as recommended management practice implementation occurs.

Priority E Constituents

E. coli and pH are the priority E constituents listed under the Lateral 2 ½ near Keyes Rd Management Plan.

The measure of pH is a non-conserved indicator of biological and physical input to the system and it is not possible to manage unless the causes are known. Determining the cause changes in pH is not a priority and the Coalition will not attempt to manage these constituents.

There have been two exceedances of the *E. coli* WQTL; one in October and November 2008. Lateral 2 ½ near Keyes Rd site subwatershed was not sampled during the 2006 *E. coli* study, so potential sources are not known.

There have been four exceedances of pH at Lateral 2 ½ near Keyes Rd; two in 2008 (October and November) and two in 2009 (April and October). The Coalition will discuss pH and *E. coli* during individual contacts and at group grower meetings, but these constituents remain a low priority.

Evaluation

Lateral 2 ½ near Keyes Rd is one of the third four priority site subwatersheds within the ESJWQC and is in its first year of focused outreach (2011 through 2013). The Coalition will focus its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Lateral 2 ½ near Keyes Rd subwatershed is to focus on providing information to growers to review their operation and determine if irrigation return flows are managed properly, specifically to growers with the potential to drain. Almond and walnut growers should be targeted for outreach especially prior to the irrigation season. Outreach includes grower notification, management practice outreach and education, tracking of management practices implementation, and providing information on special studies of management practice efficacy.

Individual surveys to document current management practice implementations and assess future planned implementations will be completed by the end of July 2011. The Coalition will then assess

these results and plan the final stages of outreach including re-contacting growers to identify newly implemented practices and future monitoring to evaluate water quality improvement.

In 2011, MPM is scheduled during months of past exceedances.

XI. LIVINGSTON DRAIN @ ROBIN AVENUE

Management Plan Constituents

Priority A/B

- Chlorpyrifos

Priority C

- Copper

Priority D

- *Selenastrum capricornutum* water column toxicity

Priority E

- pH
- Lead
- *E. coli*

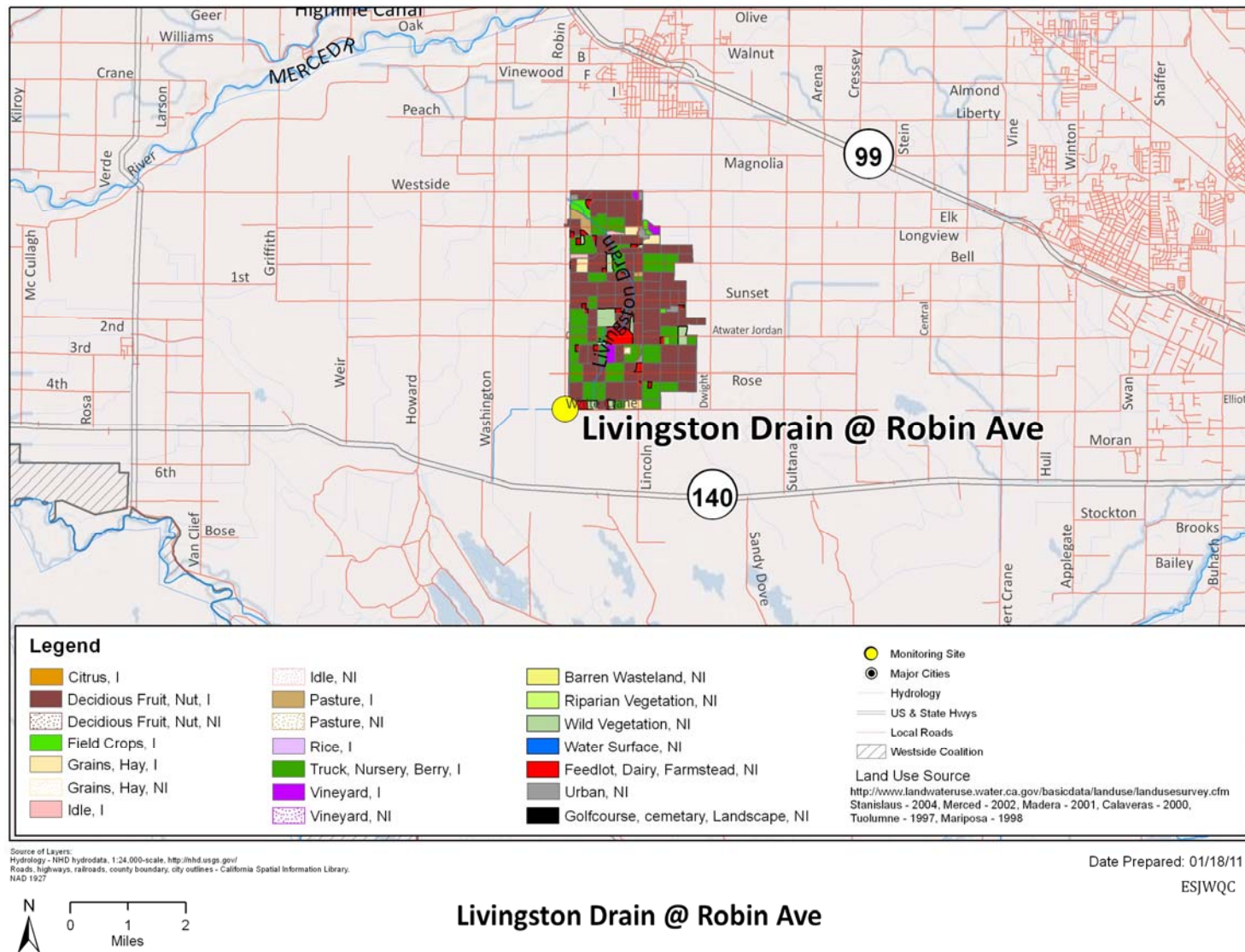
Description of Livingston Drain @ Robin Avenue Site Subwatershed

Livingston Drain @ Robin Ave (3,656 irrigated acres) is located in the west central portion of the Coalition region in Merced County. It is located west of Atwater and Livingston. The agriculture is almost entirely orchards (FigureXI-1) and several dairies are present in the watershed. Table XI-1 includes the station name (sample site), station code and target latitude/longitudes for sites sampled within this subwatershed.

Table XI-1. Coordinates of the Livingston Drain @ Robin Ave site subwatershed sampling locations.

SAMPLE SITE	STATION CODE	TARGET LAT	TARGET LONG
Livingston Drain @ Robin Ave	535XLDARA	37.3169	-120.7423

Figure XI-1. Site subwatershed map of land use for the Livingston Drain @ Robin Ave sample site



Subwatershed Monitoring History

Monitoring within the Livingston Drain @ Robin Ave site subwatershed was initiated in irrigation season of 2007; the site was not monitored during the storm season of this year. Sampling continued through 2008 (Table XI-2). A list of constituents sampled is included in Table XI-3.

Management Plan Monitoring was initiated during 2008 at Livingston Drain @ Robin Ave for copper during May through July and in September (Table XI-4).

Sampling at Livingston Drain @ Robin Ave did not occur in 2009 or 2010.

Livingston Drain @ Robin Ave site subwatershed is scheduled as high priority subwatershed scheduled for MPM 2011 through 2013 and will be monitored for Assessment Monitoring in 2023 through 2024.

Livingston Drain is not considered an impaired waterbody under the 2008 Basin Plan and is not 303d listed, however the Sacramento/San Joaquin River Delta is listed for a number of constituents including chlorpyrifos, DDT, diazinon, group A pesticides, mercury and unknown toxicity.

Table XI-2. Livingston Drain @ Robin Avenue sampling events per season per year.

	2004	2005		2006		2007		2008			2009				2010			
	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL	WINTER	STORM	IRRIGATION	FALL
Events Sampled	NA	NA	NA	NA	NA	NA	5	2	6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Events Not Sampled	NA	NA	NA	NA	NA	NA	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA	NA	5	2	6	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table XI-3. Number of analyses performed per analyte in each sampling season and year for the Livingston Drain @ Robin Ave sample site.

Only environmental samples with a sample replicate and lab replicate number of one are listed.

METHOD	ANALYTE	2007	2008			2009	2010
		IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER-FALL*
Field and Physical Parameters							
EPA 110.2	Color	5	2	6			
EPA 160.1	Dissolved Solids	5	2	6			
EPA 160.2	Suspended Solids						
EPA 180.1	Turbidity	5	2	6			
EPA 405.1	BOD	1					
EPA 415.1	Total Organic Carbon	5	2	6			
SM 9223	<i>E. coli</i>	5	2	6			
NA	Dissolved Oxygen	6	2	12			
NA	Specific Conductivity	6	2	12			
NA	pH	6	2	12			
Carbamates							
EPA 8321A	Aldicarb	5	2	6			
EPA 8321A	Carbaryl	5	2	6			
EPA 8321A	Carbofuran	5	2	6			
EPA 8321A	Diuron	5	2	6			
EPA 8321A	Linuron	5	2	6			
EPA 8321A	Methiocarb	5	2	6			
EPA 8321A	Methomyl	5	2	6			
EPA 8321A	Oxamyl	5	2	6			
Organochlorines							
EPA 8081A	DDD(p,p')	5	2	6			
EPA 8081A	DDE(p,p')	5	2	6			
EPA 8081A	DDT(p,p')	5	2	6			
EPA 8081A	Dicofol	5	2	6			
EPA 8081A	Dieldrin	5	2	6			
EPA 8081A	Endrin	5	2	6			
EPA 8081A	Methoxychlor	5	2	6			
Organophosphates							
EPA 8141A	Azinphos methyl	5	2	6			
EPA 8141A	Chlorpyrifos	5	2	6			
EPA 8141A	Demeton-s						
EPA 8141A	Diazinon	5	2	6			
EPA 8141A	Dichlorvos						
EPA 8141A	Dimethoate	5	2	6			
EPA 8141A	Disulfoton	5	2	6			
EPA 8141A	Malathion	5	2	6			
EPA 8141A	Methamidophos	5	2	6			
EPA 8141A	Methidathion	5	2	6			
EPA 8141A	Molinate	5	2	6			
EPA 8141A	Parathion, Methyl	5	2	6			
EPA 8141A	Phorate	5	2	6			
EPA 8141A	Phosmet	5	2	6			

METHOD	ANALYTE	2007	2008			2009	2010
		IRRIGATION	STORM	IRRIGATION	FALL*	WINTER-FALL*	WINTER-FALL*
EPA 8141A	Thiobencarb	5	2	6			
Pyrethroids							
EPA 8081A	Bifenthrin	5	2	6			
EPA 8081A	Cyfluthrin, total	5	2	6			
EPA 8081A	Cyhalothrin, lambda, total	5	2	6			
EPA 8081A	Cypermethrin, total	5	2	6			
EPA 8081A	Esfenvalerate/ Fenvalerate, total	5	2	6			
EPA 8081A	Permethrin, total	5	2	6			
Triazines							
EPA 547M	Glyphosate	5	2	6			
EPA 549.2M	Paraquat dichloride	5	2	6			
EPA 619	Atrazine	5	2	6			
EPA 619	Cyanazine	5	2	6			
EPA 619	Simazine	5	2	6			
Metals (Total)							
EPA 200.8	Arsenic	5	2	6			
EPA 200.8	Boron	5	2	6			
EPA 200.8	Cadmium	5	2	6			
EPA 200.8	Copper	5	2	10			
EPA 200.8	Lead	5	2	6			
EPA 200.8	Molybdenum						
EPA 200.8	Nickel	5	2	6			
EPA 200.8	Selenium	5	2	6			
EPA 200.8	Zinc	5	2	6			
Nutrients							
SM 2340 C	Hardness as CaCO3	5	2	10			
EPA 300.0	Nitrate as N	5	2	6			
EPA 350.2	Ammonia as N	5	2	6			
EPA 351.3	Nitrogen, Total Kjeldahl	5	2	6			
EPA 353.2	Nitrate + Nitrite as N						
EPA 354.1	Nitrite as N	5	2	6			
EPA 365.2	Orthophosphate as P	5	2	6			
EPA 365.2	Phosphate as P	5	2	6			
Toxicity							
EPA 821/R-02-012	<i>Ceriodaphnia dubia</i>	5	2	6			
EPA 821/R-02-012	<i>Pimephales promelas</i>	5	2	6			
EPA 821/R-02-013	<i>Selenastrum capricornutum</i>	5	2	8			
EPA 600/R-99-064	<i>Hyalella azteca</i>	1		1			

*Site not sampled during the 2008 fall season, and 2009 and 2010 sampling years.

Table XI-4. Livingston Drain @ Robin Ave site subwatershed. 2008 Management Plan Monitoring schedule for copper. A = additional sampling. X = constituents sampled.

SAMPLE SITE	DATE	TYPE	COPPER
Livingston Drain @ Robin Ave	7-May-08	A	x
Livingston Drain @ Robin Ave	3-Jun-08	A	x
Livingston Drain @ Robin Ave	8-Jul-08	A	x
Livingston Drain @ Robin Ave	9-Sept-08	A	x

Exceedance History

Exceedances of WQTLs include DO (1), pH (11), nitrate (1), *E. coli* (2), total copper (9), lead (2), chlorpyrifos (4) and water column toxicity to *S. capricornutum* (3), see Table XI-5.

All exceedances are listed in Table XI-5 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 XI-5 and is determined using the ESJWQC Management Plan prioritization process flow chart (see Figure 4 on page 23 of the 2011 MPUR).

Table XI-5. Exceedances experienced in samples collected from Livingston Drain @ Robin Ave May 2007 through September 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, NONE	NITRATE AS N, >10 MG/L	E. COLI, >235 MPN/100 ML	COPPER TOTAL, >1,300 µG/L	LEAD, >15 µG/L	CHLORPYRIFOS, >0.015 µG/L	S. CAPRICORNUTUM, (% CONTROL)
Livingston Drain @ Robin Ave	Irrigation	5/15/2007		8.95			18 (13.2)			
Livingston Drain @ Robin Ave	Irrigation	6/19/2007					16 (4.4)			
Livingston Drain @ Robin Ave	Irrigation	7/17/2007		8.82			7.8 (5.3)			
Livingston Drain @ Robin Ave	Irrigation	8/14/2007							0.016	
Livingston Drain @ Robin Ave	Irrigation	9/11/2007		8.57			14 (6.4)			
Livingston Drain @ Robin Ave	Storm1 NM	1/24/2008				1700	6.7 (3.1)	2.4 (0.6)	0.02	
Livingston Drain @ Robin Ave	Storm2 NM	2/26/2008	5.68				15 (4.1)	1.1 (0.9)		61
Livingston Drain @ Robin Ave	Irrigation1 NM	4/22/2008								58
Livingston Drain @ Robin Ave	Irrigation1 RS	4/29/2008								63
Livingston Drain @ Robin Ave	Irrigation2 NM	5/20/2008		8.79						62
Livingston Drain @ Robin Ave	Irrigation2 RS	5/27/2008		8.68						
Livingston Drain @ Robin Ave	Irrigation3 MPM	6/3/2008		8.61						
Livingston Drain @ Robin Ave	Irrigation3 NM	6/17/2008		8.97	11		45 (13)		0.23	
Livingston Drain @ Robin Ave	Irrigation4 MPM	7/8/2008		8.97			110 (5.7)			
Livingston Drain @ Robin Ave	Irrigation4 NM	7/22/2008				440	17 (16.9)		0.025	

STATION NAME	SEASON	SAMPLE DATE	OXYGEN, DISSOLVED, >7 MG/L	PH, NONE	NITRATE AS N, >10 MG/L	E. COLI, >235 MPN/100 ML	COPPER TOTAL, >1,300 µG/L	LEAD, >15 µG/L	CHLORPYRIFOS, >0.015 µG/L	S. CAPRICORNUTUM, [% CONTROL]
Livingston Drain @ Robin Ave	Irrigation5 NM	8/19/2008								
Livingston Drain @ Robin Ave	Sediment	8/28/2008		8.67						
Livingston Drain @ Robin Ave	Irrigation6 MPM	9/9/2008		8.72						
Livingston Drain @ Robin Ave	Irrigation6 NM	9/23/2008		9.02						
Constituent Priority			NP	E	NP	E	C	E	A/B	D

2007-2010 Management Plan Monitoring Results

2007

Sampling began at the Livingston Drain @ Robin Ave site during the 2007 irrigation season; therefore no management plan sampling was conducted in 2007.

2008

Additional Management Plan Monitoring occurred at Livingston Drain @ Robin Ave in May, June, July and September 2008 for copper. An exceedance of the copper WQTL occurred in July 2008 MPM samples (Tables XI-5 and XI-6).

2009-2010

No MPM occurred from 2009 through 2010 at Livingston Drain @ Robin Ave.

2011

In 2011 Livingston Drain @ Robin Ave is scheduled for MPM for *S. capricornutum* toxicity (February, April and May), copper (January, February, May, June, July and September), chlorpyrifos (January, June, July and August), and lead (January and February). This site will not rotate into Assessment Monitoring again until 2023.

Table XI-6. Livingston Drain @ Robin Ave. Normal Monitoring (NM) and Management Plan Monitoring (MPM) results. Exceedance values are in bold.

	MONTH:	APRIL	MAY	JUNE	JULY	AUG	SEPT
2007 NM (@ Robin Ave)	Date	NA	5/15/07	6/19/07	7/17/07	8/14/07	9/11/07
	Copper (µg/L)	NA	18	16	7.8	7	14
2008 MPM (@ Robin Ave)	Date	NA	5/7/08	6/3/08	7/8/08	NA	9/9/08
	Copper (µg/L)	NA	6.9	9.2	110	NA	5.3
2008 NM (@ Robin Ave)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Copper (µg/L)	8.7	7.1	45	17	5.2	4.7

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

NM- Normal Monitoring

MPM- Management Plan Monitoring

Load Calculations

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

Load = Discharge (cfs) X 28.317L/ft³ X Concentration (mg/L X 1000 or µg/L).

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

Table XI-7. Instantaneous load calculations for copper where discharge was measured in the Livingston Drain site subwatershed (sorted by analyte and date).

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µG/L	LOADING RATE µG/SEC
Livingston Drain @ Robin Ave	Chlorpyrifos	07/17/07	1.4	0.011	0.44
Livingston Drain @ Robin Ave	Chlorpyrifos	08/14/07	7.64	0.016	3.46
Livingston Drain @ Robin Ave	Chlorpyrifos	01/24/08	7.13	0.02	4.04
Livingston Drain @ Robin Ave	Chlorpyrifos	06/17/08	2.91	0.015	1.24
Livingston Drain @ Robin Ave*	Chlorpyrifos	06/17/08		0.23	18.95
Livingston Drain @ Robin Ave	Chlorpyrifos	07/22/08	3.09	0.025	2.19
Livingston Drain @ Robin Ave	Chlorpyrifos	09/23/08	1.93	0.0051	0.28
Livingston Drain @ Robin Ave	Copper	05/15/07	8.94	18	4556.77
Livingston Drain @ Robin Ave	Copper	06/19/07	2.25	16	1019.41
Livingston Drain @ Robin Ave	Copper	07/17/07	1.4	7.8	309.22
Livingston Drain @ Robin Ave	Copper	08/14/07	7.64	7	1514.39
Livingston Drain @ Robin Ave	Copper	09/11/07	5.11	14	2025.80
Livingston Drain @ Robin Ave	Copper	01/24/08	7.13	6.7	1352.73
Livingston Drain @ Robin Ave	Copper	02/26/08	0.19	15	80.70
Livingston Drain @ Robin Ave*	Copper	02/26/08		18	96.84
Livingston Drain @ Robin Ave	Copper	04/22/08	1.07	8.7	263.60

SAMPLE SITE	ANALYTE NAME	SAMPLE DATE	DISCHARGE CFS	CONCENTRATION µg/L	LOADING RATE µg/SEC
Livingston Drain @ Robin Ave	Copper	05/07/08	1.67	6.9	326.30
Livingston Drain @ Robin Ave	Copper	05/20/08	4.1	7.1	824.31
Livingston Drain @ Robin Ave	Copper	06/03/08	1.58	9.2	411.62
Livingston Drain @ Robin Ave*	Copper	06/17/08	2.91	6	494.41
Livingston Drain @ Robin Ave	Copper	06/17/08		45	3708.11
Livingston Drain @ Robin Ave	Copper	07/08/08	0	110	0
Livingston Drain @ Robin Ave	Copper	07/22/08	3.09	17	1487.49
Livingston Drain @ Robin Ave	Copper	08/19/08	3.09	5.2	455.00
Livingston Drain @ Robin Ave	Copper	09/09/08	2.45	5.3	367.70
Livingston Drain @ Robin Ave	Copper	09/23/08	1.93	4.7	256.86

*Field Duplicate

Source Identification and Outreach

The Coalition considers past monitoring results and associated PUR data to address source identification. The Coalition focuses its efforts on applied pesticides. PUR data are reviewed to determine the most frequent crop type and timing associated with applications. In 2008, the Coalition conducted additional MPM during the months when exceedances occurred in previous years to better characterize water quality the subwatershed. No upstream MPM occurred at this site in 2008.

The Livingston Drain subwatershed is a high priority as of 2011 and will remain as such through 2013. The Coalition will actively engage in outreach and education to address Livingston Drain Management Plan's priority constituents. The Coalition has begun to organize meetings and mailings to educate growers about management practices and their importance in achieving acceptable water quality. Individual meetings with targeted members are planned to inform growers about management practices as well as to assess current and expected future implementation of additional management practices.

Priority A/B Constituents

Chlorpyrifos is the only A/B constituent for the Livingston Drain subwatershed.

Chlorpyrifos

Chlorpyrifos has exceeded the WQTL of 0.015 µg/L four times in this subwatershed in the past. Exceedances of chlorpyrifos were associated with the irrigation seasons of 2007 and 2008 (Table XI-5). During 2011, Livingston Drain @ Robin Ave is scheduled for MPM during the months when past exceedances occurred.

All PUR data are reviewed for the number of monthly applications and pounds of active ingredient applied, and the acres treated (Table XI -8, Figure XI-2). The greatest amount of chlorpyrifos use occurred in 2006 (881 lbs AI) with the lowest amount of use occurring in 2007 (198 lbs AI), see Table XI -8, Figure XI-2. The greatest chlorpyrifos use has occurred consistently in the months of April and May (Table XI -8, Figure XI-2).

The Coalition also uses PUR data from each subwatershed to determine which crops receive the most applications of the constituent of concern. The largest amount of chlorpyrifos applied from 2006 through 2010 was to almonds (1,404 lbs AI) followed by sweet potato (1,093 lbs AI) (Table XI-9). The most common product containing chlorpyrifos used within this subwatershed was Lorsban (Table XI-9).

Table XI-8. Number of chlorpyrifos applications, total pounds applied and total acres treated by month for January 2006 through December 2010 in the Livingston Drain @ Robin Ave 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, 2006	1	72.0	36
April, 2006	7	343.1	170.5
May, 2006	6	281.4	139
July, 2006	2	23.9	12.5
August, 2006	6	161.3	144.5
April, 2007	1	34.4	18.5
May, 2007	4	59.4	30.5
July, 2007	2	21.9	24
August, 2007	4	83.0	83.5
May, 2008	5	246.0	121.7
June, 2008	1	16.2	8
July, 2008	2	70.6	38
August, 2008	5	145.1	159.5
May, 2009	2	94.8	47
July, 2009	1	40.0	20
August, 2009	6	258.0	244
April, 2010	2	383.9	365
July, 2010	3	64.6	73
August, 2010	3	127.8	115
Summaries by Year			
2006 Total	22	881.8	502.5
2007 Total	11	198.7	156.5
2008 Total	13	478.0	327.2
2009 Total	9	392.8	311
2010 Total	8	576.2	553
Total	63	2527.5	1850.2

Figure XI-2. Pounds of chlorpyrifos applied within the Livingston Drain @ Robin Ave site subwatershed by month for 2006-2010. Asterisk (*) denotes months with exceedances.

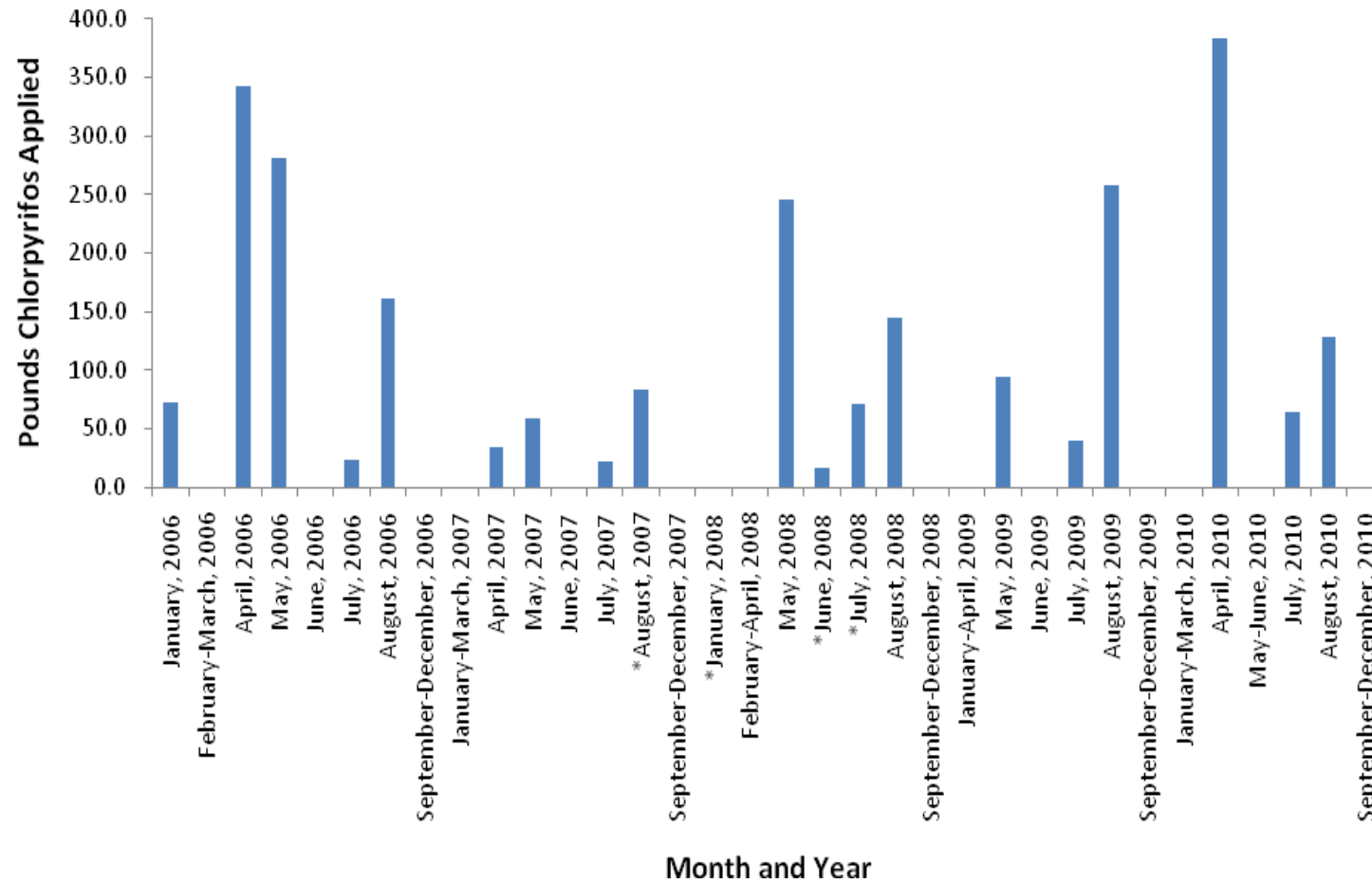


Table XI-9. Total pound active ingredient (AI) for chlorpyrifos based on PUR data from 2006-2010 within the Livingston Drain @ Robin Ave subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
CHLORPYRIFOS	ALMOND	GOVERN 4E INSECTICIDE	783.5
		LORSBAN 4E-HF	123.9
		LORSBAN ADVANCED	111.7
		LORSBAN-4E	385.0
	SWEET POTATO	LORSBAN 15G GRANULAR INSECTICIDE	1010.1
		LORSBAN-4E	83.6
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	LORSBAN ADVANCED	5.6
		LORSBAN-4E	24.0
ALMOND - Total Pounds Chlorpyrifos Applied			1404.1
SWEET POTATO - Total Pounds Chlorpyrifos Applied			1093.7
WALNUT - Total Pounds Chlorpyrifos Applied			29.6
Total Pounds Chlorpyrifos Applied (2006-2010)			2527.5

The Coalition has determined that the chlorpyrifos concentrations found in Livingston Drain @ Robin Ave were most likely the result of tailwater transporting chlorpyrifos. Because the chlorpyrifos concentrations were well above the WQTL, it is unlikely they were solely the result of spray drift.

From reviewing the PUR data from Livingston Drain @ Robin Ave it can be determined that the 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, applications occurred before and during the months associated with past chlorpyrifos exceedances at Livingston Drain @ Robin Ave. Spray drift may also play a role in generating the exceedances and should be one of the subjects of focused outreach. Analyses of these data indicate outreach should target specific growers applying chlorpyrifos and/or members farming parcels adjacent to the waterway.

Growers are encouraged to review their operation to determine if irrigation return flows are managed properly. Owners with orchards are instructed to evaluate their applications to minimize spray drift. Growers are targeted for outreach prior to the irrigation season and heavy application periods. Row crop farmers are advised of methods to better management their irrigation tailwater and storm water runoff, whereas outreach efforts to orchard and vineyard growers focus on encouraging management practices to reduce spray drift and also to improve orchard and vineyard water management.

Coalition outreach since 2007 has included grower meetings and the mailing/distribution of information, such as available funding for management practice implementation. A complete list of Coalition Outreach during 2010 is provided in the Summary of Coalition Outreach Activities section of the MPUR.

The Coalition began conducting individual meetings with targeted growers in the third priority subwatersheds during the winter of 2011. Although meetings are focusing mainly on chlorpyrifos exceedances, all water quality results are reviewed and discussed including water column and sediment toxicity. The Coalition contacted 11 members accounting for 352 acres of targeted direct drainage.

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

Management Plan Monitoring is scheduled at Livingston Drain @ Robin Ave in 2011 during months when previous exceedances occurred. The Coalition plans to conduct MPM through 2013 to evaluate improvements in water quality as recommended management practice implementation occurs.

Priority C Constituent

Copper is the only priority C constituent listed for the Livingston Drain @ Robin Ave subwatershed Management Plan.

Copper

There have been eight exceedances of the copper WQTL at Livingston Drain site subwatershed from 2007 through 2008 (Table XI-5). No exceedances of the copper WQTL were associated with *S. capricornutum* toxicity during 2007, however; an exceedance of the copper WQTL occurred during February 2008 along with toxicity to *S. capricornutum*. Copper is applied primarily during the winter and spring months, but copper is also heavily used by dairies and there are numerous dairies in the watershed (Table XI-10, Figures XI-1 and XI-3).

The PUR data are reviewed for the number of monthly copper applications, pounds of active ingredient applied, and acres treated (Table XI-10, Figure XI-3). Since 2006 there has been a general decrease in the pounds of copper applied within the subwatershed; the amount of copper used in 2006 was 7,404 lbs AI compared to 2,394 lbs AI in 2010. The greatest amount of copper use has occurred consistently during the month of January. Not all exceedances occurred during months of the greatest amount of use (Figure XI-3).

The largest amount of copper applied from 2006 through 2010 was associated with almonds (16,817 lbs AI) and peaches (4,020 lbs AI), see Table XI-11. The most common products containing copper used within this subwatershed are DuPont Kocide and Kocide (Table XI-11).

Table XI-10. Number of copper applications, total pounds applied and total acres treated by month for January 2006 – December 2010 in the Livingston Drain @ Robin Ave site subwatershed.

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

MONTH/YEAR	NUMBER OF COPPER APPLICATIONS	POUNDS OF AI APPLIED	ACRES TREATED
January, 2006	23	5965.7	1407.9
February, 2006	10	469.2	267
March, 2006	5	96.6	113
May, 2006	1	17.6	3
November, 2006	1	42.0	10
December, 2006	3	813.5	140
January, 2007	20	4067.5	1143
February, 2007	8	196.8	239
March, 2007	2	51.1	58
May, 2007	1	17.6	3
December, 2007	4	1002.8	174
January, 2008	9	965.9	231
February, 2008	13	1133.7	365.8
March, 2008	1	42.0	40
December, 2008	4	798.7	174
January, 2009	8	1733.0	426.5
February, 2009	3	199.1	80
March, 2009	1	27.7	36
April, 2009	1	42.0	40
December, 2009	4	1044.7	174
January, 2010	15	1745.9	405.4
February, 2010	7	494.1	213
March, 2010	4	115.8	142
April, 2010	2	38.5	24
Summaries by Year			
2006 Total	43	7404.6	1940.9
2007 Total	35	5335.8	1617
2008 Total	27	2940.2	810.8
2009 Total	17	3046.5	756.5
2010 Total	28	2394.2	784.4
Total	150	21121.4	5909.5

Figure XI-3. Pounds of copper applied within the Livingston Drain @ Robin Ave site subwatershed by month for 2006-2010. Asterisk (*) denotes months with exceedances.

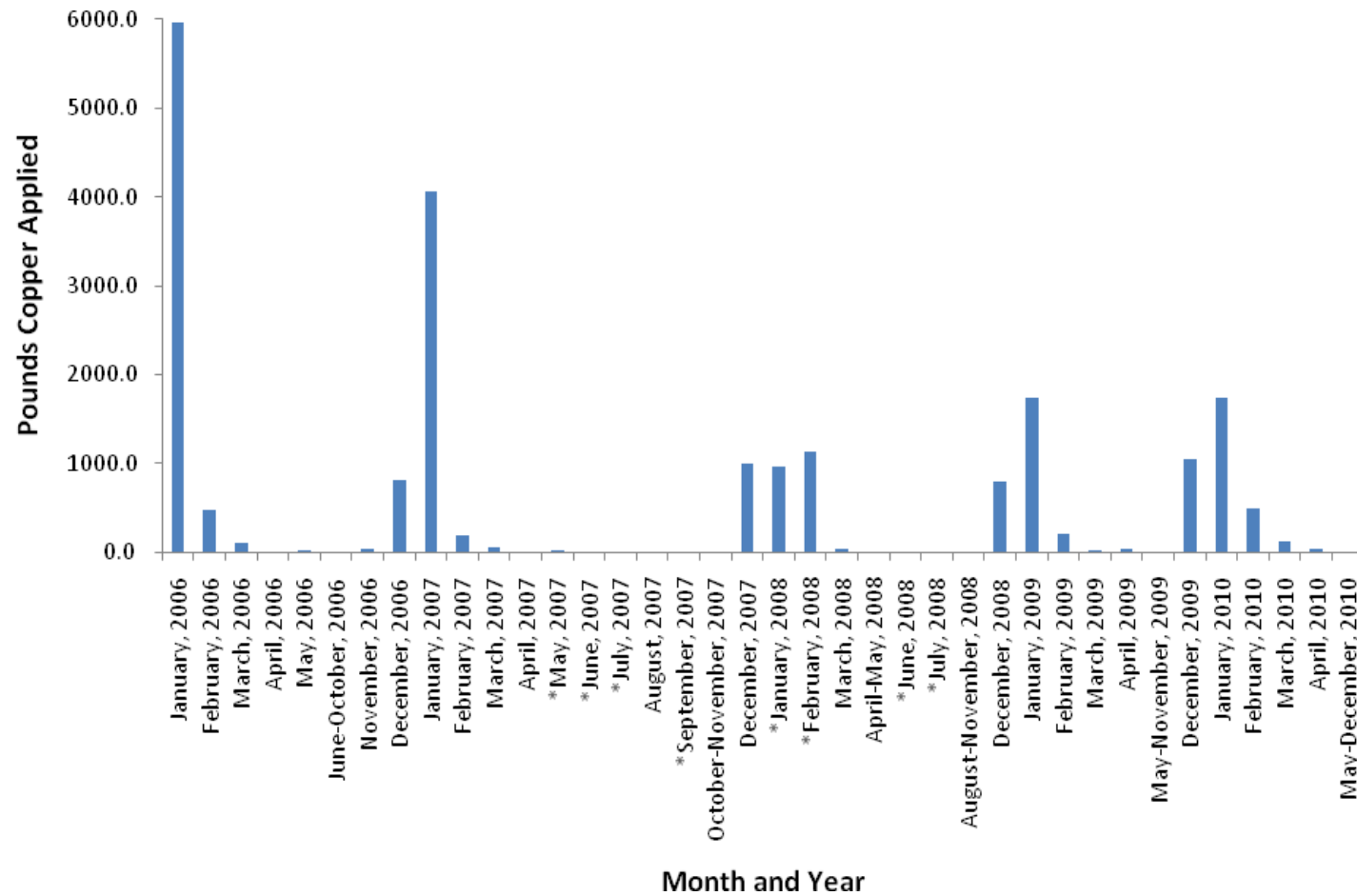


Table XI-11. Total pounds active ingredient (AI) for copper based on PUR data from 2006-2010 within the Livingston Drain @ Robin Ave subwatershed.

CHEMICAL NAME	COMMODITY	PRODUCT NAME	LBS AI APPLIED
COPPER	ALMOND	BASIC COPPER 53	1176.0
		CHAMPION WETTABLE POWDER	27.7
		CUPROFIX ULTRA 40 DISPERS	2849.3
		DUPONT GX-569 FUNGICIDE/BACTERICIDE	129.1
		DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	5552.2
		DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	363.3
		KOCIDE 101	194.0
		KOCIDE 2000	1414.9
		KOCIDE DF	880.7
		NORDOX	271.3
		NORDOX 75 WG	3737.7
		NU-COP 50DF	221.5
	GRAPES, RAISIN	DUPONT KOCIDE 3000 FUNGICIDE/BACTERICIDE	8.3
	GRAPES, WINE	NORDOX 75 WG	209.8
	PEACH	DUPONT KOCIDE 2000 FUNGICIDE/BACTERICIDE	129.1
		NORDOX 75 WG	3891.1
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	NORDOX 75 WG	65.4
ALMOND - Total Pounds Copper Applied			16817.7
GRAPES, RAISIN - Total Pounds Copper Applied			8.3
GRAPES, WINE - Total Pounds Copper Applied			209.8
PEACH - Total Pounds Copper Applied			4020.2
WALNUT - Total Pounds Copper Applied			65.4
Total Pounds Copper Applied (2006-2010)			21121.4

The Coalition will continue with its management plan strategy for copper as outlined above under the chlorpyrifos outreach section when conducting individual contacts. Orchard and vineyard operators are advised to consider irrigation water retention and management to prevent copper from entering the waterway with runoff. Storm water runoff management relevant to copper applications is also discussed to prevent the winter exceedances. Individual contacts that occurred within this subwatershed are described under the chlorpyrifos outreach section above and include discussions of copper exceedances and the above management practices.

Priority D Constituents

S. capricornutum toxicity was experienced three times in 2008 (February, April and May); the April sampling event included a resample later that month which was also toxic to *S. capricornutum*. An exceedance of copper was associated with the February 2008 toxicity event. There were no exceedances of copper associated with any of the other toxicity events.

Management practices involved in preventing irrigation return flows would be effective in reducing or eliminating *S. capricornutum* toxicity. The Coalition will continue with outreach as explained above under the chlorpyrifos section to address the toxicity.

Priority E Constituents

E. coli, pH and lead are listed as priority E constituents under the Livingston Drain site subwatershed Management Plan. Exceedances that have occurred of the priority E constituents are *E. coli* (2), lead (2) and pH (8).

The Coalition will discuss pH, lead and *E. coli* during individual contacts and at group grower meetings, but these constituents will remain a low priority.

Evaluation

Livingston Drain @ Robin Ave is one of the third four priority site subwatersheds within the ESJWQC and is in its first year of focused outreach (2011 through 2013). The Coalition will focus its resources on identifying sources of agricultural discharge within this subwatershed that could result in water quality impairments, extending outreach to individual Coalition members, and setting evaluation goals based on the effectiveness of management practices (by considering changes in water quality over time).

The Coalition's strategy for the Livingston Drain subwatershed is to focus on providing information to growers to review their operation and determine if irrigation return flows are managed properly, specifically to growers with the potential to drain to the waterway. Almond and walnut growers should be targeted for outreach especially prior to the irrigation season. Outreach includes grower notification, management practice outreach and education, tracking of implemented management practices, and providing information on special studies of management practice efficacy.

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

In 2011, MPM is scheduled during months of past exceedances.

Low Priority Subwatersheds

Merced River @ Santa Fe Drive

Merced River @ Santa Fe Drive (33,421 irrigated acres) – This waterbody is designated as a major waterbody 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 *C. 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 *E. coli* (January and April 2010), DO (September and October, 2009), lead (February 2007 and January 2008), and toxicity to *S. capricornutum* (March 2005).

Merced River @ Santa Fe Drive was monitored as a normal monitoring location from January to December 2009 and 2010 with no further exceedances to the chlorpyrifos WQTL and no toxicity. Merced River @ Santa Fe Drive is scheduled for Assessment Monitoring during 2011.

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 orchards.

Dry Creek @ Oakdale Rd was monitored for MPM constituents. This upstream location was selected based on a review of PUR data indicating likely upstream sources. The upstream monitoring site was selected to divide 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 and in January 2010 for chlorpyrifos and toxicity to *C. dubia*. However, the site was dry during both sampling events of 2009 and thus no sampling data exists for this site for that year. There was not an exceedance in chlorpyrifos and no toxicity occurred in samples collected in January 2010.

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 *S. capricornutum* and *C. 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 *S. capricornutum* in April, for copper in July and August, and for chlorpyrifos from July through September. Chlorpyrifos was the only exceedance of the WQTL in July 2009. In January and February 2010 MPM for chlorpyrifos and toxicity to *C. dubia* occurred. There were no exceedances of the WQTL and samples were not toxic in 2010.

Miles Creek is scheduled for Assessment Monitoring in 2015 and 2016.