East San Joaquin
WATER QUALITY COALITION
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April 1, 2011

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

Dear Ms. Creedon,

The East San Joaquin Water Quality Coalition (ESJWQC) is submitting the Management Plan Update Report which updates the ESJWQC Management Plan approved on November 25, 2008. The report includes information on activities conducted during 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,

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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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 *Hyalella 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 (0.041µg/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.

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.

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	535XMDDLP	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 occured.

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. 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. 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.

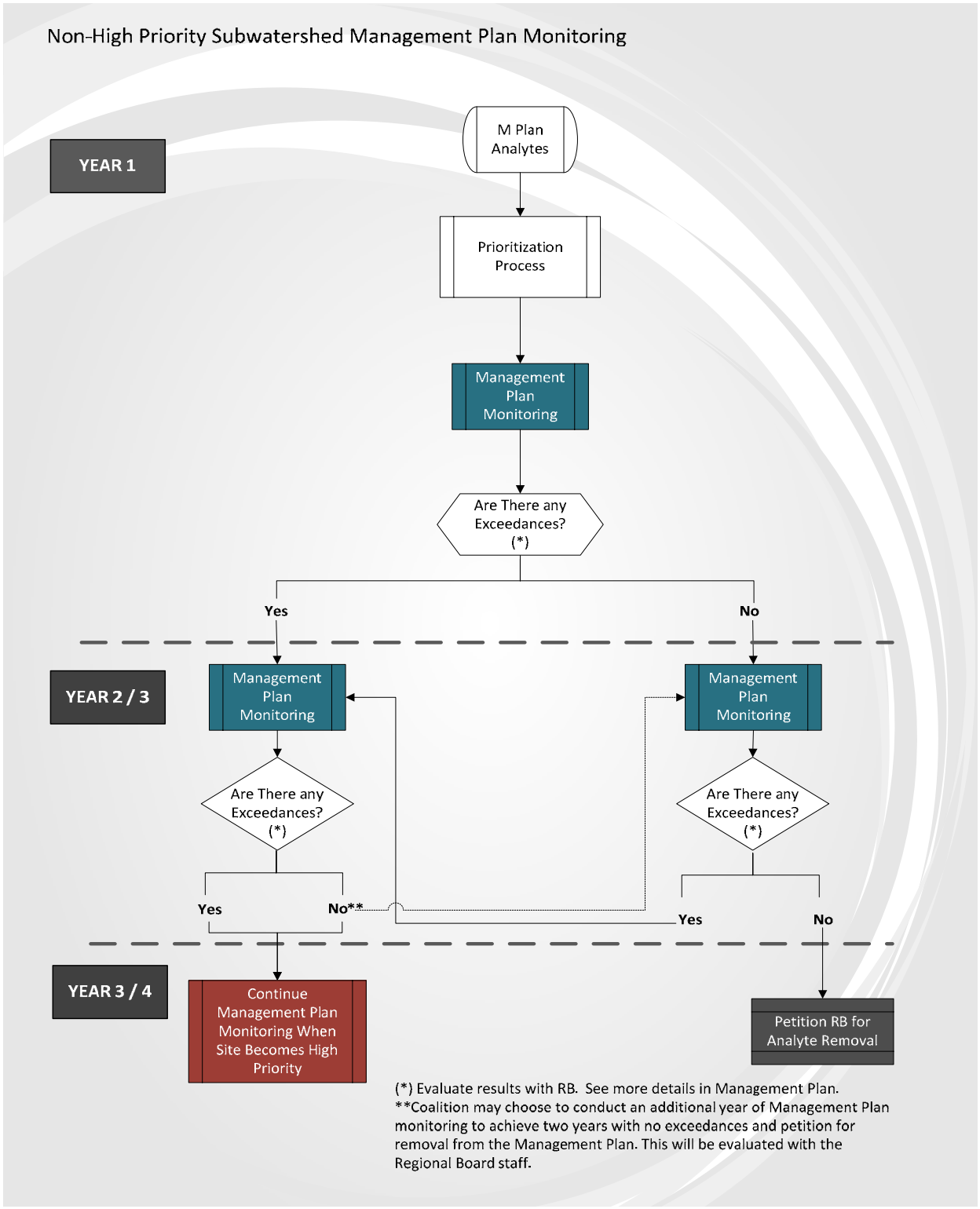
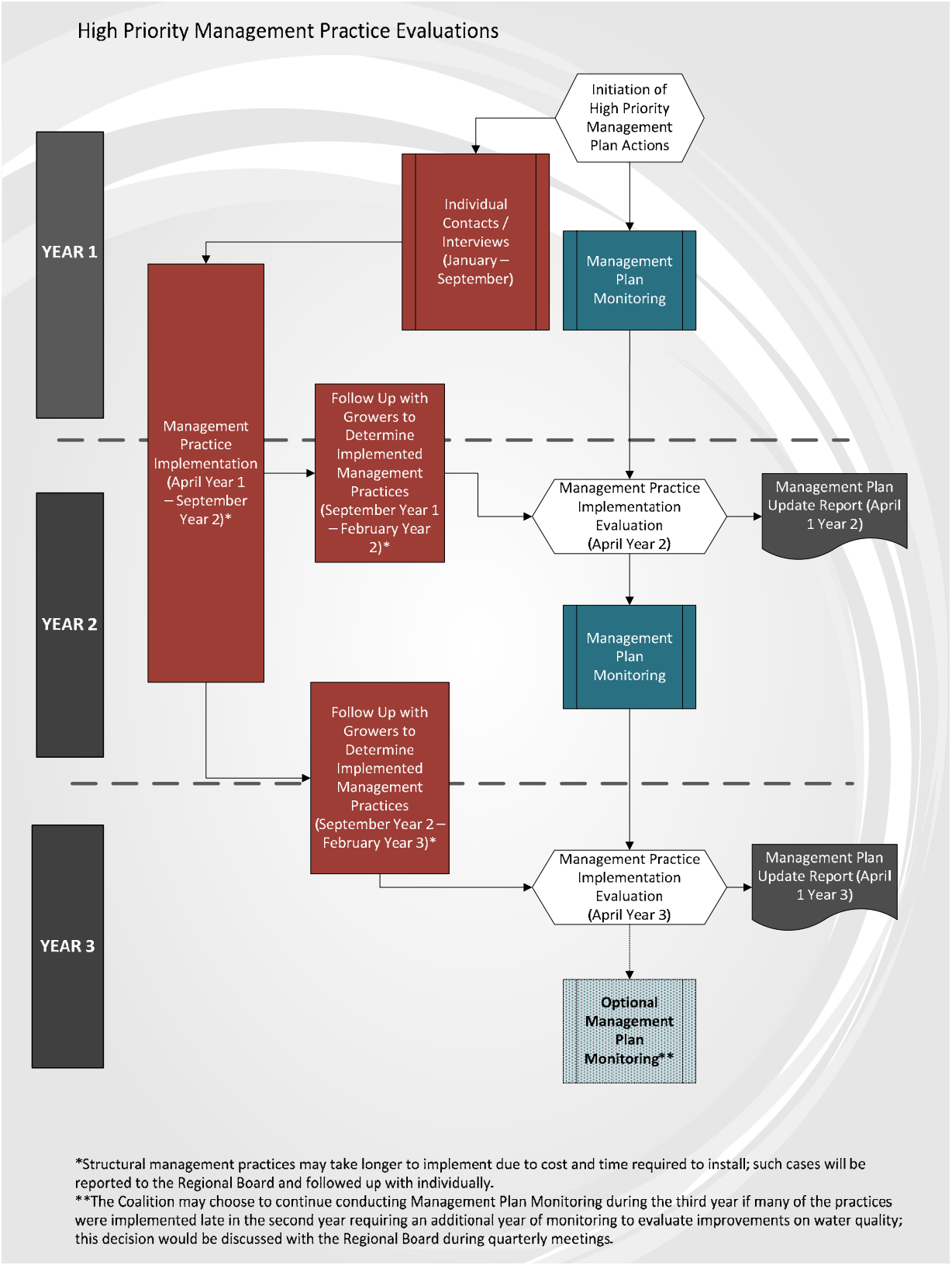


Figure 2. ESJWQC high priority subwatershed Management Plan Monitoring and management practice evaluation strategy.



*Structural management practices may take longer to implement due to cost and time required to install; such cases will be reported to the Regional Board and followed up with individually.
**The Coalition may choose to continue conducting Management Plan Monitoring during the third year if many of the practices were implemented late in the second year requiring an additional year of monitoring to evaluate improvements on water quality; this decision would be discussed with the Regional Board during quarterly meetings.

MANAGEMENT PRACTICE TRACKING STRATEGY

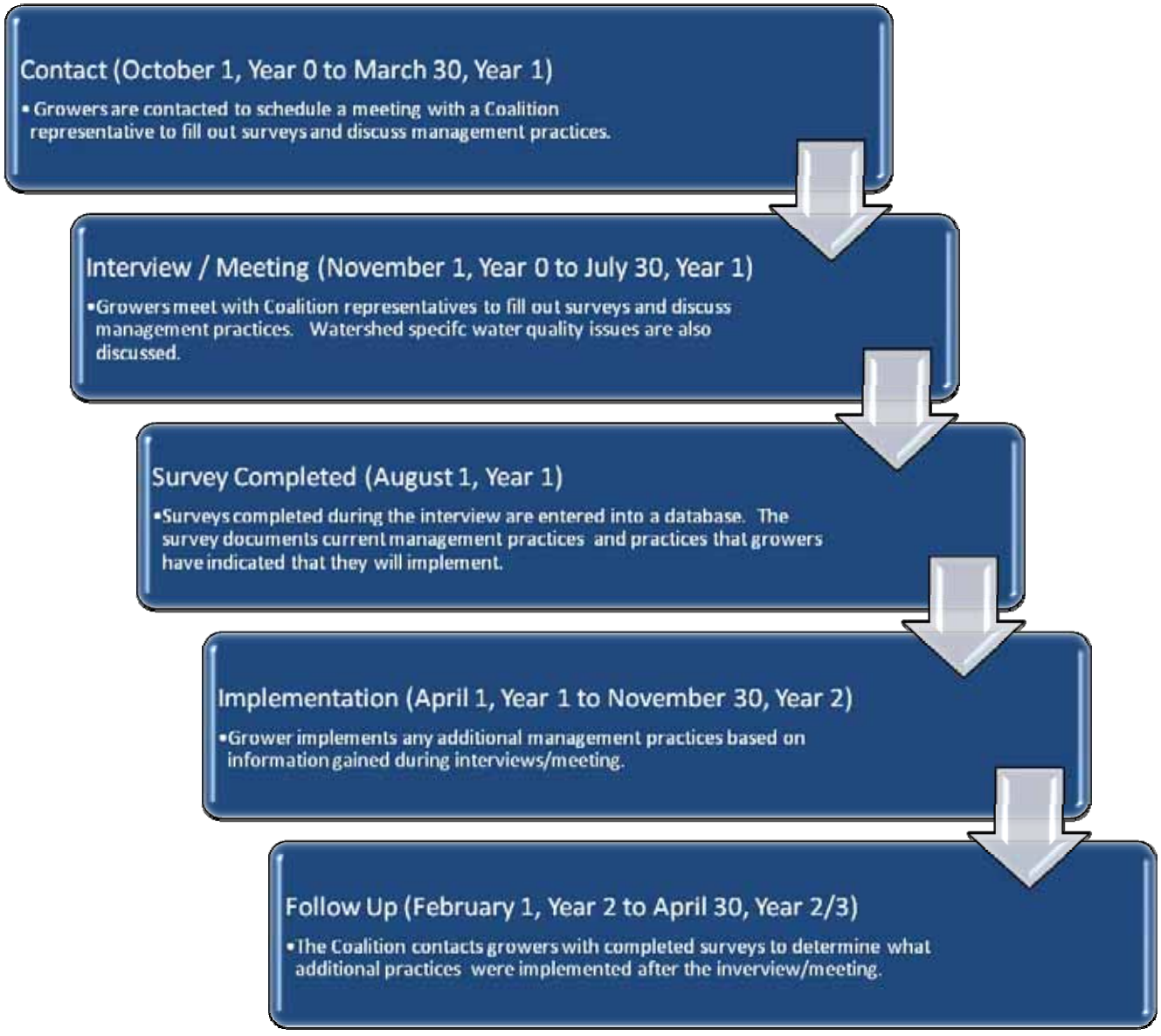
The schedule outlined in Figure 3 lists a general timeline based on Year 1, 2 and 3 of the flow chart in Figure 2. When a site becomes a high priority site subwatershed, the Coalition makes contacts to individuals within the subwatershed who have the potential for direct drainage and have applied constituents 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

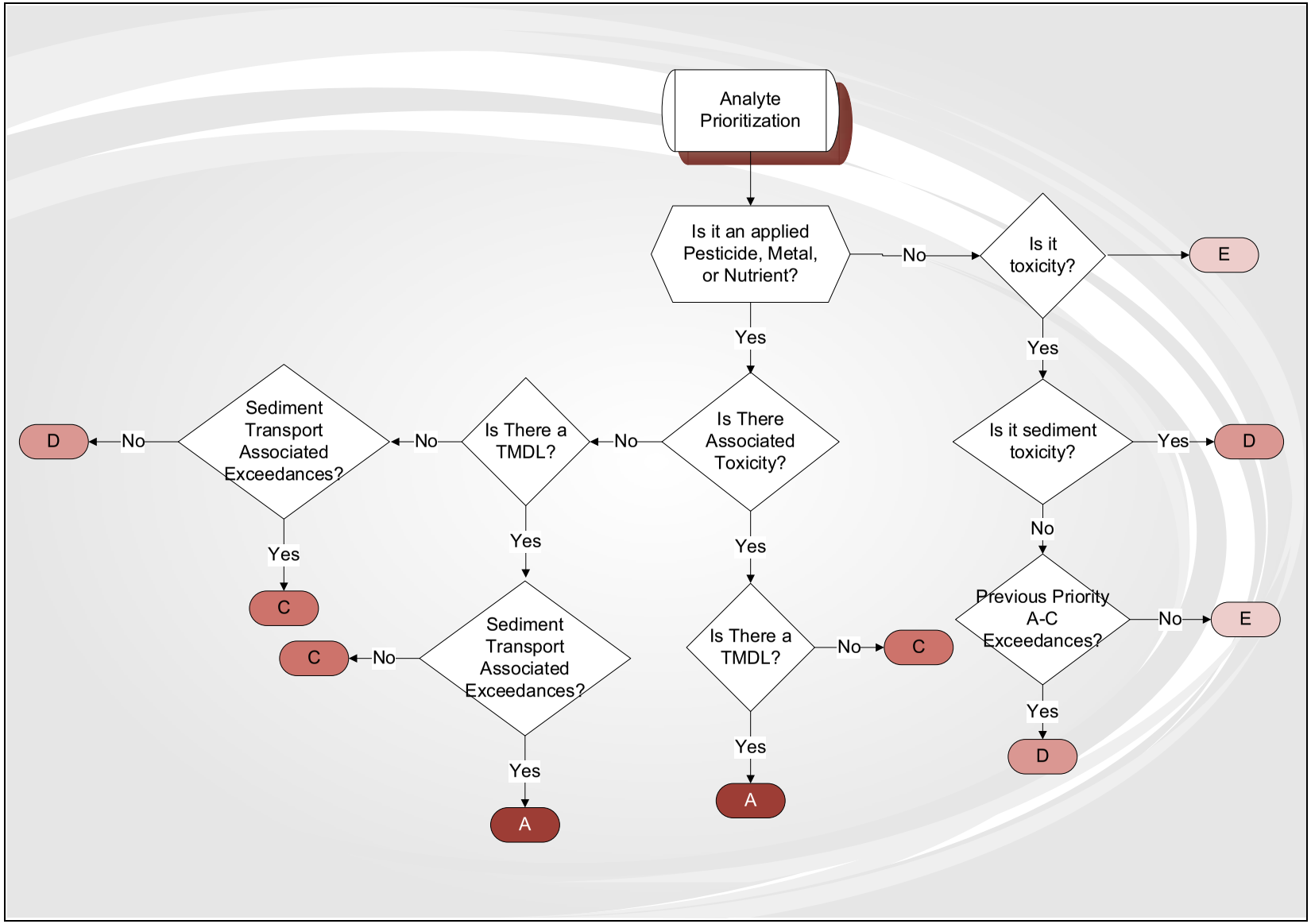
The ESJWQC developed a prioritization process which allows the Coalition to focus on constituents of the greatest concern. These constituents are included in the Management Plan process outlined below in Figure 4. The prioritization process was developed in collaboration with the Regional Board and allows 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.

Figure 4. ESJWQC prioritization process.



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

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

[2]Although 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	*C. dubia*	*S. capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Lead	*H. azteca*
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	*C. dubia*	*S. capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Lead	*H. azteca*
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	*C. dubia*	*S. capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Lead	*H. azteca*
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.					

[1]Acreage 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).
[2]The 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]

[1]Management 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.

[2]The 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.

[1]County 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 Sough @ 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** 4,750of 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.

[1]County 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 AWEP Funding Informational Mailing: sent to 429 members. Letter informed growers of available CURES AWEP 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 AWEP Funding Informational Mailing: sent to 503 members. Letter informed growers of available CURES AWEP 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.

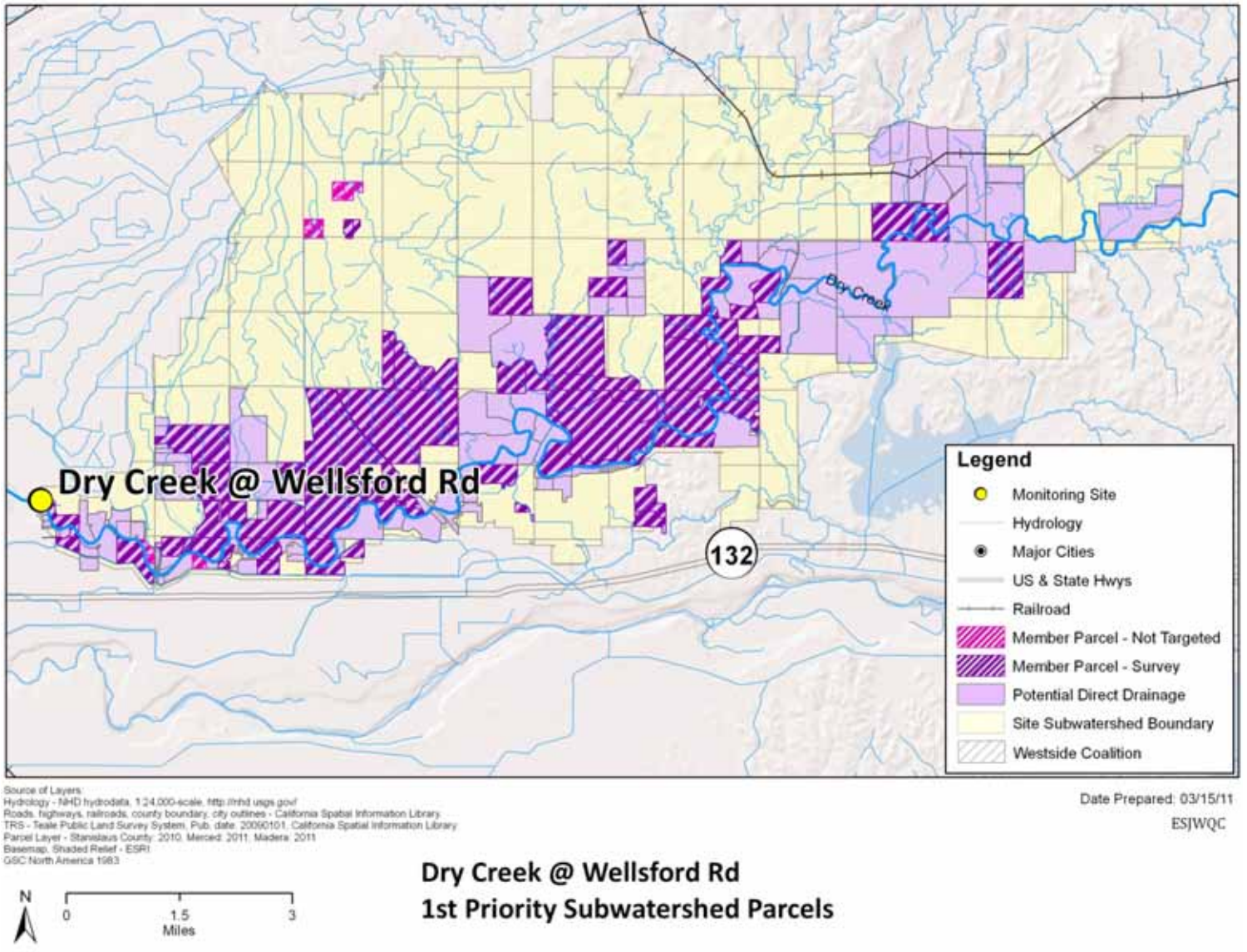


Figure 6. Dry Creek @ Wellsford crop acreage information from member surveys based on crop type and irrigation runoff (2008 / 2009).

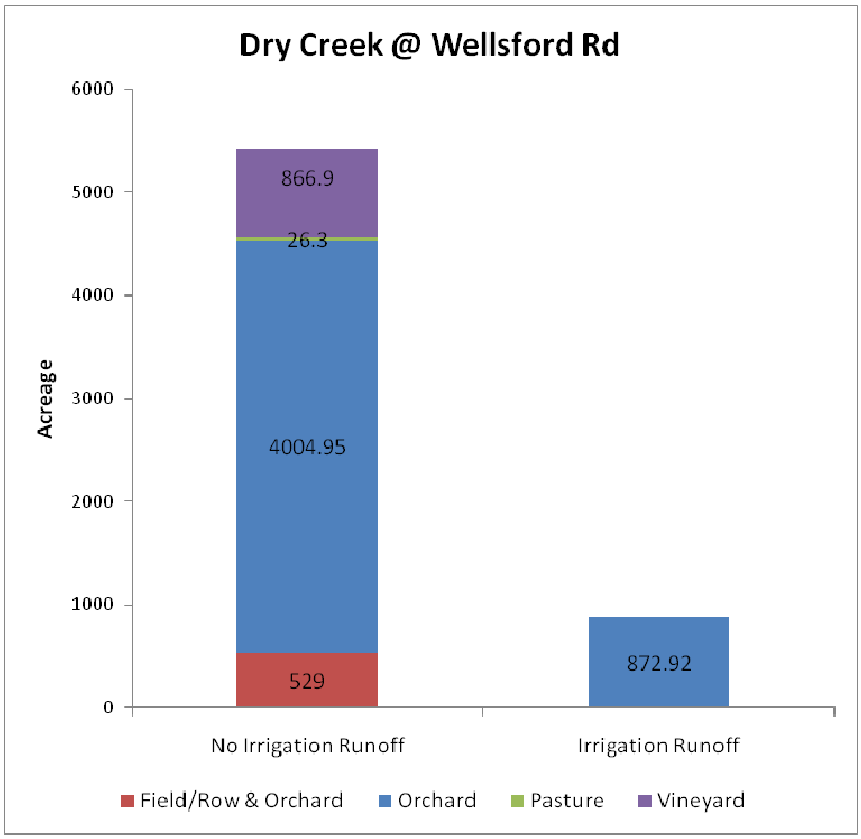
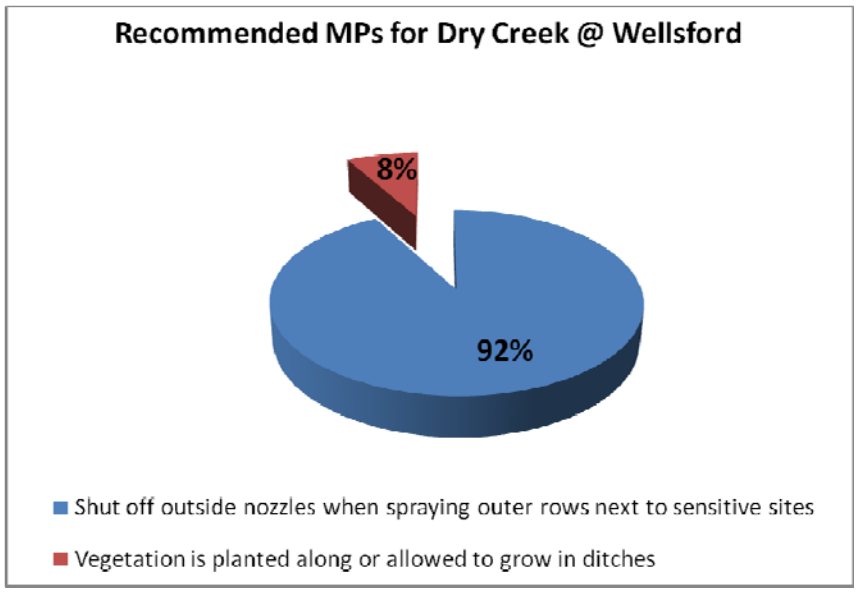


Figure 7. Percentage of acreage represented by each recommended management practice in the Dry Creek @ Wellsford subwatershed. All members that were recommended to implement additional practices did not have irrigation drainage.



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.

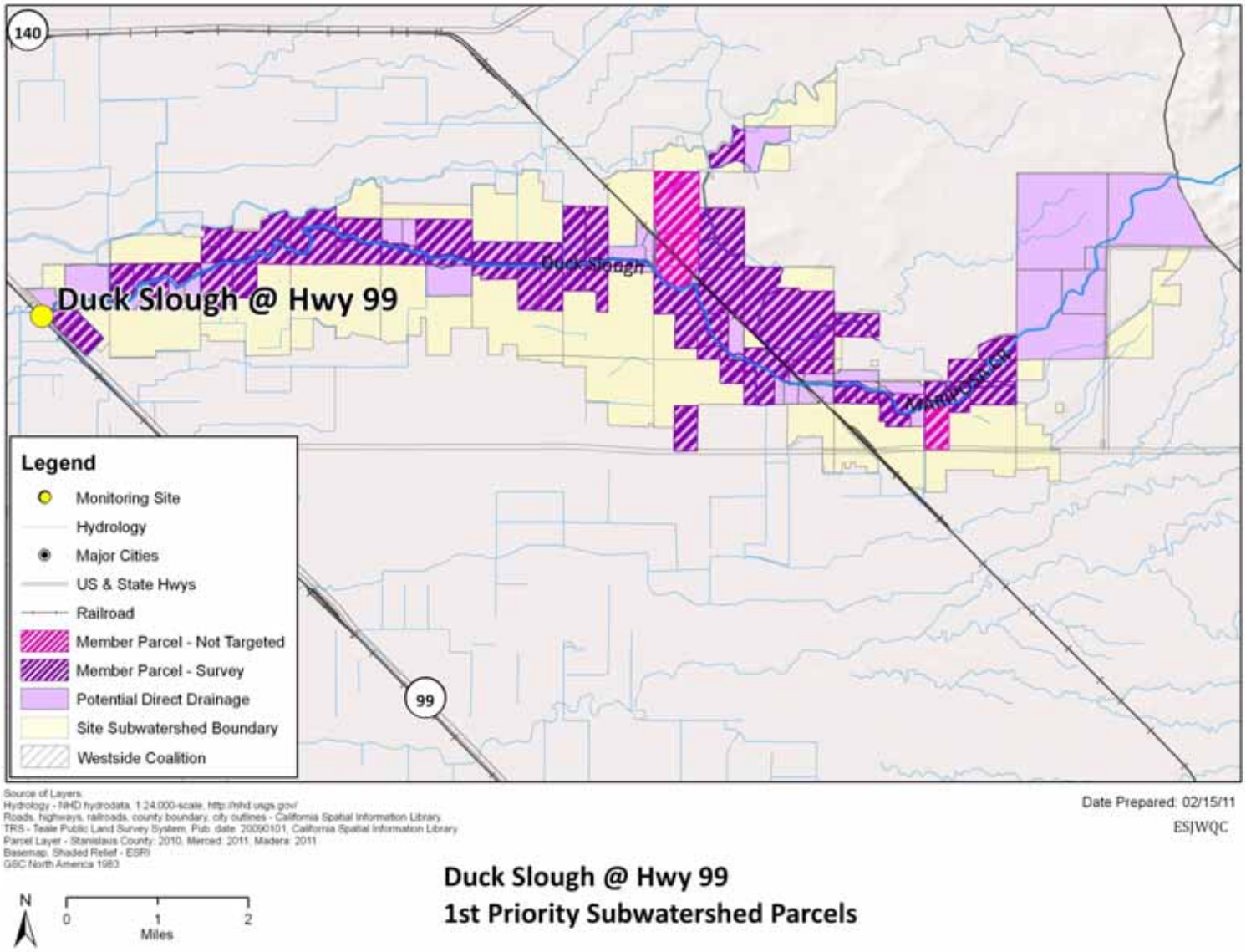


Figure 9. Duck Slough @ Hwy 99 crop acreage information from member surveys based on crop type and irrigation runoff (2008). No additional initial contacts were made in 2009.

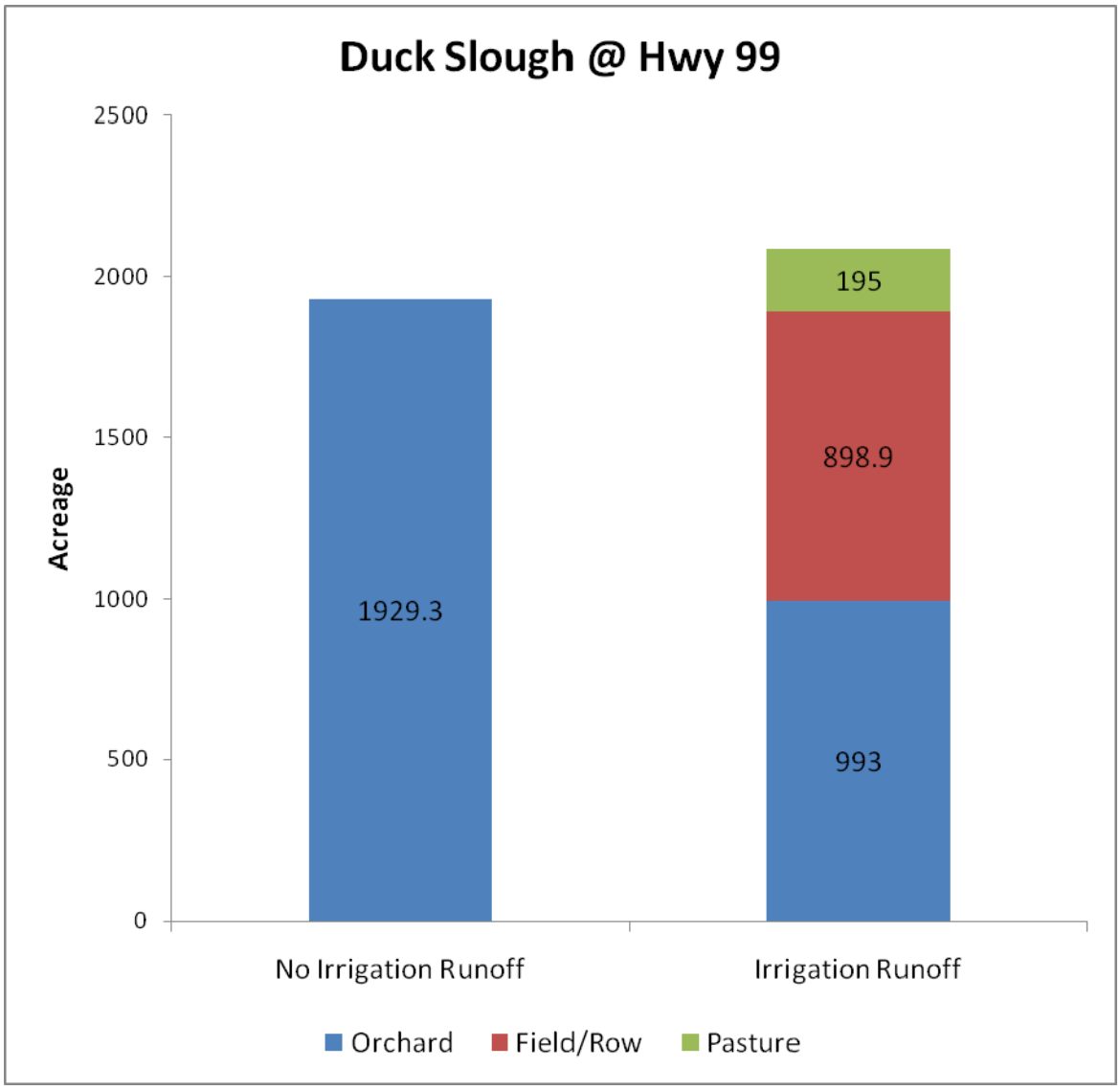


Figure 10. Percentage of acreage represented by each recommended management practice in the Duck Slough @ Hwy 99 subwatershed for members with irrigation drainage.

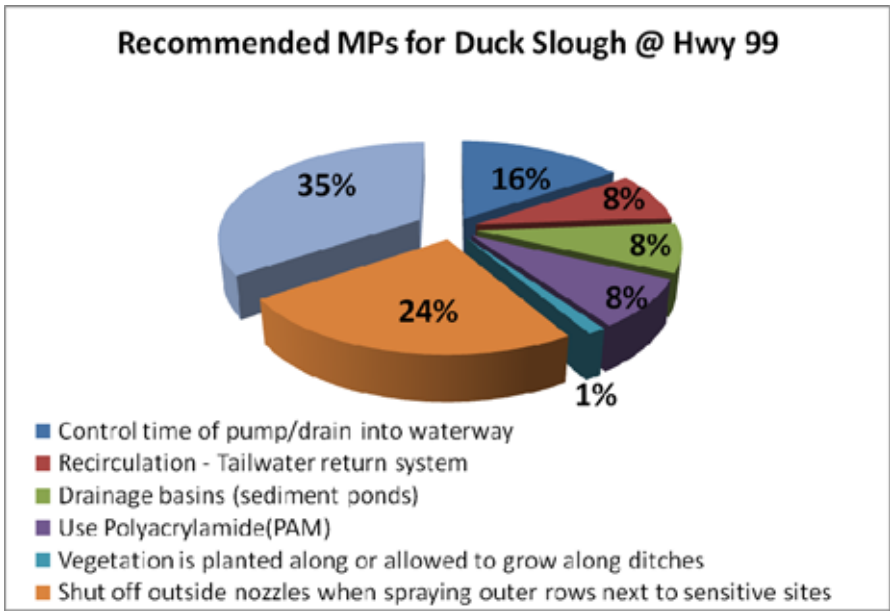
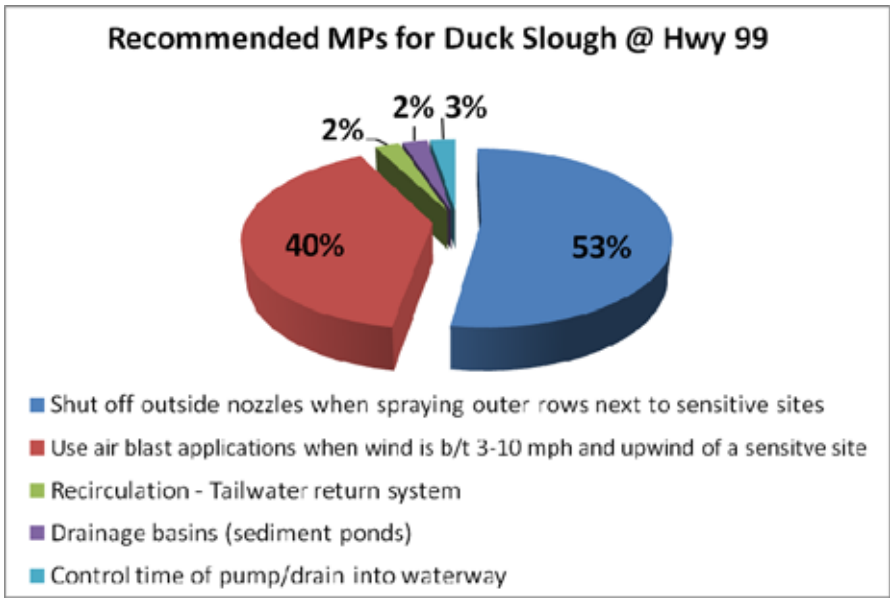


Figure 11. Percentage of acreage represented by each recommended management practice in the Duck Slough @ Hwy 99 subwatershed for members without irrigation drainage.



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 accidently 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.

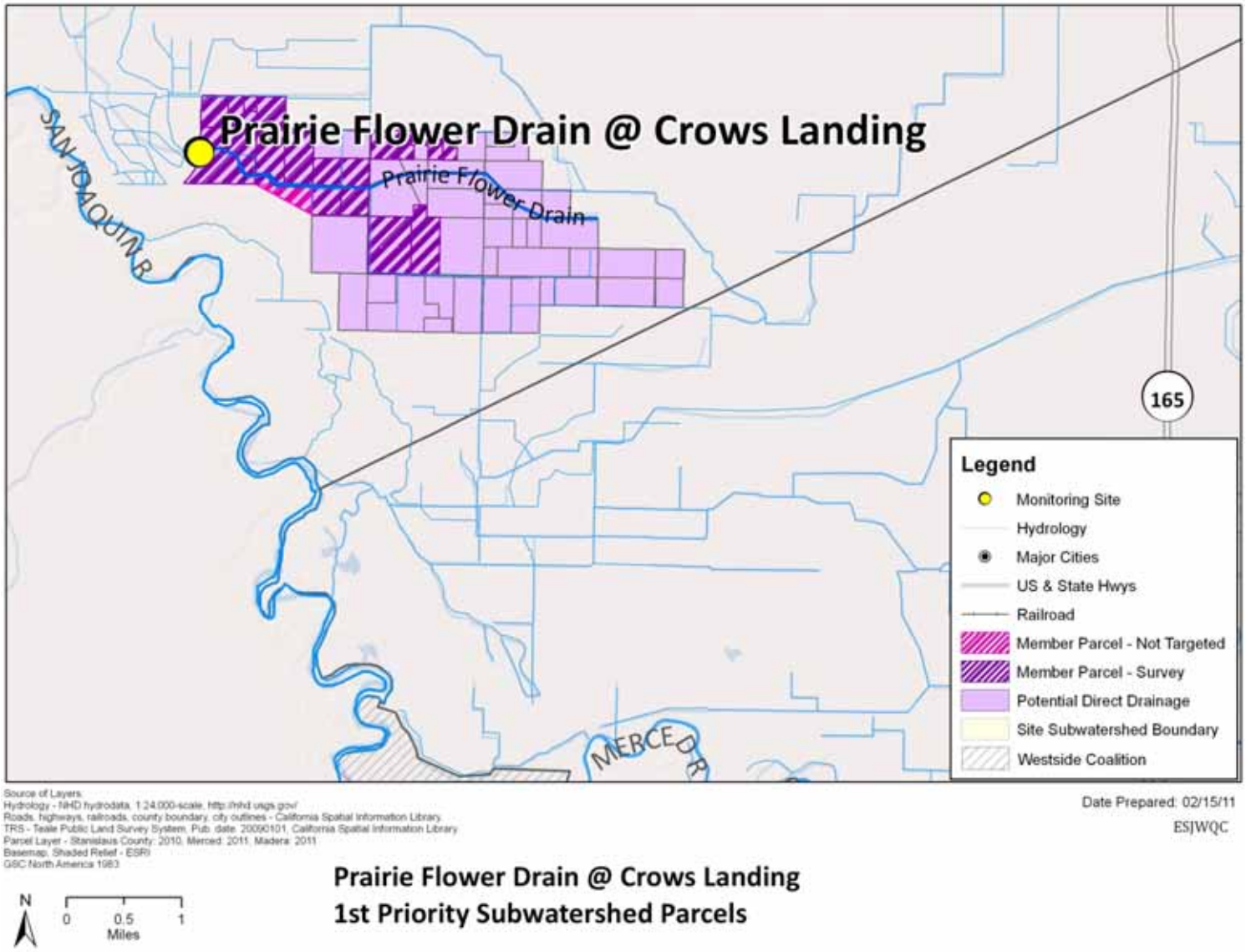


Figure 13. Prairie Flower Drain @ Crows Landing Rd crop acreage information from member surveys based on crop type and irrigation runoff (2008). No additional initial contacts were made in 2009.

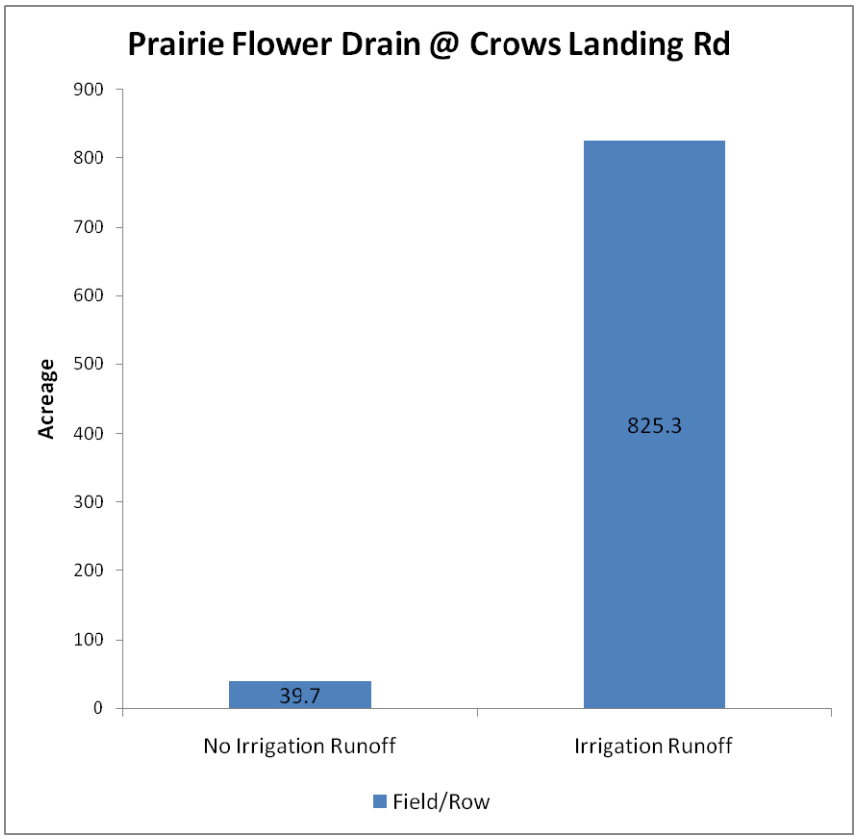
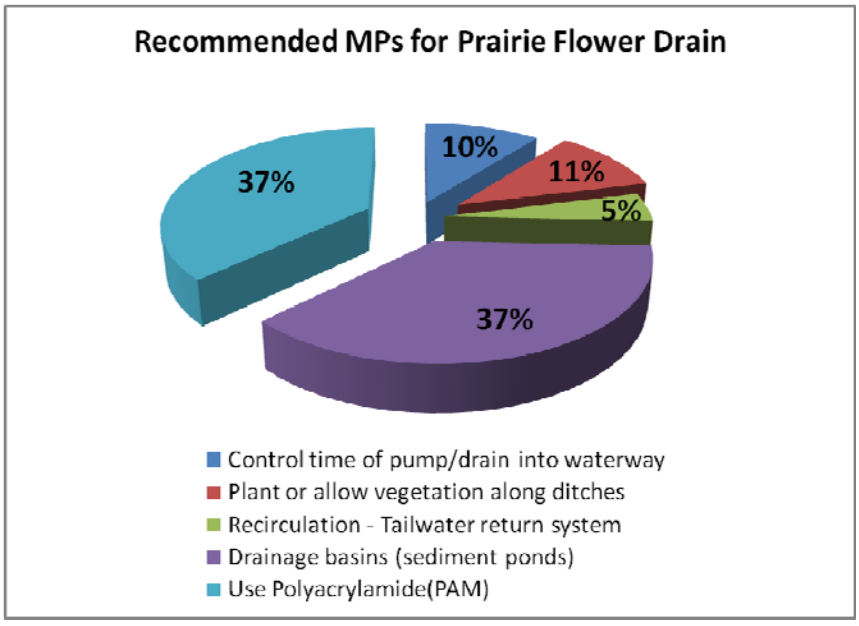


Figure 14. Percentage of acreage represented by each recommended management practice in the Prairie Flower Drain subwatershed. All members that were recommended to implement additional practices have irrigation drainage.



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 Leveled 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]

[1]Questions 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**

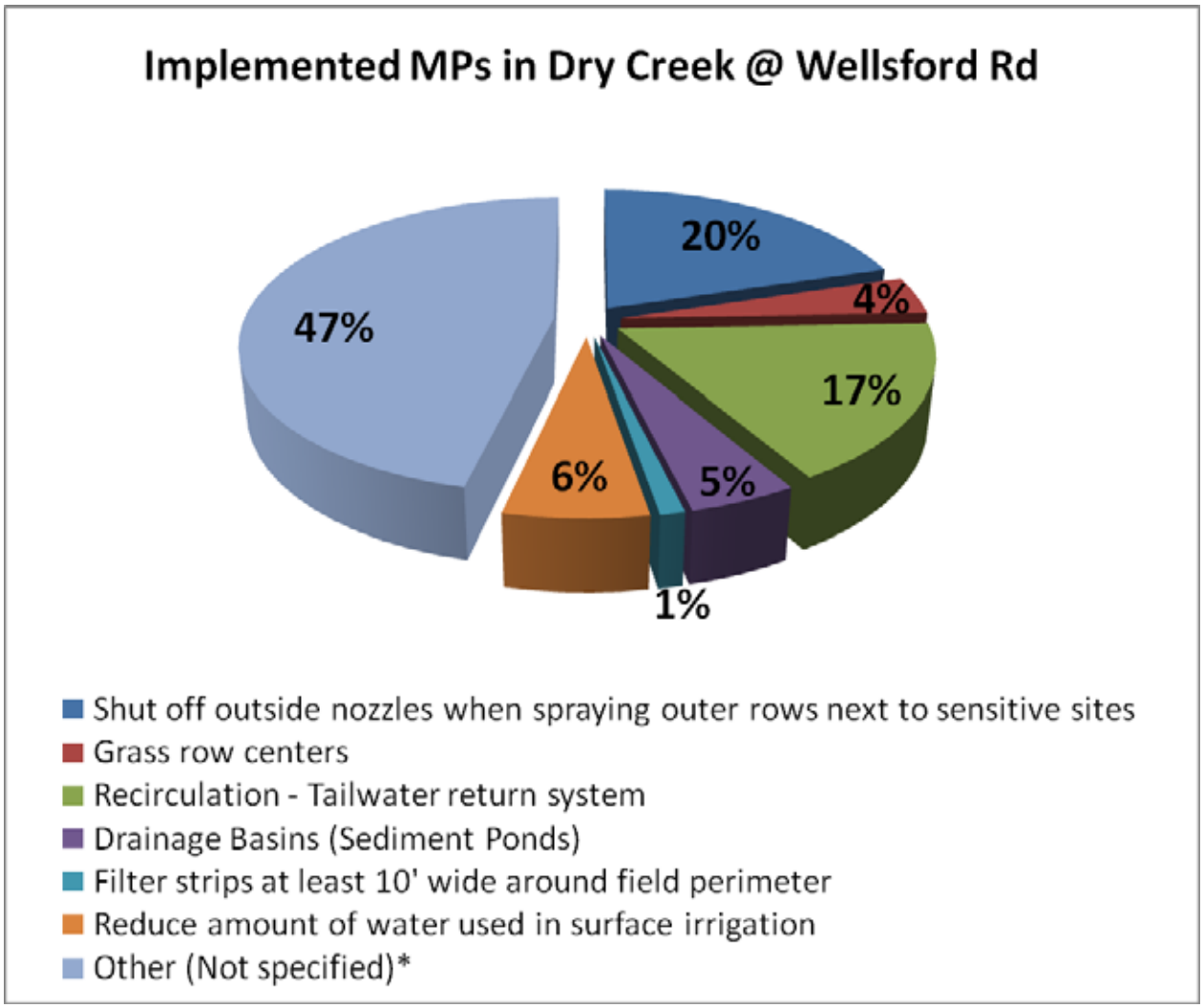
[1] Practices apply to storm drainage

[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.

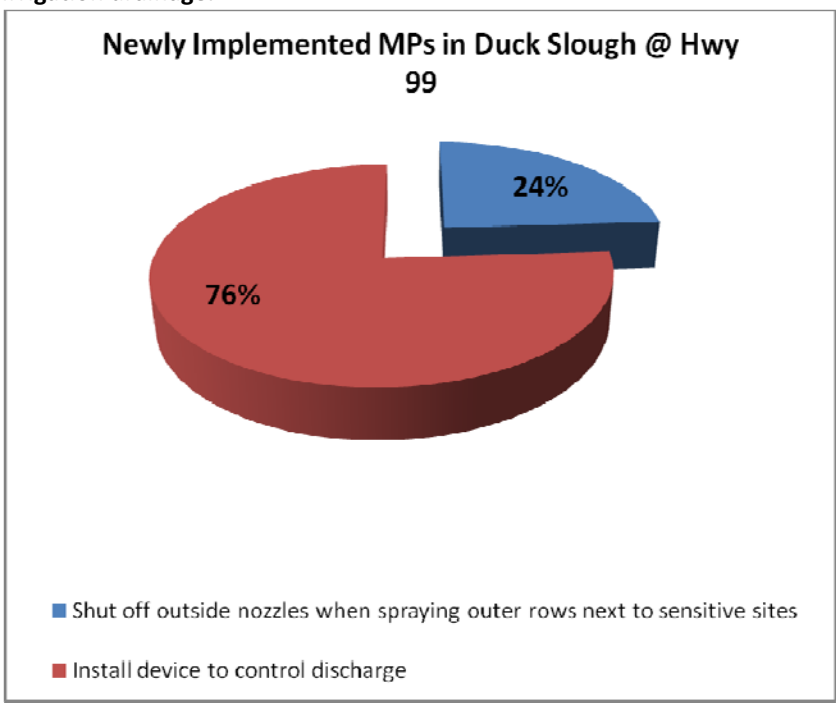
Table 21. Comparison of recommended MPs and implemented MPs in Duck Slough @ Highway 99 subwatershed.

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%**

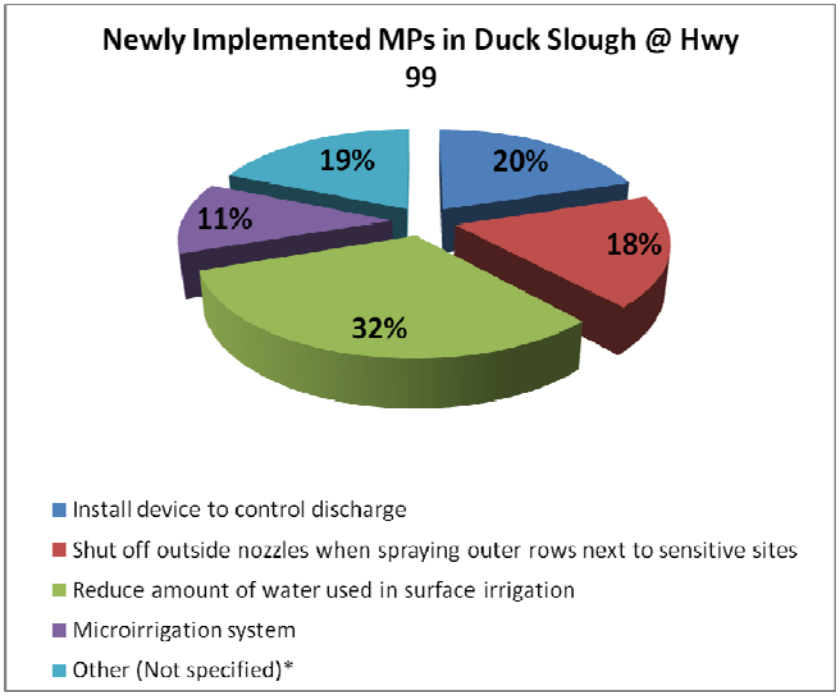
[1] Practices apply to storm drainage
[2]Management practice not specifically recommended by Coalition representative for grower's operation
[3]If growers implemented management practices other than those asked about during Coalition follow-up, they were instructed to indicate so and provide a summary/explanation.
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.

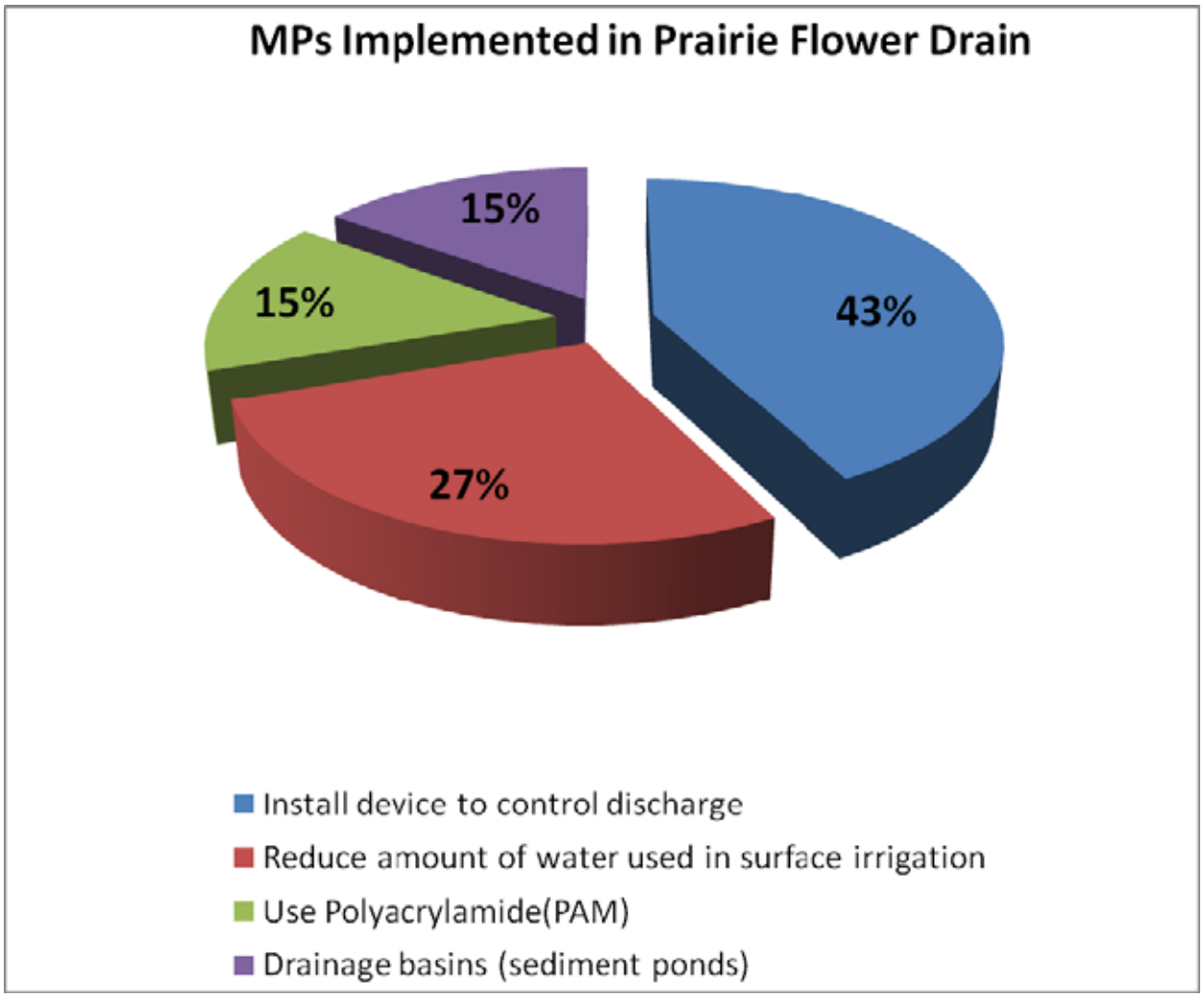
Management Practice	Acreage: Recommended Practices	Acreage: Implemented Practices	Percent of Recommended Acreage with Implemented Practices
No irrigation drainage from property			
Install device to control discharge[1]	0	91	NA
Total (no drainage)	**0**	**91**	**NA**
Yes, irrigation drainage from property			
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

2Management 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

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 microirrigaiton 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 spaying, 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.

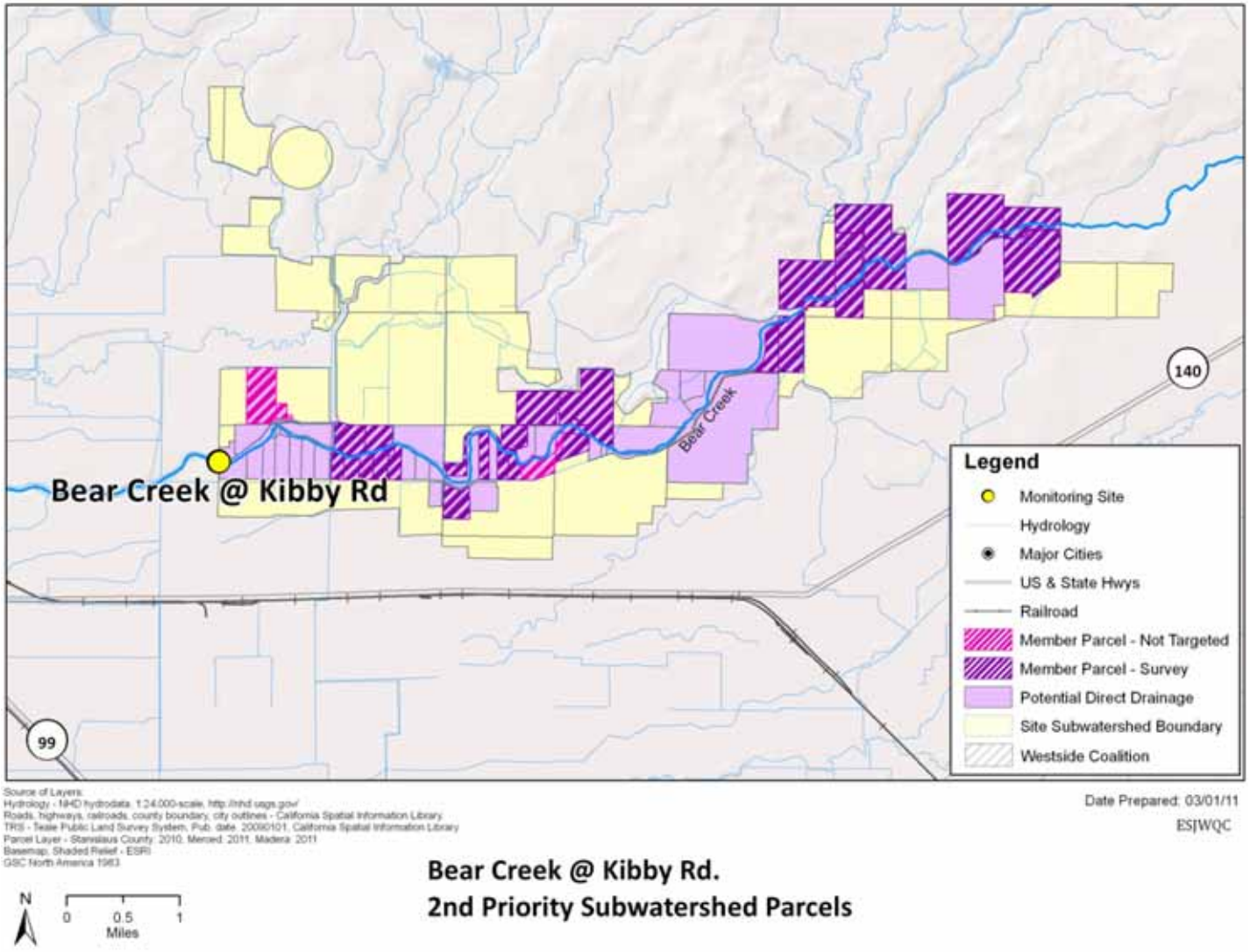


Figure 20. Bear Creek @ Kibby Rd crop acreage information from member surveys based on crop type and irrigation runoff (2010).

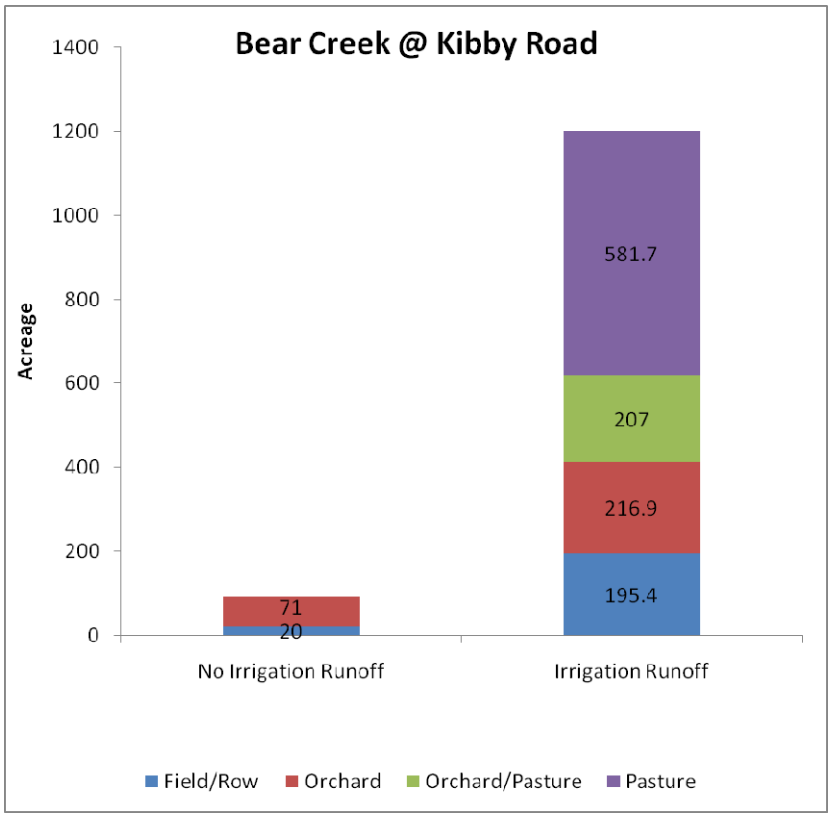
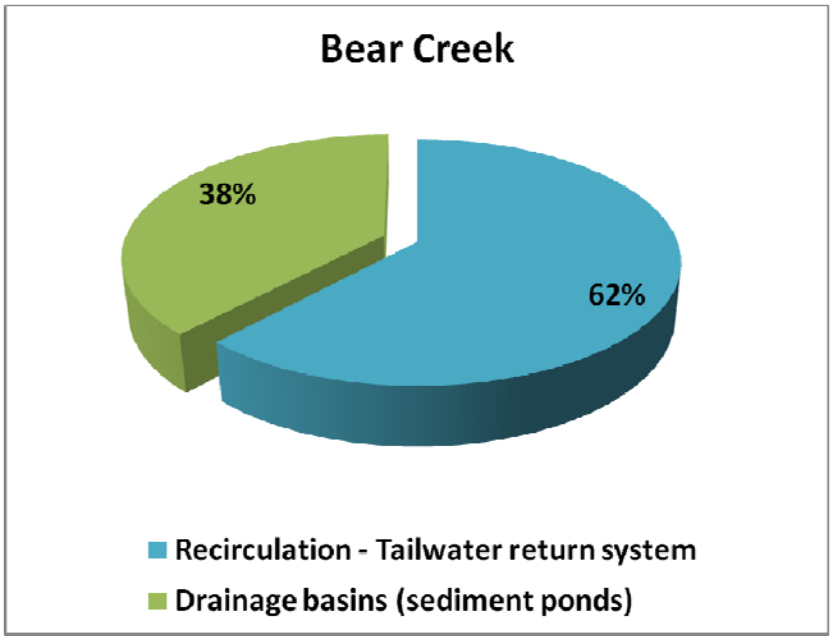


Figure 21. Percentage of acreage represented by recommended management practices for Bear Creek @ Kibby Rd. All members that were recommended to implement additional practices have irrigation drainage.



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.

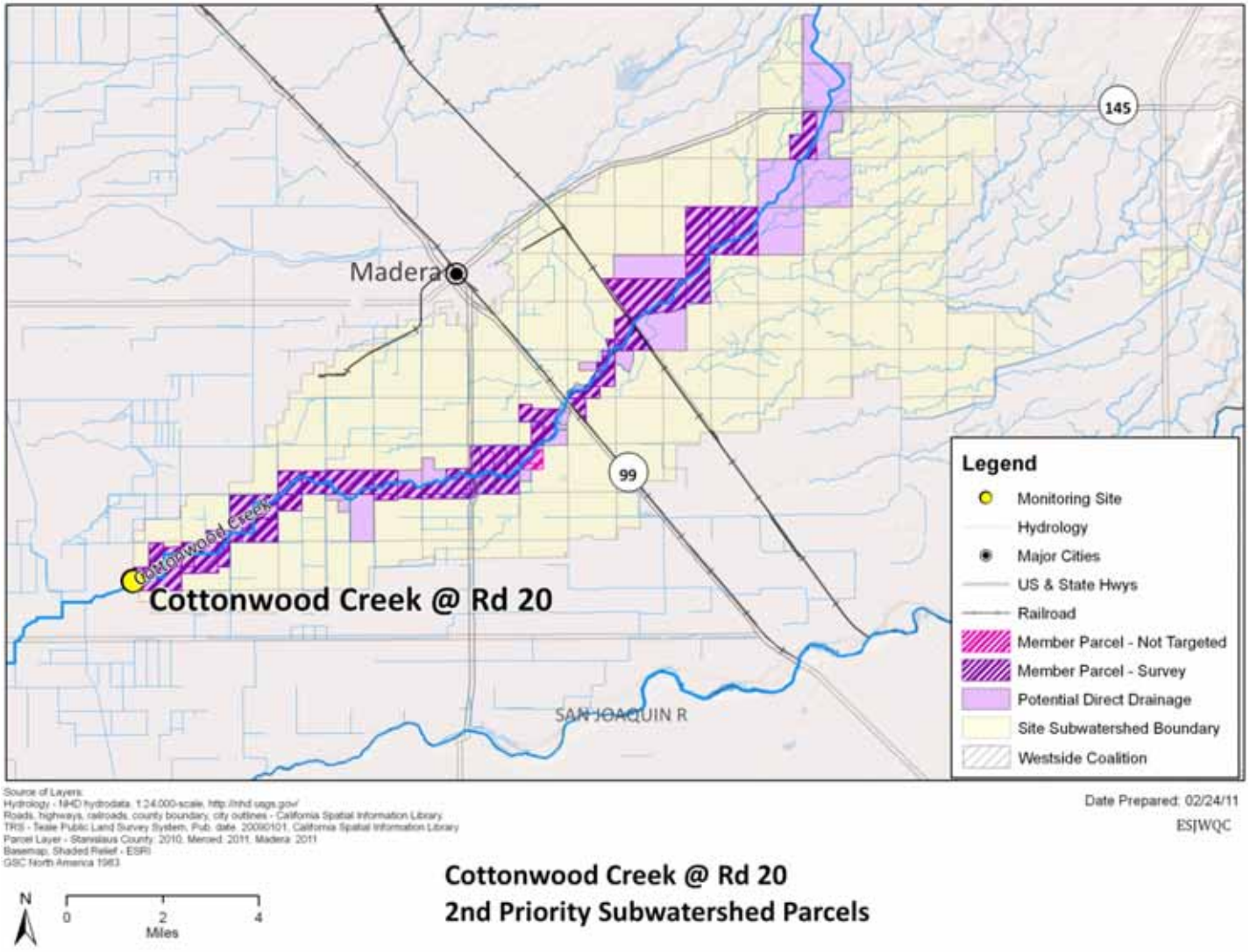


Figure23. Cottonwood Creek@ Rd 20 crop acreage information from member surveys based on crop type and irrigation runoff (2010).

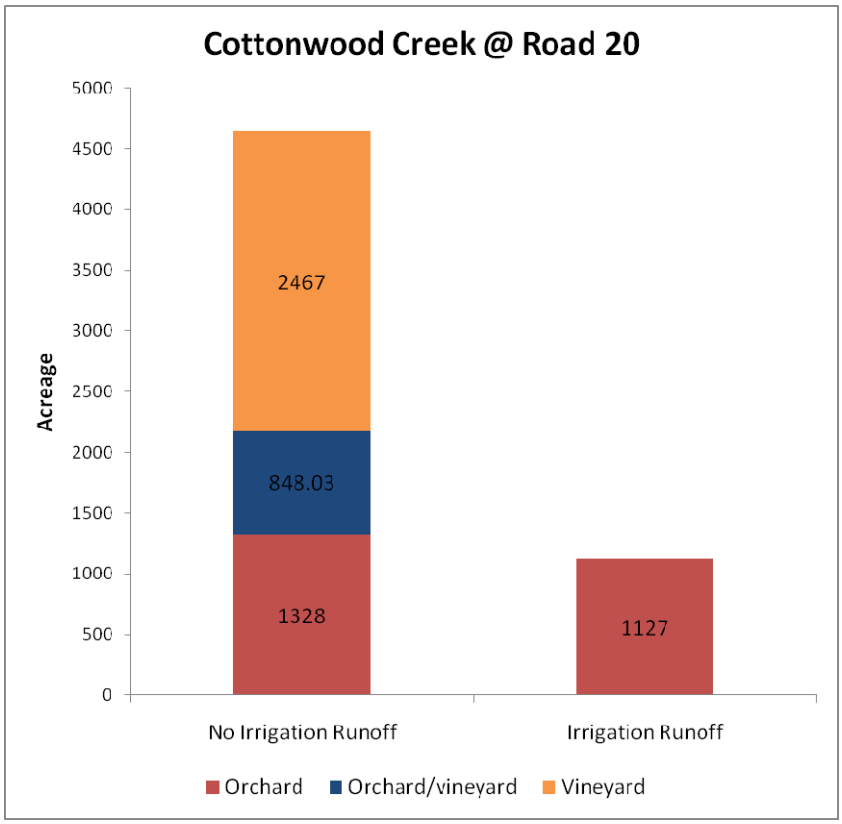
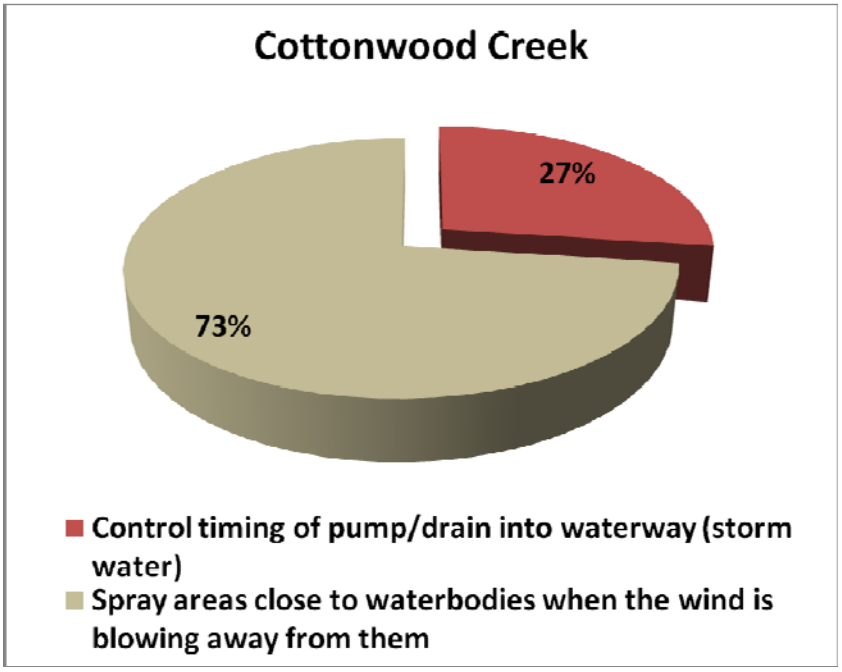


Figure 24. Percentage of acreage represented by recommended management practices for Cottonwood Creek @ Rd 20. All members that were recommended to implement additional practices did not have irrigation drainage.



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.

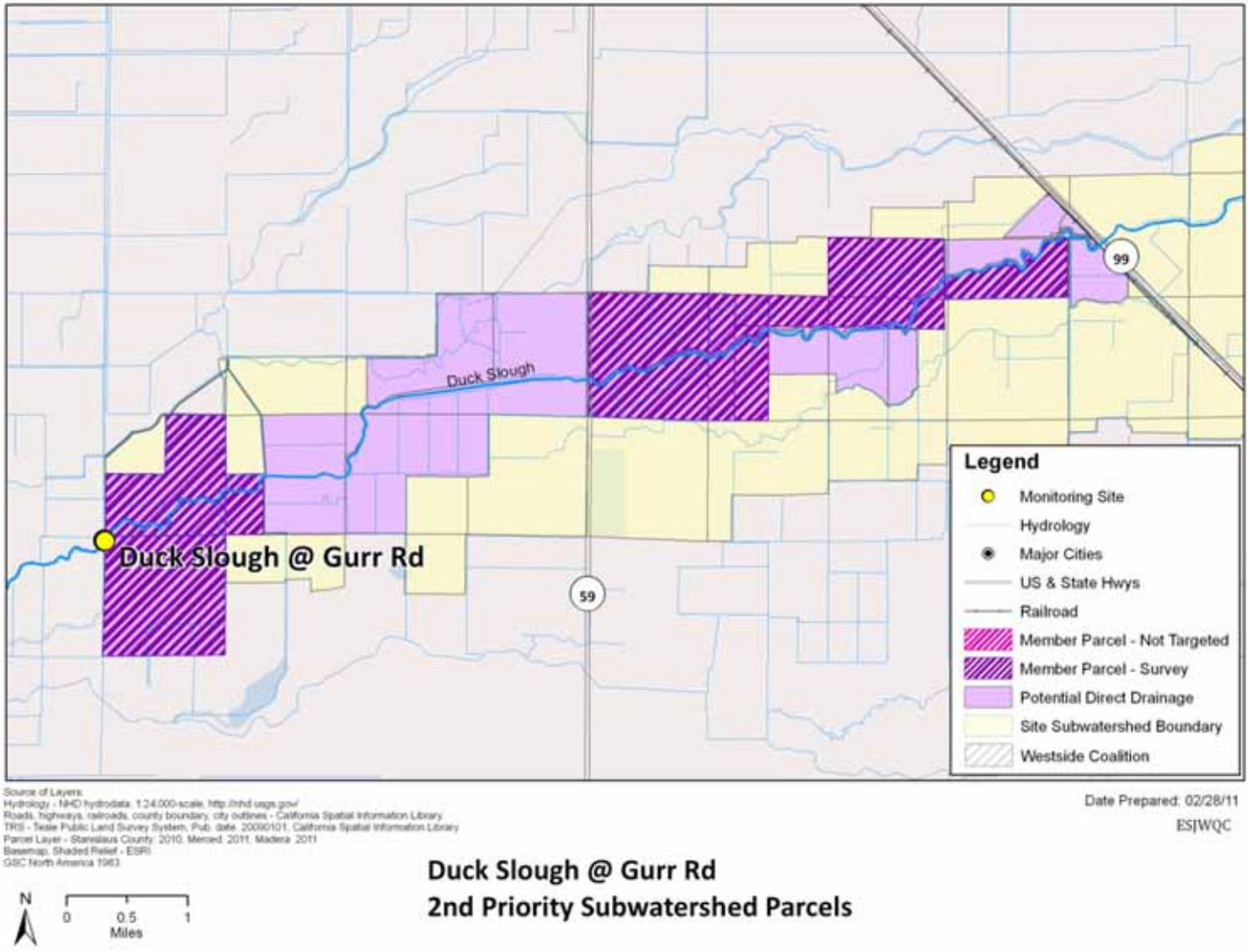


Figure 26. Duck Slough @ Gurr Rd crop acreage information from member surveys based on crop type and irrigation runoff (2010).

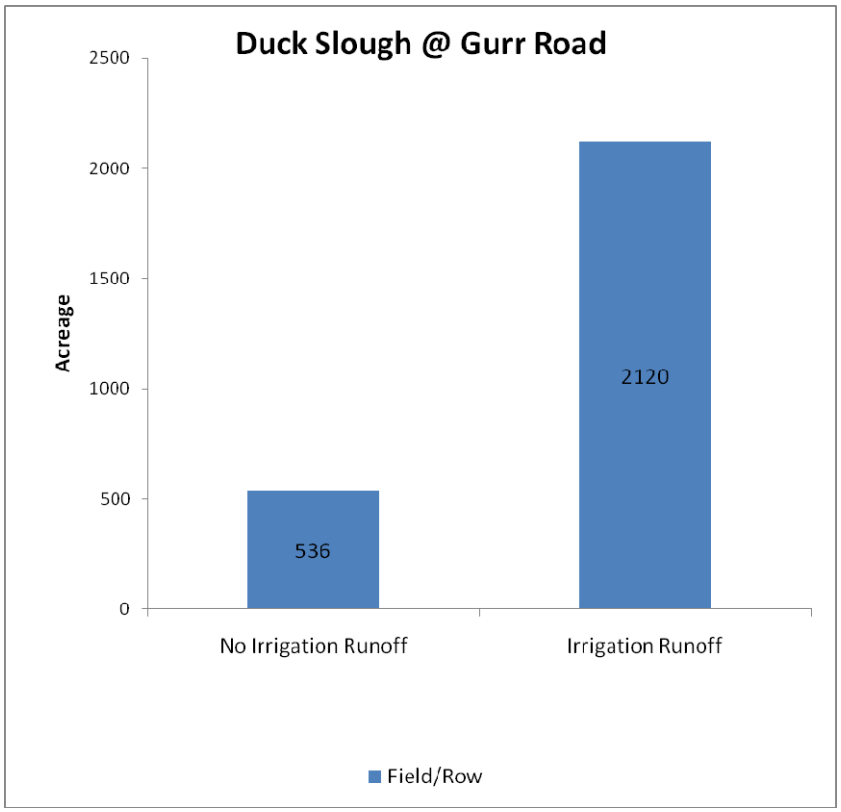
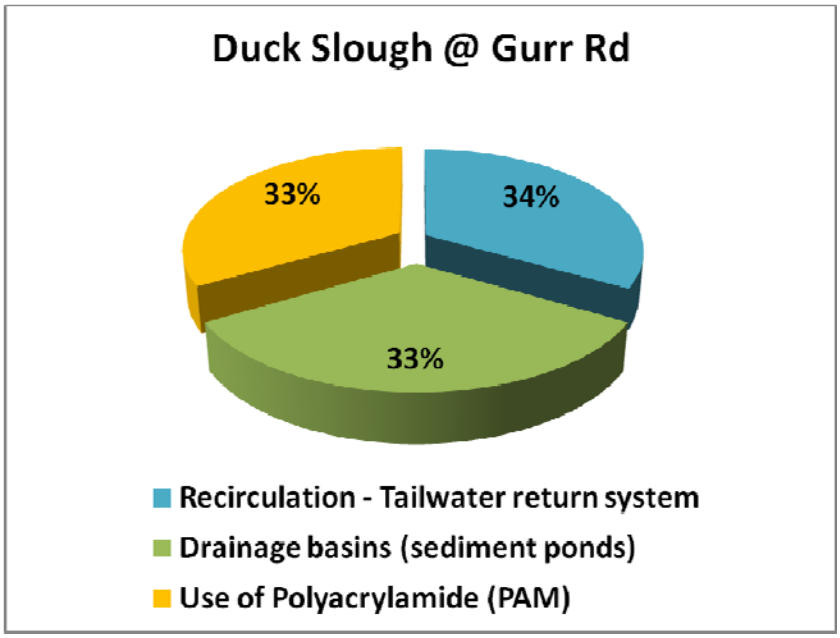


Figure 27. Percentage of acreage represented by recommended management practices for Duck Slough @ Gurr Rd for members with irrigation drainage. All members that were recommended to implement additional practices have irrigation drainage.



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.

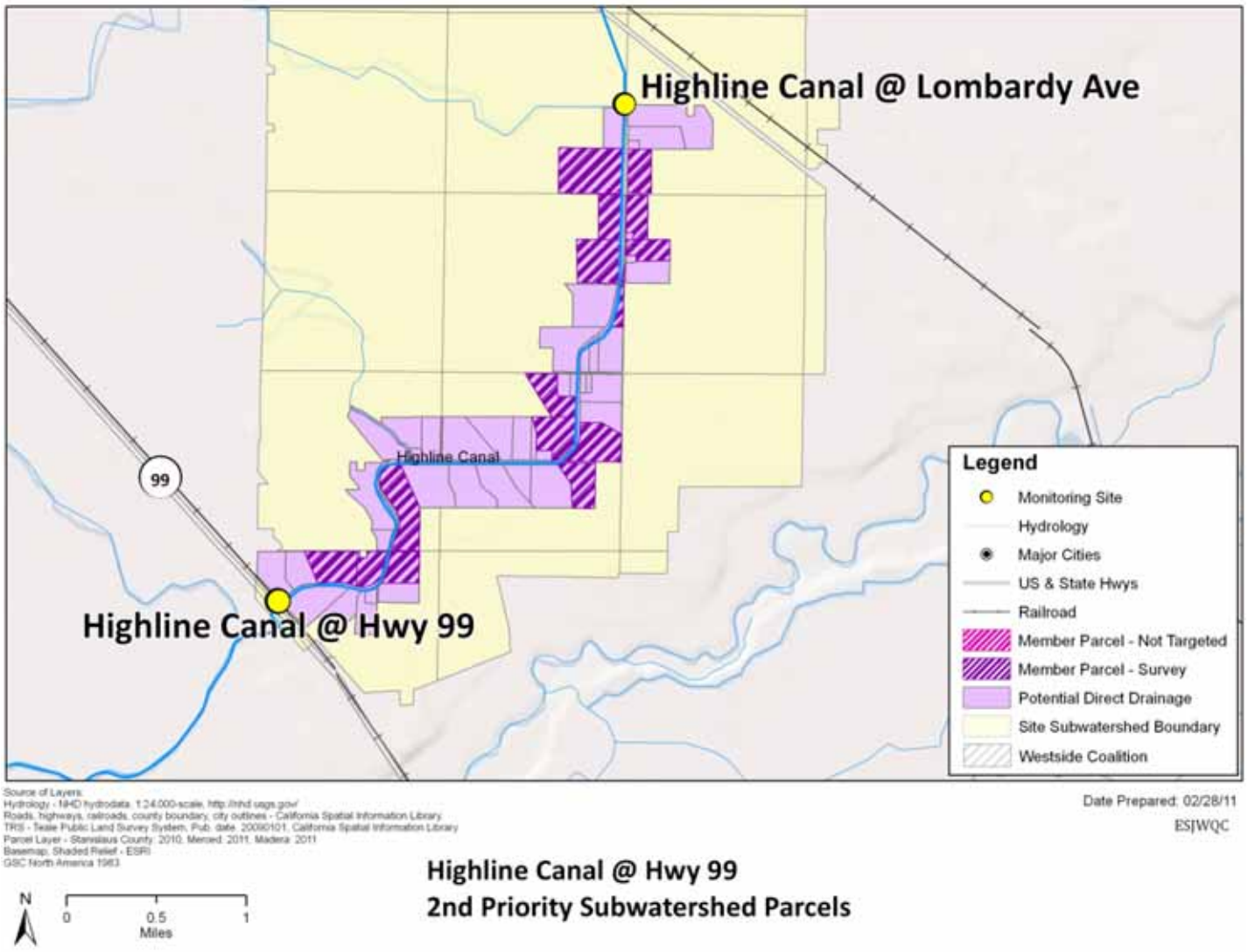
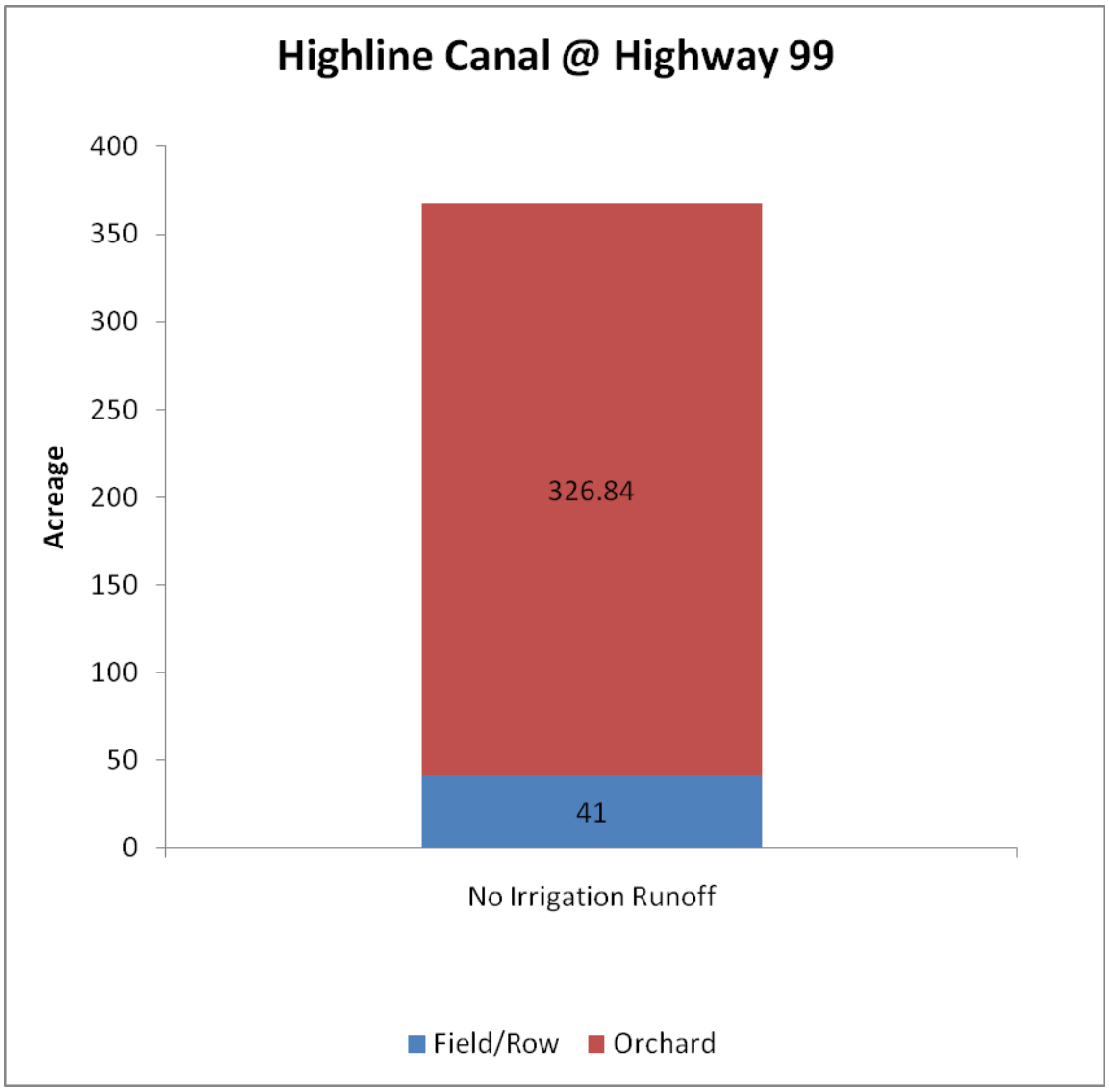


Figure 29. Highline Canal @ Hwy 99 crop acreage information from member surveys based on crop type and irrigation runoff (2010).



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.

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.

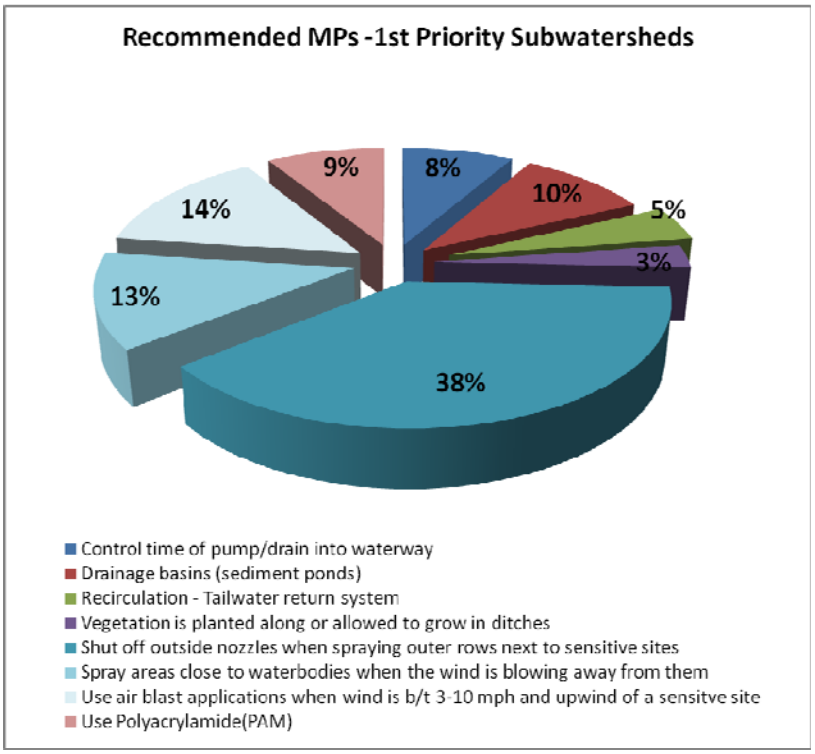
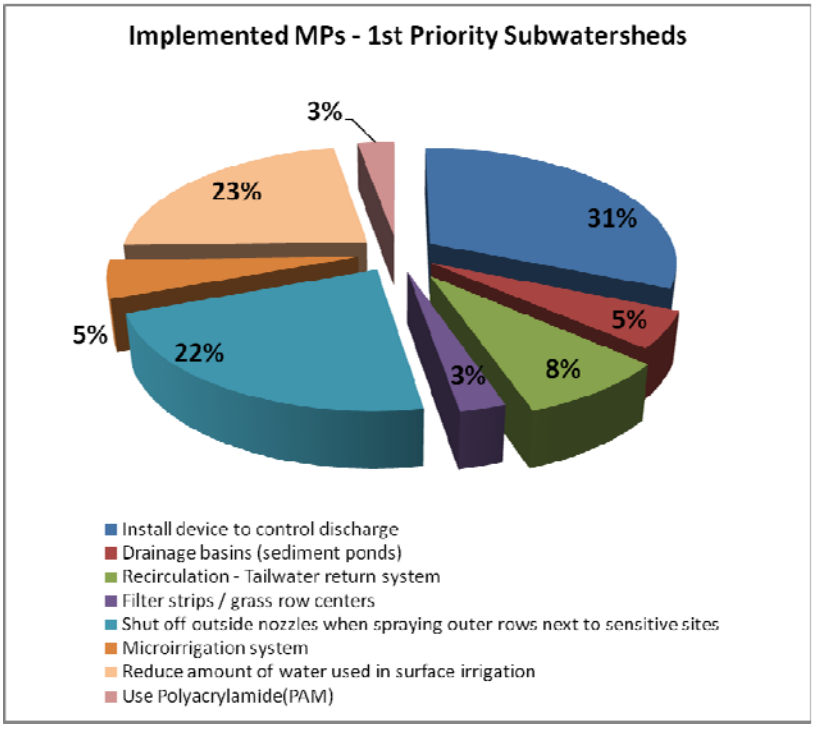


Figure 31. Percentage of acreage associated with implemented management practices for all first priority subwatersheds.



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).

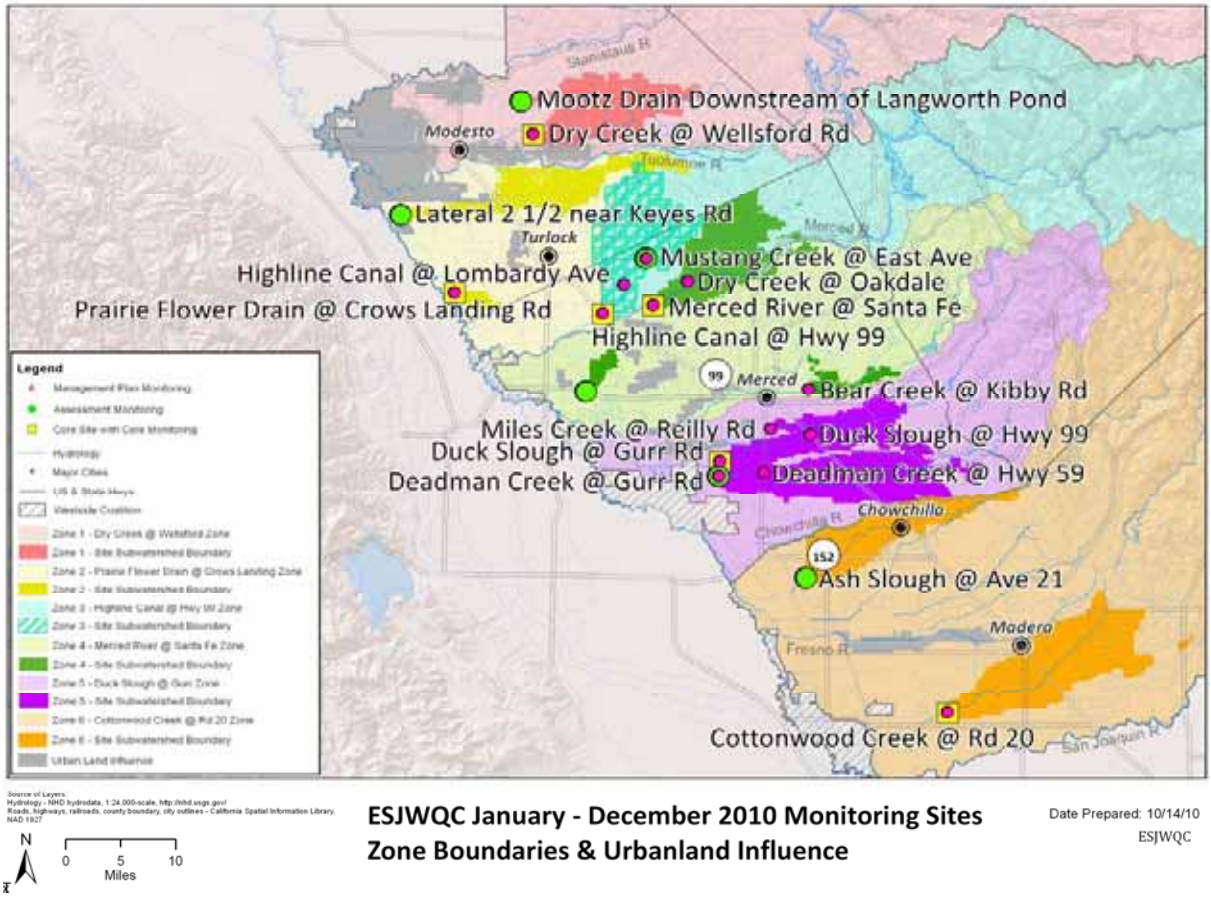
Algae (*S. capricornutum*) toxicity is listed in the management plans for all three site subwatersheds. Both Dry Creek @ Wellsford and Duck Slough @ Hwy 99 have had no water column toxicity to algae since 2008 (Table 29). Prairie Flower Drain @ Crows Landing has had a single toxic sample in both 2009 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.

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

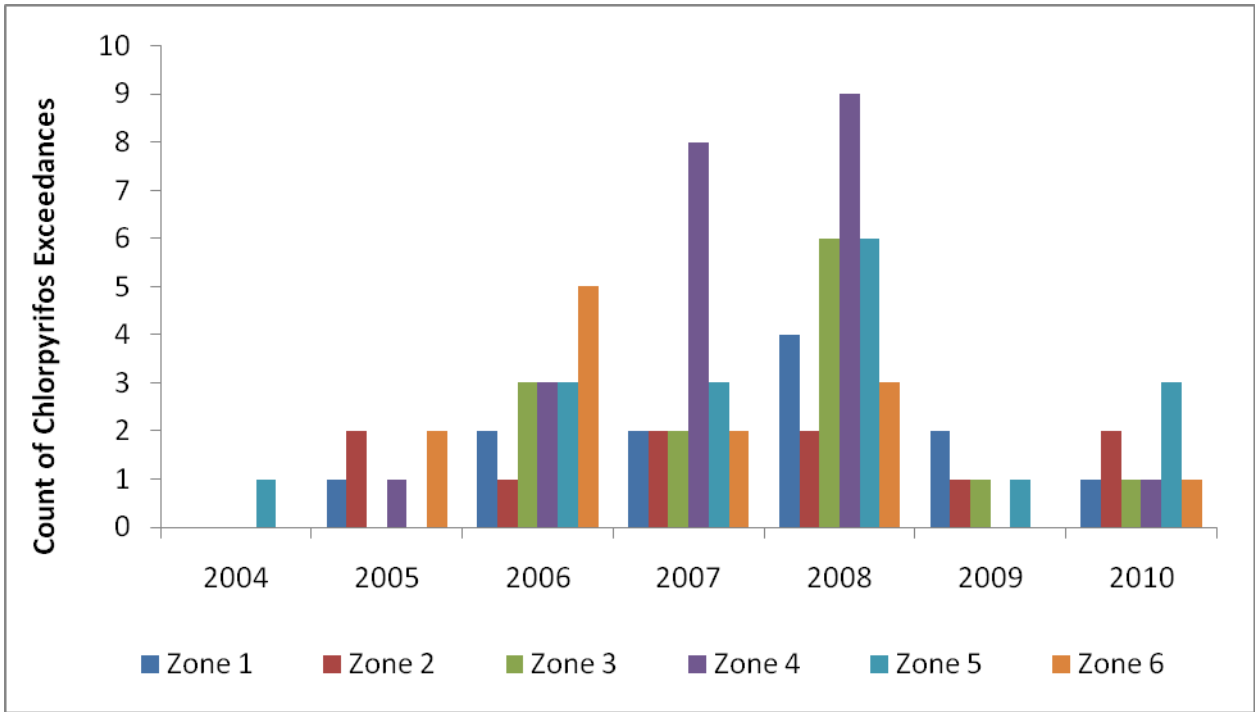
those that occurred in 2010 increased from zero to one in Zone 4 (Merced River @ Santa Fe), from one to three in Zone 5, and from zero to one in Zone 6 (Cottonwood Creek @ Rd 20).

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 (µg/L) measured in July Samples	Flow (cfs)	Calculated Instantaneous Load
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

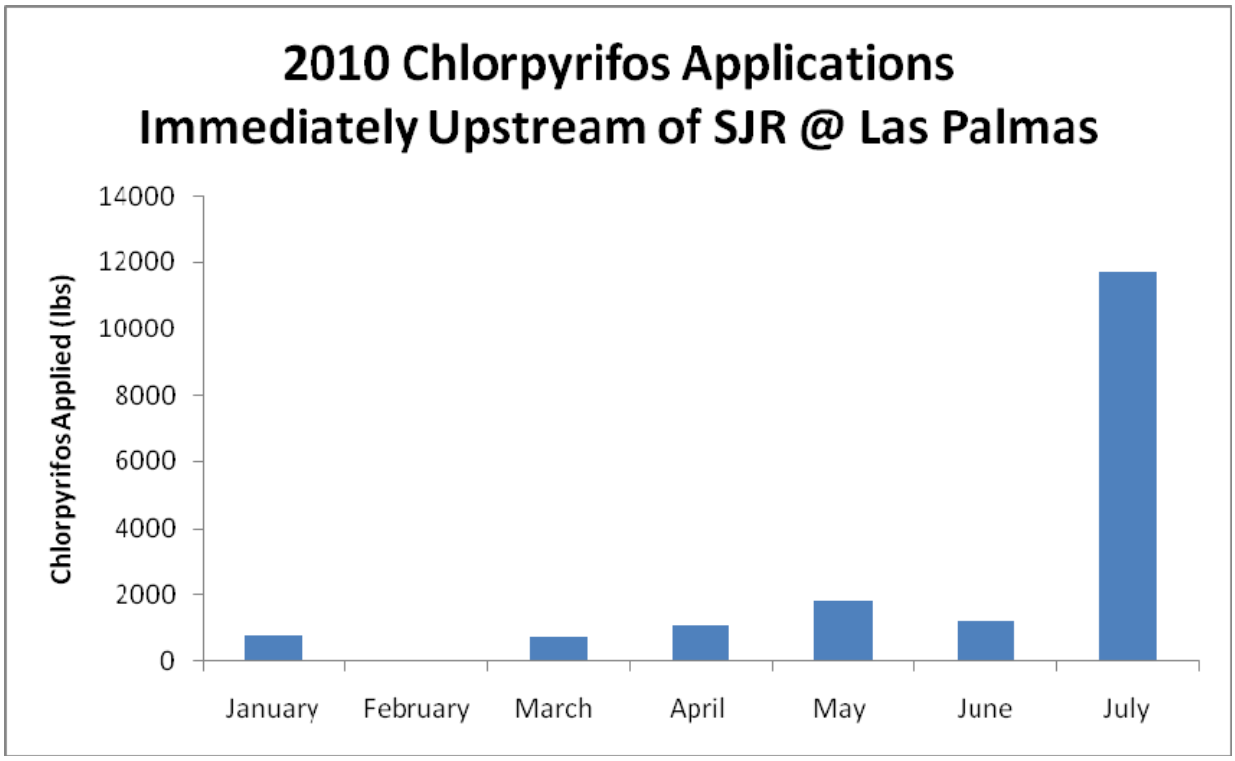
NC – Not calculated; insufficient data to complete calculation

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	*S. capricornutum*	Total Cell Count (cells/ml)	390545	56	SL	
Deadman Creek (Dutchman) @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	*C. dubia*	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	P. promelas	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	*H. azteca*	Survival (%)	60	70	SL	Pyrethroids were detected in the associated chemistry sample.
Deadman Creek (Dutchman) @ Gurr Rd	11/16/2010	Fall2	*C. dubia*	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	*P. promelas*	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 µg/kg dw), chlorpyrifos (J0.182 µg/kg dw), lambda-cyhalothrin (1.2 µg/kg dw) and permethrin (J0.127 µg/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 AWEP 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

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.