East San Joaquin
WATER QUALITY COALITION
1201 L Street Modesto, CA 95354
www.esjcoalition.org

April 1, 2009

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

Dear Dania,

The East San Joaquin Water Quality Coalition is submitting an update to the Management Plan which was originally submitted on September 30, 2008. The Management Plan update is being submitted to inform the Regional Board of progress made on the management of exceedances within the Coalition region. Included in the document are updates of exceedances of water quality trigger limits, a compilation of past outreach activities, and the plan for the next year's monitoring and outreach.

Submitted respectfully,

Parry Klassen
Board Chairman
East San Joaquin Water Quality Coalition

Management Plan Update

East San Joaquin Water Quality Coalition

Submitted on April 1, 2009

Irrigated Lands Regulatory Program
Central Valley Regional Water Quality Control Board

09

Table of Contents

List of Tables

List of Figures

List of Acronyms

AI	Active Ingredient
AMR	Annual Monitoring Report
BMP	Best Management Practice
BOD	Biological Oxygen Demand
BU	Beneficial Use
CURES	Coalition for Urban and Rural Environmental Stewardship
CVRWQCB	Central Valley Regional Water Quality Control Board
CTR	California Toxics Rule
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DHS	(California) Department of Health Services
DO	Dissolved Oxygen
DPR	California (Department of Pesticide Regulation)
DWR	(California) Department of Water Resources
EQIP	Environmental Quality Incentives Program
EPA	Environmental Protection Agency
ESJWQC	East San Joaquin Water Quality Coalition
ILRP	Irrigated Land and Regulatory Program
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MLJ-LLC	Michael L. Johnson, LLC
MPM	Management Plan Monitoring
MRP	Monitoring and Reporting Program Order No. R5-2005-00833
MRPP	Monitoring and Reporting Program Plan
MUN	Municipal and Domestic Supply (beneficial use)
NA	Not Applicable
ND	Not Detected
NM	Normal Monitoring
NSG	Not statistically different from control; Greater than 80% threshold
NRCS	Natural Resources Conservation Service
NTR	National Toxics Rule
OP	Organophosphate
PAM	Polyacrylamide
PCA	Pesticide Control Advisor
pH	Power of Hydrogen
PUR	Pesticide Use Report
RB	Regional Board
RfD	Reference Dose

SAMR	Semi-Annual Monitoring Report
SC	Specific Conductance
SG	Statistically different from control; Greater than 80% threshold
SL	Statistically different from control; Less than 80% threshold
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TRS	Township, Range, Section
UC	University of California
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
MPN/100mL	most probable number per 100 milliliters
NTU	Nephelometric Turbidity Units
ppm	parts per million
sec	second
TUa	Toxic Unit (acute)
TUc	Toxic Unit (chronic)
µg	microgram

INTRODUCTION

As required by the California Regional Water Quality Control Board Central Valley Region Monitoring and Reporting Program Order No. R5-2008-0005 for Coalition Groups (MRP Order) under Amended Order No. R5-2006-0053 Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharge from Irrigated Lands (Conditional Waiver), the East San Joaquin Water Quality Coalition (ESJWQC or Coalition) submitted a management plan on September 30, 2008 to outline methods to identify agriculture sources, track implemented management practices, and performance goals. The Management Plan was developed to work with the Coalition's Monitoring and Reporting Program Plan (MRPP) and identify when constituent-specific monitoring will occur to identify sources and evaluate effectiveness of management practices. A Management Plan update is scheduled every April 1 to report on the previous years activities and update management plan implementation schedules and timelines for reporting to the Central Valley Regional Water Quality Control Board (CVRWQCB or Regional Board) on the effectiveness of the management plan for the upcoming year. Yearly updates allow the Coalition to assess the need to conduct outreach to growers, evaluate information about pesticide use, and obtain water quality data for both irrigation and dormant seasons.

The ESJWQC Management Plan is divided into two parts: a Management Plan introduction followed by individual Site Subwatershed Management Plans. The Management Plan introduction provides an overview of the Coalition's Management Plan strategy including:

- a brief background of watershed information,
- Coalition monitoring history,
- the Management Plan process of prioritization,
- overview of general constituent sources and characteristics and
- overall goals, performance measures and schedules.

The individual Site Subwatershed Management Plans address specific water quality issues for each site subwatershed including all exceedances of water quality trigger limits, analysis of sourcing techniques, recommendations of management practices that can be used to improve water quality and specific schedules for outreach and evaluation of management practice effectiveness. The Management Plan update includes an updated Management Plan introduction and updated priority Site Subwatershed Management Plans.

WATERSHED SETTING

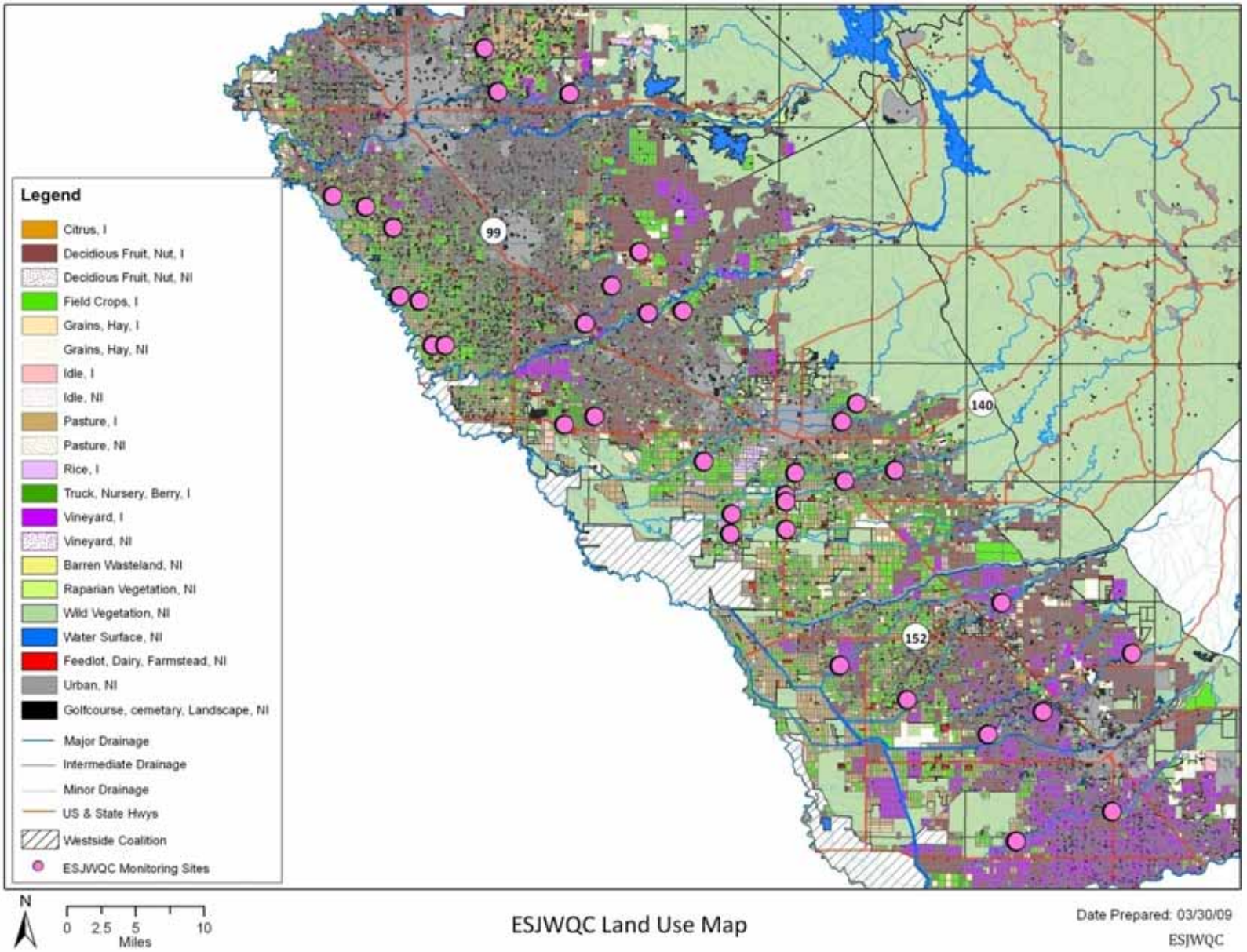
The ESJWQC area includes Stanislaus, Merced, Madera, Tuolumne, and Mariposa Counties and the portion of Calaveras County that drains into the Stanislaus River. The region that drains into the Coalition area is bordered by the crest of the Sierra Nevada on the east and the San Joaquin River on the west, the Stanislaus River on the north to the San Joaquin River on the south. The Coalition has been expanded since its inception in 2004 and now includes the area that was formerly within the Root Creek Coalition area, and the agricultural lands in the Sierra Nevada foothills in Tuolumne, Mariposa, and a small portion of Calaveras County. Additionally, there are landholdings in the vicinity of the Lone Willow Slough drainage area (west of the Eastside Bypass) that joined the Westside Coalition. The only surface water export from the Coalition area is northward via the San Joaquin River. This river drains watersheds on the east and west side of the California Central Valley (Valley), although only east side watersheds are within the Coalition area. San Joaquin River water is eventually either exported to the San Francisco Bay through the Delta, or conveyed southward via the State Water Project or the Delta Mendota Canal. The Coalition area includes within its boundaries portions of six irrigation districts: Oakdale Irrigation District, Merced Irrigation District, Turlock Irrigation District, Modesto Irrigation District, Chowchilla Water District and Madera Irrigation District. Water bodies may have both irrigation district and Coalition involvement only when they convey both irrigation supply and agriculture return water. Irrigation districts are covered by individual waivers.

The impact of urban areas on water quality may be equal to the effects from agricultural land use, especially due to the rapid and ongoing growth of urban centers. The rapid growth of cities such as Modesto, Merced, Livingston, and Turlock are consuming large amounts of irrigated agricultural land. Land designated as agricultural only a few years ago, is now covered by housing developments and shopping malls. Due to economic conditions, urban growth has slowed but eventually will increase again.

Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains approximately 1,186,889 acres that are considered irrigated agriculture (based on 2001 DWR data at http://www.landwateruse.water.ca.gov/annualdata/landuse/2001/landuselevels.cfm).

A variety of crops are grown within the Coalition boundaries and different crops are often found in regions specific to microclimate, soil type, and local farming history (Figure 1). A more detailed discussion of crop type will be provided in the ESJWQC MRPP submitted for review on July 25, 2008.

Figure 1. ESJWQC region map showing land use.



Apart from the San Joaquin River, there are five major rivers in the watershed: Fresno River, Chowchilla River, Merced River, Tuolumne River and Stanislaus River. In addition, the Eastside Bypass is considered a major water body. These east side tributaries of the San Joaquin River drain the Sierra Nevada range from east to west. Typically, only the Stanislaus, Merced, and Tuolumne Rivers maintain flows during the summer months. Flow in the Chowchilla and Fresno Rivers is intermittent to nonexistent throughout the year and they remain dry unless major storm events produce sufficient precipitation in the immediate vicinity of the rivers. Intermediate sized water bodies in the Coalition area (e.g. Dry Creek, Duck Slough, and Highline Canal) originate either in the Sierra Nevada foothills or the Valley itself and are tributaries to the major rivers. The remaining water bodies are small in size (e.g. Silva Drain, Mustang Creek) and are primarily agricultural canals and ditches that convey water to one of the larger rivers or intermediate-sized creeks/sloughs. In general, flows are greatest during the winter and spring due to wintertime precipitation and subsequent springtime snowmelt. Reservoir releases during the summer have increased flows in these tributaries, relative to the discharge record. The numerous small creeks with headwaters located in the foothills and western portion of the Sierra Nevada mountain range are primarily ephemeral with no flow from early summer through the first rains of the winter.

Recent sampling efforts indicate that many of the drainages in the southern portion of the Coalition region do not always carry runoff even during substantial rainfall events. For example, Ash Slough has remained dry throughout the 2007-2008 storm monitoring seasons, despite the rainfall events that have taken place. In addition, water bodies throughout the Coalition region tend to be “flashy” in that water from runoff events moves through the systems very quickly leaving very little flow shortly after the storm ends. During the 2008 storm season, Livingston Drain did not sustain enough water to collect a second sample (resample) approximately one week after the storm event occurred. More discussion of hydrology specific to each of the water bodies monitored by the Coalition can be found in the MRPP.

HISTORY OF COALITION MONITORING

Coalition ambient water quality and sediment toxicity monitoring were initiated in 2004 in the ESJWQC region following the inception of the Irrigated Lands Program in 2002. Each year since that time, both the number of sites monitored and the constituents analyzed were increased in accordance with the most recent CVRWQCB adopted orders and resolutions for the Irrigated Lands Regulatory Program (ILRP). During the first season of monitoring in 2004, samples were collected from four sites and were sent to laboratories to test for nine constituents/analytes plus water column toxicity testing for three different species. Ash Slough was sampled in July of 2004 but was dry and was not sampled again until the irrigation season 2005. By 2007, 24 monitoring sites were sampled and over 50 total analytes tested in addition to testing samples for toxicity. Table 1 lists the sites monitored during each the storm and irrigation seasons

across years of sampling. Specific subwatershed sampling information including number of constituents and events when the site was dry are included in the Site Subwatershed Management Plan section of this document.

Table 1. Sample sites and years monitored.

A site marked as "Dry" was dry for all sampling events during that season. A blank box means that this location was not sampled for during that year and season.

Station Name	Irrigation 2004	Storm 2004/2005	Irrigation 2005	Storm 2005/2006	Irrigation 2006	Storm 2006/2007	Irrigation 2007	Storm 2007/2008	Irrigation 2008	Fall 2008	Storm 2008/2009
Ash Slough @ Ave 21			x	x	x	Dry	Dry	Dry	Dry	Dry	Dry
August Road Drain upstream of Crows Landing Bridge (Hogin Rd)	x										
Bear Creek @ Kibby Rd		x	x	x	x	x	x	x	x		
Berenda Slough along Ave 18 1/2					x	Dry	x	x	Dry		
Black Rascal Creek @ Yosemite Rd					x	x	x	x	x		
Cottonwood Creek @ Rd 20		x	x	x	x	Dry	x	x	x	Dry	x
Cottonwood Creek @ Hwy 145[1]									x		
Deadman Creek @ Hwy 59					x	x	x	x	x		
Deadman Creek (Dutchman) @ Gurr Rd	x				x	x	x	x	x	x	x
Dry Creek @ Rd 18			x	Dry	x	x	x	x	x		
Dry Creek @ Rd 22[1]									x		
Dry Creek @ Rd 28½[1]									x		
Dry Creek @ Waterford Rd[1]									x		
Dry Creek @ Wellsford Rd		x	x	x	x	x	x	x	x	x	x
Duck Slough @ Gurr Rd	x	x	x	x	x	x	x	x	x	Dry	x
Duck Slough @ Hwy 59[1]									x		
Duck Slough @ Hwy 99		x	x	x	x	x	x	x	x		
Duck Slough @ Whealan Rd[1]									x		
Hatch Drain @ Tuolumne Rd							x	x	x		
Highline Canal @ Hwy 99			x	x	x	x	x	x	x	Dry	x
Highline Canal @ Lombardy Rd		x	x	x	x	x	x	x	x		
Hilmar Drain @ Central Ave		x	x	x	x	x	x	x	x		
Hilmar Drain @ Mitchell Rd[1]									x		
Howard Lateral @ Hwy 140										Dry	Dry
Jones Drain @ Oakdale Rd		x	x	x	x	x	x				
Lateral 2 1/2 near Keyes Rd										x	Dry
Livingston Drain @ Robin Ave							x	x	x		
Lone Willow Slough @ Madera Ave		x	x								
Merced River @ Santa Fe	x	x	x	x	x	x	x	x	x	x	x
Miles Creek @ Reilly Rd							x	x	x		
Mootz Drain @ Langworth Rd										x	x
Mustang Creek @ East Ave					x	x	x	x	Dry	Dry	x
North Slough @ Hwy 59[1]									Dry		
Prairie Flower Drain @ Crows Landing Rd		x	x	x	x	x	x	x	x	x	x
Prairie Flower Drain @ Morgan Rd[1]									x		
Reclamation Drain @ Williams Ave[1]									x		
Silva Drain @ Meadow Dr					x	x	x	x	x		
South Slough @ Quinley Rd					x	Dry	x	x	x		

[1]Upstream sampling of normal monitoring locations conducted for source identification.

Overview of 2008 Monitoring

This is the first yearly update to the Coalition's Management Plan. The 2008 year's monitoring data are reviewed and assessed for improvements in water quality and exceedances of WQTLs. This update includes an assessment of water quality during the last 12 months including new exceedances and new site/constituents requiring management plans.

During 2008, storm, irrigation, and fall monitoring was conducted as outlined in the Coalition's MRPP submitted in August of 2008. In addition, Management Plan sampling continued during irrigation months. Management Plan sampling involved either monitoring on additional dates or upstream monitoring for constituents that exhibited more than one exceedance of water quality limit triggers (WQTL). The Coalition's Semi Annual Monitoring Report (SAMR) submitted on March 1, 2009 lists the locations, dates and type of sampling that was conducted during the irrigation season including Management Plan sampling (MP), Normal monitoring (NM) and sediment toxicity. There were 36 sites were monitored during the 2008 seasons; additional sampling took place 40 times at 11 sites and upstream sampling took place 38 times at 11 sites during irrigation season.

At this time, 25 water bodies in the Coalition region require a management plan including Ash Slough, Bear Creek, Berenda Slough, Black Rascal Creek, Cottonwood Creek, Deadman Creek @ Gurr Road, Deadman Creek @ Highway 59, Dry Creek @ Wellsford Rd, Dry Creek @ Rd 18, Duck Slough @ Gurr Road, Duck Slough @ Hwy 99, Hatch Drain, Highline Canal @ Hwy 99, Highline Canal @ Lombardy Rd, Hilmar Drain, Lateral 2 ½, Livingston Drain, Merced River, Miles Creek, Mootz Drain, Mustang Creek, Prairie Flower Drain, Silva Drain, South Slough and Westport Drain.

Beneficial Uses

The Regional Board has assigned beneficial uses (BU) to many water bodies within the Coalition region, but many water bodies monitored by the Coalition do not have assigned BUs. Using the tributary rule, the Coalition applied BUs to upstream tributaries based on the assigned BU in downstream water bodies as listed in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basin (Basin Plan) (Table 2). Water Quality Trigger Limits (WQTLs) are based on the BUs applied to the specific water body. Consequently, identifying an appropriate group of BUs specifies the appropriate WQTLs which in turn determine the exceedances managed by the Coalition and outlined in this document. South Slough is currently listed in Table 2 however the Coalition is currently engaged in discussion with the Regional Board to remove this water body from the Coalition's Monitoring and Reporting Program Plan (MRPP) due to a lack of drainage.

Table 2. Primary water bodies that drain into the major rivers of the ESJWQC region and the beneficial use for each of the major river reaches.

Site Subwatershed (site name)	Immediate Downstream River	Beneficial Use of Immediate Downstream River
Ash Slough @ Avenue 21**	San Joaquin River[2]	1-4, 7-9, 11-15
Bear Creek @ Kibby Rd**	San Joaquin River[2]	1-4, 7-9, 11-15
Berenda Slough along Avenue 18 ½	San Joaquin River[2]	1-4, 7-9, 11-15
Black Rascal Creek @ Yosemite Rd	San Joaquin River[2]	1-4, 7-9, 11-15
Cottonwood Creek @ Rd 20	San Joaquin River[2]	1-4, 7-9, 11-15
Deadman Creek @ Gurr Rd	San Joaquin River[2]	1-4, 7-9, 11-15
Deadman Creek @ Hwy 59	San Joaquin River[2]	1-4, 7-9, 11-15
Dry Creek @ Rd 18**	San Joaquin River[2]	1-4, 7-9, 11-15
Dry Creek @ Wellsford Rd	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Duck Slough @ Gurr Rd	San Joaquin River[2]	1-4, 7-9, 11-15
Duck Slough @ Hwy 99	San Joaquin River[2]	1-4, 7-9, 11-15
Hatch Drain @ Tuolumne Rd	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Highline Canal @ Hwy 99	Merced River[5]	1, 3-15
Highline Canal @ Hwy 99	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Highline Canal @ Lombardy Rd	Merced River[5]	1, 3-15
Highline Canal @ Lombardy Rd	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Hilmar Drain @ Central Ave	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Lateral 2 1/2 near Keyes Rd	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Livingston Drain @ Robin Ave	San Joaquin River[2]	1-4, 7-9, 11-15
Merced River @ Santa Fe	Merced River[5]	1, 3-15
Miles Creek @ Reilly Rd	San Joaquin River[2]	1-4, 7-9, 11-15
Mootz Drain @ Langworth Rd	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Mustang Creek @ East Ave	Merced River[5]	1, 3-15
Mustang Creek @ East Ave	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Prairie Flower Drain @ Crows Landing Rd	San Joaquin River[3]	1-4, 7-9, 11-13, 15
Silva Drain @ Meadow Dr	Merced River[5]	1, 3-15
South Slough @ Quinley Rd	San Joaquin River[2]	1-4, 7-9, 11-15
Westport Drain @ Vivian Ave	San Joaquin River[3]	1-4, 7-9, 11-13, 15

[1] Friant Dam to Mendota Pool reach
[2] Sack Dam to Merced River reach (all waterbodies that drain to this reach enter via the East Side Bypass with the exception of Livingston Drain)
[3] Mouth of Merced River to Vernalis
[4] New Don Pedro Reservoir to San Joaquin River reach
[5] McSwain Reservoir to San Joaquin River reach
[6] "Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis" (wording from the Basin Plan).
[7] Goodwin Dam to San Joaquin River
** Surface water flow in these water bodies terminates in subterranean flow except for periods of increased runoff during large winter storms.
* Beneficial Use code list:

1 - Municipal and Domestic Supply
2 - Agriculture Supply (irrigation)
3 - Agriculture Supply (stock watering)
4 - Industrial Process Supply
5 - Industrial Service Supply
6 - Hydropower Generation
7 - Water Contact Recreation
8 - Non-contact Water Recreation
9 - Warm Freshwater Habitat
10 - Cold Freshwater Habitat
11 - Migration of Aquatic Organisms (warm)
12 - Migration of Aquatic Organisms (cold)
13 - Spawning, Reproduction, and/or Early Development (warm)
14 - Spawning, Reproduction, and/or Early Development (cold)
15 - Wildlife Habitat

Water Quality Trigger Limits

Water quality trigger limits (WQTLs) are established to preserve water quality within the Valley. The most recent WQTLs are listed in Table 3 (updated by the Regional Board on September 16, 2008). Objectives and limits listed in the WQTL table are based on the following beneficial uses: Agricultural Supply; Cold Freshwater Habitat; Municipal and Domestic Supply; Spawning, Reproduction, and/or Early Development of Freshwater Aquatic Life; Water Contact Recreation; and Wildlife Habitat. For sites and constituents that have exceeded a WQTL two or more times, a management plan is required to be implemented. A tally of WQTL exceedances is compiled in Table 4 for all years and all sampling locations. WQTLs have changed over years of monitoring and therefore the Coalition may have reported exceedances in the past that are no longer considered exceedances of current WQTL and there may also be exceedances reported in this document that were not reported in previous documents.

Table 3. Water Quality Triggers Limits (WQTLs) for constituents and parameters measured during Coalition monitoring (updated on September 16, 2008).

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Field and Physical Parameters					
pH	6.5 - 8.5 units	Numeric		Sacramento/San Joaquin Rivers Basin Plan (page III.6.00)	1
Electrical Conductivity (maximum)	700 umhos/cm	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Dissolved Oxygen (minimum)	7 mg/L	Numeric	Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Rivers Basin Plan. Water Quality Control Plan for the Tulare Lake Basin.	1
	5 mg/L		Warm Freshwater Habitat	Basin Plan Objective, page III-5.00: for waters designated WARM (aquatic life). Tulare Lake Basin Plan	
Turbidity	variable	Numeric	Municipal and Domestic Supply	Basin Plan Objective - increase varies based on natural turbidity	1
Total Dissolved Solids	450 mg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Total Suspended Solids	NA				
Temperature	variable	Numeric		Basin Plan Objective (see objectives for COLD, WARM, and Enclosed Bays and Estuaries)	1
E coli	235 MPN/100 ml	Narrative	Water Contact Recreation	EPA ambient water quality criteria, single-sample maximum	3
Fecal coliform	200 MPN/100 ml 400 MPN/100 ml	Numeric	Water Contact Recreation	Sacramento/San Joaquin Rivers Basin Plan (page III.3.00) Geometric mean of not less than five samples for any 30- day period, nor shall more than 10% of the total number of samples taken during a 30 -day period.	1
TOC	NA				
Pesticides - Carbamates					
Aldicarb	3 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Carbaryl	2.53 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average	3
Carbofuran	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methiocarb	0.5 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates	3
Methomyl	0.52 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average (California Department of Fish and Game) (aquatic life)	3
Oxamyl	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Drinking Water Standards - Maximum Contaminant Levels (MCLs). California Dept of Health Services. Primary MCL	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Pesticides - Organochlorines					
DDD(p,p')	0.00083 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR, Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
DDE(p,p')	0.00059 µg/L				
DDT(p,p')	0.00059 µg/L				
Dicofol	NA				
Dieldrin	0.00014 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) / Continuous Concentration 4-day average (total)	1
Endrin	0.036 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-Day Average	1
	0.76 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
Methoxychlor	0.03 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - Freshwater Aquatic Life Protection - instantaneous maximum	3
	30 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Pesticides - Organophosphates					
Azinphos methyl	0.01 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - instantaneous maximum	3
Chlorpyrifos	0.015 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Rivers Basin Plan: page III-6.01; San Joaquin River & Delta, Sacramento & Feather Rivers; more stringent 4-day average.	1
Diazinon	0.1 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan: San Joaquin River & Delta numeric standard. Sacramento & Feather Rivers numeric standard	1
Dichlorvos	0.085 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water. Cal/EPA Cancer Potency Factor as a drinking water level	3
Dimethoate	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Notification Level – DHS (MUN, human health). California Notification Levels. (Department of Health Services)	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Demeton-s	NA				
Disulfoton	0.05 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - Freshwater Aquatic Life Protection - instantaneous maximum	3
Malathion	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methamidophos	0.35 µg/L	Narrative	Municipal and Domestic Supply	Basin Plan Toxicity Objective, Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Methidathion	0.7	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose (MUN, human health)	3
Parathion, Methyl	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Phorate	0.7 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Phosmet	140 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Group A Pesticides					
Aldrin	0.00013 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	3 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Instantaneous maximum	
Chlordane	0.00057 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0043 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor	0.00021 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Heptachlor Epoxide	0.0001 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Total Hexachlorocyclohexane (including lindane)	0.0039 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.95 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Maximum Concentration (1-hour Average)	
Endosulfan	110 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR (USEPA) - Continuous Concentration 4-day average (total)	
Toxaphene	0.00073 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0002 µg/L		Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Pesticides - Herbicides					
Atrazine	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Cyanazine	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Health Advisory (human health)	3
Diuron	2 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water. USEPA Health Advisory. Likely to be carcinogenic to humans (U.S. Environmental Protection Agency, 2005 Guidelines for Carcinogen Risk Assessment).	3
Glyphosate	700 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Linuron	1.4 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3
Molinate	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Paraquat dichloride	3.2 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Simazine	4.0 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Thiobencarb	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Trifluralin	5 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Cancer Risk Level. One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water	3
Metals (c)					
Arsenic	10 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Boron	700 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Cadmium	for aquatic life; variable (see cadmium worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness	1
	5 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Copper	for aquatic life; variable (see copper worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness/	1
	1,300 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Lead	for aquatic life; variable (see lead worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Molybdenum	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan - San Joaquin River, Mouth of the Merced River to Vernalis	1
	50 µg/L			Sacramento/San Joaquin Basin Plan - Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River	
	10 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
	35 µg/L		Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level.	
Nickel	For aquatic life variable (see Nickel worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	100 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Selenium	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
	5 µg/L (4-day average)	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR Freshwater Aquatic Life Protection - Continuous Concentration - 4-Day Average	
Zinc	For aquatic life variable (see Zinc worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness/	1
Nutrients					
Nitrate as NO3 Nitrate as N	45,000 µg/L as NO3 10,000 µg/L as N	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Nitrite as Nitrogen	1,000 µg/L as N	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Ammonia	For aquatic life variable (see ammonia worksheet).	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Freshwater Aquatic Life Criteria, Continuous Concentration	3
	1.5 mg/L (regardless of pH and Temperature values)	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Taste and Odor Threshold (Ammore and Hautala)	3
Hardness	NA				
Phosphorus, total	NA				
Orthophosphate, soluble	NA				
TKN	NA				

Category 1: Constituents that have numeric water quality objectives in the Sac-SJR Basin Plan or other WQO listed by reference such as MCLs (Page III-3.0)* , CTRs (Page III-10.1)*, and chlorinated hydrocarbon pesticides (Page III-6.0, third bullet)*. Other numeric objectives may only apply to specific water bodies sections, or during specified time periods (see Basin Plan for more details).

Category 2: Pesticides with discharge prohibitions. Prohibitions apply to any discharges not subject to board-approved management practices (Page IV-25.0)*.

Category 3: Constituent does not have numeric WQO, and does not have a primary MCL. WQ Trigger Limit exceedance is based on implementation of narrative objective. All detections should be tracked. None are default exceedances.

Category 4: Coalitions may propose alternative triggers for specific water bodies. The coalition must provide the documentation that supports their proposed alternative trigger.

(*) Water Quality Control Plan for the Sacramento and San Joaquin River Basins. Revised on October 2007. Narrative WQTLs are based on Water Quality Goals Database. Updated by Jon Marshack on 16 July 2008

NA = Not Available. Until completion of evaluation studies and MRP Plan submittals with site specific information on beneficial uses.

ND = Non Detect.

2004 - 2008 Exceedances

An important aspect of the ESJWQC Management Plan is to maintain yearly updates of exceedances based on the most recent WQTLs (Table 3). Table 4 provides a tally of exceedances for sites monitored from 2004 through 2008. 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. Table 5 includes a tally of exceedances experienced since the last update (September 30, 2008) which includes monitoring results from the 2008 storm, irrigation, and fall seasons. South Slough @ Quinley Rd is included in this tally however the Coalition is in discussion with the Regional Board to remove this site from its Monitoring and Reporting Program Plan (MRPP) due to recent information regarding the source and drainage of this water body. In both tables, cells with green highlights indicate exceedances that are currently under the ESJWQC Management Plan. In Table 5, blue highlights indicate sites/constituents that are included in the ESJWQC Management Plan due to exceedances experienced in 2008.

Table 4. ESJWQC exceedance tally based on results through December 2008.

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	*Ceriodaphnia dubia*, Survival (%)	*Pimephales promelas*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)	*E. coli*, MPN/100 mL	Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate as N, mg/L	Nitrite as N, mg/L	Arsenic, µg/L	Copper, 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	Malathion, µg/L	Methidathion	Methoxychlor, µg/L	Methyl parathion, µg/L	Simazine, µg/L	Thiobencarb, µg/L
Ash Slough @ Ave 21						1		3						5	2				4														
Bear Creek @ Kibby Rd	2	3		3		2	**2**	7					1	4					2				1										
Berenda Slough along Ave 18 1/2	8			1		3		2											3								1						
Berenda Slough @ Rd 19	1																																
Black Rascal Creek @ Yosemite Rd	17	2		5		1	1	11						1	2				4														
Cottonwood Creek @ Rd 20	13	1			1	2	1	12						12	3				2	1				1			2					1	
Cottonwood Creek @ Hwy 145	1													1																			
Deadman (Dutchman) Creek @ Gurr Rd	14	1	1		2	2		21	1				7	4					1				1		1			1					
Deadman Creek @ Hwy 59	17					3	1	12					5						4		1		1				1					1	
Dry Creek @ Rd 18	3	2		1		4	2	4						21	5	1			3					2			2						
Dry Creek @ Rd 22	1	1												6																			
Dry Creek @ Rd 28 1/2														1																			
Dry Creek @ Wellsford Rd	19	4		2		5	2	21						3	1				6								2						1
Dry Creek @ Waterford Rd	2																		2														
Duck Slough @ Gurr Rd	3	2	1	3		2	5	16	1					8	4			1	1														2
Duck Slough @ Hwy 59	3		1																														
Duck Slough @ Hwy 99	1	3		1		3	**2**	12						11	11				4														
Duck Slough @ Whealan Rd														3																			
Hatch Drain @ Tuolumne Rd	23		22			10	6	12	12	1	13	1	12										1			1				1			
Highline Canal @ Hwy 99	1	9	1	4		4	6	7	2	2				7	7				4								2						
Highline Canal @ Lombardy Rd	1	4	1	6	2	4	7	4		1				5	8	1			5								1	1			1	1	
Hilmar Drain @ Central Ave	6	3	35	1		6	4	20	26	2	12			2					1		1	1					3						
Hilmar Drain @ Mitchell Rd	2		2			2					1																						
Reclamation Drain @ Williams			1																														

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	*Ceriodaphnia dubia*, Survival (%)	*Pimephales promelas*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)	*E. coli*, MPN/100 mL	Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate as N, mg/L	Nitrite as N, mg/L	Arsenic, µg/L	Copper, 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	Malathion, µg/L	Methidathion	Methoxychlor, µg/L	Methyl parathion, µg/L	Simazine, µg/L	Thiobencarb, µg/L
Lateral 2 ½ near Keyes Rd		2						2		1																							
Livingston Drain @ Robin Ave	1	11				4		2			1			9	2				4														
Merced River @ Santa Fe	2	1		5		1		1						1	2				3														
Miles Creek @ Reilly Rd	6			3		3	3	7						7	5		1		3										1				
Mootz Drain @ Langworth Rd	1	1						1											1														
Mustang Creek @ East Ave	8		2	2		1	1	6	1										2			2										2	
Prairie Flower Drain @ Crows Landing Rd	13	5	48	2	2	7	6	25	33	2	21	1	1						4							1		1					
Prairie Flower Drain @ Morgan	5		6								5																						
Silva Drain @ Meadow Dr	17	**1**		3	1		4	13		3				3	1				6														
South Slough @ Quinley Rd	4	2				1		3						1	1				**1**						1								
Westport Drain @ Vivian Rd	7		19			4	1	7	13		13								2														
Total Exceedance Count (Active Sites)	**202**	**58**	**140**	**42**	**8**	**75**	**54**	**231**	**89**	**12**	**66**	**2**	**26**	**115**	**54**	**2**	**1**	**1**	**72**	**1**	**2**	**3**	**4**	**3**	**2**	**2**	**14**	**3**	**1**	**1**	**1**	**5**	**3**

All data were evaluated including field QCs. If a field QC has an exceedance, and the associated environmental sample does NOT have an exceedance, than that field QC exceedance is included in the tally.
Upstream management plan sites are listed below the primary site.

Table 5. ESJWQC exceedance tally based on 2008 sampling events.

All sites are listed that have had at least one exceedance. Sites are listed alphabetically by station name and constituents are listed alphabetically within each of the following groups: field parameters, inorganics, bacteria, metals, pesticides and toxicity. Blue highlighted cells refer to sites/constituents that require a management plan due to 2008 irrigation exceedancs; green highlights refer to sites/constituents already in management plans.

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Ceriodaphnia dubia, Survival (%)	Pimephales promelas, Survival (%)	Selenastrum capricornutum, Total Cell Count	Hyalella azteca, Survival (%)	E. coli, MPN/100 mL	Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate as N, mg/L	Arsenic, µg/L	Copper, µg/L	Lead, µg/L	Carbofuran	Chlorpyrifos, µg/L	Cyanazine, µg/L	DDE (p,p'), µg/L	DDT (p,p'), µg/L	Diazinon, µg/L	Dieldrin, µg/L	Dimethoate, µg/L	Diuron, µg/L	Malathion, µg/L	Methidathion, µg/L	Methyl parathion, µg/L	Simazine, µg/L
Bear Creek @ Kibby Rd		1				2	2	2				1	3														
Berenda Slough @ Rd 19	1																										
Black Rascal Creek @ Yosemite Rd	8	2				1	1	5					1	2													
Cottonwood Creek @ Rd 20	1				1	2	1	6					4	2		2	1			1			2				1
Cottonwood Creek @ Hwy 145	1												1														
Deadman (Dutchman) Creek @ Gurr Rd	5	1	1			1		8	1			5	1						1		1						
Deadman Creek @ Hwy 59	8					3	1	6				5				2							1				1
Dry Creek @ Rd 18	2					3	1	1					7	1		1				1			2				
Dry Creek @ Rd 22	1	1											6														
Dry Creek @ Rd 28 1/2													1														
Dry Creek @ Wellsford Rd	8	1				1	2	9					1	1		1											
Dry Creek @ Waterford Rd	2															2											
Duck Slough @ Gurr Rd							2	2					2	2	1												
Duck Slough @ Hwy 59	3		1																								
Duck Slough @ Hwy 99		1				2	2	3					2	2		1											
Duck Slough @ Whealan Rd													3														
Hatch Drain @ Tuolumne Rd	17		17			10	4	7	8		8	8							1								
Highline Canal @ Hwy 99		5	1			3	3	3	2	2			2			2							1				
Highline Canal @ Lombardy Rd	1	2	1	2	2	1	3	2		1			3	1		2								1		1	1
Hilmar Drain @ Central Ave	3		14			4	3	4	8		3							1					1				
Hilmar Drain @ Mitchell Rd	2		2			2					1																
Reclamation Drain @ Williams Ave			1																								
Lateral 2 ½ near Keyes Rd		2						2		1																	
Livingston Drain @ Robin Ave	1	8				4		2			1		5	2		3											
Merced River @ Santa Fe	1			2									1	1		2											

Station Name	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Ceriodaphnia dubia, Survival (%)	Pimephales promelas, Survival (%)	Selenastrum capricornutum, Total Cell Count	Hyalella azteca, Survival (%)	E. coli, MPN/100 mL	Dissolved Solids, mg/L	Ammonia, mg/L	Nitrate as N, mg/L	Arsenic, µg/L	Copper, µg/L	Lead, µg/L	Carbofuran	Chlorpyrifos, µg/L	Cyanazine, µg/L	DDE (p,p'), µg/L	DDT (p,p'), µg/L	Diazinon, µg/L	Dieldrin, µg/L	Dimethoate, µg/L	Diuron, µg/L	Malathion, µg/L	Methidathion, µg/L	Methyl parathion, µg/L	Simazine, µg/L
Miles Creek @ Reilly Rd	6			2		2	2	4					4	4		2									1		
Mootz Drain @ Langworth Rd	1	1						1								1											
Mustang Creek @ East Ave	3		1	2		1	1	1								2											2
Prairie Flower Drain @ Crows Landing Rd	3		17			6	2	8	11	1	11					1						1		1			
Prairie Flower Drain @ Morgan Rd	5		6								5																
Silva Drain @ Meadow Dr	10	1		2	1		2	4		3			3	1		3											
South Slough @ Quinley Rd	1					1		1					1	1		1											
Westport Drain @ Vivian Rd	7		19			3	1	5	8		8					1											
Total Exceedance Count, 2008	**101**	**26**	**81**	**10**	**4**	**52**	**33**	**86**	**38**	**8**	**37**	**19**	**51**	**20**	**1**	**29**	**1**	**1**	**2**	**2**	**1**	**1**	**7**	**2**	**1**	**1**	**5**

All data were evaluated including field QCs. If a field QC has an exceedance, and the associated environmental sample does NOT have an exceedance, than that field QC exceedance is included in the tally.
Upstream management plan sites are listed below the primary site.

The most common exceedances in 2008 were dissolved oxygen, *E. coli*, TDS/SC, copper, chlorpyrifos, and *Selenastrum* and *Hyalella* toxicity. Table 5 provides the exceedances during 2008 sampling already under previous Management Plans. DO exceeded the WQTL at Black Rascal Creek @ Yosemite Rd, Cottonwood Creek @ Road 20, Deadman Creek @ Gurr Rd, Deadman Creek @ Highway 59, Dry Creek @ Wellsford Road, Hatch Drain @ Tuolumne Rd, Hilmar Drain @ Central Ave, Mustang Creek @ East Avenue, Prairie Flower Drain @ Crows Landing Rd, Silva Drain @ Meadow Rd, and South Slough @ Quinley Road. pH exceeded the WQTL at Bear Creek @ Kibby Road, Dry Creek @ Wellsford Road, Duck Slough @ Highway 99, Highline Canal @ Highway 99, Highline Canal @ Lombardy Rd, and Livingston Drain @ Robin Rd. TDS/SC exceeded the WQTL at Hatch Drain @ Tuolumne Rd, Hilmar Drain @ Central Ave, Prairie Flower Drain @ Crows Landing Rd, and Westport Drain @ Vivian Rd. *Ceriodaphnia* toxicity exceeded the WQTL at Highline Canal @ Lombardy Road, and Merced River @ Santa Fe Drive. *Selenastrum* toxicity exceeded the WQTL at Dry Creek @ Wellsford Road, Highline Canal @ Lombardy Rd, and Hilmar Drain @ Central Ave. *Hyalella* toxicity exceeded the WQTL at Duck Slough @ Gurr Rd, Hatch Drain @ Tuolumne Road, Highline Canal @ Highway 99, Highline Canal @ Lombardy, Prairie Flower Drain @ Crows Landing Rd, and Silva Drain @ Meadow Drive. *E. coli* exceeded the WQTL at Bear Creek @ Kibby Road, Black Rascal Creek @ Yosmite Road, Cottonwood Creek @ Road 20, Deadman Creek @ Gurr Rd, Deadman Creek @ Highway 59, Dry Creek @ Road 18, Dry Creek @ Wellsford Road, Duck Slough @ Gurr Road, Duck Slough @ Highway 99, Hatch Drain @ Tuolumne Road, Highline Canal @ Highway 99, Highline Canal @ Lombardy Road, Hilmar Drain @ Central Avenue, Miles Creek @ Reilly Road, Mustang Creek @ East Avenue, Prairie Flower Drain @ Crows Landing Rd, Silva Drain @ Meadow Drive, South Slough @ Quinley Road, and Westport Drain @ Vivian Road. Nitrate exceeded the WQTL at Hatch Drain @ Tuolumne Road, Hilmar Drain @ Central Avenue, Prairie Flower Drain @ Crows Landing Road, and Westport Drain @ Vivian Road. Nitrate concentrations exceeded the WQTL at Hatch Drain @ Tuolumne Road, Hilmar Drain @ Central Ave, Prairie Flower Drain @ Crows Landing Road, and Westport Drain @ Vivian Rd. Arsenic exceeded the WQTL at Deadman Creek @ Gurr Road and Hatch Drain @ Tuolumne Road. Copper exceeded the WQTL at Cottonwood Creek @ Road 20, Deadman Creek @ Gurr Road, Dry Creek @ Rd 18, Dry Creek @ Wellsford Road, Duck Slough @ Gurr Road, Duck Slough @ Highway 99, Highline Canal @ Highway 99, Highline Canal @ Lombardy Road, Livingston Drain @ Robin Road, and Miles Creek @ Reilly Road. Lead exceeded the WQTL at Dry Creek @ Road 18, Duck Slough @ Gurr Road, Duck Slough @ Highway 99, and Highline Canal @ Lombardy Road. Chlorpyrifos exceeded the WQTL at Deadman Creek @ Highway 59, Dry Creek @ Road 18, Dry Creek @ Wellsford Road, Duck Slough @ Highway 99, Highline Canal @ Highway 99, Highline Canal @ Lombardy Road, Prairie Flower Drain @ Crows Landing Road, and Silva Drain @ Meadow Drive. Diuron exceeded the WQTL at Hilmar Drain @ Central Avenue.

2008 New Site/Constituents Requiring Management Plans

As a result of 2008 storm, irrigation, and fall monitoring, several new Management Plans are required (see blue highlights in Table 5). Exceedances of chlorpyrifos require management plans for the Cottonwood Creek @ Road 20, Livingston Drain @ Robin Ave, Merced River @

Santa Fe Drive, Miles Creek @ Reilly Rd, Mootz Drain @ Langworth Road, Mustang Creek @ East Avenue, South Slough @ Quinley Road, and Westport Drain @ Vivian Road watersheds. *Selenastrum* toxicity will trigger management plans for Bear Creek @ Kibby Road, Cottonwood Creek @ Road 20, Deadman Creek @ Gurr Road, Deadman Creek @ Highway 59, Dry Creek @ Road 18, Duck Slough @ Highway 99, Hatch Drain @ Tuolumne Rd, Highline Canal @ Highway 99, Livingston Drain @ Robin Ave, Miles Creek @ Reilly Rd, Prairie Flower Drain @ Crows Landing Rd, and Westport Drain @ Vivian Road. Ceriodaphnia toxicity will trigger management plans for Miles Creek @ Reilly Road, Mustang Creek @ East Avenue, and Silva Drain @ Meadow Rd. Hyalella toxicity will trigger a management plan at Bear Creek @ Kibby Road, Dry Creek @ Road 18, Dry Creek @ Wellsford Road, Duck Slough @ Highway 99, Hilmar Drain @ Central Avenue, and Miles Creek @ Reilly Rd. Exceedances of the copper WQTL will trigger management plans for Bear Creek @ Kibby Rd and Silva Drain @ Meadow Rd. Other exceedances triggering management plans are DO at Dry Creek @ Road 18, Merced River @ Santa Fe Dr, Miles Creek @ Reilly Rd, and Westport Drain @ Vivian Road, pH at Black Rascal Creek @ Yosemite Rd and Lateral 2 ½ near Keyes Road, SC/TDS at Highline Canal @ Hwy 99, and Mustang Creek @ East Avenue, *Pimephales* toxicity at Highline Canal @ Lombary Road, *E. coli* at Lateral 2 ½ near Keyes Rd, and Livingston Drain @ Robin Ave, ammonia at Highline Canal @ Hwy 99, Prairie Flower Drain @ Crows Landing Rd, and Silva Drain @ Meadow Drive, lead at Black Rascal Creek @ Yosemite Ave, Cottonwood Creek @ Rd 20, Livingston Drain @ Robin Ave, Merced River @ Santa Fe, and Miles Creek @ Reilly Rd, diazinon at Cottonwood Creek @ Rd 20 and Dry Creek @ Rd 18, diuron at Cottonwood Creek @ Rd 20, Dry Creek @ Rd 18, and Highline Canal @ Hwy 99, and simazine at Mustang Creek @ East Ave.

Upstream sites were monitored for Management Plan constituents as well as DO, SC, pH, and temperature as part of Management Plan monitoring program. As a result, field and physical parameters not under a site subwatershed's management plan may have been monitored at an upstream location. During 2008 monitoring, if a field or physical parameter exceedance occurred at an upstream location, the constituent was previously under a management plan at the normal monitoring site. The only exceptions were a pH exceedance experienced at Dry Creek @ Road 22, and a DO and SC exceedances experienced at Duck Slough @ Highway 59.

MANAGEMENT PLAN PROCESS

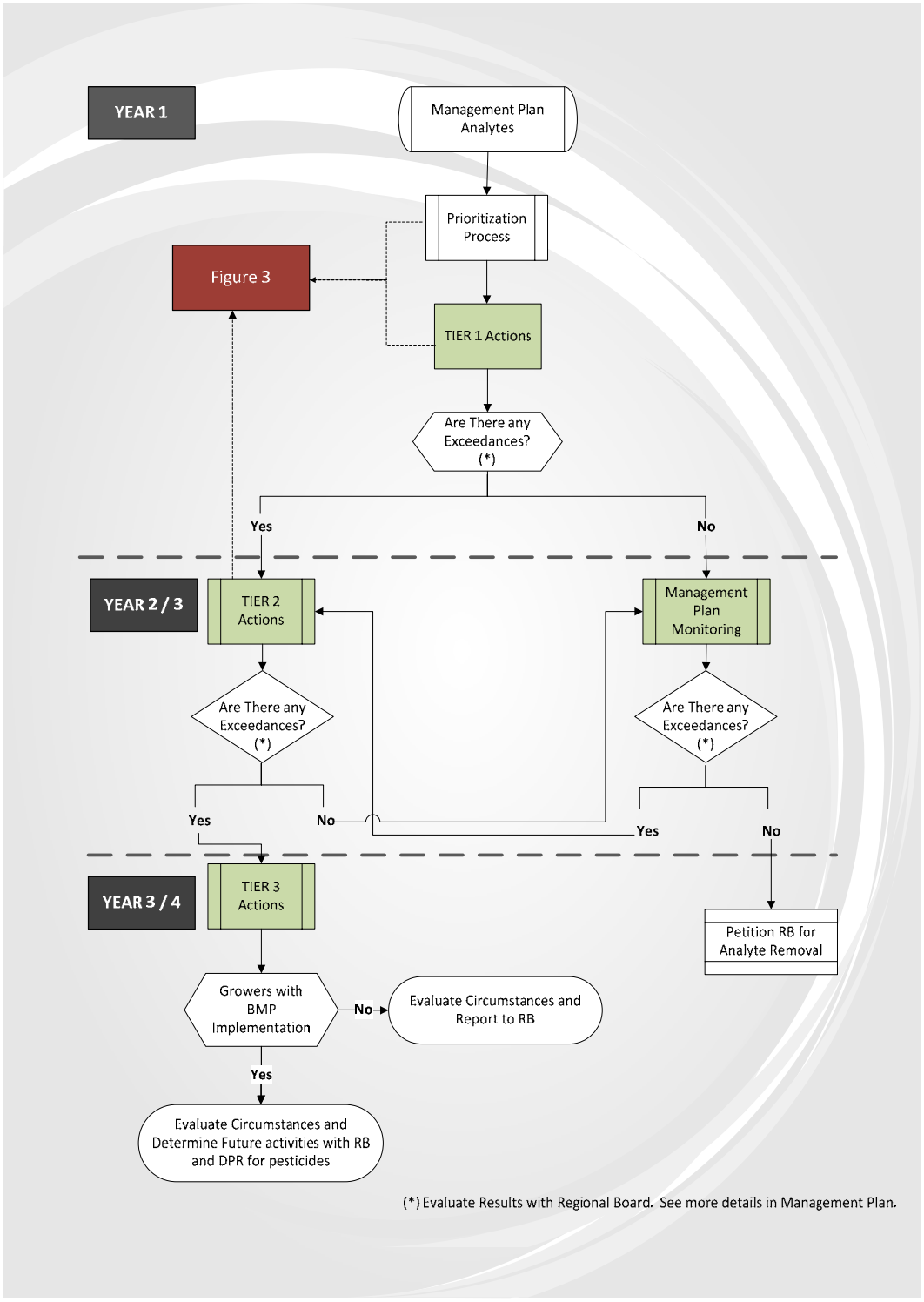
The ESJWQC Management Plan process was first outlined in the ESJWQC Management Plan submitted on September 30, 2008. This process was a combination of years and tiers diagrammed in a flow chart which then determined the specific actions that would be taken by the Coalition (Figure 2). For a more complete description of this process including the definition of years and tiers, see the ESJWQC Management Plan (submitted September 30, 2008).

During the 2007 and 2008 irrigation season, additional and upstream Management Plan Monitoring was conducted following the process outlined in Figure 2. In 2009, the Coalition will utilize information gained during Management Plan Monitoring in its outreach efforts, especially within high priority site subwatersheds. Due to the extensive amount of monitoring conducted within the Coalition region, the Coalition will focus its efforts on documenting changes in management practices and perform outreach at both an individual and grower group level.

The next Management Plan update will be submitted on April 1, 2010 and will include documentation of management practice implementation and outreach activities. This update will also assess any new exceedances that occurred during 2009 at both core and assessment sites triggering a management plan. In 2010 the Coalition will focus on evaluating management practice implementation within high priority areas.

Figure 2. Coalition Management Plan process and associated actions.

The prioritization process (including TIER actions) is included in Figure 3.



RB- Regional Board
DPR- Department of Pesticide Regulation
BMP- Best Management Practices

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 in Figure 3. The prioritization process was developed in collaboration with the Regional Board and allows the Coalition to focus on constituents where sourcing is possible (i.e. pesticide use reports) and for which management practices are available. Following the flow chart in Figure 3, a priority level is assigned to a Management Plan constituent for a specific site subwatershed. Priority levels will determine the level of activity for sourcing, outreach and evaluation. The ESWJQC Management Plan (submitted September 30, 2008) includes a detailed description of the prioritization process including tiers and actions.

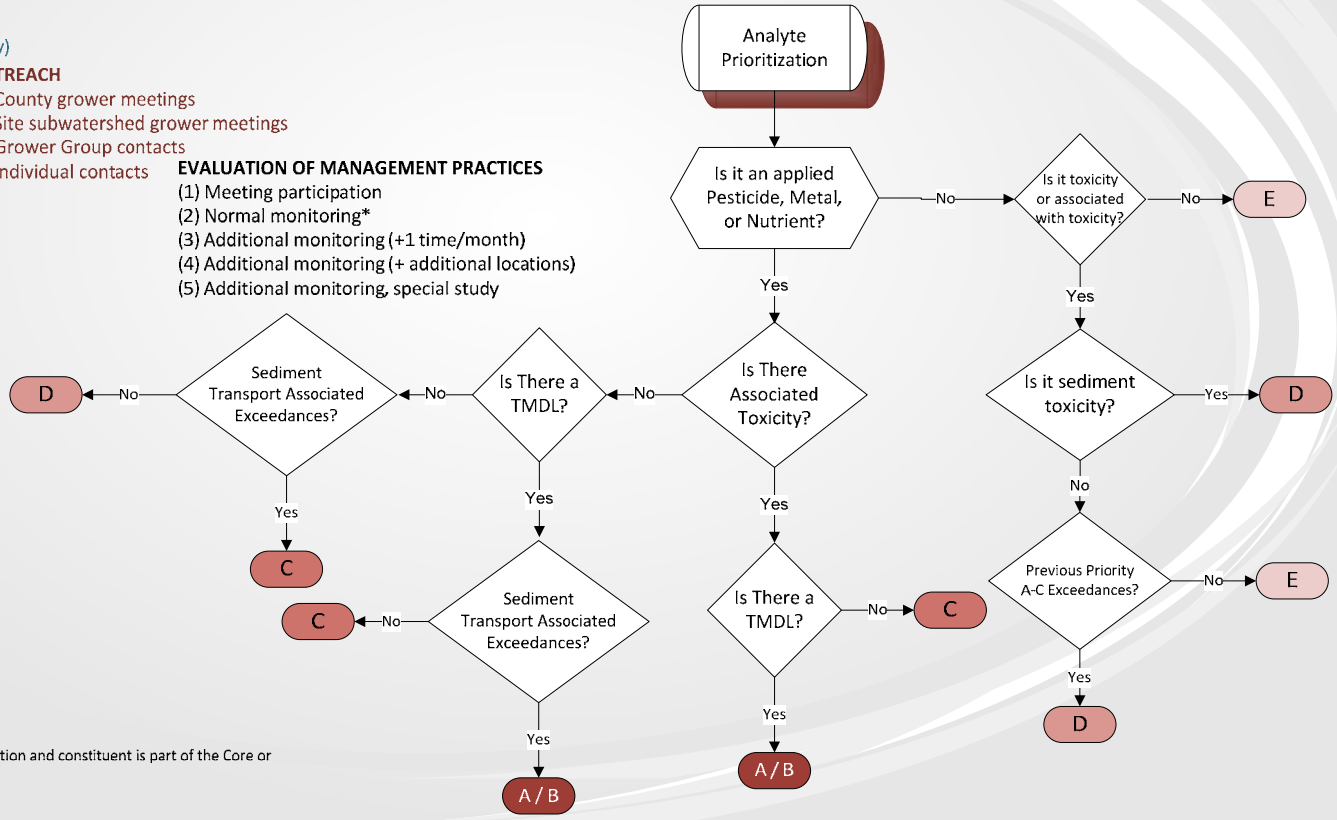
Figure 3. ESJWQC prioritization process including actions for sourcing, outreach and evaluation of management practices.

Priority Level	TIER 1			TIER 2			TIER 3		
	Source	Outreach	Evaluation	Source	Outreach	Evaluation	Source	Outreach	Evaluation
A	1, 3	1, 2	2, 3	1, 2, 3/4	1, 2, 3, 4	1, 2, 3, 4	1, 3, 4	1, 2, 3, 4	1, 2, 3, 4, 5
B	1, 3	1, 2	2, 3	1, 2, 3/4	1, 2, 3	1, 2, 3, 4	1, 3, 4	1, 2, 3, 4	1, 2, 3, 4, 5
C	1, 3	1, 2	2, 3	1, 2, 3/4	1, 2, 3	1, 2, 3, 4	1, 3, 4	1, 2, 3, 4	1, 2, 3, 4, 5
D	1, 3	1, 2	2, 3	1, 2, 3/4	1, 2	2, 3	1, 3, 4	1, 2, 3	1, 2, 3, 4
E		1	2		1	2		1	2

SOURCE
(1) PURs
(2) Creek Walks
(3) Additional Monitoring (upstream/ + frequency)
(4) Special Studies

OUTREACH
(1) County grower meetings
(2) Site subwatershed grower meetings
(3) Grower Group contacts
(4) Individual contacts

EVALUATION OF MANAGEMENT PRACTICES
(1) Meeting participation
(2) Normal monitoring*
(3) Additional monitoring (+1 time/month)
(4) Additional monitoring (+ additional locations)
(5) Additional monitoring, special study



*Normal monitoring will occur if the location and constituent is part of the Core or Assessment Monitoring schedule.

PRIORITY-SPECIFIC MANAGEMENT GOALS AND PLANS

The prioritization of constituents and site subwatersheds is described in detail in the ESJWQC Management Plan (submitted on September 30, 2008). Figure 3 includes actions at each tier and priority levels for sourcing, outreach and evaluation. The overall Management Plan process from year to year is outlined in Figure 2 and described in the section Management Plan Process. Actions listed in Figure 3 are a guideline by which the Coalition will base its actions. The specific actions will be addressed in the individual Site Subwatershed Management Plans and the Coalition may chose to undertake more actions than are listed based on the magnitude and frequency of exceedances.

During the irrigation season of 2007 and 2008 the Coalition conducted monitoring on additional dates or upstream monitoring for all management plan sites/constituents following the process outlined in Figure 2 and 3. In high priority subwatersheds, grower group and individual contacts were initiated during 2008/2009 and will continue into 2010 using sourcing information obtained from Management Plan Monitoring data and PUR information.

The Coalition began monitoring in October 2008 under a new Monitoring and Reporting Program Plan (MRPP) to meet the requirements of the ILRP Monitoring and Reporting Program Order No. R5-2008-0005 (MRP) for Coalition Groups. Under the new MRPP, the Coalition's monitoring program includes six Core and six Assessment Monitoring locations with Assessment Monitoring locations rotating every two years. Therefore not all past monitoring locations are currently being monitored by the Coalition.

During the 2009 irrigation and storm season, the Coalition will focus on high priority subwatersheds including Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing in its strategy for outreach and Management Plan Monitoring. The Coalition will continue to monitor for high priority constituents during months where exceedances have occurred at Cottonwood Creek @ Rd 20, Duck Slough (Gurr Rd and Hwy 99), Highline Canal (Lombardy and 99), Hilmar Drain @ Central Ave which are the next set of sites that will be prioritized by the Coalition in 2010. In addition to these sites, the Coalition will also continue monitoring at Mustang Creek, Merced River, Miles Creek and Deadman Creek (Gurr and 59) for high priority constituents. A detailed Management Plan Monitoring schedule is included in the following section.

MANAGEMENT PLAN SCHEDULES

Management Plan Development Timelines

The ESJWQC Management Plan submitted on September 30, 2008 included monitoring results from 2004 through September 2007. This update includes monitoring results through December 2008.

In the Management Plan addendum submitted on November 24, 2008 the Coalition submitted a proposed schedule for addressing each site subwatershed within the Management Plan with a prioritization approach. This table has been updated below (Table 6).

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

Site Subwatershed Name	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
Hilmar Drain @ Central Ave	2010-2012
Ash Slough @ Ave 21	2011-2013
Berenda Slough along Ave 18 1/2	2011-2013
Dry Creek @ Rd 18	2011-2013
Livingston Drain @ Robin Ave	2011-2013
Bear Creek @ Kibby Rd	2012-2014
Black Rascal Creek @ Yosemite Rd	2012-2014
Deadman Creak @ Hwy 59	2012-2014
Deadman Creek (Dutchman) @ Gurr Rd	2012-2014
Hatch Drain @ Tuolumne Rd	2013-2015
Highline Canal @ Lombardy Rd	2013-2015
Merced River @ Santa Fe	2013-2015
Miles Creek @ Reilly Rd	2013-2015
Mustang Creek @ East Ave	2014-2016
Silva Drain @ Meadow Dr	2014-2016
South Slough @ Quinley Rd	2014-2016
Westport Drain @ Vivian Rd	2014-2016
Re-evaluate All Site Subwatersheds and Revise Schedule	**Annually**

Management Plan Performance Goals and Schedules

Management Plan Sampling Schedule

2008 Management Plan sampling was conducted as outlined in the ESJWQC Management Plan submitted on September 30, 2008. Either monitoring on additional dates or upstream Management Plan sampling was conducted based on site subwatershed exceedances, exceedance prioritization and Management Plan tier level. All 2008 Management Plan sampling locations are included in Table 7. All results from Management Plan and normal monitoring were included in the ESJWQC Semi Annual Monitoring Report submitted on March 1, 2009. Results from Management Plan sampling are included below in Table 8.

As described in the section Priority Specific Management Goals and Plans, the Coalition will be focusing on high priority subwatersheds during the irrigation and storm seasons of 2009/2010. Dry Creek @ Wellsford, Duck Slough @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd will be monitored for priority constituents during month in which exceedances have occurred (Table 9). In addition the Coalition will continue to monitor for high priority constituents during months where exceedances have occurred at sites the will be prioritized starting in 2010 (Table 6) and four other water bodies that were selected due to their relation to downstream sites (Mustang Creek), level of exceedances (Miles Creek and Deadman Creek) and importance in the Coalition area (Merced River). Table 9 includes all sites, months and constituents that will be sampled for high priority Management Plan constituents. The sampling schedule includes two rounds of Management Plan sampling: 2009/2010 for prioritized sites and 2010/2011 for the rest of the sites not sampled in 2009/2010.

Table 7. 2008 Management Plan sampling locations.

Zone*	Management Plan Site Name	Upstream Site Name	Station Code	Latitude	Longitude
6	Ash Slough @ Ave 21		545XASAAT	37.0545	-120.4158
4	Bear Creek @ Kibby Rd		535XBCAKR	37.3128	-120.4138
6	Berenda Slough along Ave 18 1/2		545XBSAAE	37.0182	-120.3265
		Berenda Slough @ Rd 19	545XBSARN	37.1214	-120.2021
4	Black Rascal Creek @ Yosemite Rd		535BRCAYR	37.3321	-120.3947
6	Cottonwood Creek @ Rd 20		545XCCART	36.8686	-120.1818
		Cottonwood Creek @ Hwy 145	545XCCAHO	36.9002	-120.0555
5	Deadman Creek @ Gurr Rd		535XDCAGR	37.1936	-120.5612
5	Deadman Creek @ Hwy 59		535DMCAHF	37.1981	-120.4869
6	Dry Creek @ Rd 18		545XDCARE	36.9818	-120.2195
		Dry Creek @ Rd 22	545XDCART	37.0057	-120.1471
		Dry Creek @ Rd 28 1/2	545XDCATE	37.0679	-120.0292
1	Dry Creek @ Wellsford Rd		535XDCAWR	37.6602	-120.8743
		Dry Creek @ Waterford Rd	535XDCWF	37.6588	-120.7789
5	Duck Slough @ Gurr Rd		535XDSAGR	37.2142	-120.5596
		Duck Slough @ Hwy 59	535XDSHFN	37.2345	-120.4881
		North Slough @ Hwy 59	535XNSHFN	37.2277	-120.4880
5	Duck Slough @ Hwy 99		535XDSAHN	37.2501	-120.4100
		Duck Slough @ Whealan Rd	535XDSAWH	37.2615	-120.3433
2	Hatch Drain @ Tuolumne Rd		535XHDATR	37.5149	-121.0122
3	Highline Canal @ Hwy 99		535XHCHNN	37.4153	-120.7557
3	Highline Canal @ Lombardy Ave		535XHCHNN	37.4556	-120.7207
2	Hilmar Drain @ Central Ave		535XHDACA	37.3906	-120.9582
		Reclamation Drain @ Williams Ave	535XRDAWA	37.3907	-120.9409
		Hilmar Drain @ Mitchell Rd	535XHDAMR	37.3907	-120.9409
4	Livingston Drain @ Robin Ave		535XLDARA	37.3169	-120.7423
4	Merced River @ Santa Fe		535XMRSFD	37.4271	-120.6721
5	Miles Creek @ Reilly Rd		535XMCARR	37.2582	-120.4755
3	Mustang Creek @ East Ave		535XMCAEA	37.4918	-120.6839
2	Prairie Flower Drain @ Crows Landing Rd		535XPFDCL	37.4422	-121.0024
		Prairie Flower Drain @ Morgan Ave	535XPFDMR	37.4379	-120.9757
4	Silva Drain @ Meadow Dr		535XSDAMD	37.4291	-120.6261
4	South Slough @ Quinley Rd		535XSSAQR	37.2699	-120.5971
2	Westport Drain @ Vivian Rd		535XWDAVR	37.5368	-121.0486

*The ESJWQC MRPP submitted on August 25, 2008 includes a complete description of each zone

Table 8. 2008 Management Plan sampling results.

A = additional monitoring; U = upstream monitoring.

Sample Site	Sample Date	Type	Ammonia as N, mg/L	Chlorpyrifos, µg/L	Copper, µg/L	Diuron, µg/L	Nitrate as N, mg/L	Pimephales promelas, % Control	Selenastrum capricornutum, % Control	Ceriodaphnia dubia, % Control
Deadman Creek @ Gurr Rd	4/22/2008	A			4.2					
Prairie Flower Drain at Morgan	4/22/2008	U					35			
Dry Creek at Road 22	4/29/2008	U		<0.003	5.2					
Duck Slough @ Whealan Rd	4/29/2008	U			3.5					
Hilmar Drain @ Central Ave	4/29/2008	A				3.4				
Highline Canal @ Hwy 99	4/29/2008	A			1.4					
Ash Slough @ Ave 21	5/7/2008	A			Dry					
Black Rascal Creek @ Yosemite Rd	5/7/2008	A		<0.003						100, NSG
Highline Canal @ Lombardy Rd	5/7/2008	A			1.7					
Highline Canal @ Hwy 99	5/7/2008	A								100, NSG
Livingston Drain @ Robin Ave	5/7/2008	A			6.9					
Bear Creek @ Kibby Rd	5/7/2008	A		<0.003						100, NSG
Miles Creek @ Reilly Rd	5/7/2008	A			3					
Prairie Flower Drain at Morgan	5/20/2008	U					22			
Deadman Creek @ Gurr Rd	5/20/2008	A			6.2			100, NSG		
Cottonwood Creek at Highway 145	5/27/2008	U			2.4					
Duck Slough @ Whealan Rd	5/27/2008	U		<0.003						
Dry Creek at Road 22	5/27/2008	U			5.7					
Berenda Slough @ Rd 19	5/27/2008	U							Dry	
Ash Slough @ Ave 21	6/3/2008	A			Dry					
Miles Creek @ Reilly Rd	6/3/2008	A			4.2					
Livingston Drain @ Robin Ave	6/3/2008	A			9.2					
Hilmar Drain @ Central Ave	6/3/2008	A				<0.2				
Highline Canal @ Hwy 99	6/3/2008	A			1.5					
Highline Canal @ Lombardy Rd	6/3/2008	A								100, NSG
Deadman Creek @ Gurr Rd	6/17/2008	A						102.6, NSG		
Prairie Flower Drain at Morgan	6/17/2008	U					30			
Duck Slough @ Whealan Rd	6/24/2008	U			73					
Cottonwood Creek at Highway 145	6/24/2008	U			39					
Duck Slough @ Hwy 59	6/24/2008	U			12					

Sample Site	Sample Date	Type	Ammonia as N, mg/L	Chlorpyrifos, µg/L	Copper, µg/L	Diuron, µg/L	Nitrate as N, mg/L	Pimephales promelas, % Control	Selenastrum capricornutum, % Control	Ceriodaphnia dubia, % Control
Dry Creek at Road 22	6/24/2008	U			6.5					
Ash Slough @ Ave 21	7/8/2008	A		Dry	Dry					
Highline Canal @ Hwy 99	7/8/2008	A		<0.003	1.7					
Bear Creek @ Kibby Rd	7/8/2008	A		<0.003						95, NSG
Black Rascal Creek @ Yosemite Rd	7/8/2008	A		<0.003						100, NSG
Livingston Drain @ Robin Ave	7/8/2008	A			110					
Merced River @ Santa Fe Dr	7/8/2008	A								100, NSG
Silva Drain @ Meadow Dr	7/8/2008	A		<0.003						
Highline Canal @ Lombardy Rd	7/8/2008	A		<0.003						
Dry Creek at Waterford	7/22/2008	U		0.02						
Reclamation Drain @ Williams Ave	7/22/2008	U	0.2		10		2.6		108, NSG	
Prairie Flower Drain at Morgan	7/22/2008	U					0.053	100, NSG		
Hilmar Drain @ Mitchell Rd	7/22/2008	U	<0.05		5.5		28		70, SL	
Duck Slough @ Whealan Rd	7/29/2008	U		0.0081	3					
Berenda Slough @ Rd 19	7/29/2008	U		<0.003					283, NSG	
Duck Slough @ Hwy 59	7/29/2008	U			18				271, NSG	
Cottonwood Creek at Highway 145	7/29/2008	U			2.3					
Dry Creek @ Rd 28 1/2	7/29/2008	U			5.3					
Dry Creek at Road 22	7/29/2008	U		<0.003	7					
North Slough @ Hwy 59	7/29/2008	U			Dry				Dry	
Ash Slough @ Ave 21	8/5/2008	A		Dry	Dry					
Deadman Creek @ Hwy 59	8/5/2008	A		0.14						
Silva Drain @ Meadow Dr	8/5/2008	A		0.021						
Black Rascal Creek @ Yosemite Rd	8/5/2008	A		<0.003						100, NSG
Highline Canal @ Lombardy Rd	8/5/2008	A							160, NSG	
Merced River @ Santa Fe Dr	8/5/2008	A								100, NSG
Miles Creek @ Reilly Rd	8/5/2008	A			4.2					
Highline Canal @ Hwy 99	8/5/2008	A			1.6					
Dry Creek at Waterford	8/19/2008	U		0.023						
Prairie Flower Drain at Morgan	8/19/2008	U		<0.003			20			
Cottonwood Creek at Highway 145	8/26/2008	U			2.1					
Dry Creek at Road 22	8/26/2008	U			6.5					
Duck Slough @ Whealan Rd	8/26/2008	U			3.4					
Ash Slough @ Ave 21	9/9/2008	A			Dry					

Sample Site	Sample Date	Type	Ammonia as N, mg/L	Chlorpyrifos, µg/L	Copper, µg/L	Diuron, µg/L	Nitrate as N, mg/L	Pimephales promelas, % Control	Selenastrum capricornutum, % Control	Ceriodaphnia dubia, % Control
Deadman Creek @ Hwy 59	9/9/2008	A		0.069						
Black Rascal Creek @ Yosemite Rd	9/9/2008	A		<0.003						
Highline Canal @ Hwy 99	9/9/2008	A								100, NSG
Highline Canal @ Lombardy Rd	9/9/2008	A								100, NSG
Livingston Drain @ Robin Ave	9/9/2008	A			5.3					
Dry Creek @ Waterford Rd	9/23/2008	U		<0.003						100, NSG
Prairie Flower Drain @ Morgan Rd	9/23/2008	U		<0.003			29			100, NSG
Berenda Slough @ Rd 19	9/30/2008	U		Dry						
Dry Creek @ Rd 28 1/2	9/30/2008	U			Dry					
Cottonwood Creek at Highway 145	9/30/2008	U			Dry					
North Slough @ Hwy 59	9/30/2008	U							Dry	
Dry Creek at Road 22	9/30/2008	U			36					
Duck Slough @ Hwy 59	9/30/2008	U							131, NSG	
Duck Slough @ Whealan Rd	9/30/2008	U			3.7					

NSG – not significantly different from the control, greater than 80% of the control; SL – significantly different from the control, less than 80% of the control.

Table 9. 2009-2011 Management Plan sampling schedule.

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

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Simazine
Dry Creek @ Oakdale Rd (upstream of Merced River)	2009	December				X	
Merced River @ Santa Fe Dr	2009	December				X	
Cottonwood Creek @ Rd 20	2010	January				X	
Deadman Creek @ Gurr Rd*	2010	January		X	X		
Deadman Creek @ Hwy 59	2010	January		X			
Dry Creek @ Oakdale Rd (upstream of Merced River)	2010	January	X			X	
Duck Slough @ Gurr Rd	2010	January			X		
Highline Canal @ Hwy 99	2010	January		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	
Deadman Creek @ Gurr Rd*	2010	February		X	X		
Dry Creek @ Wellsford Rd	2010	February		X	X		
Duck Slough @ Gurr Rd	2010	February			X		
Highline Canal @ Hwy 99	2010	February		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			
Second Round of Management Plan Monitoring (not sampled in 2009/2010)							
Hatch Drain @ Tuolumne Rd	2010	April		X			
Livingston Drain @ Robin Ave	2010	April		X			
Westport Drain @ Vivian Rd	2010	April		X			
Hatch Drain @ Tuolumne Rd	2010	May		X			
Livingston Drain @ Robin Ave	2010	May		X			
Livingston Drain @ Robin Ave	2010	June			X	X	
Silva Drain @ Meadow Dr	2010	June			X		
Hatch Drain @ Tuolumne Rd	2010	July		X			

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Simazine
Livingston Drain @ Robin Ave	2010	July			X	X	
Silva Drain @ Meadow Dr	2010	July	X			X	
South Slough @ Quinley Rd	2010	July				X	
Westport Drain @ Vivian Rd	2010	July				X	
Bear Creek @ Kibby Rd	2010	August			X		
Hatch Drain @ Tuolumne Rd	2010	August		X			
Silva Drain @ Meadow Dr	2010	August	X		X	X	
Silva Drain @ Meadow Dr	2010	September			X		
Bear Creek @ Kibby Rd	2011	January			X		
Dry Creek @ Rd 18	2011	January		X		X	
Hatch Drain @ Tuolumne Rd	2011	January		X			
Livingston Drain @ Robin Ave	2011	January		X	X	X	
Bear Creek @ Kibby Rd	2011	February			X		
Dry Creek @ Rd 18	2011	February		X		X	
Hatch Drain @ Tuolumne Rd	2011	February		X			
Livingston Drain @ Robin Ave	2011	February		X	X	X	
Westport Drain @ Vivian Rd	2011	February		X			

*Assessment site October 2008-December 2010; Assessment sites are monitored for all constituents once per month.

Management Practice Identification, Evaluation, and Outreach

Each year exceedances are identified and the source of the exceedance is investigated using one or more of the following: PURs, TIEs, past applications (when a pesticide causes an exceedance), and additional monitoring. Table 10 outlines the site subwatershed by tier level and for each lists the priority level and Coalition actions that will be performed in 2009/2010. South Slough is not included in this table since the Coalition is in discussion to remove this site from the ESJWQC MRPP due to a lack of drainage.

The Coalition uses various surveys to understand current management practices implemented within the subwatershed region and to evaluate changes in practices and effectiveness of both current and new practices on water quality. The Coalition will use three types of surveys: general surveys, grower group surveys and individual surveys. The general survey was mailed to all members within the subwatershed area. Returned surveys were entered into an Access database and are being linked to member information. The difficulty of using general surveys is that a single grower may fill out a survey for each parcel that he/she manages or they may fill out one survey for multiple parcels in multiple subwatersheds

General Survey

The ESJWQC General Survey is a requirement for all members to submit to be considered an active member. This survey is used as a baseline assessment of overall Coalition management practices. The Coalition has linked surveys with individual parcels and conducted an analysis of management practices (as indicated by survey results) for all site subwatersheds. This analysis was submitted on January 30, 2009 in the General Survey Summary Report. The Coalition has previously summarized the results of the surveys by site subwatershed however this analysis allows the Coalition to evaluate management practices on a parcel level.

Grower Group Survey

The Grower Group Survey was handed out at a grower meeting on March 26, 2009 for the Duck Slough site subwatershed. There are 88 members within this site subwatershed all of which were contacted by mail regarding this meeting. Of the 88 members there were 22 attendees representing 6,787 acres (40% of the member acreage). This group meeting was set up to address member and growers within the Duck Slough priority subwatershed to discuss water quality exceedances and management practices. Future group meetings could include growers of specific crops (row crops, grapes, orchards) and/or groups who use specific types of pesticides (e.g. organophosphates, herbicides, pyrethroids). These surveys will be included with meeting handouts and will assess whether a member has already completed a general survey and whether they are interested in having a Coalition representative contact them to do an on-site assessment of their current management practices.

Individual Grower Meetings (Checklist)

The Individual Grower Checklist will be filled out by a Coalition representative while interviewing growers during meetings with individual growers in high priority subwatersheds. These growers are identified and contacted based on the following criteria:

- operating within a high priority management plan subwatershed,
- identified as applying a chemical or discharging excessive sediment that is associated with a water quality exceedance,
- active member of the Coalition,
- close proximity to the watershed that could result in discharge of agricultural drain water or spray drift into the waterway.

The goal of individual grower meetings is to obtain information about current management practices from growers that have applied chemicals at times coinciding with water quality exceedances of that chemical. The checklists were updated since the ESJWQC Management Plan submittal on September 30, 2008 and an example checklist packet is included in Appendix I.

In January – March of 2009, ESJWQC representatives met with 7 of 25 targeted growers within the Dry Creek @ Wellsford site subwatershed representing 4,313 of 6,510 targeted acres (66% of targeted acreage). Individual checklists were completed and entered into an Access database. The Coalition plans to continue meeting with individuals within Dry Creek as well as begin meeting with growers within the Duck Slough site subwatershed during 2009. Although costly to conduct individual interviews, the Coalition has been able to discuss site specific management practice strategies and believes that growers are receptive to increasing management practices to eliminate water quality exceedances. Coalition representatives are finding growers to be receptive to modifying management practice to mitigate water quality exceedances. The Coalition has been able to develop a database to track the survey responses and will continue to compile the information during the next year.

Table 10. A list of site subwatershed tiers and corresponding level of actions for 2009.

Some site subwatersheds are in both Tier 1 and Tier 2 for different constituents.

				Sourcing			Outreach			Evaluation		
	Priority	PUR Data	Creek Walk*	Additional / Upstream Monitoring	Special Studies	County Grower Meetings	Site Subwatershed Grower Meetings	Grower Group Contacts	Individual Contacts	Meeting Participation	Normal Monitoring	Additional / Upstream / Special Study
Tier 1 Subwatersheds												
Ash Slough	B	x				x	x			x	x	
Bear Creek	A	x				x	x			x		
Black Rascal	A	x				x	x			x		
Cottonwood Creek	C	x	x	x		x	x			x	x	x
Deadman Creek @ Gurr Rd	D	x		x		x	x			x	x	x
Deadman Creek @ Hwy 59	C	x		x		x	x			x		x
Dry Creek @ Rd 18	E	x				x	x			x		
Dry Creek @ Wellsford	C	x	x	x		x	x	x	x	x	x	x
Duck Slough @ Gurr Rd	E	x	x	x		x	x			x	x	x
Duck Slough @ Hwy 99	C	x	x	x		x	x	x	x	x		x
Hatch Drain	D	x				x	x			x		
Highline Canal @ Hwy 99	D	x		x		x	x			x	x	x
Highline Canal @ Lombardy Rd	D	x		x		x	x			x		x
Hilmar Drain	C	x		x		x	x			x		x
Lateral 2 ½	E	x				x	x			x	x	
Livingston Drain	C	x				x	x			x		
Merced River	C	x		x		x	x			x	x	x
Miles Creek	C	x		x		x	x			x		x
Mootz Drain	C	x				x	x			x	x	
Mustang Creek	C	x		x		x	x			x		x
Prairie Flower Drain	D	x	x	x		x	x	x	x	x	x	x
Silva Drain	C	x				x	x			x		
Westport Drain @ Vivian Rd	C	x				x	x			x		
Tier 2 Subwatersheds												
Bear Creek	E	x				x	x			x		
Berenda Slough	B	x				x	x			x		
Black Rascal	E	x				x	x			x		
Cottonwood Creek	C	x	x	x		x	x			x	x	x
Deadman Creek @ Gurr Rd	C	x		x		x	x			x	x	x
Deadman Creek @ Hwy 59	A	x		x		x	x			x		x
Dry Creek @ Rd 18	A	x				x	x			x		
Dry Creek @ Wellsford	A	x	x	x		x	x	x	x	x	x	x
Duck Slough @ Gurr Rd	C	x	x	x		x	x			x	x	x
Duck Slough @ Hwy 99	A	x	x	x		x	x	x	x	x		x
Hatch Drain	E	x				x	x			x		
Highline Canal @ Lombardy Rd	A	x		x		x	x			x		x
Highline Canal @ Hwy 99	A	x		x		x	x			x	x	x
Hilmar Drain	C	x		x		x	x			x		x
Livingston Drain	C	x				x	x			x		
Merced River	D	x		x		x	x			x	x	x
Miles Creek	C	x		x		x	x			x		x
Mustang Creek	A	x		x		x	x			x		x

				Sourcing			Outreach			Evaluation		
	Priority	PUR Data	Creek Walk*	Additional / Upstream Monitoring	Special Studies	County Grower Meetings	Site Subwatershed Grower Meetings	Grower Group Contacts	Individual Contacts	Meeting Participation	Normal Monitoring	Additional / Upstream / Special Study
Prairie Flower Drain	A	x	x	x		x	x	x	x	x	x	x
Silva Drain	A	x				x	x			x		x
Westport Drain @ Vivian Rd	E	x				x	x			x		x

*Creek Walks are only conducted once; an "X" indicates that the creek walk has either been conducted or is planned to be conducted in the upcoming year.

Table 11. Management Plan sourcing, outreach and evaluation schedule (refer to Figure 3 for tier information).

Action	Description	When
SOURCING		
(1) PUR data	Request pesticide use information from County Agricultural Commissioners to identify specific problem applications.	Standing requests with Ag Commissioners to receive data as soon as possible.
(2) Creek Walks	County Agricultural Commissioner staff will walk creeks of high priority and document pipe inputs from fields and residences. Pipes will be documented with photos and GPS.	The Stanislaus Agricultural Commissioner walked Prairie Flower Drain and Dry Creek @ Wellsford subwatersheds in November and December of 2007. New creek walks depend on contracts between the ESJWQC and Ag Commissioners however it is anticipated that Cottonwood Creek and Duck Slough will be walked in 2009.
(3) Additional Monitoring	Additional monitoring conducted for specific constituents (Priority A-C) during months where exceedances have occurred at sites that are not currently monitored under the 2008 MRPP.	Sampling will be conducted in prioritized sites for high priority constituents during irrigation and storm months when past exceedances have occurred.
(4) Special Studies	Special studies will occur when additional information about potential sources needs to be obtained beyond the additional monitoring.	Will be specific to the situation. Currently, no special studies are planned.
OUTREACH		
(1) County grower meetings and (2) site subwatershed grower meetings	Hold meetings for growers in the subwatershed to discuss management practices that can be used to eliminate exceedances and to encourage implementation of new management practices. Provide monitoring results to growers to inform farmers, landowners and/or stakeholders about water quality problems.	Between each growing season (storm and irrigation).
(3) Grower group meetings	Provide information and outreach materials about management practices that could be used by growers to reduce the impact of agriculture on water quality specific to a group of growers (i.e walnut or alfafa growers).	Between each growing season (storm and irrigation) and as needed.
(4) Individual contacts	Conduct individual interviews with farmers, landowners and/or stakeholders to discuss water quality issues, current management practices and recommended management practices to improve water quality.	Winter/Spring (November to June).
EVALUATION		

Action	Description	When
(1) Meeting participation	Assess effectiveness of Coalition meetings by tracking attendance, documenting management practice implementation and monitoring water quality exceedances. Document where and when management practices have been implemented in order to track effects on water quality at relevant monitoring sites through individual grower meetings.	Annually in Management Plan updates.
(2) Normal monitoring	Normal monitoring at Core and Assessment Monitoring locations as part of the ESJWQC MRPP submitted in 2008. Not all sites will be monitored under the 2008 MRPP. These results will supplement additional monitoring conducted under the Management Plan.	Once a month, every month of the year.
(3) Additional Monitoring (sites not included in current MRPP)	Additional monitoring conducted for specific constituents (Priority A-C) during months where previous exceedances have occurred at sites that are not currently monitored under the 2008 MRPP. Results will be used to evaluate improvements in water quality.	Sampling will be conducted in prioritized sites for high priority constituents during irrigation and storm months when past exceedances have occurred.
(4) Additional Monitoring (+additional locations)	Additional monitoring conducted for specific constituents (Priority A-C) during months where previous exceedances have occurred at locations upstream of the site under the Management Plan. Upstream sampling results will be used to evaluate improvements in water quality.	Upstream monitoring will occur in two subwatersheds, Dry Creek and Merced River, during months when past exceedances occurred.
(5) Additional Monitoring (special study)	Additional monitoring for special studies will be done to evaluate specific management practice effectiveness.	No special studies are planned at this time.

Table 12. Management Plan tracking schedule.

Priority Subwatershed Evaluation of Management Practices	Dry Creek @ Wellsford Rd	Duck Slough @ Hwy 99	Prairie Flower Drain @ Crows Landing Rd
Determine number/type of management practices currently in place.	January 2009	January 2009	January 2009
Group Grower Contacts[1]	NA	March 26, 2009	April 2009
Individual Contacts	February – April 2009	April 2009 – April 2010	April 2009 – April 2010
Implementation of new management practices.	April 2009 – February 2010	April 2009 – April 2011	April 2009 – April 2011
Assess number/type of new management practices implemented.	October 2009 - February 2010	October 2009 - April 2011	October 2009 - April 2011
Evaluate effectiveness of new management practices[2].	April 2009 – February 2011	April 2009 – February 2011	April 2009 – February 2011

[1]Grower Group Contacts are outlined in the Site Subwatershed Management Plans and may not be applicable for all constituents.
[2]Evaluating effectiveness will be dependent on the type of management practice implemented. This is general guideline to be used for practices that can be assessed without special study monitoring.

Table 13. Management Plan implementation schedule for all high priority subwatersheds.

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

Management Practice Performance Goals

The ESJWQC Management Practice Performance Goal, Water Quality Management Practice Performance Goals #1-7 and associated Performance Measures are described in detail in the ESJWQC Management Plan (submitted on September 30, 2008). The Coalition developed a detailed plan of actions to achieve these goals which led to direct outputs and indirect outcomes during 2008/2009. The Water Quality Management Practice Performance Goals and associated Performance Measures, Outputs and Outcomes from 2008/2009 are discussed below.

ESJWQC Management Practice Performance 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.*

Water Quality Management Practice Performance Goal #1: Identify potential sources of exceedances.

Performance Measures

1.1 Continue irrigation and storm monitoring for exceedances at Coalition sites.

1.2 Request pesticide use information from County Agricultural Commissioners.

1.3 Identify applications with the potential to cause toxicity or result in an exceedance of a specific chemical.

2008 Outputs and Outcomes

The Coalition conducted monitoring during the storm and irrigation seasons of 2008 (January – September) under the previous ESJWQC MRPP. Starting in October 2008, monitoring was conducted under the new ESJWQC MRPP submitted on August 25, 2008. During the irrigation season of 2008 monitoring on additional dates and upstream monitoring were conducted to further identify sources of priority constituents (Table 8). Results were discussed in relation to overall Coalition water quality in the March 1, 2009 SAMR and are also discussed in the Site Subwatershed section of the Management Plan for priority subwatersheds.

As presented in the Coalition's Monitoring and Reporting Program Plan, the primary method of source identification is to use the pesticide use reports (PURs) filed with each County Agricultural Commissioner. The Coalition continues to use PUR reports to associate water quality exceedances with specific applications so that problem applications can be identified. This has also created an avenue to target outreach toward particular landowners or application events. PUR data are included with each SAMR and will be included in future Annual Monitoring Reports (AMRs). In addition, for

priority subwatersheds, additional analysis of PUR data is evaluated in this Management Plan update (see the Site Subwatershed section).

2009 Strategy
The Coalition plans to proceed with normal monitoring as outlined in the most recent ESJWQC MRPP and any additional Management Plan monitoring as outlined in this document. In addition, the Coalition will continue to obtain and associate PUR data with particular exceedances enabling the Coalition to identify sources of exceedances and then target outreach toward problem applications and/or specific landowners to improve water quality.

Water Quality Management Practice Performance Goal #2: Inform growers with irrigated crop land about water sampling results and obtain information on currently implemented management practices.

Performance Measures

2.1 Provide monitoring results to all Coalition members and other interested parties through the ESJWQC Annual Report.

2.2 Provide monitoring results at annual meetings in the winter of 2008-09.

2.3 Encourage growers to implement new management practices where applicable.

2.4 Document where and when management practices have been implemented in order to track effects on water quality at relevant monitoring sites.

2008 Outputs and Outcomes
Monitoring results from 2008 were made available to Coalition landowners and interested parties in ESJWQC 2008 Annual Report which was distributed to Coalition members at annual meetings and provided in a number of locations including the County Agricultural Commissioner's office. Monitoring results were presented at annual meetings held in Stanislaus, Merced, and Madera Counties on December 16, 17, and 18, 2008, respectively (Table 14).

Annual meetings included discussions and handouts discussing BMPs that could be implemented to reduce and/or eliminate exceedances. The Coalition encourages growers to implement new management practices where applicable through mailings, during general grower meetings, and while making individual contact with growers. Specific examples of this outreach are found in both Table 14 (July 1, 2008, mid-July, and October 2, 2008 mailings) and Table 15 (February 29, June 18, October 21, October 28, November 4, November 12, and November 20, 2008, and February 5, February 9, March 2, March 4, March 23, and March 26, 2009 meetings). Table 16 includes a list of the individual contacts where Coalition representatives discussed exceedances and encouraged implementation of management practices.

To facilitate tracking of management practice implementation, the Coalition submitted an ESJWQC General Survey Summary Report (submitted January 30, 2009) to establish a baseline of management practices. The baseline can be used to evaluate any new management practice implementation.

2009 Strategy

The Coalition initiated individual contacts within the Dry Creek @ Wellsford site subwatershed and will begin making individual contacts in the Duck Slough subwatershed in 2009. During the contacts, the Coalition evaluates the current management practices on the grower's parcels and discusses additional management practices that may be employed. The Coalition records all information on a checklist (see Appendix I) including practices that may be employed in the next year. The Coalition plans to contact the growers in one to two years later to determine which practices were implemented. All information will be tracked in an Access database and summarized in the Management Plan yearly updates.

Water Quality Management Practice Performance Goal #3: Conduct meetings in Coalition counties to provide growers with information on management practices to address toxicity or exceedances of water quality standards found in sampling results.

Performance Measures

3.1 Hold meetings for growers to discuss management practices that can be used to eliminate exceedances.

3.2 When available, provide information on the results of the management practices studies (described below).

3.3 Assess effectiveness of Coalition meetings by tracking attendance, documenting management practice implementation and monitoring water quality exceedances

2008 Outputs and Outcomes

Results and exceedances are communicated to growers through Coalition mailings, including the annual report, and at site subwatershed grower meetings. Local workshops are organized for the subwatershed to inform growers when and where toxicity or exceedances occur. Prior to those meetings landowners and operators (both coalition members and non members) are contacted by the Coalition by mail about the specific exceedances in their site subwatershed. During a typical meeting, the Coalition reviews results of local watershed exceedances and Management Plan constituents as well as discusses BMPs. Coalition representatives present results of management practice studies, provide relevant handouts, pamphlets, and other useful information. Table 14 lists grower meetings notifications (May 12, July 1, and October 29, 2008, and March 10, 2009) and Table 15 describes each meeting in detail (February 29, June 18, November 12, and November 20, 2008, and February 5, February 9, March 2, March 4, March 10, March 23, and March 26, 2009). The Coalition records attendance at

meetings, hands out grower group surveys, and, coupled with continued monitoring, will be able to gauge the Coalition's effectiveness of outreach. Coalition strategies can then be shaped around these results.

2009 Strategy

The Coalition will continue to conduct annual grower meetings, grower group meetings and individual contacts during the spring and fall of 2009. The Coalition conducted a grower group meeting on March 26, 2009 for the Duck Slough subwatershed. Attendees represented 40% of the member acreage within that subwatershed. The Coalition will follow up with individual contacts based on priority members who are located near waterways and use products of concern based on past exceedances. In addition, the Coalition will continue to conduct grower group and county meetings to inform growers of current water quality exceedances.

Water Quality Management Practice Performance Goal #4: Provide support to growers to implement management practices that will reduce the impact of discharges from agriculture on water quality.

Performance Measures

4.1 Provide information and outreach materials about Management Practices that could be used by growers to reduce the impact of agriculture on water quality.

4.2 Where general outreach and education efforts do not result in the implementation of effective management practices or improvements in water quality in the subwatershed, growers who have the potential to impact water quality through use of specific pesticides will be contacted individually in order to ensure that management practices are being employed.

2008 Outputs and Outcomes

The Coalition provides information on management practices and other outreach materials at every opportunity. Growers were informed about local exceedances and/or relevant BMPs in almost every notification listed in Table 14. Handouts, pamphlets, and other useful information are made available at every management practice outreach and education meeting, including all general grower meetings, Pest Management Update courses, and Annual Grower Meetings (Tables 15). The BMP Handbook, Management Practices for Protecting Water Quality (binder of BMPs information developed by CURES) is a significant resource for growers and was sent to all Coalition members during October 2008 (Appendix II).

2009 Strategy
As discussed under Performance Goal #2, the Coalition has begun conducting individual contacts within the Dry Creek @ Wellsford site subwatershed (Table 16). These contacts will be followed by contacts within the Duck Slough site subwatershed. The Coalition will follow up with these individuals in a year to assess management practice implementation. In addition, the Coalition will continue to provide information regarding studies and resources to encourage growers to implement additional management practices.

Water Quality Management Practice Performance Goal #5: Perform evaluations of management practices suitable for East San Joaquin Water Quality Coalition irrigated agriculture.

Performance Measures

5.1 Communicate results of management practices efficiency studies to landowners as results become available.

5.2 Monitoring at sites with exceedances will occur after implementation of management practices to evaluate effectiveness within each subwatershed.

2008 Outputs and Outcomes
The Coalition consistently makes results of management practice efficacy studies available to growers through presentations, discussions, and conversations at general and individual grower meetings. Printed explanations, summaries, and supplementary discussions of results are distributed through notifications and at general and individual meetings. The BMP Handbook, Management Practices for Protecting Water Quality, distributed to members in 2008, contains extensive and comprehensive information concerning results of management practices efficiency studies (Table 15, October 2008).

2009 Strategy
Continued monitoring and management practice implementation tracking via surveys and individual contacts enables the Coalition to evaluate its effectiveness within each individual watershed. The Coalition will use information that it obtains during individual contacts in high priority subwatersheds to determine the efficacy of newly implemented management practices on downstream water quality.

The Coalition recently submitted a grant proposal to USDA Agricultural Water Enhancement Program for funding to install BMPs on farms located in subwatersheds in Stanislaus and Merced counties with Management Plans (Table 18). A decision regarding the requested $10 million funding over five years will be made June 15, 2009. This proposal has the potential to bring funding to many farmers who otherwise would

be unable to install structural BMPs such as sediment basins, retention ponds and recirculation systems.

Water Quality Management Practice Performance Goal #6: Work with pesticide retailers and Pest Control Advisors to assist in providing outreach to growers and applicators in the Coalition region.

Performance Measures

6.1 Provide management practice information to growers by working with sales representatives and pest control advisors to promote management practices in the management plan region.

2008 Outputs and Outcomes

The Coalition has been very successful in working with sales representatives and Pest Control Advisors (PCAs) to promote use of management practices when applying the product. Coalition representative Parry Klassen was invited to present at four Pest Management Update Course classes and a CAPCA Continuing Education meeting during which he discussed Coalition results, sprayer calibrations, and organophosphate and pyrethroid use on orchards and row crops, and BMPs for pesticides and nutrients (Table 15, October 7, 21, 28, and November 4, 2008, and February 5, 2009). Additionally, the Pesticide Applicator Professional Association hosted a grower meeting on November 20, 2008 (details in Table 15) and Coalition representatives also met with Helena Chemical Company branch offices located near Modesto and Merced to discuss the Management Plan statuses of local subwatersheds (details in Table 15, February 9 and March 23, 2009).

2009 Strategy

Coalition representatives will continue to meet and work with PCAs during 2009 including attending meetings, offering continuing education credits for attending grower meetings and inviting PCA's to meet with Coalition representatives during individual contacts.

Water Quality Management Practice Performance Goal #7: Anticipate potential water quality problems caused by agricultural inputs.

Performance Measures

7.1 Distribute management practice publications on preventing movement of pyrethroids in irrigation runoff or through drift.

2008 Outputs and Outcomes

The Coalition strived to educate growers about the water quality issues linked to insecticide applications and associated management practices by distributing and/or

making available publications and other information through mailings, in notifications, and at grower meetings. In particular, notifications on October 2 and December 3, 2008 (Table 14) and meetings on October 28, November 4, and November 20, 2008, and February 5, 2009 (Table 15) were specifically geared toward addressing pyrethroids in irrigation runoff and drift that could cause sediment toxicity.

2009 Strategy

The Coalition plans to continue with efforts to make available and distribute information regarding pyrethroids in irrigation runoff and drift including member mailings and hosting BMP information on the ESJWQC website.

SUMMARY OF COALITION OUTREACH ACTIVITIES

The SAMR submitted on June 30, 2008 and March 1, 2009 included information on Coalition activities, events and deliverables that occurred during the 2008 storm and irrigation monitoring season, respectively, including all exceedance and communication reports delivered to the Regional Board staff. Below is a summary of those activities, events and deliverables from January 2008 to March 2009. Coalition activities are categorized into grower notification (Table 14), management practice outreach and education (Table 15), management practice tracking and implementation (Table 16), general survey status (Table 17), and collaborations and special studies (Table 18).

Table 14. ESJWQC actions and deliverables dealing with grower notification of exceedances and management practices relevant to 2008 monitoring.

Grower Notification				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
February 4, 2008	Merced, Madera and Fresno Counties	Article discussing toxicity in Merced River published in Merced Sun Star newspaper.	Chlorpyrifos, toxicity	Parry Klassen
May 12, 2008	Dry Creek, Hatch Drain, Westport Drain, and Prairie Flower Drain subwatersheds	Mailing to 27 members and non-members with identified drains announcing a grower meeting on June 18, 2008 and notifying growers that permission has been obtained to "walk the creeks" and map locations of drainage into waterways.	All	Parry Klassen
July 1, 2008	Almond and alfalfa growers in all counties	Mailing to almonds and/or alfalfa growing Coalition members in subwatersheds with chlorpyrifos exceedances during the 2007 irrigation season. Mailing included list of crop specific BMPs that could be used when applying chlorpyrifos	Chlorpyrifos	Parry Klassen
Mid-July	All	Mailing of Watershed Coalition News (newsletter) to 6,500 growers containing ESJWQC sponsored article on chlorpyrifos exceedances and BMPs to reduce discharge and/or spray drift.	Chlorpyrifos and all applied pesticides	Parry Klassen
October 2, 2008	All	Mailing to announce NRCS Funds are available.	Pesticides	Parry Klassen

Grower Notification				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
October 29, 2008	Dry Creek @ Wellsford subwatershed	Mailing to all 118 members within Dry Creek subwatershed to announce grower meeting on November 14, 2008; included cover letter, agenda, survey (if outstanding), and exceedances chart for all years and seasons.	All Constituents	Parry Klassen
December 3, 2008	All	Mailing to all growers announcing a deadline extension for membership renewal and the 2008 Annual Meetings.	All	Parry Klassen
March 10, 2009	Duck Slough site subwatershed	Mailing to 88 members on Duck Slough to announce grower meeting for the Duck Slough/Mariposa Creek Watershed on March 26, 2009 to discuss recently approved MP for Duck Slough. Mailing included letter, meeting agenda, BMP survey (if outstanding), and exceedance chart.	All	Parry Klassen, Wayne Zipser

Table 15. ESJWQC actions and deliverables pertaining to BMP outreach and education to address exceedances and management practices relevant to 2008 monitoring.

Management Practice Outreach and Education				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
February 29, 2008	Merced	Meeting with growers regarding toxicity experienced in Merced River; discussed Coalition member responsibilities and program enforcement; 13,264 letters distributed.	Chlorpyrifos, toxicity	Parry Klassen, MLJ-LLC, CVRWQCB
June 18, 2008	Stanislaus	Grower meeting at Farm Bureau inviting all direct dischargers (identified in creek walks) in the upstream subwatershed to discuss compliance with ILRP.	All Constituents	Parry Klassen, Mike Johnson
October, 2008	All	BMP Handbook: Management Practices for Protecting Water Quality (binder of information on BMPs) sent out to all Coalition members. Developed by CURES, funded by Westside Coalition Prop 50 grant.	All Constituents	Parry Klassen
October 7, 2008	Merced	Merced Community College Pest Management Update Course: grower, PCA meeting to discuss Coalition results.	All Constituents	Parry Klassen

Management Practice Outreach and Education				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
October 21, 2008	Merced	Merced Community College Pest Management Update Course: grower, PCA meeting to discuss sprayer calibrations.	All Constituents	Parry Klassen
October 28, 2008	Merced	Merced Community College Pest Management Update Course: grower, PCA meeting to discuss organophosphates and pyrethroids relating to orchards.	Organophosphates, pyrethroids	Parry Klassen
November 4, 2008	Merced	Merced Community College Pest Management Update Course: grower, PCA meeting to discuss organophosphates and pyrethroids relating to row crops.	Organophosphates, pyrethroids	Parry Klassen
November 12, 2008	Dry Creek @ Wellsford subwatershed	Meeting with Dry Creek growers in Modesto regarding water quality exceedances, Management Plan requirements and management practices to reduce agricultural discharge.	All Constituents	Parry Klassen, MLJ-LLC
November 20, 2008	Modesto	Pesticide Applicator Professional Association grower meeting to discuss Stanislaus County coalition results, BMPs for Ops and pyrethroids.	Organophosphates, pyrethroids	Parry Klassen
December 16, 2008	Stanislaus County	2008 Annual Growers Meeting: discussed ESJ Coalition activities, 2008 monitoring results, priority management plans specifically pesticides drive water quality challenge, and filled out BMP surveys.	All Constituents	Parry Klassen, MLJ-LLC
December 17, 2008	Merced County	2008 Annual Growers Meeting: discussed ESJ Coalition activities, 2008 monitoring results, priority management plans specifically pesticides drive water quality challenge, and filled out BMP surveys.	All Constituents	Parry Klassen, MLJ-LLC
December 18, 2008	Madera County	2008 Annual Growers Meeting: discussed ESJ Coalition activities, 2008 monitoring results, priority management plans specifically pesticides drive water quality challenge, and filled out BMP surveys.	All Constituents	Parry Klassen, MLJ-LLC
February 5, 2009	Stanislaus County Dry Creek/Prairie Flower Drain	CAPCA Continuing Education meeting on various pest management issues; Klassen presentation on Dry Creek/Prairie Flower Drain Mgmt Plan status; BMPs for pesticides, nutrients	Pesticides, nutrients, sediment	Parry Klassen

Management Practice Outreach and Education				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
February 9, 2009	Stanislaus County Prairie Flower Drain site subwatershed	Meeting with Helena Chemical Co, Modesto; staff manager and Pest Control Advisors (#6 PCAs) on Mgmt Plan status on Prairie Flower Drain; contacting growers about BMPs	Pesticides, nutrients	Parry Klassen
March 2, 2009	Waterford Dry Creek site subwatershed	Modesto Irrigation District Grower Meeting; 40 growers attended. Klassen reviewed results from Stanislaus County sites and also the management plans on Dry Creek and PFD.	All	Parry Klassen
March 4, 2009	Modesto Dry Creek site subwatershed	Modesto Irrigation District Grower Meeting; 60 growers attended. Zipser reviewed results from Stanislaus County sites and also the management plans on Dry Creek and PFD.	All	Wayne Zipser
March 10, 2009	Merced Duck Slough site subwatershed	Grower meeting to discuss topics related to organic farming including organic inspections, approved materials, OSPs, and an individual grower/PCA's experience with the transition to organic. Klassen presented an update on the ILRP; BMPs for row crops and orchards w/runoff of pesticides and nutrients.	All	Parry Klassen
March 23, 2009	Merced Duck Slough site subwatershed	Meeting with Helena Chemical Co, Merced; staff manager and Pest Control Advisors (#5 PCAs) on Mgmt Plan status on Duck Slough; contacting growers about BMPs.	Pesticides, nutrients	Parry Klassen
March 26, 2009	Le Grand, Duck Slough site subwatershed	Growers invited to meeting have properties adjacent to Duck Slough; presentations discussed watershed specific 2009 MP, past exceedances, BMPs for row crops and orchards w/runoff of pesticides and nutrients and Coalition follow-up activities (PUR review, individual grower contacts, BMPs); filled out meeting surveys. 43 in attendance representing 23 member farming operations.	All	Parry Klassen, MLJ LLC

Table 16. ESJWQC meetings/contacts to assess management practice implementation.

Management Practice Tracking and Implementation				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
January 15, 2009	Dry Creek Site Subwatershed	Individual contact with grower representing 362 acres along Dry Creek.	Chlorpyrifos, copper	Parry Klassen, Wayne Zipser
January 21, 2009	Dry Creek Site Subwatershed	Individual contact with grower representing 697 acres along Dry Creek.	Chlorpyrifos, copper	Parry Klassen, Wayne Zipser
January 23, 2009	Dry Creek Site Subwatershed	Individual contact with grower representing 2,450 acres along Dry Creek.	Chlorpyrifos, copper	Parry Klassen, Wayne Zipser
February 24, 2009	Dry Creek Site Subwatershed	Individual contact with grower representing 230 acres along Dry Creek.	Chlorpyrifos, copper	Parry Klassen, Wayne Zipser
February 26, 2009	Dry Creek Site Subwatershed	Individual contact with grower representing 367 acres along Dry Creek.	Chlorpyrifos, copper	Parry Klassen, Wayne Zipser
February 27, 2009	Dry Creek Site Subwatershed	Individual contact with grower representing 162 acres along Dry Creek.	Chlorpyrifos, copper	Parry Klassen, Wayne Zipser
March 21, 2009	Dry Creek Site Subwatershed	Individual contact with grower representing 45 acres along Dry Creek.	Chlorpyrifos, copper	Parry Klassen, Wayne Zipser

Table 17. Status of general surveys within the ESJWQC region.

General Surveys				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
January 30, 2009	All	General survey results linked to parcels and summarized in the ESJWQC General Survey Summary Report.	Not Applicable	MLJ-LLC

Table 18. ESJWQC actions to address exceedances and management practices relevant to 2008 monitoring through collaboration with other entities.

Collaborations and Special Studies				
Date	**County or Site Subwatershed**	**Details**	**Constituents Addressed**	**Who**
February 28, 2009	Stanislaus, Merced	Submitted grant proposal to USDA Agricultural Water Enhancement Program for funding to install BMPs on farms located in subwatersheds in Stanislaus and Merced counties with Management Plans. Requested $2 million annually for 5 years ($10 million total). Decision on funding to be made May 15, 2009	Not Applicable	Parry Klassen/CURES; ESJQWC; Westside San Joaquin River Watershed Coalition; NRCS; West and East Stanislaus Resource Conservation District

I. DRY CREEK @ WELLSFORD RD

Management Plan Constituents

Priority A

- Chlorpyrifos

Priority C

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

Priority D

- *Hyalella azteca* sediment toxicity

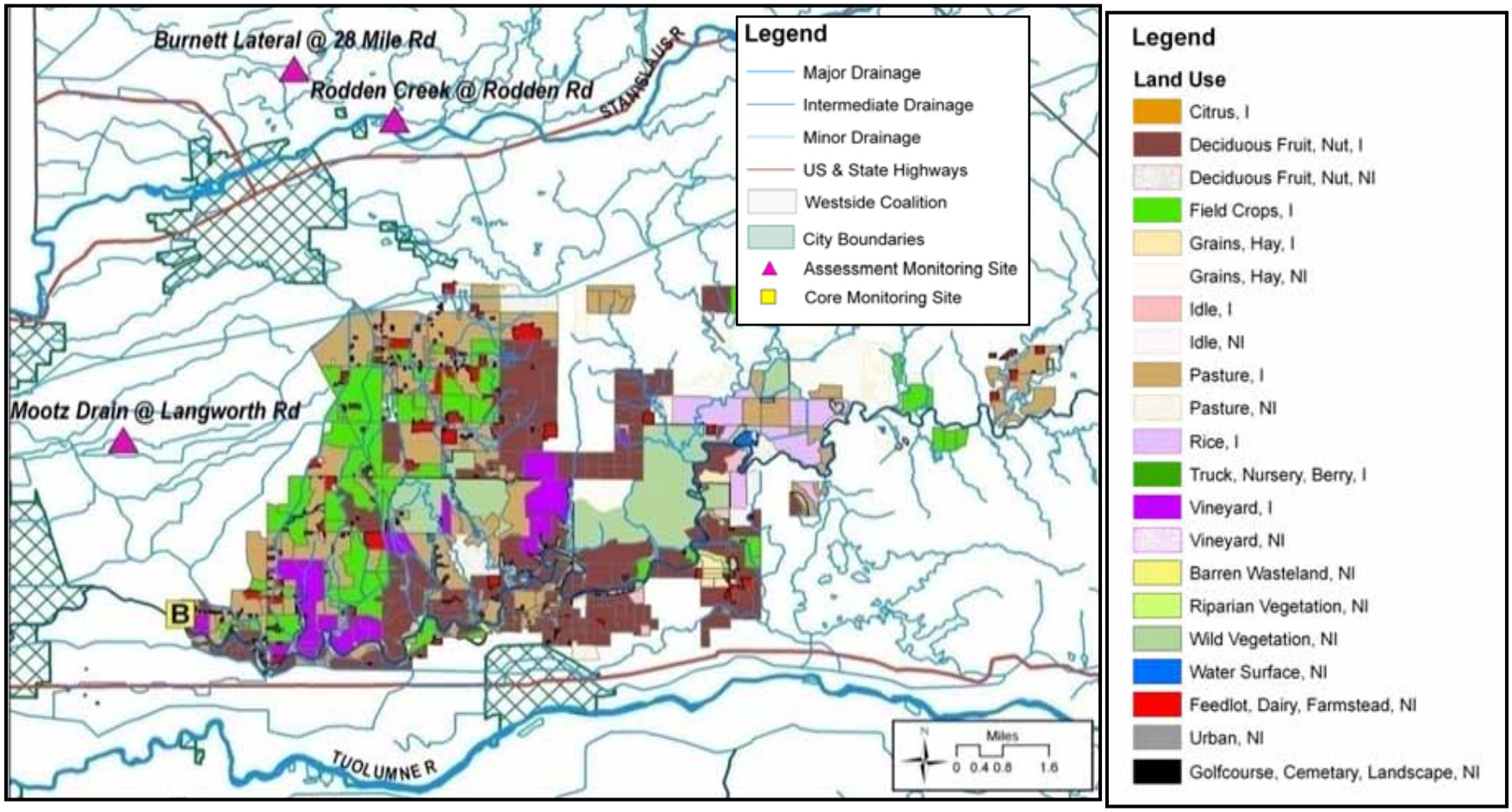
Priority E

- Dissolved Oxygen
- *E. coli*
- pH

Description of Dry Creek at Wellsford Rd Site Subwatershed

Dry Creek @ Wellsford Rd (23,339 irrigated acres) is a site subwatershed within the northern part of the Coalition region. It receives runoff from a combination of field crops, deciduous nuts, and vineyards (Figure I-1). Dry Creek originates in the Sierra foothills to the east of Modesto and drains into the Tuolumne River. This site subwatershed samples Dry Creek at the furthest downstream location that collects agricultural drainage prior to flowing through the urban areas of Modesto. Dairies are located upstream of this site and the town of Waterford may contribute an urban signal.

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



Subwatershed Monitoring History

The Coalition initiated monitoring within the Dry Creek site subwatershed at Dry Creek @ Wellsford Road during the storm season of 2005 (Table I-1). The constituents monitored for at this site are listed in Table I-2 by year and season. Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and included additional sampling at Dry Creek @ Wellsford Road in July and August for chlorpyrifos and in September for *Ceriodaphnia* sp. toxicity (Table I-3). Upstream Management Plan Monitoring occurred during the 2008 irrigation season at Dry Creek @ Waterford Road during July – September for chlorpyrifos and in September for *Ceriodaphnia* sp. toxicity (Table I-4). This upstream location was selected based on a review of PUR data indicating likely upstream sources. The upstream monitoring site was selected to cut the watershed into smaller areas which will allow an analysis of the contribution of each portion of the watershed to the load measured at the Dry Creek @ Wellsford Road site. Sampling locations of the Dry Creek subwatershed are provided in Table I-5 and Figure I-2. Exceedances of field and physical parameters, *E. coli*, pesticides and water column toxicity have occurred at this site. A summary and discussion of these exceedances are provided in the next section (Table I-6).

To gain additional information about potential sources of discharge into the Dry Creek @ Wellsford Rd site subwatershed, the Stanislaus County Agricultural Commissioner's staff walked the waterway in November 2007 and documented all drains using GPS and digital photos. The Coalition notified individual(s) owning the parcels where drains were found and conducted a joint meeting with the Stanislaus County Agriculture Commissioner in June 2008. The Coalition mapped the drains and is using this information to further assess possible sources of water quality impairments.

Table I-1. Dry Creek @ Wellsford Rd sampling events per season and year. An irrigation season sampling event encompasses normal monitoring and any associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall event encompasses normal monitoring.

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

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

Table I-2. Number of analyses performed per constituent in each sampling season and year for the Dry Creek @ Wellsford Rd sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

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

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 8141A	Malathion				5	2	7	2	6	
EPA 8141A	Methamidophos				5	2	6	2	6	
EPA 8141A	Methidathion				5	2	7	2	6	
EPA 8141A	Molinate				5	2	7	2	6	
EPA 8141A	Parathion, Methyl				5	2	7	2	6	
EPA 8141A	Phorate				5	2	7	2	6	
EPA 8141A	Phosmet				5	2	7	2	6	
EPA 8141A	Thiobencarb				5	2	7	2	6	
Pyrethroids										
EPA 8081A	Bifenthrin		1	2	5	2	6			
EPA 8081A	Cyfluthrin, total		1	2	5	2	6			
EPA 8081A	Cyhalothrin, lambda, total	2	5	2	5	2	6			
EPA 8081A	Cypermethrin, total	2	5	2	5	2	6			
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	5	2	5	2	6			
EPA 8081A	Permethrin, total	2	5	2	5	2	6			
Triazines										
EPA 547M	Glyphosate				5	2	6	2	6	
EPA 549.2M	Paraquat dichloride				5	2	6	2	6	
EPA 619	Atrazine				5	2	6	2	6	
EPA 619	Cyanazine				5	2	6	2	6	
EPA 619	Simazine				5	2	6	2	6	
Metals (Total)										
EPA 200.8	Arsenic				5	2	6	2	6	
EPA 200.8	Boron				5	2	6	2	6	
EPA 200.8	Cadmium				5	2	6	2	6	
EPA 200.8	Copper				5	2	6	2	6	
EPA 200.8	Lead				5	2	6	2	6	
EPA 200.8	Nickel				5	2	6	2	6	
EPA 200.8	Selenium				5	2	2	2	6	
EPA 200.8	Zinc				5	2	6	2	6	
Nutrients										
EPA 130.2	Hardness as CaCO3				5	2	6	2	6	
EPA 300.0	Nitrate as N				5	2	6	2	6	
EPA 350.2	Ammonia as N				5	2	6	3	6	2
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	3	6	2
EPA 354.1	Nitrite as N				5	2	6	2	6	

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 353.3	Nitrate + Nitrite as N							1		2
EPA 365.2	OrthoPhosphate as P				5	2	6	3	6	2
EPA 365.2	Phosphate as P				5	2	6	3	6	2
Toxicity										
EPA 821-02-012	*Ceriodaphnia dubia*	2	5	2	6	2	7	2	6	
EPA 821-02-012	*Pimephales promelas*	2	5	2	5	2	6	2	6	
EPA 821-02-013	*Selenastrum capricornutum*	2	5	2	5	2	6	4	6	
EPA 600/R-99-064	*Hyalella azteca*		1	1	1	1	1	2	2	

NA - Not applicable

Table I-3. Dry Creek site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and *Ceriodaphnia dubia*. "X" indicates the site, month, and analyte sampled.

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

Table I-4. Dry Creek site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos and *Ceriodaphnia dubia*. "X" indicates the site, month, and analyte sampled.

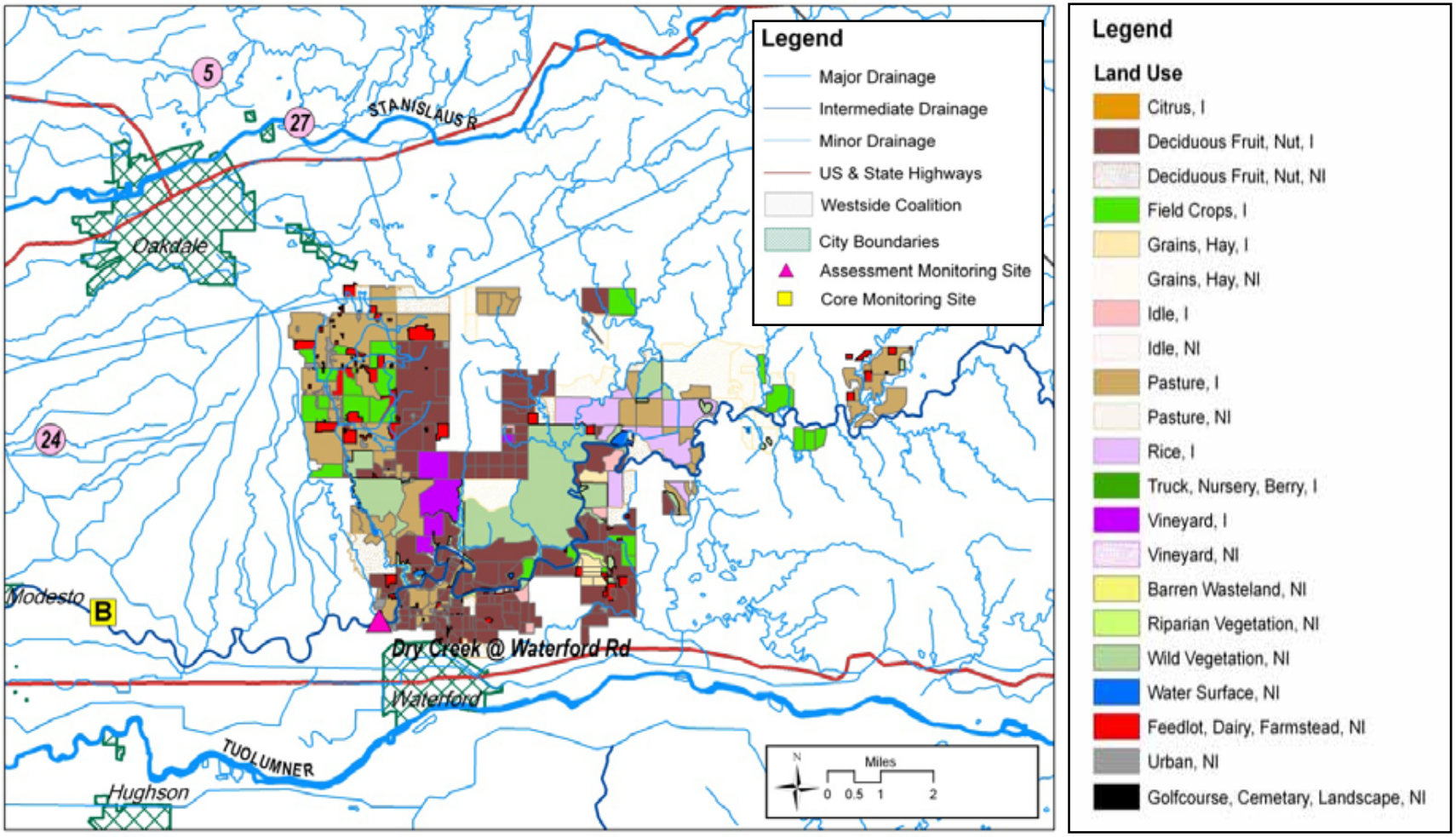
Sample Site	Date	Type	Chlorpyrifos	*Ceriodaphnia dubia*
Dry Creek @ Waterford Rd	22-Jul-08	U	X	
Dry Creek @ Waterford Rd	19-Aug-08	U	X	
Dry Creek @ Waterford Rd	23-Sep-08	U	X	X

Table I-5. Coordinates of the Dry Creek site subwatershed sampling locations.

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

*Original ESJWQC sampling site
[u]Upstream sites

Figure I-2. Site subwatershed map of land use for the Dry Creek @ Waterford Rd upstream sample site. "B" = Dry Creek @ Wellsford Rd site location.



Exceedance History

Ambient water monitoring within the Dry Creek subwatershed was initiated in the 2005 storm sampling season at the site at Wellsford Rd. Dry Creek @ Wellsford Road samples collected from 2005-2008 have experienced exceedances of water quality trigger limits (WQTL) for field parameters, *E. coli,* pesticides, and metals (Table I-6). Toxicity in the water column to *Ceriodaphnia dubia,* and *Selenastrum capricornutum,* and sediment toxicity to *Hyalella azteca,* occurred at the monitoring site (Table I-6). Twenty-one dissolved oxygen (DO) exceedances, four pH exceedances, and 21 *E. coli* exceedances have occurred. Eight exceedances of the chlorpyrifos WQTL were experienced, all occurring in the irrigation sampling seasons of 2005, 2006, 2007, and 2008, including at the 2008 upstream Management Plan Monitoring site Dry Creek @ Waterford Road. Two diuron exceedances occurred in February, 2007 and one exceedance of thiobencarb occurred in September, 2006. The analysis of metals was initiated in 2006, and there have been three copper exceedances and one lead exceedance at the Dry Creek @ Wellsford Rd site subwatershed. Water column toxicity to *Ceriodaphnia* occurred in February of 2005 and September of 2006, and *Selenastrum* toxicity occurred four times during the 2007 storm season and once during the 2008 storm season. Toxicity to *Hyalella azteca* occurred twice during 2008, once in each season.

Dry Creek is not considered impaired and is not included on the current Central Valley Basin Plan 303d list, nor are any of the immediate downstream receiving water bodies. However, Dry Creek is listed on the proposed 2008 303d list.

Although all exceedances are listed in Table I-6, only those that have occurred at a site more than once in a three year period are subject to management plan actions. Using the priority flow chart outlined in the Management Plan introduction (Figure 3), priorities were assigned to the constituents experiencing more than one exceedance except chlorpyrifos and diazinon which require a Management Plan after a single exceedance. Based on the exceedances at the Dry Creek @ Wellsford Rd site subwatershed, the constituents receiving the highest priorities were chlorpyrifos (A), copper (C), diuron (C), and toxicity to *Ceriodaphnia dubia* (C) and *Selenastrum capricornutum* (C).

Table I-6. All exceedances experienced in samples collected from locations within the Dry Creek site subwatershed from February 2005 through December 2008 (sorted by season and date).

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	*E. coli*, MPN/100 mL	Copper[1], µg/L	Lead[1], µg/L	Chlorpyrifos, µg/L	Diuron, µg/L	Thiobencarb, µg/L	*Ceriodaphnia dubia*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)
Dry Creek @ Wellsford Rd	Irrigation	11-May-05		6.26									
Dry Creek @ Wellsford Rd	Irrigation	15-Jun-05	5.9		240								
Dry Creek @ Wellsford Rd	Irrigation	13-Jul-05	5.7										
Dry Creek @ Wellsford Rd	Irrigation	17-Aug-05		9.18	900			0.024					
Dry Creek @ Wellsford Rd	Irrigation	21-Sep-05	6.98		500								
Dry Creek @ Wellsford Rd	Irrigation	18-May-06			280								
Dry Creek @ Wellsford Rd	Irrigation	15-Jun-06	6.08										
Dry Creek @ Wellsford Rd	Irrigation	13-Jul-06	6.69					0.026					
Dry Creek @ Wellsford Rd	Irrigation	10-Aug-06						0.024					
Dry Creek @ Wellsford Rd	Irrigation	14-Sep-06			310					0.1	70		
Dry Creek @ Wellsford Rd	Irrigation	17-Apr-07				5.1 (5)							
Dry Creek @ Wellsford Rd	Irrigation	19-Jun-07	5.77										
Dry Creek @ Wellsford Rd	Irrigation	17-Jul-07	6.64					0.021					
Dry Creek @ Wellsford Rd	Irrigation	31-Jul-07	6.91										
Dry Creek @ Wellsford Rd	Irrigation	14-Aug-07	6.58		440								
Dry Creek @ Wellsford Rd	Irrigation	11-Sep-07	6.5		420			0.043					
Dry Creek @ Wellsford Rd	Irrigation	22-Apr-08			>2400								
Dry Creek @ Wellsford Rd	Irrigation	20-May-08	5.67		330								
Dry Creek @ Wellsford Rd	Irrigation	17-Jun-08	6.31		>2400								
Dry Creek @ Waterford Rd	*Irrigation*	*22-Jul-08*	*6.08*					*0.02*					
Dry Creek @ Wellsford Rd	Irrigation	22-Jul-08	6.67		>2400			0.03					
Dry Creek @ Waterford Rd	*Irrigation*	*19-Aug-08*	*5.93*					*0.023*					
Dry Creek @ Wellsford Rd	Irrigation	19-Aug-08	6.85		580								
Dry Creek @ Wellsford Rd	Irrigation	28-Aug-08	6.64										71
Dry Creek @ Wellsford Rd	Irrigation	23-Sep-08			290								
Dry Creek @ Wellsford Rd	Irrigation	2-Oct-08	5.83										
Dry Creek @ Wellsford Rd	Storm	15-Feb-05									80		
Dry Creek @ Wellsford Rd	Storm	22-Mar-05		8.96	900								
Dry Creek @ Wellsford Rd	Storm	1-Mar-06			300								
Dry Creek @ Wellsford Rd	Storm	16-Mar-06			1600								

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	*E. coli*, MPN/100 mL	Copper[1], µg/L	Lead[1], µg/L	Chlorpyrifos, µg/L	Diuron, µg/L	Thiobencarb, µg/L	*Ceriodaphnia dubia*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)
Dry Creek @ Wellsford Rd	Storm	11-Feb-07	6.17		290				37			508000	
Dry Creek @ Wellsford Rd	Storm	22-Feb-07										220000	
Dry Creek @ Wellsford Rd	Storm	28-Feb-07			2400	8.4 (7.2)			4			298750	
Dry Creek @ Wellsford Rd	Storm	7-Mar-07										826000	
Dry Creek @ Wellsford Rd	Storm	24-Jan-08			>2400								
Dry Creek @ Wellsford Rd	Storm	26-Feb-08			>2400	11 (6.0)	1.8 (1.7)					494753	
Dry Creek @ Wellsford Rd	Storm	4-Mar-08											88
Dry Creek @ Wellsford Rd	Fall	21-Oct-08	4.91		550								
Dry Creek @ Wellsford Rd	Fall	16-Dec-08	2.77	8.68									
Priorities			**E**	**E**	**E**	**C**		**A**	**C**	**NP[2]**	**C**	**C**	**D**

[1] Water quality trigger for each sample is based on hardness and is shown in parenthesis.
[2] NP - not prioritized; the Coalition is not responsible for prioritizing thiobencarb.

2007 and 2008 Management Plan Monitoring Results

The Coalition performed additional sampling at Dry Creek @ Wellsford Rd in 2007 for chlorpyrifos and *Ceriodaphnia dubia* toxicity during months of previous exceedances (Table I-3). There was no toxicity to *Ceriodaphnia* during 2007 including the additional sampling conducted in September. Chlorpyrifos exceeded the WQTL of 0.015 µg/L during normal monitoring sampling in July and September 2007. Additional samples collected on July 31, 2007 and August 28, 2007 had no detectable levels of chlorpyrifos (<0.003 µg/L) (Table I-7). In 2008, upstream Management Plan Monitoring occurred at Dry Creek @ Waterford Road for chlorpyrifos during July, August, and September and for toxicity to *Ceriodaphnia* during September (Table I-4). Again, there was no toxicity to *Ceriodaphnia* during 2008 normal and upstream monitoring (Table I- 7). Chlorpyrifos exceeded the WQTL during normal monitoring in July (0.03 µg/L) and during upstream monitoring in both July and August (0.02 and 0.023 µg/L, respectively) (Table I-7).

Table I-7. Dry Creek site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for chlorpyrifos and Ceriodaphnia dubia toxicity from the 2007-2008 irrigation seasons. Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (@ Wellsford Rd)	Date	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/11/07
	Chlorpyrifos (µg/L)	<0.00259	0.011	<0.00259	**0.021**	<0.003	**0.043**
	Ceriodaphnia dubia (Survival %)	100	100	100	100	100	100
2007 MPM A (@ Wellsford Rd)	Date	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	<0.003	<0.003	NA
	Ceriodaphnia dubia (Survival %)	NA	NA	NA	NA	NA	100
2008 NM (@ Wellsford Rd)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	**0.03**	<0.003	<0.003
	Ceriodaphnia dubia (Survival %)	100	100	100	100	100	100
2008 MPM US (@ Waterford Rd)	Date	NA	NA	NA	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	NA	NA	NA	**0.02**	**0.023**	<0.003
	Ceriodaphnia dubia (Survival %)	NA	NA	NA	NA	NA	100

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

Load Calculations

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

Load = Discharge (cfs) X 28.317L X Concentration (milligram/L X 1000 or µg/L).

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

Table I-8. Instantaneous, calculated loads for chlorpyrifos, copper and diuron loads at Dry Creek @ Wellsford Rd and Dry Creek @ Waterford Rd (sorted by site, analyte, and date).

Station Name	Analyte Name	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Dry Creek @ Wellsford Rd	Chlorpyrifos	17-Aug-05	0	0.024	0
Dry Creek @ Wellsford Rd	Chlorpyrifos	13-Jul-06	123.91	0.026	91.23
Dry Creek @ Wellsford Rd	Chlorpyrifos	10-Aug-06	NR	0.024	NA
Dry Creek @ Wellsford Rd	Chlorpyrifos	15-May-07	51.13	0.011	15.93
Dry Creek @ Wellsford Rd	Chlorpyrifos	17-Jul-07	68.57	0.021	40.78
Dry Creek @ Wellsford Rd	Chlorpyrifos	11-Sep-07	61.02	0.043	74.3
Dry Creek @ Wellsford Rd	Chlorpyrifos	22-Jul-08	63.22	0.03	53.71
Dry Creek @ Wellsford Rd	Copper	13-Jul-06	123.91	3.1	10877.15
Dry Creek @ Wellsford Rd	Copper	11-Feb-07	NR	1.9	NA
Dry Creek @ Wellsford Rd	Copper	28-Feb-07	NR	8.4	NA
Dry Creek @ Wellsford Rd	Copper	17-Apr-07	30.71	5.1	4435.04
Dry Creek @ Wellsford Rd	Copper	15-May-07	51.13	6.1	8831.87
Dry Creek @ Wellsford Rd	Copper	19-Jun-07	32.21	5.9	5381.33
Dry Creek @ Wellsford Rd	Copper	17-Jul-07	68.57	3.9	7572.62
Dry Creek @ Wellsford Rd	Copper	14-Aug-07	65.83	5.3	9879.77
Dry Creek @ Wellsford Rd	Copper	11-Sep-07	61.02	3.3	5702.08
Dry Creek @ Wellsford Rd	Copper	26-Feb-08	NR	11	NA
Dry Creek @ Wellsford Rd	Copper	22-Apr-08	39.8	4.7	5296.98
Dry Creek @ Wellsford Rd	Copper	20-May-08	38.30	3.8	4121.26
Dry Creek @ Wellsford Rd	Copper	17-Jun-08	38.94	3.7	4079.86
Dry Creek @ Wellsford Rd	Copper	22-Jul-08	63.22	3.2	5728.64
Dry Creek @ Wellsford Rd	Copper	19-Aug-08	52.75	5.3	7916.73
Dry Creek @ Wellsford Rd	Copper	23-Sep-08	33.48	2.3	2180.52
Dry Creek @ Wellsford Rd	Diuron	11-Feb-07	NR	37	NA
Dry Creek @ Wellsford Rd	Diuron	28-Feb-07	NR	4	NA
Dry Creek @ Wellsford Rd	Diuron	17-Apr-07	30.71	0.29	252.19
Dry Creek @ Wellsford Rd	Diuron	22-Apr-08	39.8	0.2	225.4
Dry Creek at Waterford Rd	*Chlorpyrifos*	*22-Jul-08*	*NR*	*0.02*	*NA*
Dry Creek at Waterford Rd	*Chlorpyrifos*	*19-Aug-08*	*24.24*	*0.023*	*15.79*

NR – Unable to deploy instrument, discharge not taken.
NA – Unable to calculate due to lack of information.

Source Identification

Priority A Constituents

Chlorpyrifos

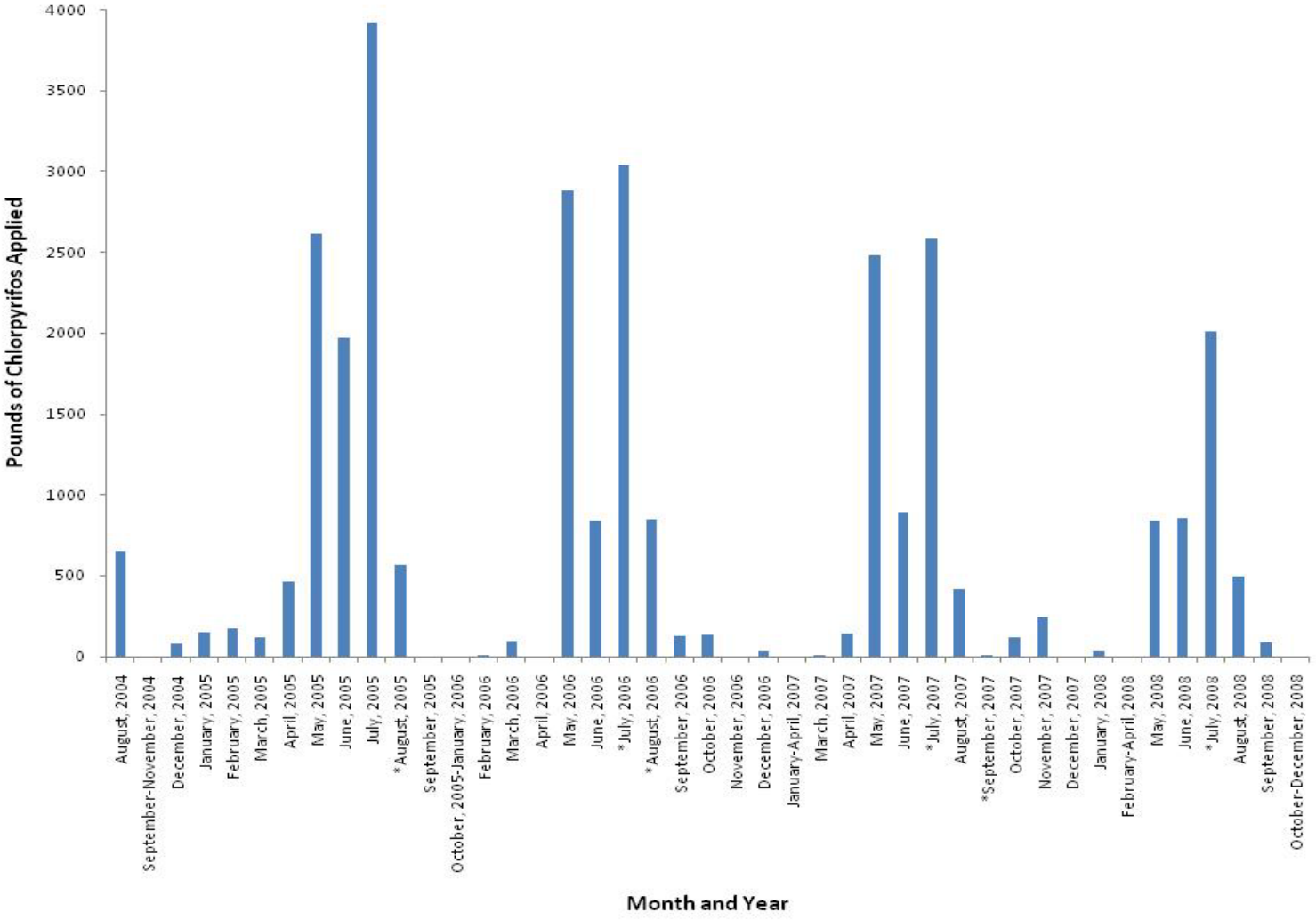
Eight exceedances of the chlorpyrifos WQTL of 0.015 µg/L occurred during the latter months of irrigation seasons in samples collected between 2004 and 2008 (Table I-6). The Coalition uses a combination of monitoring data and evaluation of Pesticide Use Report (PUR) data to identify possible sources. PUR data are reviewed for the number and amount of the active ingredient (AI), chlorpyrifos applied (pounds applied), and acres treated (Table I-9, Figure I-3). The amount of chlorpyrifos applied in this subwatershed has decreased annually since 2005 as has the number of chlorpyrifos applications (Table I-9, Figure I-3). All PUR data has been submitted with previous Semi Annual Monitoring Reports (SAMRs) and is only summarized here.

Table I-9. Number of chlorpyrifos applications, pounds AI applied, and acres treated by month for August 2004 through December 2008 in the Dry Creek @ Wellsford Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
August, 2004	16	656.4	619.5
December, 2004	1	80.0	45
January, 2005	1	152.5	75
February, 2005	3	175.9	94
March, 2005	3	120.9	111
April, 2005	6	464.6	521.5
May, 2005	22	2617.1	2022.41
June, 2005	15	1970.3	1244
July, 2005	50	3923.3	2312
August, 2005	16	569.8	425.75
September, 2005	1	2.0	0.75
February, 2006	1	8.0	83
March, 2006	4	98.1	60.5
May, 2006	27	2881.3	1842.41
June, 2006	14	842.4	538.9
July, 2006	55	3042.9	2625
August, 2006	27	852.8	475
September, 2006	5	123.9	62.5
October, 2006	3	137.4	73.91
December, 2006	1	29.9	15
March, 2007	1	10.2	23
April, 2007	7	139.6	260.4
May, 2007	23	2486.1	1598.9

Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
June, 2007	24	887.9	597
July, 2007	40	2585.9	1611.2
August, 2007	11	414.7	207.75
September, 2007	1	11.6	11
October, 2007	1	117.6	63.3
November, 2007	4	247.4	133.15
January, 2008	1	29.9	14
May, 2008	20	840.6	595
June, 2008	14	858.9	714
July, 2008	41	2012.0	1565.61
August, 2008	10	499.4	350
September, 2008	2	85.6	48
Summaries by Year			
2004 Total	17	736.4	664.5
2005 Total	117	9996.5	6806.41
2006 Total	137	8016.6	5776.22
2007 Total	112	6901.1	4505.7
2008 Total	88	4326.4	3286.61
Total	**471**	**29977.0**	**21039.44**

Figure I-3. Pounds of chlorpyrifos applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2004-2008. Asterisk (*) denotes months with exceedances.

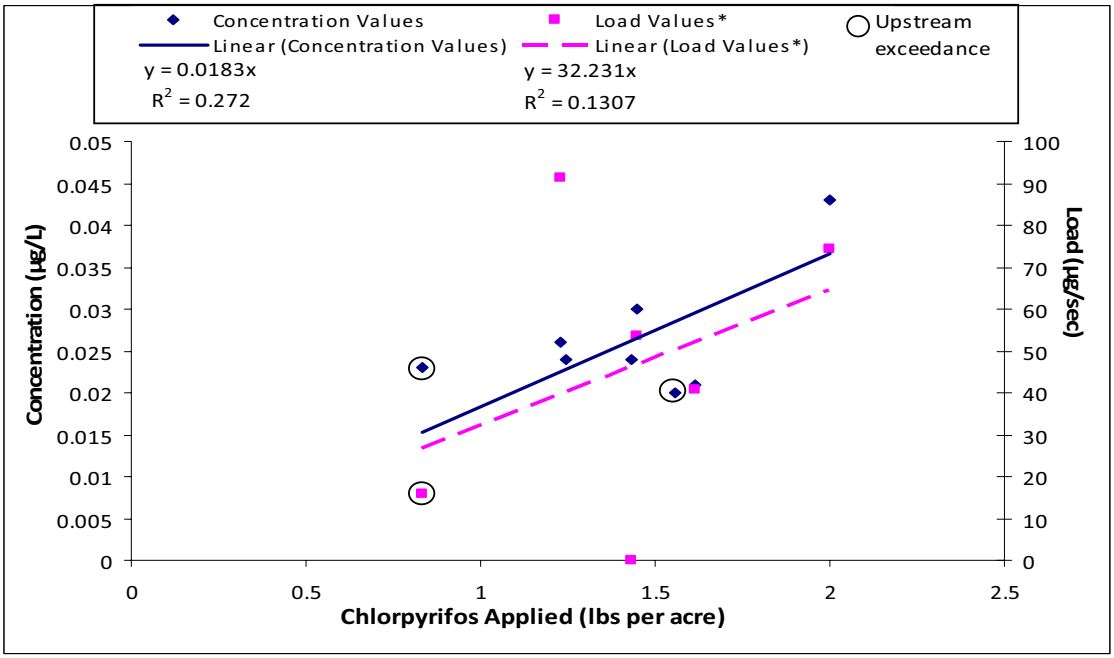


The Coalition has developed hypotheses to guide the search for sources within the watershed. If the amount of chlorpyrifos (either concentration or load) detected in the sample water was positively associated with amount of chlorpyrifos applied, then the exceedance would most likely be a result of accumulated runoff from numerous parcels. Alternatively, if there was no relationship between the amount applied across the watershed and the amount found in the water, the exceedance would be a result of one or a few parcels with poorly managed discharge. In order to develop an outreach strategy based on PUR data and the above hypothesis, the Coalition assumes that all applications have been reported and that each application has been reported accurately. The outreach strategy of the Coalition varies depending on which hypothesis is correct. The hypotheses are not mutually exclusive as some parcels could always contribute to exceedances, although the magnitude of the exceedance would be determined by the amount of product applied.

Consequently, the Coalition performed an analysis of chlorpyrifos applications and concentration in the water for all exceedances. Applications were restricted to be within four weeks prior to each exceedance. Although chlorpyrifos applied more than four weeks before sampling may still be detected, it is more probable that if recent applications were made, exceedances would more likely be the result of these applications, especially in the irrigation season. A linear regression analysis was performed to establish the relationship between both application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure I-4), and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure I-5). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI were summed and divided by the summed acreage. The small sample size precluded a rigorous statistical treatment but sample sizes are sufficiently large to allow the two hypotheses to be distinguished. The intercept for all analyses was set at zero as there should be no chlorpyrifos in the water if there are no applications. However, this assumes that applications more than four weeks prior to sampling would not contribute chlorpyrifos to the water body.

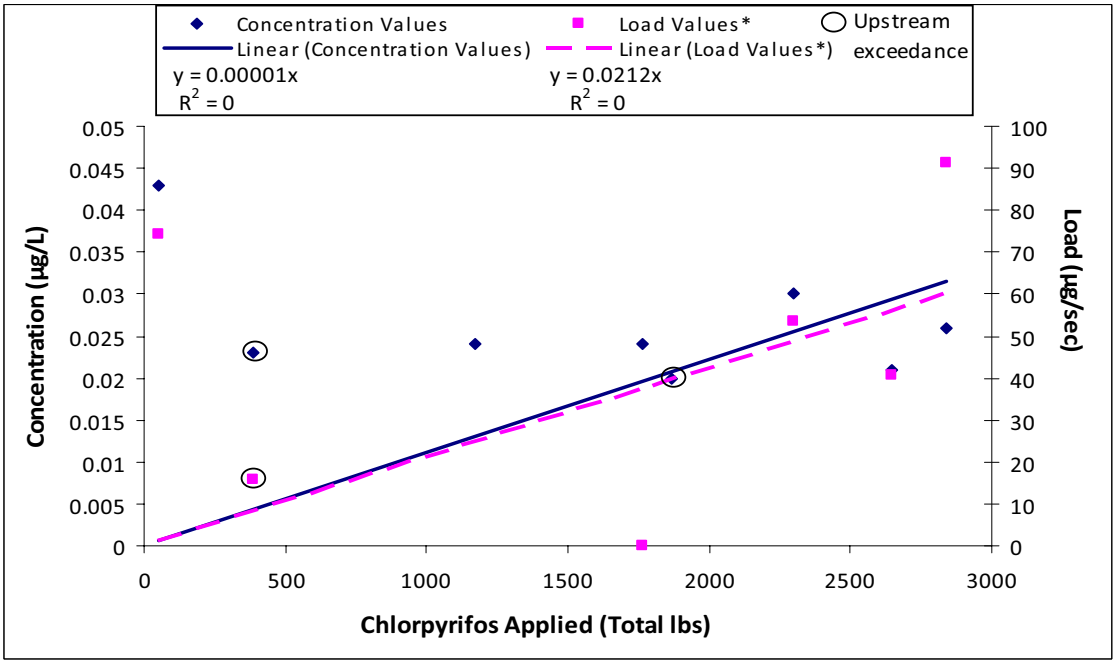
The regression of concentration of pounds AI applied per acre indicated a positive but non-significant relationship. Twenty-seven percent of the variation in concentration in the water column was accounted for by the application rate (Figure I-4). There was no significant regression of chlorpyrifos concentration on total pounds of active ingredient applied (Figure I-5). The average application rate of chlorpyrifos for the Dry Creek subwatershed from 2004-2008 is 1.47 lbs AI/acre (Table I-10). The highest application rates are associated with almond and walnut orchard sprays and corn (Table I-10).

Figure I-4. Chlorpyrifos concentration and loads compared to application rates (average lbs per acre) for the Dry Creek @ Wellsford Rd site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for all exceedance dates.

Figure I-5. Chlorpyrifos concentration and loads compared to application rates (total lbs across all acres) for the Dry Creek @ Wellsford Rd site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for all exceedance dates.

Table I-10. Average pound of AI per acre for chlorpyrifos based on PUR data from 2004-2008 within the Dry Creek @ Wellsford Rd subwatershed.

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
CHLORPYRIFOS	ALMOND	CHLORPYRIFOS 4E AG	0.9382
			1.8763
		GOVERN 4E INSECTICIDE	2.0201
		LORSBAN 4E INSECTICIDE	2.0054
		LORSBAN 4E-HF	0.0199
			0.3738
			1.4256
			1.9938
			1.9939
			5.9816
		LORSBAN-4E	0.4646
			0.531
			0.9292
			1.0005
			1.072
			1.7422
			1.8584
			2.001
		NUFOS 4E	1.0168
			1.271
			1.7022
			2.0577
			2.181
		WARHAWK	0.202
	CORN (FORAGE - FODDER)	LORSBAN 15G GRANULAR INSECTICIDE	1.5
		LORSBAN 4E-HF	0.0312
			0.0467
		LORSBAN-4E	1.5007
	CORN FOR/FOD	GOVERN 4E INSECTICIDE	0.3637
			0.4042
			0.4444
			0.849
		LORSBAN 4E-HF	0.0498
			0.2391
			0.7975
		NUFOS 4E	0.691
			1.0168
	N-OUTDR CONTAINER/FLD GRWN PLANTS	LORSBAN-75WG	1.5
	N-OUTDR GRWN TRNSPLNT/PRPGTV MTRL	LORSBAN-4E	2.001
			2.1287
	OP-DEC. TREE	LORSBAN-75WG	2.0025
	WALNUT	GOVERN 4E INSECTICIDE	2.0201
		LORSBAN 4E INSECTICIDE	2.0003
		LORSBAN 4E-HF	0.9969

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
			1.0966
			1.9938
			1.9939
			2.0736
		LORSBAN-4E	1.0005
			1.3938
			1.8584
			1.9076
			2.1443
			2.8614
		NUFOS 4E	1.0168
			2.0335
			2.2595
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	CHLORPYRIFOS 4E AG	0.319
			1.8763
		LORSBAN 4E INSECTICIDE	2.0003
		LORSBAN 4E-HF	0.9969
			1.0539
			1.9938
			1.9939
			2.0549
			2.1555
			2.1751
			2.2154
		LORSBAN-4E	0.2001
			0.9292
			1.0005
			1.8584
			2.001
		NUFOS 4E	2.0335
			2.2595
Average pounds chlorpyrifos applied per acre (2004-2008)			**1.47**

Additional data obtained since the submission of the ESJWQC Management Plan (September 30, 2008) has not changed the relationships of concentration or load vs. pounds AI per acre (Figure 1-4). The relationship submitted in the September Management Plan had a similar slope (0.016) compared to the slope in this update (0.018). These data suggest that the same processes were operating in the watershed in the summer of 2008 as occurred previously. No large residuals were generated from data in the summer of 2008 indicating that no unusual conditions were present. However, it appears that the application rate may be important in determining exceedances and the concentration of chlorpyrifos in the water. To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Tables I-11, I-12, I-13, I-14 and Figures I-6, I-7, I-8, I-9). Within the Dry Creek site subwatershed—including the normal

monitoring site and upstream management plan site—there were 31 sections associated with exceedances and each section had between 1 and 6 applications in the period prior to sampling. Mapping the parcels with applications prior to exceedances indicates that applications are being made in numerous parcels along Dry Creek prior to exceedances. Although numerous applications are made near tributaries (laterals) to Dry Creek and it is unlikely that irrigation return flows along these tributaries reach Dry Creek. Site visits during the summer months demonstrate that many of the laterals that drain into Dry Creek do not maintain flows and that movement of chlorpyrifos to Dry Creek, although possible, is less likely than is drift from adjacent orchards. Consequently, outreach efforts have focused on contacting individual growers along Dry Creek for discussions about management practices.

Table I-11. Dry Creek @ Wellsford Rd site subwatershed. All TRS with more than one association between an application and exceedance for chlorpyrifos in 2005-2008. Table summarizes the number of applications associated with an exceedance for a given date and TRS.

TRS*	Chlorpyrifos Applications per Date of Exceedance					
	8/17/2005	7/13/2006	8/10/2006	7/17/2007	9/11/2007	7/22/2008
2S10E24			1	1		
2S10E36			2	1		
2S11E19			1	1		1
2S11E31		2				
2S11E33	1	1	1	2		3
3S10E25		1	3	1	1	
3S10E26				2		
3S10E27		1		2		
3S10E28	2	6	1	1		
3S11E12		2		1		
3S11E13		1		1		
3S11E15	1	4	1			
3S11E16		3		1		
3S11E2	3					
3S11E20	2	2	2	4		4
3S11E21	7	4	4	6		4
3S11E22	2	1	2			4
3S11E23	2	1	1	3		2
3S11E25	1	1		1		1
3S11E28	1	1		1		
3S11E29	5	3	3	6	1	6
3S11E30	4	4	4	7		6
3S11E4		1	5	1	2	2
3S11E5	1		2	4		1
2S11E34						2
3S11E24						1
3S11E27						1
3S11E3						2
3S11E18						6
3S11E19						1

*Bolded TRS are members of the Coalition

Table I-12. Dry Creek @ Waterford Rd (US) site subwatershed. All TRS with more than one association between an application and exceedance for chlorpyrifos in 2008. Table summarizes the number of applications associated with an exceedance for a given date and TRS.

TRS*	Date of associated exceedance	
	7/22/2008	8/19/2008
2S11E19	1	
2S11E33	3	
2S11E34	2	
3S11E20	4	3
3S11E21	4	2
3S11E22	4	
3S11E23	2	
3S11E24	1	
3S11E25	1	1
3S11E27	1	
3S11E3	2	
3S11E4	2	3
3S11E5	1	

Table I-13. Dry Creek @ Wellsford Road site subwatershed. TRS' with chlorpyrifos applications in the month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant chlorpyrifos applications.

TRS*	Exceedance Date		
	7/22/2008		
	Application Date	Pounds Applied	Acres Treated
2S11E19	7/17/2008	27.91	14
2S11E33	6/29/2008	117.94	58
	7/9/2008	223.01	120
	7/11/2008	223.01	120
2S11E34	7/11/2008	40.67	40
	7/17/2008	40.67	40
3S11E18	7/12/2008	9.05	10.66
	7/12/2008	10.79	29.66
	7/12/2008	18.22	41
	7/16/2008	10.73	44.87
	7/17/2008	10.30	25.49
	7/18/2008	21.72	31.43
3S11E19	7/13/2008	44.60	24
3S11E20	7/11/2008	40.40	20
	7/22/2008	18.58	10
	7/22/2008	22.30	12
	7/22/2008	46.46	25
3S11E21	7/5/2008	55.75	30
	7/18/2008	20.01	10
	7/18/2008	28.01	14
	7/21/2008	16.01	8
3S11E22	6/25/2008	81.34	80
	7/3/2008	36.89	37
	7/5/2008	14.87	8
	7/8/2008	22.30	12
3S11E23	6/25/2008	37.17	20
	7/8/2008	74.34	40
3S11E24	7/19/2008	172.85	84
3S11E25	6/27/2008	55.75	30
3S11E27	7/21/2008	38.10	82
3S11E3	7/11/2008	61.01	60
	7/17/2008	61.01	60
3S11E4	7/9/2008	139.38	75
	7/11/2008	139.38	75
3S11E29	6/24/2008	18.01	18
	6/26/2008	22.01	22
	6/27/2008	13.01	13
	6/27/2008	27.88	13
	6/30/2008	27.88	15
	7/1/2008	27.88	15
3S11E30	6/30/2008	18.58	10
	7/8/2008	22.81	11
	7/14/2008	37.17	20
	7/18/2008	32.02	16
	7/19/2008	17.45	8
	7/19/2008	34.90	20.5
3S11E5	6/27/2008	15.01	15

*Bolded TRS are members of the Coalition

Table I-14. Dry Creek @ Waterford Road (US) site subwatershed. TRS' with chlorpyrifos applications in the month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant chlorpyrifos applications.

TRS*	Exceedance Date					
	7/22/2008			8/19/2008		
	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated
2S11E19	7/17/2008	27.91	14			
2S11E33	6/29/2008	117.94	58			
	7/9/2008	223.01	120			
	7/11/2008	223.01	120			
2S11E34	7/11/2008	40.67	40			
	7/17/2008	40.67	40			
3S11E20	7/11/2008	40.40	20	7/22/2008	18.58	10
	7/22/2008	18.58	10	7/22/2008	22.30	12
	7/22/2008	22.30	12	7/22/2008	46.46	25
	7/22/2008	46.46	25			
3S11E21	7/5/2008	55.75	30	7/27/2008	4.98	5
	7/18/2008	20.01	10	8/8/2008	146.41	144
	7/18/2008	28.01	14			
	7/21/2008	16.01	8			
3S11E22	6/25/2008	81.34	80			
	7/3/2008	36.89	37			
	7/5/2008	14.87	8			
	7/8/2008	22.30	12			
3S11E23	6/25/2008	37.17	20			
	7/8/2008	74.34	40			
3S11E24	7/19/2008	172.85	84			
3S11E25	6/27/2008	55.75	30	7/25/2008	116.15	250
3S11E27	7/21/2008	38.10	82			
3S11E3	7/11/2008	61.01	60			
	7/17/2008	61.01	60			
3S11E4	7/9/2008	139.38	75	7/25/2008	6.00	4
	7/11/2008	139.38	75	7/27/2008	15.00	8
				7/30/2008	9.38	5
3S11E5	6/27/2008	15.01	15			

*Bolded TRS are members of the Coalition

Figure I-6. Dry Creek @ Wellsford Road site subwatershed. TRS' with applications co-occurring with a chlorpyrifos exceedance.

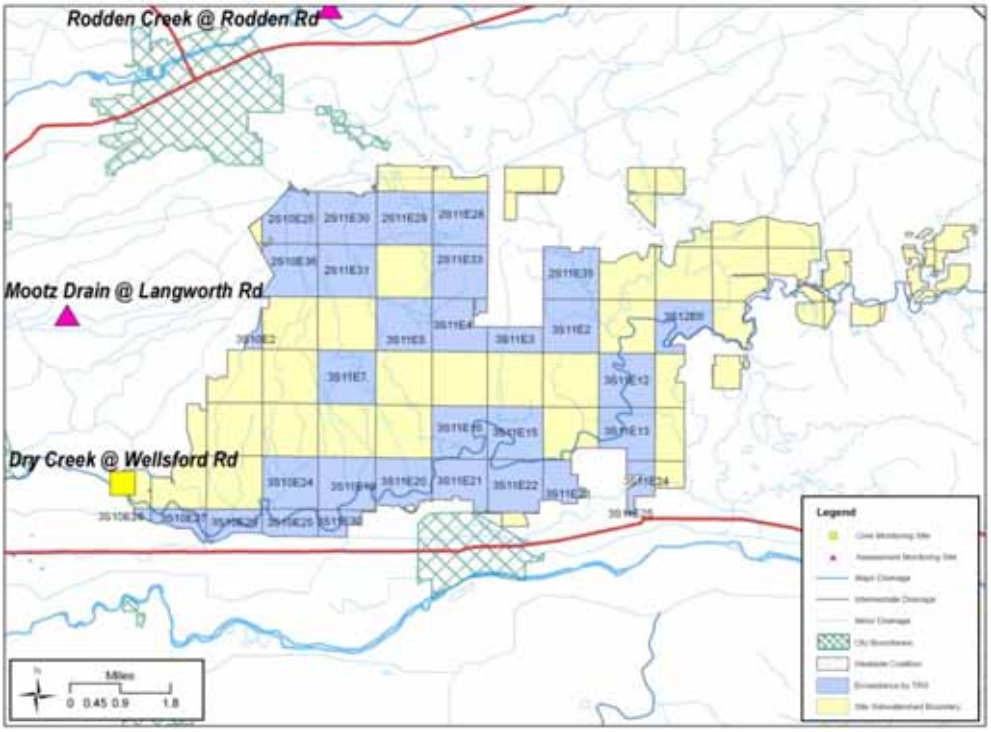


Figure I-7. Dry Creek @ Wellsford Road site subwatershed. APNs within TRS' with applications co-occurring with chlorpyrifos exceedances.

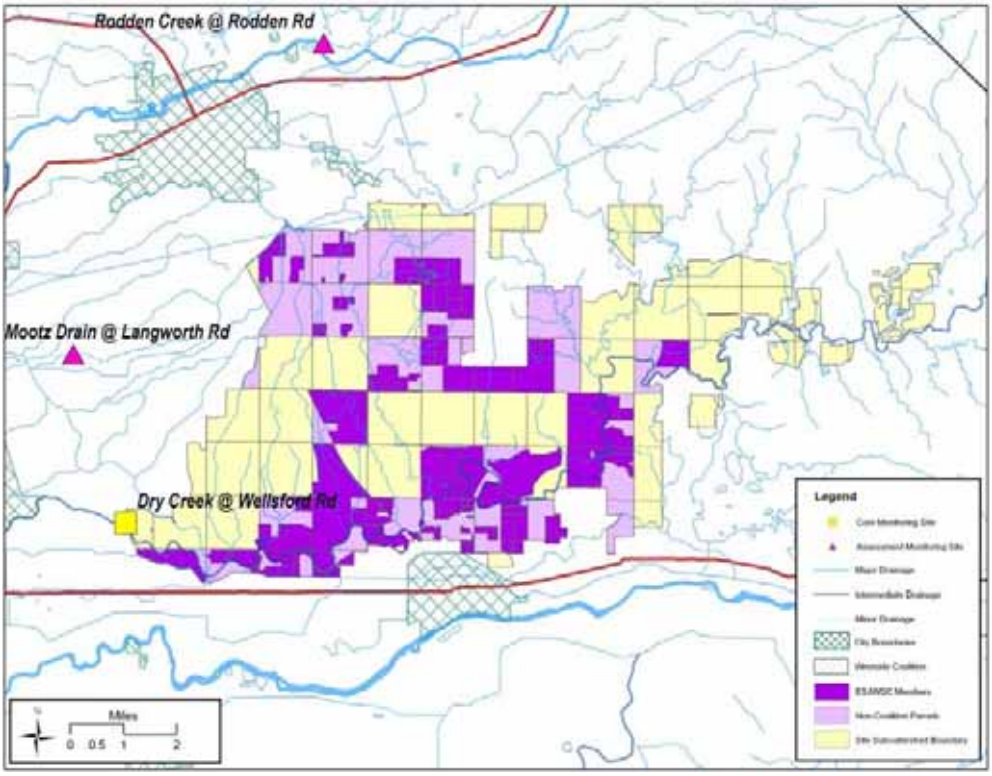


Figure I-8. Dry Creek @ Waterford Road (US) site subwatershed. TRS' with applications co-occurring with a chlorpyrifos exceedance.

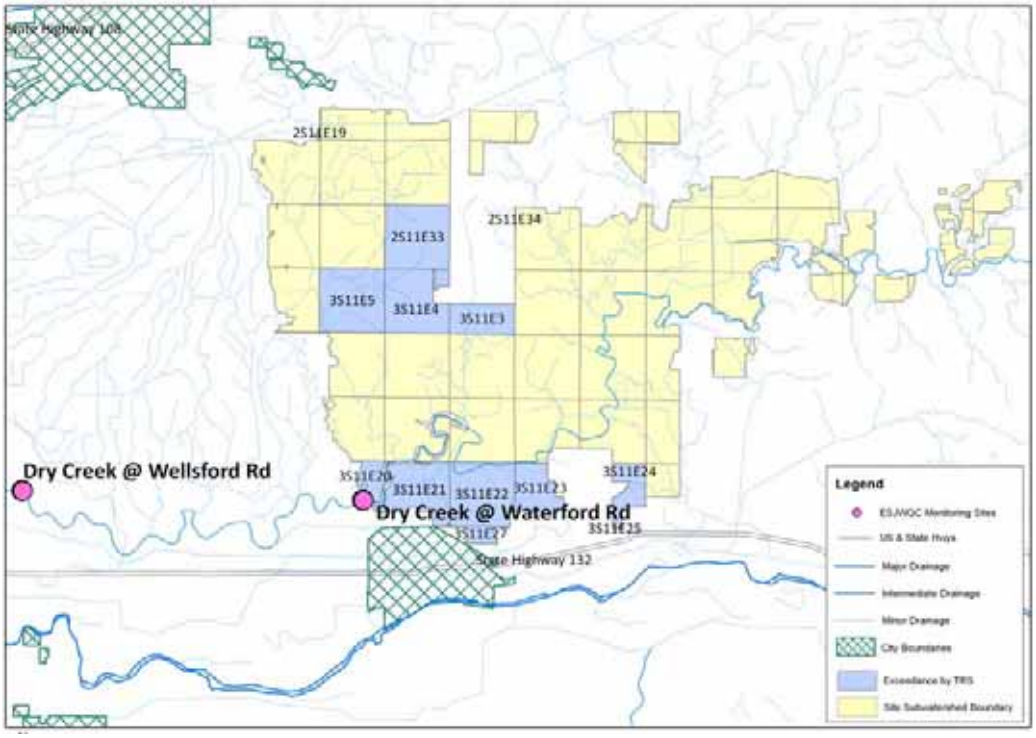
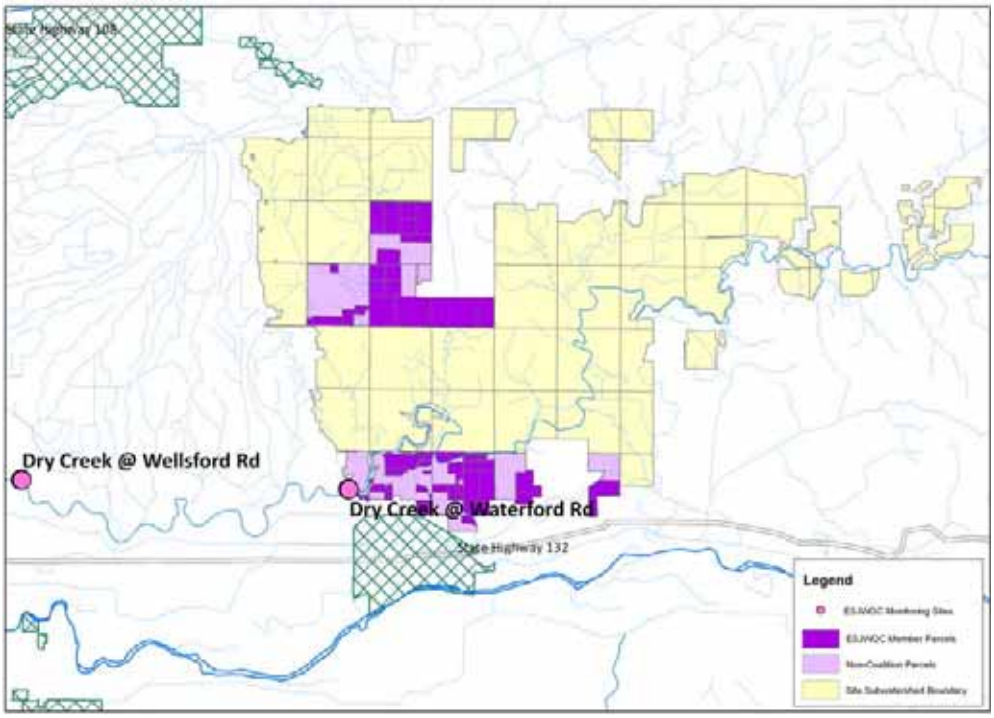


Figure I-9. Dry Creek @ Wellsford Road (US) site subwatershed. APNs within TRS' with applications co-occurring with chlorpyrifos exceedances.



Priority C Constituents

Dry Creek @ Wellsford Rd is listed for the following priority C constituents: copper, diuron and water column toxicity to *Ceriodaphnia dubia* and *Selenastrum capricornutum*.

Copper

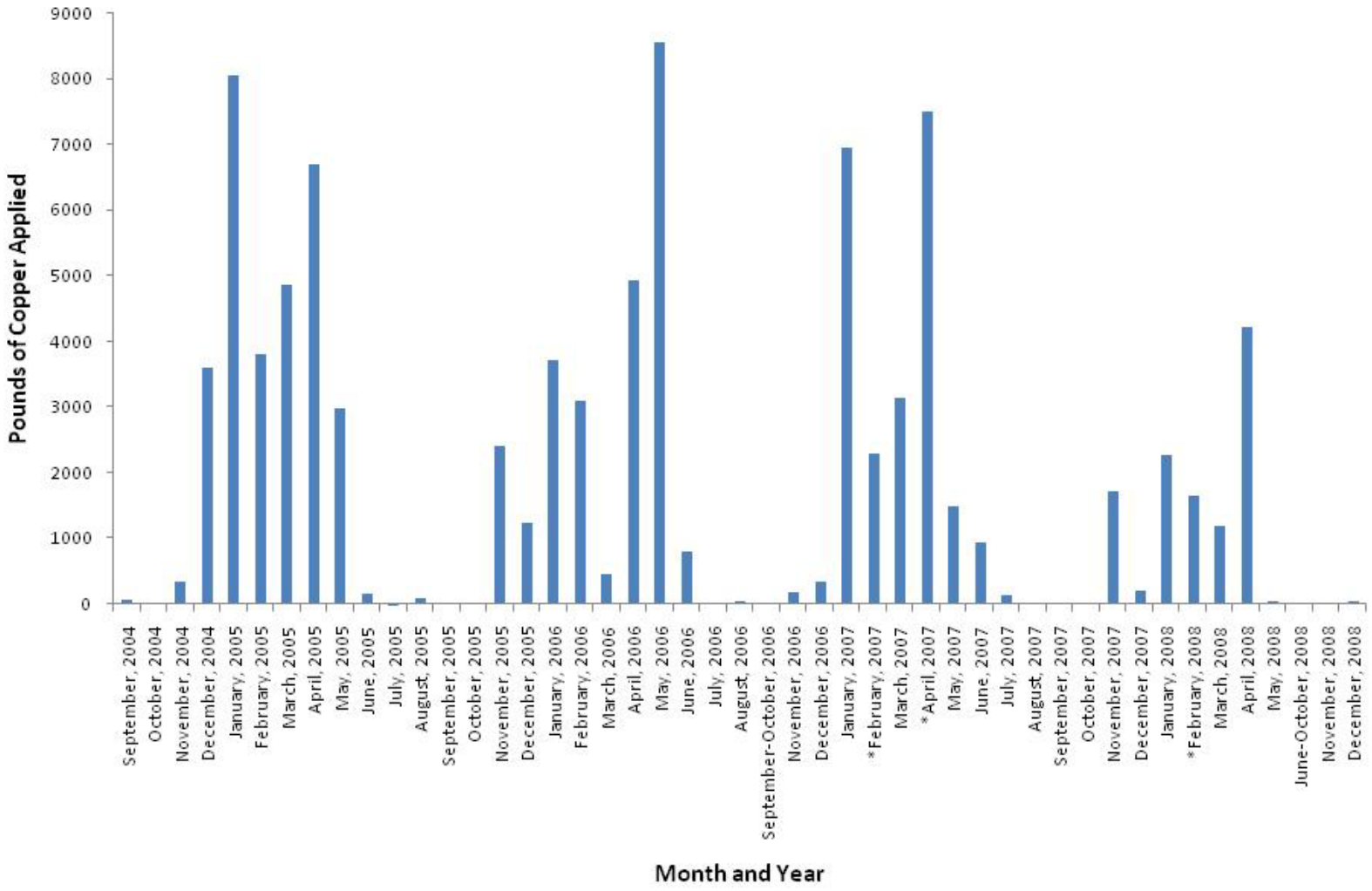
PUR data are used to evaluate copper applications prior to an exceedance within the Dry Creek @ Wellsford site subwatershed. Previous SAMRs included all copper PUR data which are summarized in this Management Plan update. Copper is one of the most heavily applied constituents in the site subwatershed. In keeping with applications in previous years, all applications occurred between November and May with the overwhelming majority of the applications between January and April (88% of applications between November 2007 and May 2008) (Table I-15, Figure I-10). The large number of applications is spread across the entire site subwatershed with applications in almost every section (Figures I-13, I-14). Since 2005, the amount of copper applied (pounds AI) and the number of applications has decreased annually (Table I-15, Figure 1-10).

Table I-15. Number of copper applications, total pounds AI applied and total acres treated by month for August 2004 through December 2008 in the Dry Creek @ Wellsford site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
September, 2004	2	70.0	20
November, 2004	4	345.3	709
December, 2004	9	3601.3	718
January, 2005	29	8069.7	1338.41
February, 2005	51	3809.9	1905.25
March, 2005	38	4863.3	1340.5
April, 2005	47	6703.1	2099.3
May, 2005	25	2986.1	721.7
June, 2005	3	161.6	72
July, 2005	1	0.5	10
August, 2005	2	84.3	35.12
September, 2005	1	15.0	10
November, 2005	2	2404.9	605
December, 2005	8	1243.9	343
January, 2006	29	3714.1	916
February, 2006	48	3098.8	1844.5
March, 2006	8	454.7	503
April, 2006	51	4937.9	1196.88
May, 2006	47	8561.3	1671.75
June, 2006	3	803.6	126

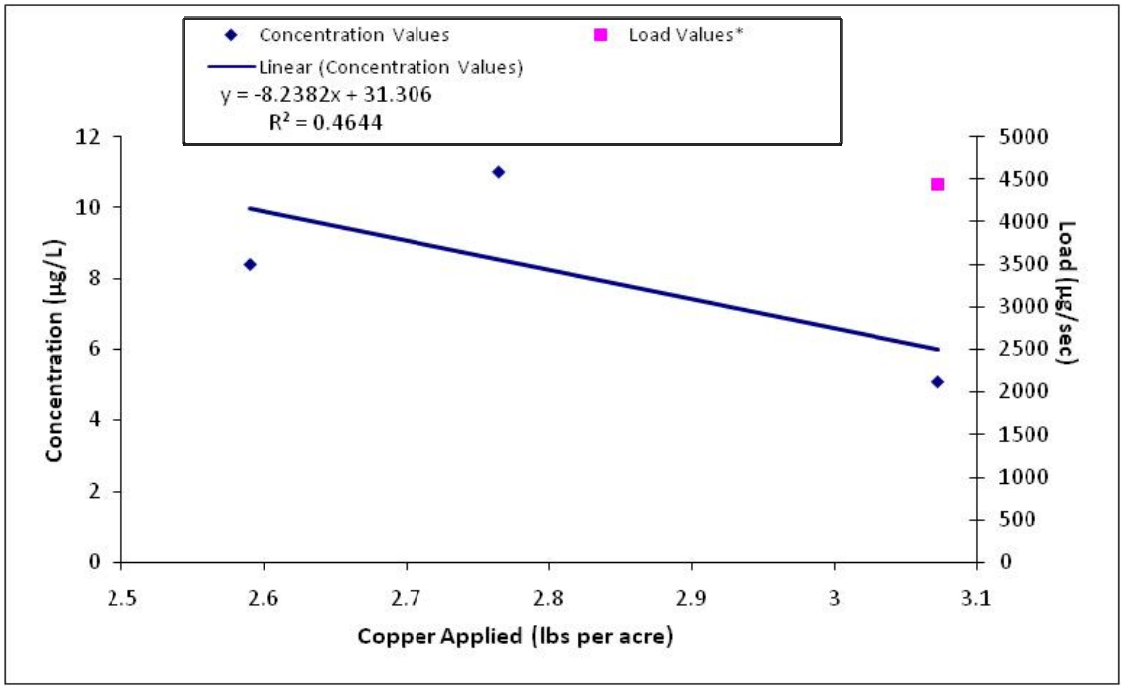
Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
August, 2006	2	49.5	22
November, 2006	4	177.8	57.5
December, 2006	4	353.9	51
January, 2007	20	6954.0	1517.2
February, 2007	46	2299.5	1562
March, 2007	27	3154.5	940
April, 2007	62	7496.8	2287
May, 2007	10	1491.9	224.75
June, 2007	3	938.1	100
July, 2007	2	129.0	43
August, 2007	1	18.0	6
October, 2007	1	32.3	3
November, 2007	5	1714.7	435
December, 2007	5	203.0	59
January, 2008	13	2275.9	563.5
February, 2008	37	1656.8	1224
March, 2008	15	1197.5	794
April, 2008	32	4213.7	1284
May, 2008	3	39.5	25
November, 2008	2	29.5	12
December, 2008	2	53.0	13.5
Summaries by Year			
2004 Total	15	4016.6	1447
2005 Total	207	30342.2	8480.28
2006 Total	196	22151.6	6388.63
2007 Total	182	24431.8	7176.95
2008 Total	104	9465.9	3916
Total	**704**	**90408.1**	**27408.86**

Figure I-10. Pounds of copper applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2004-2008. Asterisk (*) denotes months with exceedances.



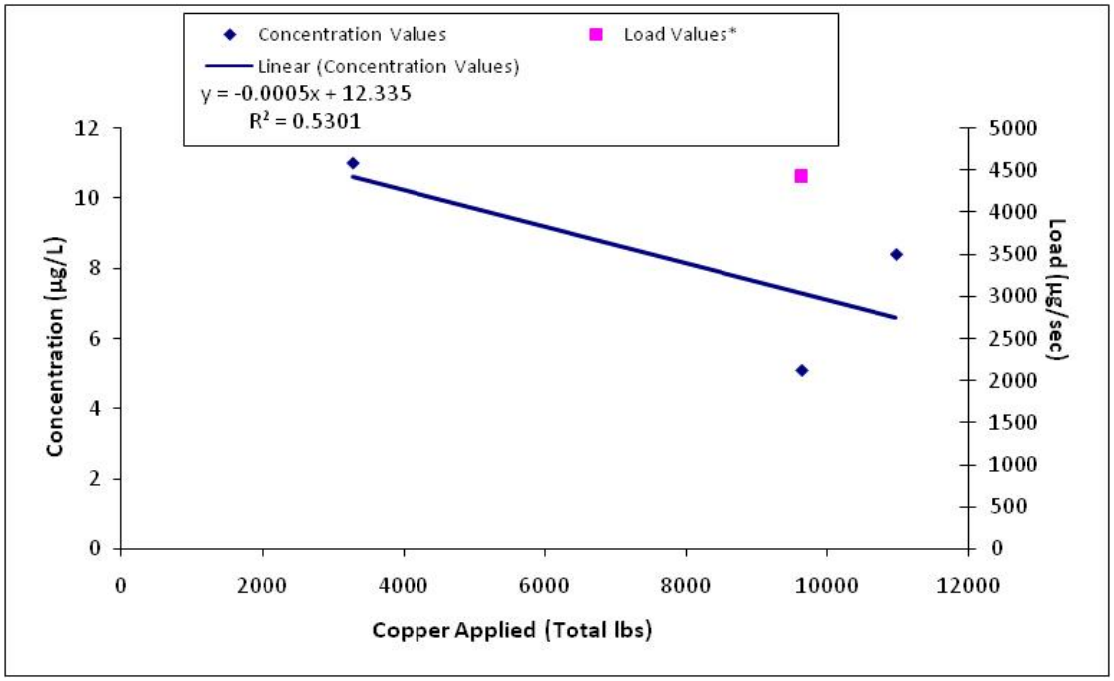
Similar to the analysis performed for chlorpyrifos, a linear regression analysis was performed to establish the relationship between application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure I-11), and application in total pounds applied over all acres (only those receiving applications) and concentration and load (Figure 1-12). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI were summed and divided by the summed acreage. Four products with copper as the active ingredient were included in the analysis. The intercept was not set to zero as there could be natural copper in the system that would serve as a baseline value. Unlike the chlorpyrifos analysis, copper applications were included in the analysis if they occurred within twelve weeks of the detection. Copper does not degrade and could remain in place until moved to a surface water body. It is unclear if the twelve week window is sufficient, but summing applications from a longer window dilutes out the effects of recent applications. Statistically, using longer than twelve weeks for applications may make the points in the regression analysis non-independent as the same applications contribute to the average pounds AI per acre for several detections. For the analysis reported below, some interdependence was allowed for data points that were temporally close because the same application in the previous few months could contribute to both detections.

Figure I-11. Copper exceedance concentrations and loads compared to application rates (average lbs per acre) for the Dry Creek @ Wellsford Rd site subwatershed for applications within twelve weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for 2 of the 3 exceedance dates, thus no trend line could be drawn for Load Values.

Figure I-12. Copper exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Dry Creek @ Wellsford Rd site subwatershed for applications within twelve weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for 2 of the 3 exceedance dates, thus no trend line could be drawn for Load Values.

The regression of concentration and pounds applied (AI) per acre indicated a negative relationship with application rate (Figures I-11, I-12). Unfortunately, because the exceedance concentration changes with hardness, it is difficult to determine if the exceedances are a result of changes in application rate or changes in hardness in the water column. Alternatively, the negative relationship indicates that a small group of growers are responsible for the exceedances. The negative relationship is based on very few points and until additional data points are available, the relationship suggests that a small group of growers near the creek are responsible.

These data are all based on total copper, and the Coalition is now measuring dissolved copper. Until more data are available, understanding the relationship between application rates and concentration will be difficult. The Coalition will address this issue when more dissolved copper data are available.

In the few months prior to the first exceedance (2/28/07), there were 67 applications of copper to portions of 23 different TRS' (Table I-16). Although some applications were made to peaches, plums, cherries, and pistachios, the overwhelming majority of the applications were made to almonds. The average application rate was 3.01 pounds AI per acre. There were 63 applications in the two months between the first and second exceedance (March – April 17, 2007) in 20 different TRS'. There was one application on grapes and one on peaches, five applications on almonds, and the remainder of applications was to walnuts. The average application rate was 3.87 pounds AI per acre. Of the 30 total applications prior to the 2/26/2008 exceedance, all were to almonds with the exception of seven applications to peach, plum, grapes, and others. The 2006-2008 combined overall average application rate was 3.74 pounds AI per acre.

To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Tables I-17, I-18, I-19). There were 14 sections associated with all exceedances, i.e. there were applications to parcels in the same TRS prior to all three exceedances. Each TRS had between 1 and 20 applications prior to the exceedances. However, it appears that applications were made to different parcels prior to the first exceedance relative to the second exceedance in 2007 as almonds received the first application and walnuts the second. This trend may have continued in 2008 as prior to the January exceedance most applications were to almonds. PURs indicate no applications to walnuts during 2008, and consequently there was no exceedance in February of 2008. Applications were made over a large portion of the watershed on parcels of members and nonmembers (Figures I-13, I-14).

Table I-16. Dry Creek @ Wellsford Rd site subwatershed. All TRS with more than one association between an application and exceedance for copper in 2005-2008. Table summarizes the number of applications associated with an exceedance for a given date and TRS.

TRS*	Copper Applications per Date of Exceedance		
	2/28/2007	4/17/2007	2/26/2008
2S10E26	3	3	1
2S11E28	1	2	
3S10E14	2	2	1
3S10E21	4	4	1
3S10E25	3	6	
3S10E26		3	
3S10E27	1	5	1
3S10E28	3	6	1
3S11E12		2	1
3S11E13		2	
3S11E15	2	2	
3S11E18	6	11	
3S11E20	2	5	
3S11E21	2	4	1
3S11E22	1	5	1
3S11E23	3	8	
3S11E24	1	1	
3S11E25	3	6	1
3S11E27	2	2	2
3S11E28	3	3	
3S11E29	11	20	3
3S11E30	8	10	5
3S11E4	1	1	1
3S11E5	1	3	2
3S11E6	3	3	3
3S11E8	1	1	
2S10E24			1
3S11E2			3
3S11E3			1

*Bolded TRS are members of the Coalition

Table I-17. Dry Creek @ Wellsford Rd site subwatershed. TRS' with copper applications in the month prior to each exceedance date during 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant copper applications.

TRS*	Exceedance Date		
	2/26/2008		
	Application Date	Pounds Applied	Acres Treated
3S10E14	1/30/2008	64.56	20
3S10E21	12/12/2007	2.15	2
3S10E27	12/19/2007	60.41	9
3S10E28	1/14/2008	200.20	26
3S11E12	1/19/2008	261.80	42.5
3S11E2	12/11/2007	9.68	3
	1/2/2008	48.42	14
	1/18/2008	808.50	175
3S11E21	2/26/2008	22.88	15
3S11E22	1/31/2008	40.49	24
3S11E25	1/31/2008	461.45	110
3S11E27	1/31/2008	69.17	41
	1/31/2008	101.23	60
3S11E29	1/23/2008	74.17	13
	2/25/2008	10.49	10
	2/26/2008	64.11	38
3S11E3	1/1/2008	11.41	2
3S11E30	1/17/2008	50.61	20
	2/25/2008	6.75	4
	2/25/2008	30.37	18
	2/25/2008	55.68	33
	2/26/2008	16.87	10
3S11E4	2/25/2008	12.32	160
3S11E5	12/26/2007	63.91	22
	12/27/2007	66.84	23
3S11E6	2/13/2008	145.26	55
	2/13/2008	290.52	100
	2/14/2008	145.26	56

*Bolded TRS are members of the Coalition.

Figure I-13. Dry Creek @ Wellsford Rd. TRS that have had applications co-occurring with a copper exceedance.

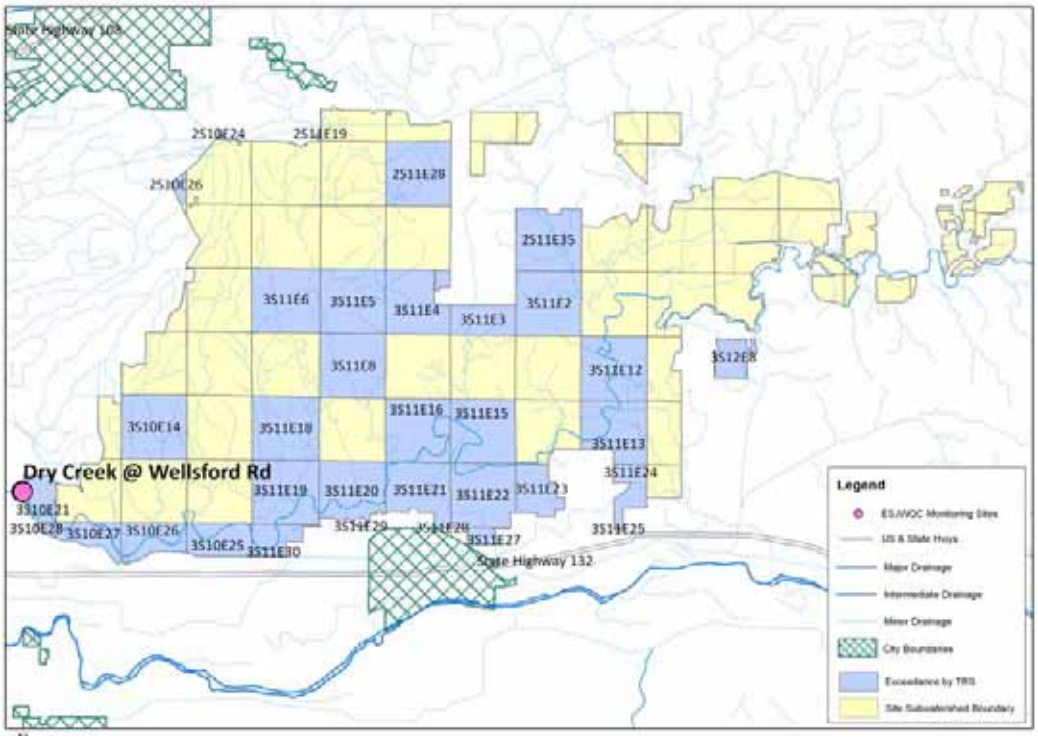
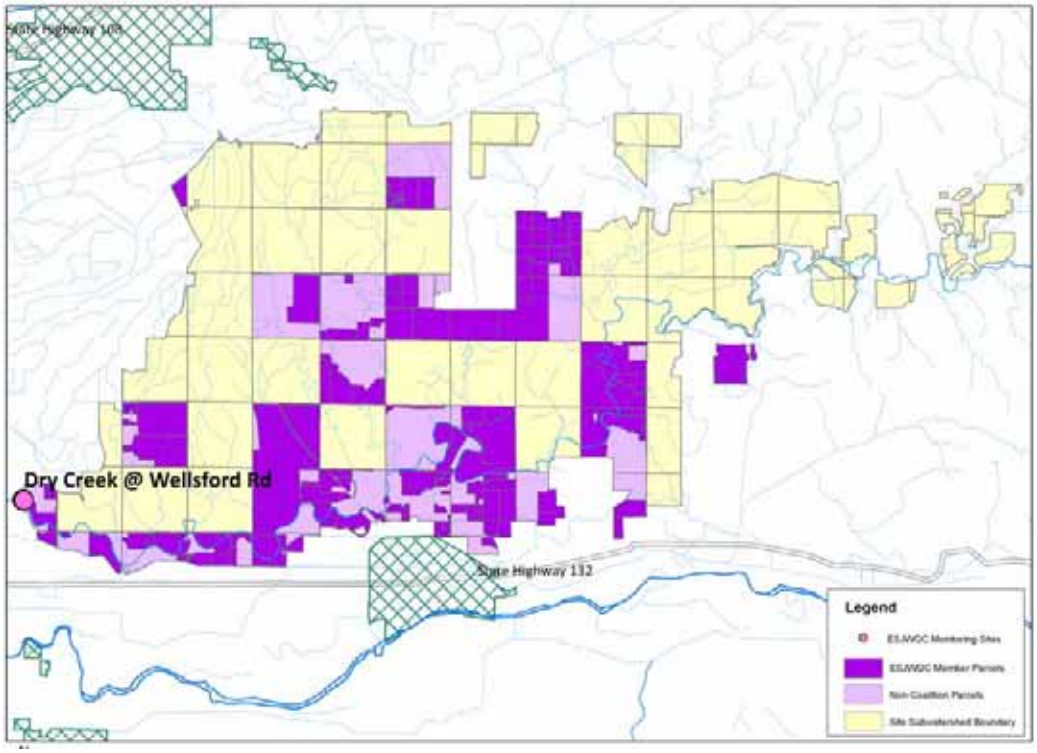


Figure I-14. Dry Creek @ Wellsford Rd. Member APNs relative to TRS with applications co-occurring with copper exceedances.



The updated analyses conducted by the Coalition suggest that management of copper in this watershed now should focus on providing information to specific growers located adjacent to Dry Creek to encourage the retention of water and sediment on the fields, especially during the dormant season. The Coalition will begin measuring total and dissolved metals this upcoming monitoring season and should be able to more accurately assess which management practices will be effective for copper. The Coalition's approach to outreach this last winter has been to identify specific growers with a potential to discharge to Dry Creek and conduct individual visits. While slow, this approach is likely to provide greater improvements in water quality compared to large group meetings.

Diuron

Diuron is a soluble herbicide applied in the Dry Creek watershed primarily in the months of October – May. The month with the largest amount AI applied varied from year to year with large applications in October 2004, January and November 2006, and January 2007 (Table I-18, Figure I-15).

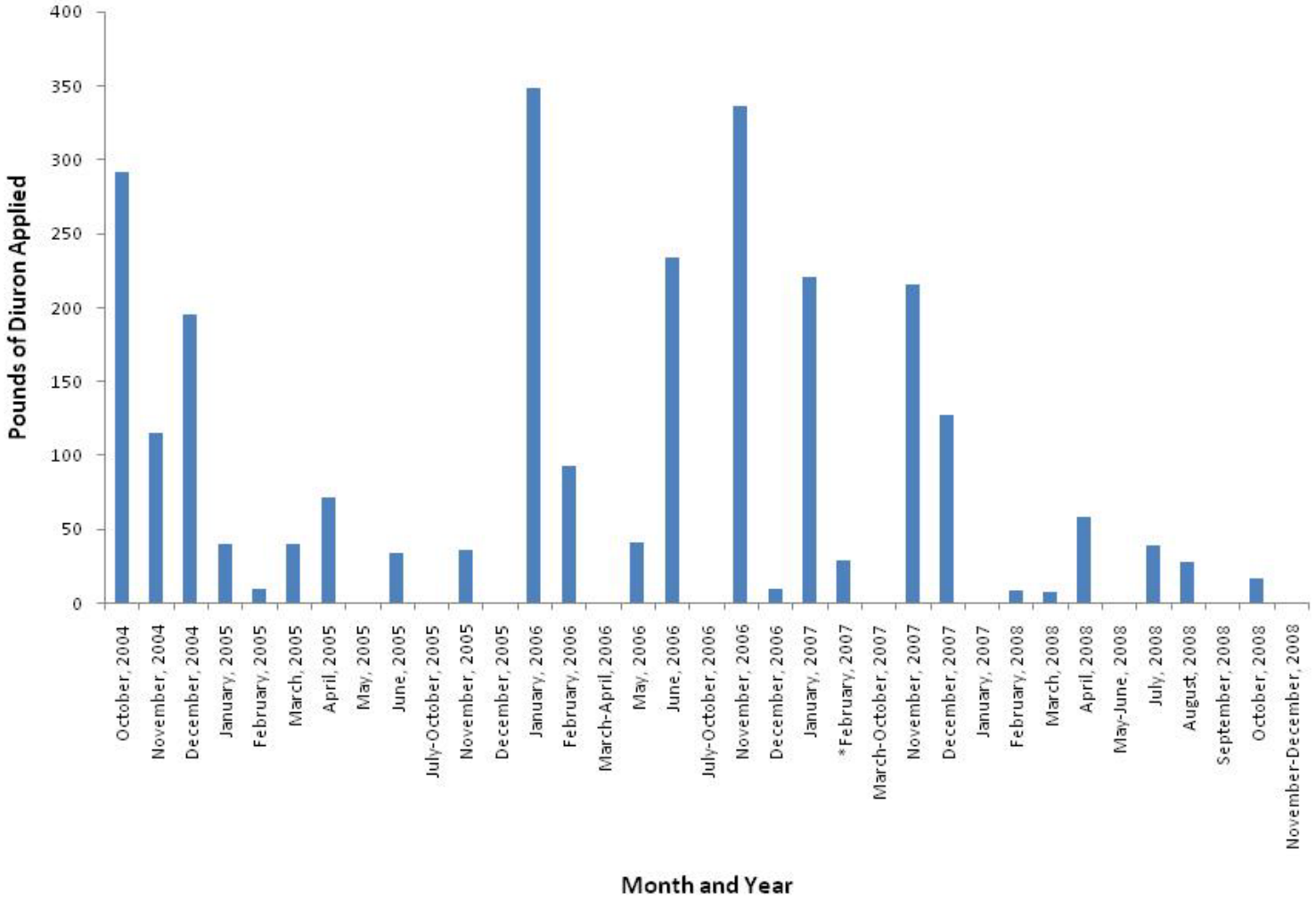
There are only two applications associated with 2007 exceedances within one month of sampling. A third application occurred approximately five weeks prior to the first exceedance and a fourth application occurred approximately seven weeks prior to the first exceedance. Diuron did not exceed the WQTL (2 µg/L) during 2008 monitoring and there was no reported use of diuron during 2008.

Table I-18. Number of diuron applications, total pounds AI applied and total acres treated by month for August 2004-December 2008 in the Dry Creek @ Wellsford Rd site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
October, 2004	3	291.4	196
November, 2004	2	115.4	87
December, 2004	8	195.1	72.6
January, 2005	2	40.5	42
February, 2005	1	9.8	6
March, 2005	1	40.2	25.76
April, 2005	3	72.4	70
June, 2005	1	34.2	17.5
November, 2005	3	36.1	47
January, 2006	2	348.1	338.5
February, 2006	3	93.0	38
May, 2006	2	41.8	33
June, 2006	1	233.9	320
November, 2006	4	336.3	430
December, 2006	1	10.1	7

Month/Year	Number of Diuron Applications	Pounds of AI Applied	Acres Treated
January, 2007	2	220.4	156
February, 2007	1	29.3	40
November, 2007	1	215.6	275
December, 2007	6	128.1	409
February, 2008	2	9.0	11.3
March, 2008	1	7.7	24
April, 2008	1	58.5	40
July, 2008	4	39.6	39
August, 2008	2	28.4	26
October, 2008	1	17.0	42.5
Summaries by Year			
2004 Total	13	601.8	355.6
2005 Total	11	233.1	208.26
2006 Total	13	1063.2	1166.5
2007 Total	10	593.4	880
2008 Total	11	160.2	182.8
Total	**58**	**2651.6**	**2793.16**

Figure I-15. Pounds of diuron applied within the Dry Creek @ Wellsford Rd site subwatershed by month for 2004-2008. Asterisk (*) denotes months with exceedances.



Ceriodaphnia dubia toxicity

There was no *Ceriodaphnia* toxicity in 2008 during either normal monitoring or Management Plan Monitoring. Even when an exceedance of chlorpyrifos occurred in July 2008, there was no *Ceriodaphnia* toxicity.

The Coalition's strategy for eliminating *Ceriodaphnia* toxicity has been to focus on soluble pesticides, represented by chlorpyrifos (see above section on chlorpyrifos sources). Individual growers are contacted and *Ceriodaphnia* toxicity is discussed.

Selenastrum capricornutum toxicity

Selenastrum toxicity occurred once during 2008 storm season. The toxicity was associated with an exceedance level concentration of copper. The two are closely tied as copper is used as an algicide as well as a fungicide.

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

Priority D Constituents

As a result of 2008 monitoring, *Hyalella azteca* is now listed as a Priority D constituent in the Dry Creek site subwatershed. Both the storm and irrigation seasons experienced one toxicity each during 2008 monitoring.

Priority E Constituents

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

DO/pH

Two DO exceedances occurred in the fall of 2008; October and December (Table I-17). Both occurred during the period of very low flow. The December exceedance was accompanied by an exceedance of pH.

E. coli

A single exceedance of the *E. coli* WQTL occurred in October 2008. Again, the source of the *E. coli* exceedance is unknown given that irrigation return flows were minimal in the period after harvest.

The Coalition's approach to managing DO, *E. coli*, and pH will remain the same as outlined in the September Management Plan.

2009 Management Plan Monitoring

Dry Creek @ Wellsford is currently a Core Monitoring location and will be monitored every month for nutrients, physical parameters and field parameter. The Coalition will monitor for assessment site constituents in 2011. The Coalition will conduct Management Plan Monitoring at Duck Slough @ Whealan Rd and Waterford Rd during July and August for chlorpyrifos. The Coalition will also collect samples during the first storm event for copper and *Selenastrum* toxicity.

Outreach

The Coalition conducts numerous types of outreach to its membership:

- General grower meetings on a county level,
- Subwatershed specific grower meetings,
- Crop specific grower meetings (may be specified by crop, chemical use or seasonal practices i.e. dormant season orchard),
- Individual contacts,
- Mailings of crop-specific BMP literature.

The Coalition outreach for the Dry Creek subwatershed includes grower meetings, individual contacts and mailing/distribution of information. All activities performed during the October 2008 - March 2009 period are summarized in the Summary of Coalition Outreach Activities section of the Management Plan update.

County meetings for all growers, including Dry Creek growers were held in December 2008. Information on exceedances was provided and Dry Creek was a focus of discussion given its priority watershed status. Additionally, Dry Creek was the first location for intensive individual contacts. Growers with property adjacent to Dry Creek were contacted and visits conducted to discuss water quality exceedances, tour the property, and discuss opportunities for implementation of additional management practices. Further details are provided below.

Evaluation

One approach for evaluating the success of management practice implementation in the subwatershed is through evaluating information on management practices used on farm properties adjacent to Dry Creek.

As a result of previous exceedances, survey results, and outreach, the Coalition is focused on contacting specific growers. Targeted growers are located adjacent to Dry Creek and have applied chlorpyrifos or copper in months previous to water quality exceedances. Of the 15,984

acres in the subwatershed, the Coalition has targeted 6,510 acres for individual contacts. To date, the Coalition has conducted meetings with seven growers covering 4,313 acres (66%) of the targeted acreage. The Coalition will continue to contact individual growers as time permits.

II. DUCK SLOUGH @ HIGHWAY 99

Management Plan Constituents

Priority A

- Chlorpyrifos

Priority C

- Copper

Priority D

- *Hyalella azteca* sediment toxicity

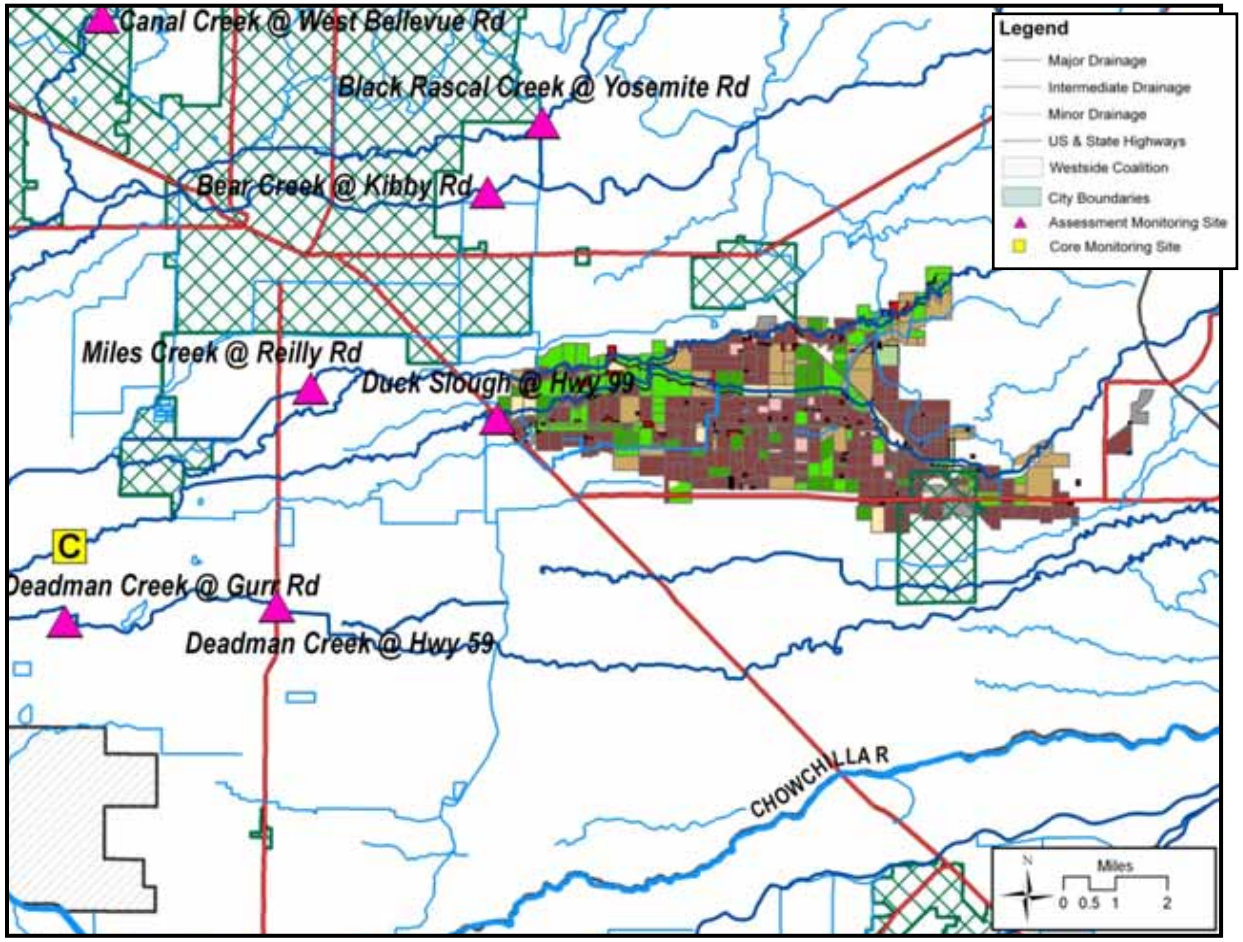
Priority E

- *E. coli*
- pH
- Lead
- *Selenastrum capricornutum* water column toxicity

Description of Duck Slough @ Hwy 99 Site Subwatershed

Duck Slough @ Hwy 99 (15,622 irrigated acres) is located upstream of the Duck Slough @ Gurr Road site and was selected to determine relative contribution of water quality impairments in the upstream portion of the Duck Slough subwatershed. Duck Slough originates in the Sierra foothills and flows west eventually joining with Deadman Creek in the western portion of the coalition region. The monitoring site is located just east of Highway 99 south of Planada and Merced. Irrigated agriculture in this site subwatershed is primarily deciduous orchards, with truck crops and irrigated pasture the next most common land uses (Figure II-1).

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



Subwatershed Monitoring History

Duck Slough site subwatershed was first monitored during the storm season of 2005 at Duck Slough @ Highway 99 (Table II-1). The constituents sampled at this location from 2005-2008 are listed in Table II-2. Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and included additional sampling at Duck Slough @ Highway 99 in July for chlorpyrifos and in August and September for copper (Table II-3). Upstream Management Plan Monitoring occurred during the 2008 irrigation season at Duck Slough @ Whealan Road for chlorpyrifos and copper during specific months of the 2008 irrigation season (Table II-4). This location was selected based on a review of PUR data indicating likely upstream sources. The upstream monitoring site was selected to cut the watershed into smaller areas which will allow an analysis of the contribution of each portion of the watershed to the load measured at the Duck Slough @ Highway 99 site. Sampling locations for the Duck Slough subwatershed are provided in Table II-5 and Figure II-2.

Duck Slough is proposed for listing on the 2008 Central Valley Basin Plan 303d list.

The Coalition is in the process of finalizing a contract with Merced County Agricultural Commissioner to conduct creek walks similar to those conducted in Stanislaus County. Work is anticipated to begin in Fall/Winter 2009. Once the results have been evaluated, the Coalition anticipates contacting individual member growers in the Duck Slough subwatershed identified as having potential discharge points into Duck Slough. Landowners with potential discharge points who are Coalition members will be contacted first to discuss options for mitigating any farm runoff. The Coalition anticipates contacting individual member growers during the winter 2009 and spring 2010 and returning with follow-up interviews in spring 2011. Names of non members who are identified in the creek walk with discharges will be forwarded to the Regional Water Board.

Table II-1. Duck Slough @ Hwy 99 sampling events per season and year. An irrigation season sampling event encompasses normal monitoring and any associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall event encompasses normal monitoring.

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

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

Table II-2. Number of analyses performed per analyte in each sampling season and year for the Duck Slough @ Hwy 99 sample site. Only environmental samples with a sample replicate and lab replicate number of one are shown.

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

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Organophosphates										
EPA 8141A	Azinphos methyl				5	2	7	2	6	
EPA 8141A	Chlorpyrifos	2	5	2	5	2	7	2	6	
EPA 8141A	Diazinon	2	5	2	5	2	7	2	6	
EPA 8141A	Dimethoate				5	2	7	2	6	
EPA 8141A	Disulfoton				5	2	7	2	6	
EPA 8141A	Malathion				5	2	7	2	6	
EPA 8141A	Methamidophos				5	2	6	2	6	
EPA 8141A	Methidathion				5	2	7	2	6	
EPA 8141A	Molinate				5	2	7	2	6	
EPA 8141A	Parathion, Methyl				5	2	7	2	6	
EPA 8141A	Phorate				5	2	7	2	6	
EPA 8141A	Phosmet				5	2	7	2	6	
EPA 8141A	Thiobencarb				5	2	7	2	6	
Pyrethroids										
EPA 8081A	Bifenthrin			2	5	2	6			
EPA 8081A	Cyfluthrin, total			2	5	2	6			
EPA 8081A	Cyhalothrin, lambda, total	2	5	2	5	2	6			
EPA 8081A	Cypermethrin, total	2	5	2	5	2	6			
EPA 8081A	Esfenvalerate/ Fenvalerate, total	2	5	2	5	2	6			
EPA 8081A	Permethrin, total	2	5	2	5	2	6			
Triazines										
EPA 547M	Glyphosate				5	2	6	2	6	
EPA 549.2M	Paraquat dichloride				5	2	6	2	6	
EPA 619	Atrazine				5	2	6	2	6	
EPA 619	Cyanazine				5	2	6	2	6	
EPA 619	Simazine				5	2	6	2	6	
Metals (Total)										
EPA 200.8	Arsenic				5	2	6	2	6	
EPA 200.8	Boron				5	2	6	2	6	

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 200.8	Cadmium				5	2	6	2	6	
EPA 200.8	Copper				5	2	8	2	6	
EPA 200.8	Lead				5	2	6	2	6	
EPA 200.8	Nickel				5	2	6	2	6	
EPA 200.8	Selenium				5	2	2	2	6	
EPA 200.8	Zinc				5	2	6	2	6	
Nutrients										
EPA 130.2	Hardness as CaCO3				5	2	8	2	6	
EPA 300.0	Nitrate as N				5	2	6	2	6	
EPA 350.2	Ammonia as N				5	2	6	2	6	
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	2	6	
EPA 354.1	Nitrite as N				5	2	6	2	6	
EPA 365.2	OrthoPhosphate as P				5	2	6	2	6	
EPA 365.2	Phosphate as P				5	2	6	2	6	
Toxicity										
EPA 821/R-02-012	*Ceriodaphnia dubia*	2	5	2	6	2	7	2	6	
EPA 821/R-02-012	*Pimephales promelas*	2	5	2	5	2	7	2	6	
EPA 821/R-02-013	*Selenastrum capricornutum*	2	7	2	5	2	7	2	7	
EPA 600/R-99-064	*Hyalella azteca*			1	1	1	1	1	2	

Table II-3. Duck Slough site subwatershed. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and copper. "X" indicates the site, month, and analyte sampled.

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

Table II-4. Duck Slough site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos and copper. X indicates the site, month and analyte sampled.

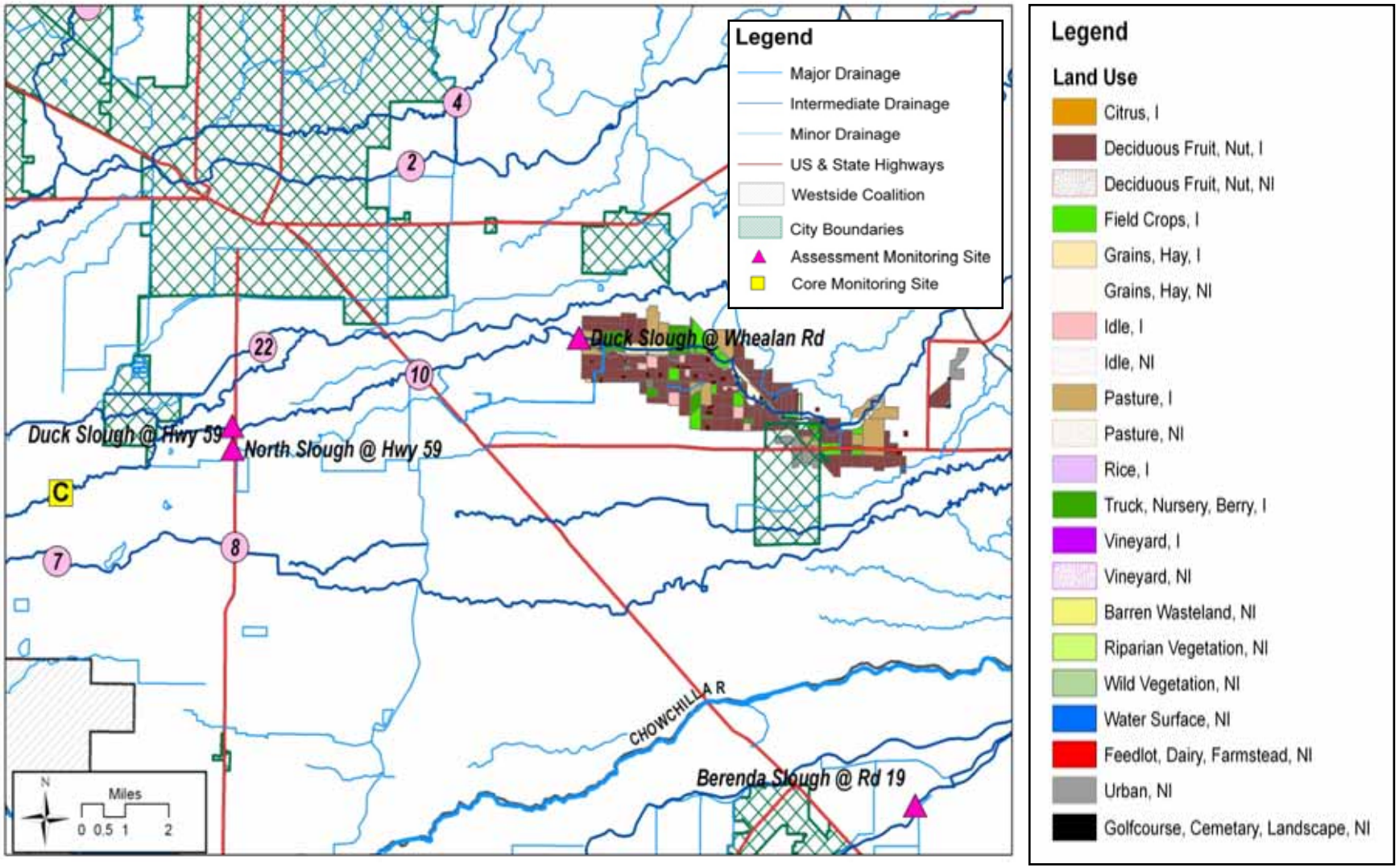
Station Name	Date	Type	Chlorpyrifos	Copper
Duck Slough @ Whealan Rd	29-Apr-08	U		X
Duck Slough @ Whealan Rd	27-May-08	U	X	
Duck Slough @ Whealan Rd	24-Jun-08	U		X
Duck Slough @ Whealan Rd	29-Jul-08	U	X	X
Duck Slough @ Whealan Rd	26-Aug-08	U		X
Duck Slough @ Whealan Rd	30-Sep-08	U		X

Table II-5. Coordinates of the Duck Slough site subwatershed sampling locations.

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

*Original ESJWQC sampling site
[U] Upstream sites

Figure II-2. Site subwatershed map of land use for the Duck Slough @ Whealan Rd upstream sample site. ("10" = Duck Slough @ Hwy 99 site location.)



Exceedance History

Sampling at Duck Slough @ Hwy 99 has resulted in exceedances of field and physical parameters, *E. coli,* metals, and chlorpyrifos. Toxicity in the water column to *Ceriodaphnia dubia* and *Selenastrum capricornutum* and in the sediment to *Hyalella azteca* has also occurred at this monitoring site (Table II-6).

During ambient water monitoring at Duck Slough @ Hwy 99 (including upstream sampling at Duck Slough @ Whealan Rd), exceedances of numerous field, physical, inorganic and organic parameters have occurred including DO (1), pH (3), and *E. coli* (3) (Table II-6). Four exceedances of the chlorpyrifos WQTL occurred, once per year in varying months across the irrigation season (Table II-6). The analysis of metals was initiated during the 2006 irrigation season, and 14 exceedances of the copper WQTL and 11 of the lead WQTL occurred in this subwatershed (Table II-6). Three of the four copper exceedances during the 2008 irrigation season occurred at the upstream Management Plan Monitoring site Duck Slough @ Whealan Road. Samples taken from Duck Slough have also resulted in water column toxicity to *Ceriodaphnia* once and to *Selenastrum* three times; sediment toxicity to *Hyalella* occurred twice, both during the 2008 irrigation season (Table II-6). Based on the exceedances at the Duck Slough @ Highway 99 site subwatershed, the constituents receiving the highest priorities were chlorpyrifos (A) and copper (C).

Table II-6. All exceedances experienced in samples collected from locations within the Duck Slough site subwatershed between July 2004 and December 2008 (sorted by season and date).

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	E. coli, MPN/100 mL	Copper[1], µg/L	Lead[1], µg/L	Chlorpyrifos, µg/L	*Ceriodaphnia dubia*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)
Duck Slough @ Hwy 99	Irrigation	10-May-05			1600						
Duck Slough @ Hwy 99	Irrigation	12-Jul-05						0.026		1320000	
Duck Slough @ Hwy 99	Irrigation	17-May-06		8.57	280		5.2 (3.02)	0.27	0		
Duck Slough @ Hwy 99	Irrigation	14-Jun-06			260						
Duck Slough @ Hwy 99	Irrigation	8-Aug-06				3.4 (2.4)	2.3 (0.41)				
Duck Slough @ Hwy 99	Irrigation	13-Sep-06	6.72		340	19 (5)	24 (1.25)				
Duck Slough @ Hwy 99	Irrigation	24-Apr-07				4.1 (3.7)	1.5 (0.81)				
Duck Slough @ Hwy 99	Irrigation	26-Jun-07				3 (2.4)	0.68 (0.41)				
Duck Slough @ Hwy 99	Irrigation	24-Jul-07				3.5 (3)	0.64 (0.57)				
Duck Slough @ Hwy 99	Irrigation	31-Jul-07		8.8				0.042			
Duck Slough @ Hwy 99	Irrigation	21-Aug-07				5.5 (3.3)	1.1 (0.69)				
Duck Slough @ Hwy 99	Irrigation	28-Aug-07				3.1 (2.4)					
Duck Slough @ Hwy 99	Irrigation	18-Sep-07			610	6.9 (2.8)	1.8 (0.52)				
Duck Slough @ Hwy 99	Irrigation	29-Apr-08			280					937637	
Duck Slough @ Hwy 99	Irrigation	7-May-08								18219	
Duck Slough @ Whealan Rd	*Irrigation*	*24-Jun-08*				*73 (5.0)*					
Duck Slough @ Hwy 99	Irrigation	29-Jul-08				2.7 (2.6)	0.69 (0.5)				
Duck Slough @ Hwy 99	Irrigation	26-Aug-08					0.72 (0.69)				
Duck Slough @ Whealan Rd	*Irrigation*	*26-Aug-08*				*3.4 (1.9)*					
Duck Slough @ Hwy 99	Irrigation	28-Aug-08									84
Duck Slough @ Hwy 99	Irrigation	30-Sep-08						0.034			
Duck Slough @ Whealan Rd	*Irrigation*	*30-Sep-08*				*3.7 (1.3)*					
Duck Slough @ Hwy 99	Irrigation	2-Oct-08									87
Duck Slough @ Hwy 99	Storm	21-Mar-05			1600						
Duck Slough @ Hwy 99	Storm	15-Mar-06			900						
Duck Slough @ Hwy 99	Storm	12-Feb-07			2400	31 (10.1)	15 (3.59)				

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	E. coli, MPN/100 mL	Copper[1], µg/L	Lead[1], µg/L	Chlorpyrifos, µg/L	*Ceriodaphnia dubia*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)
Duck Slough @ Hwy 99	Storm	28-Feb-07			2400						
Duck Slough @ Hwy 99	Storm	25-Jan-08			>2400						
Duck Slough @ Hwy 99	Storm	25-Feb-08			>2400	9.9 (8.0)					
Duck Slough @ Hwy 99	Storm	4-Mar-08		8.65							
Priorities			**NP[2]**	**E**	**E**	**C**	**E**	**A**	**NP[2]**	**E**	**D**

[1] Water quality trigger for each sample is based on hardness and is shown in parenthesis.
[2] NP – Not prioritized. Fewer than two exceedances for this constituent at this site within three years.

2007 and 2008 Management Plan Monitoring Results

Under the Coalition's Management Plan, the Coalition performed additional sampling at this location during the 2008 irrigation season for chlorpyrifos and copper (Table II-4). To facilitate comparison with 2007 data, a summary of results from 2007 are provided. Chlorpyrifos was detected in samples collected during normal July 2007 monitoring (0.011 µg/L) below the WQTL, however samples collected one week later on July 31, 2007 exceeded the WQTL (0.42 µg/L) (Table II-7). Copper exceedances occurred in samples collected in 2007 during all months sampled from February – September including additional samples collected on August 28, 2007 (Table II-7). In accordance with the 2008 upstream Management Plan Monitoring schedule, Duck Slough @ Whealan Road was monitored for chlorpyrifos during May and July 2008 and for copper during April, June, July, August, and September 2008 (previous section, Table II-4). Chlorpyrifos was detected at both sites during July monitoring and exceeded WQTL at Duck Slough @ Highway 99 during September monitoring. Copper exceedances occurred once during normal monitoring in July and three times at the upstream site during June, August, and September.

Table II-7. Duck Slough site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for chlorpyrifos and copper from the 2007-2008 irrigation seasons. Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (@ Hwy 99)	Date	4/24/07	5/29/07	6/26/07	7/24/07	8/21/07	9/18/07
	Chlorpyrifos (µg/L)	<0.00259	<0.00259	<0.00259	0.011	<0.003	<0.003
	Copper (µg/L)	**4.1**	**2.1**	**3**	**3.5**	**5.5**	**6.9**
2007 MPM A (@ Hwy 99)	Date	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA*	NA	**0.42**	NA	NA
	Copper (µg/L)	NA	NA	NA	NA	**3.1**	2.5
2008 NM (@ Hwy 99)	Date	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.0026	0.0067	<0.003	**0.034**
	Copper (µg/L)	3.3	2.4	2.9	**2.7**	3	3.8
2008 MPM US (@ Whealan Rd)	Date	4/29/08	5/27/08	6/24/08	7/29/08	8/26/08	9/30/08
	Chlorpyrifos (µg/L)	NA	<0.003	NA	0.0081	NA	NA
	Copper (µg/L)	3.5	NA	**73**	3	**3.4**	**3.7**

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

Load Calculations

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

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

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

Because very few discharge measurements have been taken at the Duck Slough @ Hwy 99 site since it is usually too deep to wade, only exceedances and/or detections that occurred when discharge was taken during an event are shown in Table II-8.

Table II-8. Duck Slough @ Hwy 99 and Duck Slough @ Whealan Rd. Instantaneous load calculations for chlorpyrifos and copper where discharge was measured.

Station	Analyte	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Duck Slough @ Whealan Rd	*Chlorpyrifos*	*29-Jul-08*	*18.73*	*0.0081*	*4.30*
Duck Slough @ Hwy 99	Copper	12-Jul-06	58.3	2.7	4457.37
Duck Slough @ Whealan Rd	*Copper*	*29-Apr-08*	*5.73*	*3.5*	*567.90*
Duck Slough @ Whealan Rd	*Copper*	*24-Jun-08*	*22.15*	*73*	*45787.17*
Duck Slough @ Whealan Rd	*Copper*	*29-Jul-08*	*18.73*	*3*	*1591.13*
Duck Slough @ Whealan Rd	*Copper*	*26-Aug-08*	*21.60*	*3.4*	*2079.60*
Duck Slough @ Whealan Rd	*Copper*	*30-Sep-08*	*7.56*	*3.7*	*792.08*

Source Identification

Priority A Constituents

The Coalition uses a combination of monitoring data and evaluation of PUR data to identify possible sources. All PUR data associated with exceedances have been submitted in previous SAMRs and are summarized in the following section.

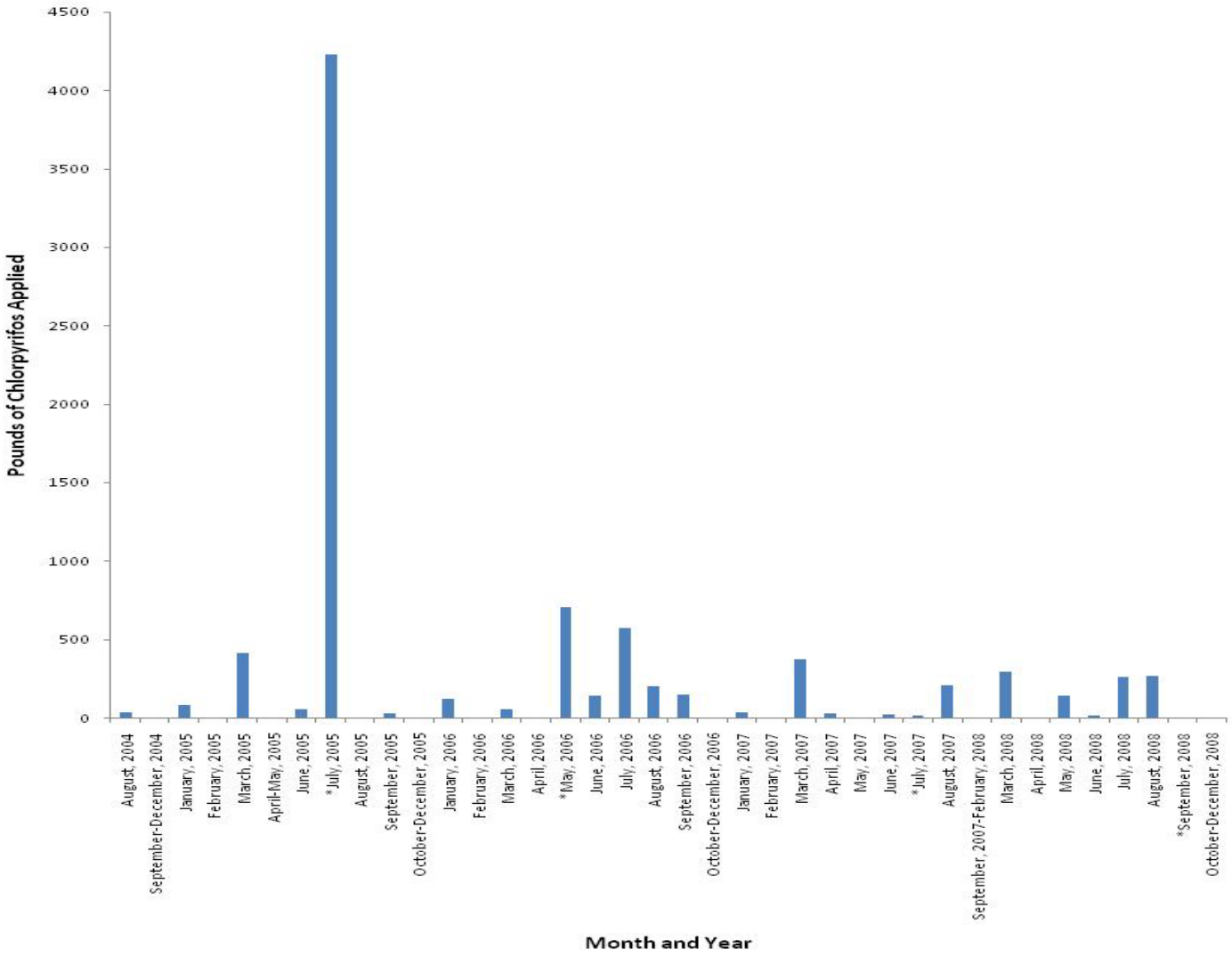
Chlorpyrifos

There was one exceedance during 2008 monitoring of the chlorpyrifos WQTL in September during normal monitoring (Table II-6). PUR data are reviewed for the number and amount of the active ingredient (AI), chlorpyrifos applied (pounds applied), and acres treated (Table II-9, Figure II-3). All PUR data has been submitted with previous Semi Annual Monitoring Reports (SAMRs) and is only summarized here. The amount of chlorpyrifos applied, the number of applications, and the number of acres treated is summarized in Table II-9 by year and month. Pounds of chlorpyrifos applied by month and year are provided in Figure II-3.

Table II-9. Number of chlorpyrifos applications, total pounds applied, and total acres treated by month for August 2004 through December 2008 in the Duck Slough @ Hwy 99 site subwatershed. If a month is not included in the table, no applications were made.

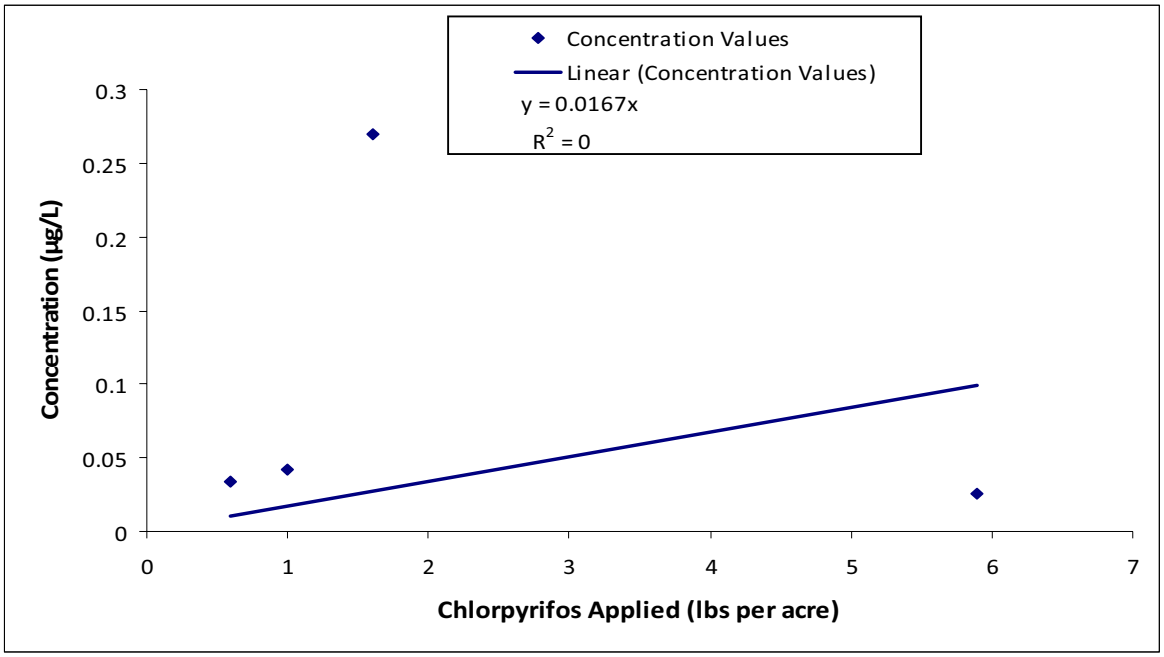
Month/Year	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
August, 2004	1	29.9	20
January, 2005	4	76.9	38.1
March, 2005	14	408.7	695
June, 2005	2	50.0	30
July, 2005	17	4226.8	812
September, 2005	1	28.0	14
January, 2006	6	119.7	59
March, 2006	3	56.1	151
May, 2006	13	706.5	433
June, 2006	1	137.6	69
July, 2006	5	570.2	508
August, 2006	5	199.9	136
September, 2006	2	145.6	80
January, 2007	2	29.9	15
March, 2007	15	370.0	433.81
April, 2007	3	28.8	57.42
June, 2007	1	19.9	10
July, 2007	1	10.2	10
August, 2007	4	204.0	261.33
March, 2008	15	290.4	347.53
May, 2008	2	140.1	70
June, 2008	1	10.2	8
July, 2008	6	261.8	522.9
August, 2008	7	264.0	426.5
Summaries by Year			
2004 Total	1	29.9	20
2005 Total	38	4790.4	1589.1
2006 Total	35	1935.5	1436
2007 Total	26	662.8	787.56
2008 Total	31	966.5	1374.93
Total	**131**	**8385.0**	**5207.59**

Figure II-3. Pounds of chlorpyrifos applied within the Duck Slough @ Hwy 99 site subwatershed by month for 2004-2008. Asterisk (*) denotes months with exceedances.



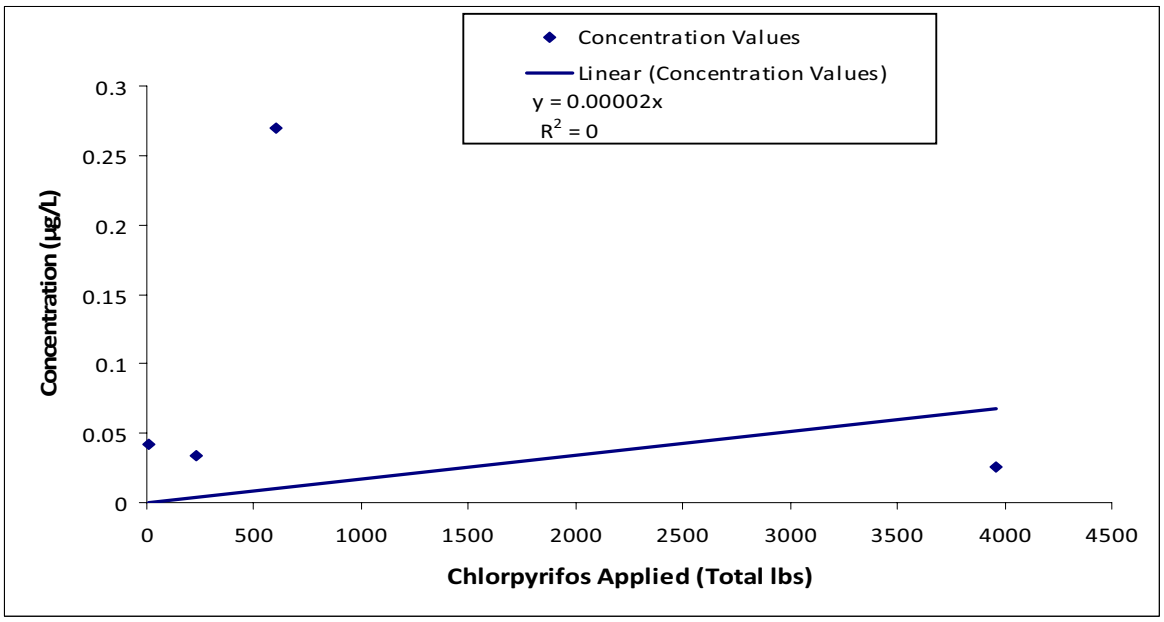
The Coalition performed an analysis of chlorpyrifos applications within the last four to eight weeks and concentrations and loads of chlorpyrifos in the water (all exceedances). A linear regression analysis was performed to establish the relationship between both application in pounds per acre for those acres on which applications were made (not averaged across the entire watershed) and concentration and load (Figure II-4), and between total pounds applied over all acres (only those receiving applications) and concentration and load (Figure II-5). To associate PUR data (pounds AI per acre) with a single exceedance, the pounds AI was summed and divided by the summed acreage. The small sample size precluded a rigorous statistical treatment. The intercept for all analyses was set at zero as there should be no chlorpyrifos in the water if there are no applications. However, this assumes that applications more than four weeks prior to sampling would not contribute chlorpyrifos to the water body.

Figure II-4. Chlorpyrifos exceedance concentrations compared to loads and application rates (average lbs per acre) for the Duck Slough @ Hwy 99 site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



Loads were unavailable for all exceedance dates.

Figure II-5. Chlorpyrifos exceedance concentrations compared to application rates (total lbs across all acres) for the Duck Slough @ Highway 99 site subwatershed for applications within four weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



Loads were unavailable for all exceedance dates.

The regression of concentration on pounds applied (AI) per acre indicated no relationship with 0% of the variation in concentration accounted for by the application rate (Figure II-4). This is in contrast to the relationship reported in September 2008 where 63% of the variation in concentration was accounted for by application rate. The addition of a single data point changed the relationship from a steep positive slope to no slope. It now appears that the chlorpyrifos exceedance in 2007 is the outlier and would probably be the result of a single grower's application. The lack of slope indicates that exceedances are not a result of accumulated discharge from numerous properties, but more likely from one or a few growers adjacent to the creek. The average application rate of chlorpyrifos for the Duck Slough subwatershed from 2004-2008 is 2.39 lbs AI/acre (Table II-10). The highest application rates are associated with almond and walnut orchard sprays.

Table II-10. Average pounds AI per acre for chlorpyrifos based on PUR data from 2004-2008 within the Duck Slough @ Hwy 99 subwatershed.

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
CHLORPYRIFOS	ALFALFA	LORSBAN 4E-HF	0.4985
		NUFOS 4E	0.7626
	ALMOND	LORSBAN 4E-HF	0.3115
			0.9969
			1.9939
		LORSBAN-4E	1.8584
			2.2511
			18.5838
		NUFOS 4E	0.3177
		WHIRLWIND	1.9045
			1.9997
			2.1663
	CORN (FORAGE - FODDER)	CHLORPYRIFOS 4E AG	1.0089
	CORN FOR/FOD	NUFOS 4E	1.0168
	WALNUT	GOVERN 4E INSECTICIDE	2.0201
		LORSBAN-4E	0.9292
	WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	LORSBAN-4E	2.001
Average pounds chlorpyrifos applied per acre (2004-2008)			**2.39**

There were 14 sections associated with exceedances between 2004 and 2008 during normal and Management Plan Monitoring (Table II-11). In 2008, five sections had applications prior to an exceedance (Tables II-11, II-12 and Figures II-6, II-7). Four of the sections had no applications associated with an exceedance prior to the September exceedance. Section 8S15E11 was associated with previous exceedances and the September 2008 exceedance.

Table II-11. Duck Slough @ Hwy 99. All TRS that had more than one application associated with an exceedance for chlorpyrifos in 2005-2008. Table summarizes the number of applications associated with an exceedance per date and TRS.

TRS*	Chlorpyrifos Applications per Date of Exceedances			
	7/12/2005	5/17/2006	7/31/2007	9/30/2008
7S15E34	1			
8S14E11				1
8S14E14			1	
8S14E2				1
8S15E10	1	1		
8S15E11	1	1		1
8S15E12		3		
8S15E13		1		
8S15E15	4	4		
8S15E24	1			
8S15E3				1
8S15E6	1			
8S15E9	3			
8S16E18				2

*Bolded TRS are members of the Coalition.

Table II-12. Duck Slough @ Hwy 99. TRS' with chlorpyrifos applications in the month prior to each exceedance date for 2008. Includes pounds applied and acres treated. If an exceedance date is not included in this table, there were no relevant chlorpyrifos applications.

TRS*	Exceedance Date		
	9/30/2008		
	Application Date	Pounds Applied	Acres Treated
8S14E11	8/7/2008	72.48	78
8S14E2	8/24/2008	67.79	136
8S15E11	8/26/2008	15.15	7.5
8S15E3	8/27/2008	51.86	68
8S16E18	8/17/2008	9.97	32
	8/17/2008	10.17	32

*Bolded TRS are members of the Coalition

Figure II-6. Duck Slough @ Hwy 99. TRS' that have had applications co-occurring with a chlorpyrifos exceedance.

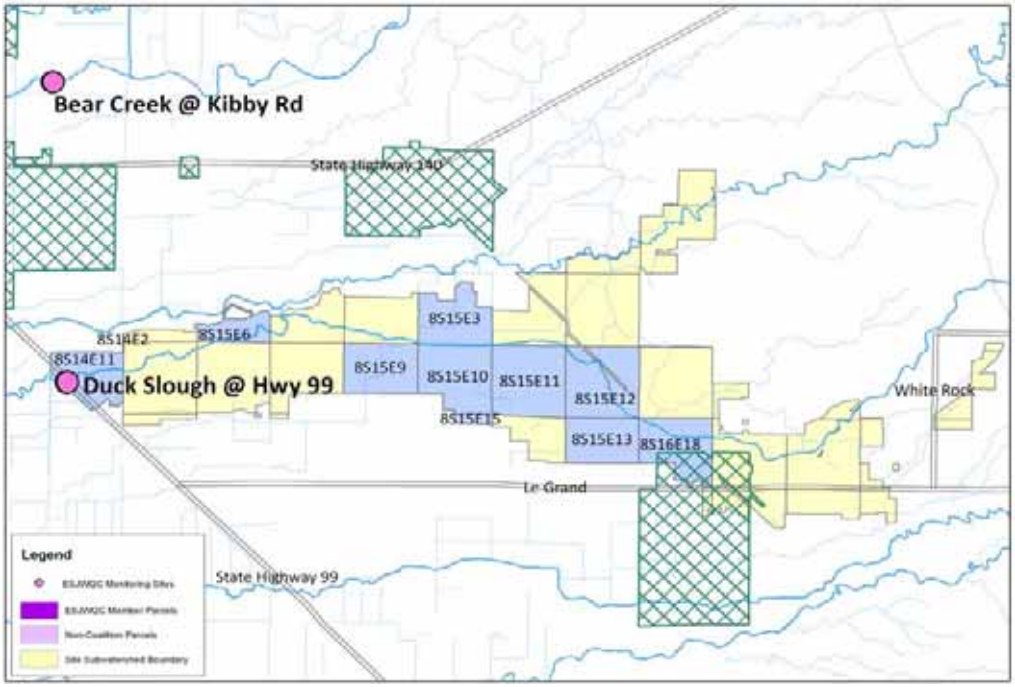
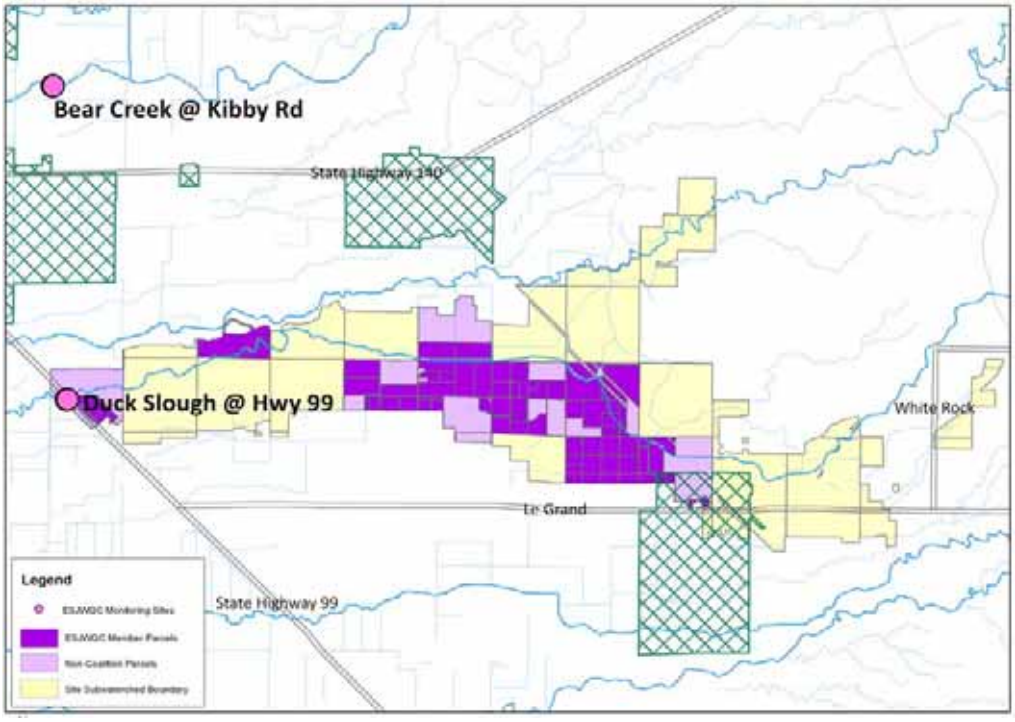


Figure II-7. Duck Slough @ Hwy 99. Member APNs within TRS' with applications co-occurring with chlorpyrifos exceedances.



The analyses conducted by the Coalition suggest that management of chlorpyrifos in this watershed should focus on providing information on a targeted basis to growers to encourage the proper management of irrigation tail water. Also, those TRS' adjacent to the creek appear to be primarily associated with the exceedances. The map of members and nonmembers (Figure II-5) suggests that a large portion of the watershed consists of members, particularly near the creek itself.

Priority C Constituents

Copper

Numerous exceedances of copper have occurred since monitoring for metals was initiated. In 2008, copper was applied from January through June (Table II-14, Figure II-8), and a single exceedance occurred in July at the Highway 99 site (Table II-6). Interestingly, the concentration of copper in July was the next to lowest concentration measured at that site during the irrigation season. Elevated concentrations in other months were not exceedances due to differences in hardness. At the upstream site, exceedances occurred in June, August, and September. With the exception of the June exceedance of 73 µg/L, all concentrations were similar. The June exceedance was an order of magnitude larger than other exceedances, but this watershed has a history of occasional large concentrations of copper. The June exceedance was not coincident with a lower pH (7.44). Copper was applied in several sections of the watershed on both member and nonmember parcels (Figures II-9, II-10, II-11, II-12). Since 2005, the amount of copper and the number of applications have decreased annually within this watershed (Table II-13, Figure II-8).

Table II-13. Number of copper applications, total pounds applied and total acres treated by month for January 2005-December 2008 in the Duck Slough @ Hwy 99 site subwatershed. If a month is not included in the table, no applications were made.

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
January, 2005	12	1568.7	376.1
February, 2005	5	514.8	159.7
March, 2005	3	369.9	81
April, 2005	26	1363.2	483.25
May, 2005	10	497.1	214.5
August, 2005	3	139.8	127.8
September, 2005	2	82.4	74.7
October, 2005	1	25.8	21
November, 2005	1	69.1	45
December, 2005	5	1122.8	153
January, 2006	12	1872.3	321
February, 2006	9	814.0	251
March, 2006	4	288.0	360

Month/Year	Number of Copper Applications	Pounds of AI Applied	Acres Treated
April, 2006	12	1038.3	263.5
May, 2006	9	935.4	367
August, 2006	1	113.0	103
December, 2006	2	539.0	70
January, 2007	9	1502.7	223
February, 2007	8	533.7	280
March, 2007	3	309.2	115
April, 2007	10	422.9	147.5
May, 2007	1	8.3	33
December, 2007	5	247.0	88
January, 2008	4	601.0	110
February, 2008	2	650.3	42
March, 2008	1	8.1	5
April, 2008	2	108.3	65
May, 2008	3	168.3	95.5
June, 2008	1	17.9	25.84
Summaries by Year			
2004 Total	3	214.3	191.2
2005 Total	68	5753.6	1736.05
2006 Total	49	5600.0	1735.5
2007 Total	36	3023.9	886.5
2008 Total	13	1553.8	343.34
Total	**169**	**16145.6**	**4892.59**

Figure II-8. Pounds of copper applied within the Duck Slough @ Hwy 99 site subwatershed by month for 2005-May 2007. No PUR data available between May 2007 and November 2007. Asterisk (*) denotes months with exceedances.

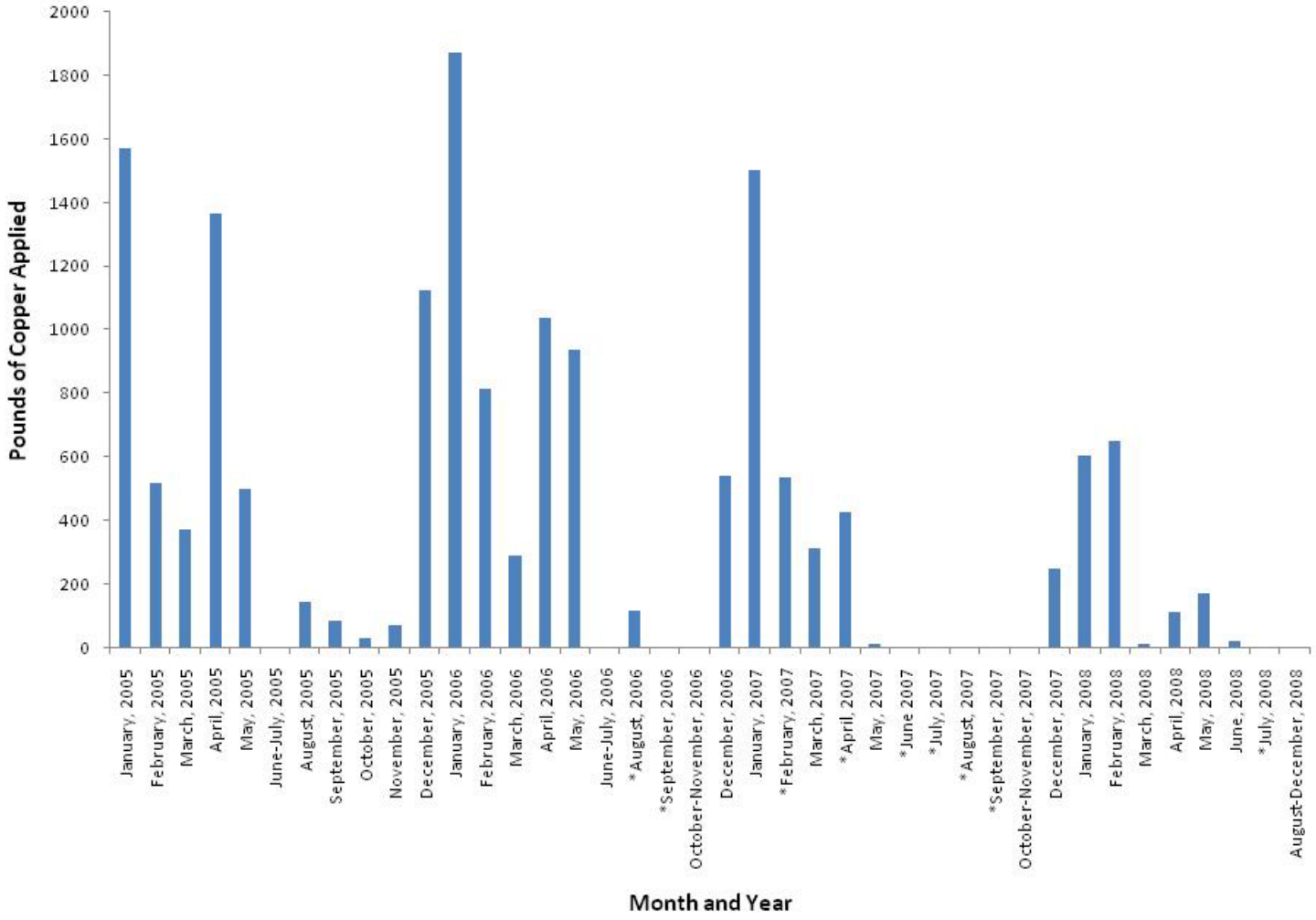


Figure II-9. Duck Slough @ Hwy 99. TRS that have had applications co-occurring with a copper exceedance.

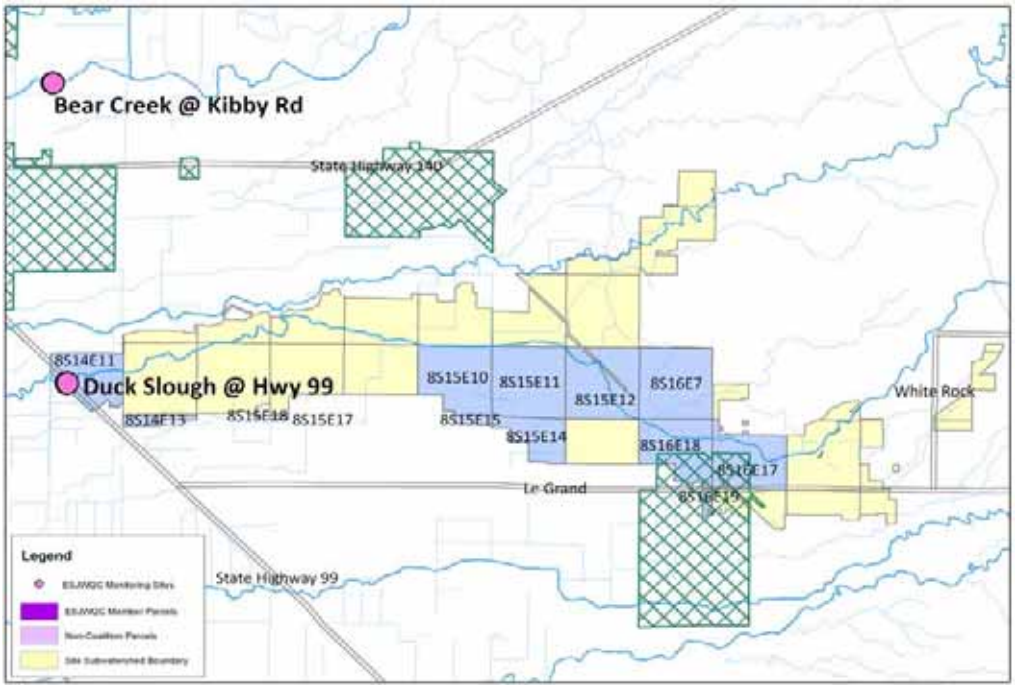


Figure II-10. Duck Slough @ Hwy 99. Member APNs relative to TRS with applications co-occurring with copper exceedances.

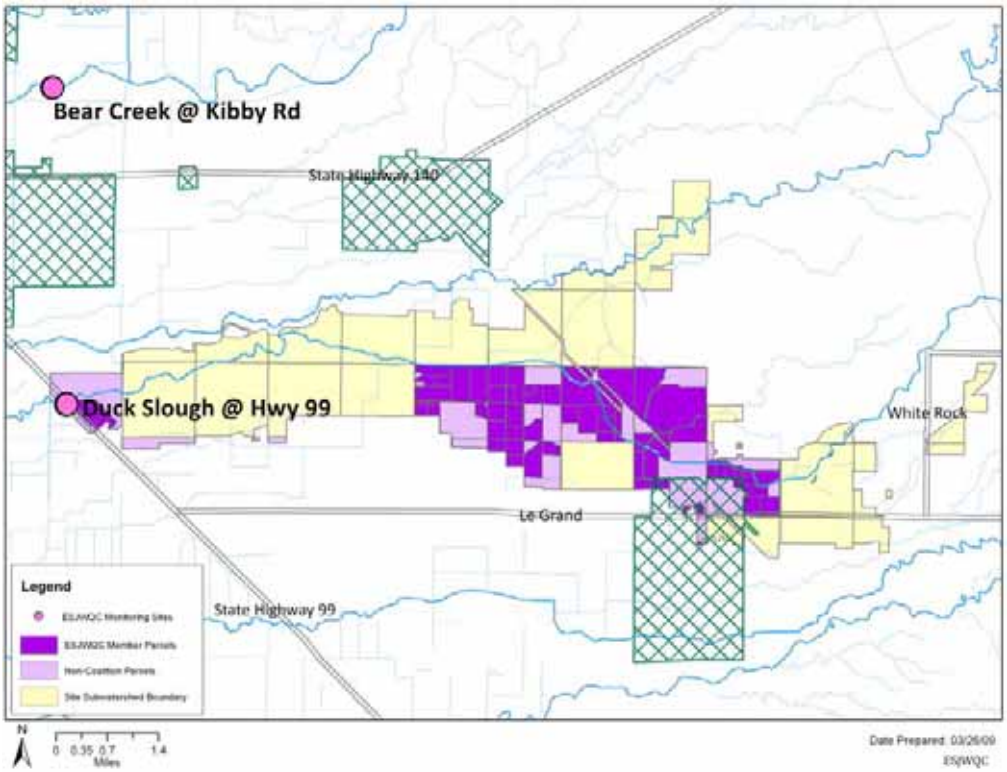
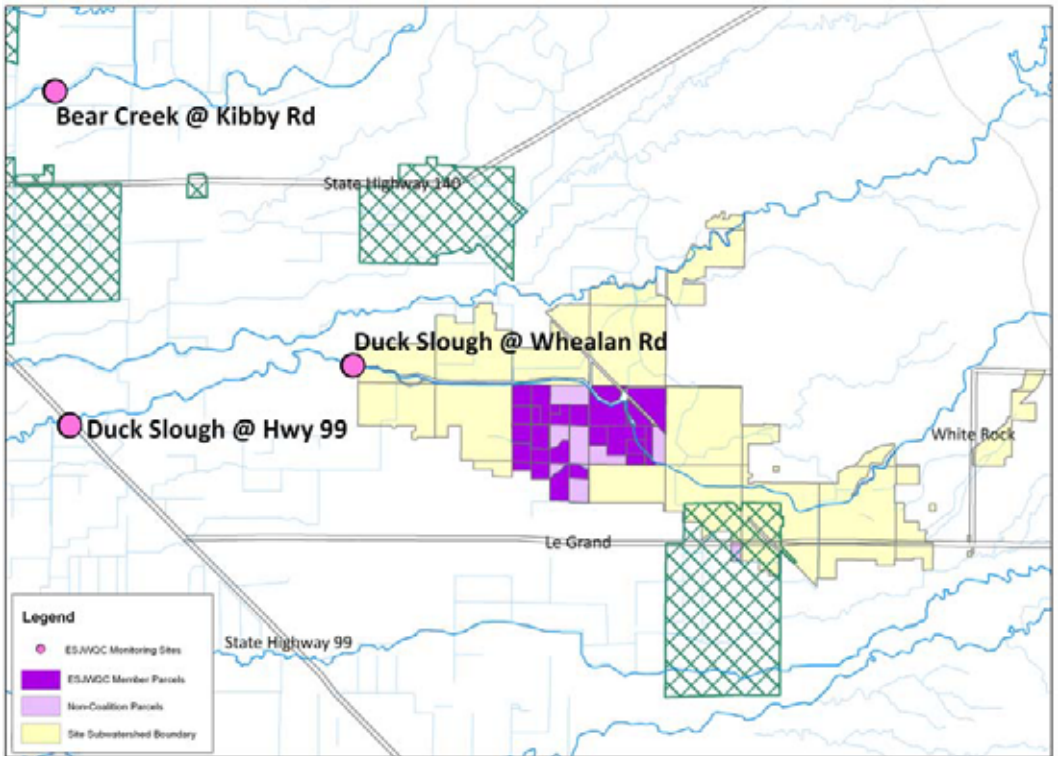


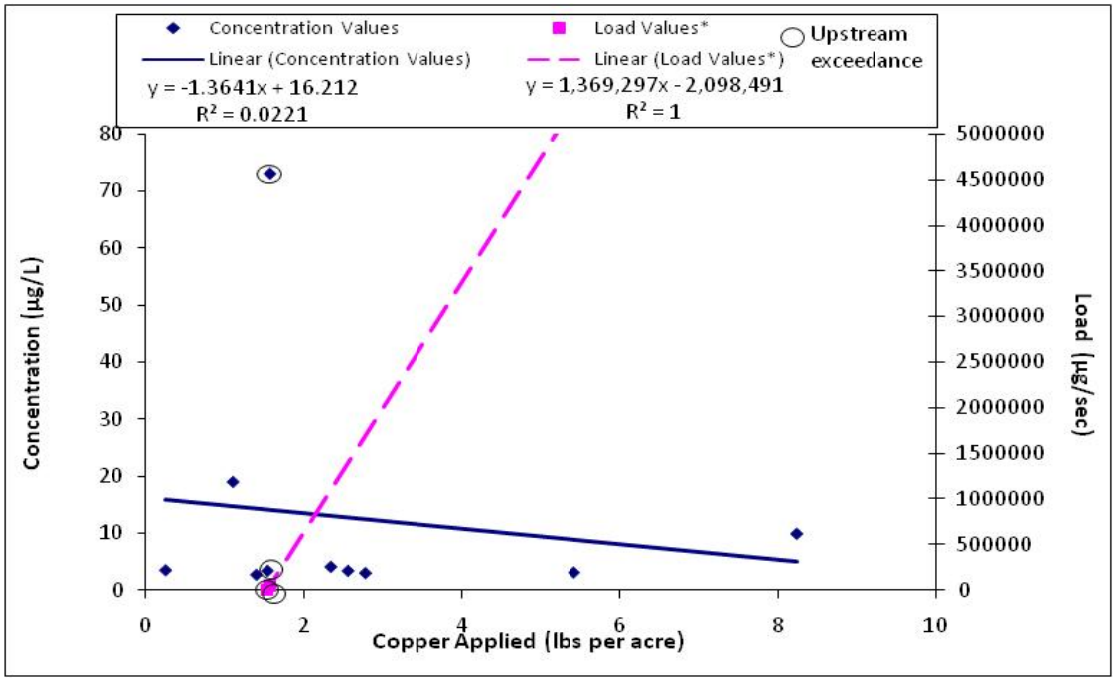
Figure II-11. Duck Slough @ Whealan Rd. TRS that have had applications co-occurring with a copper exceedance.

Figure II-12. Duck Slough @ Whealan Rd. Member APNs relative to TRS with applications co-occurring with copper exceedances.



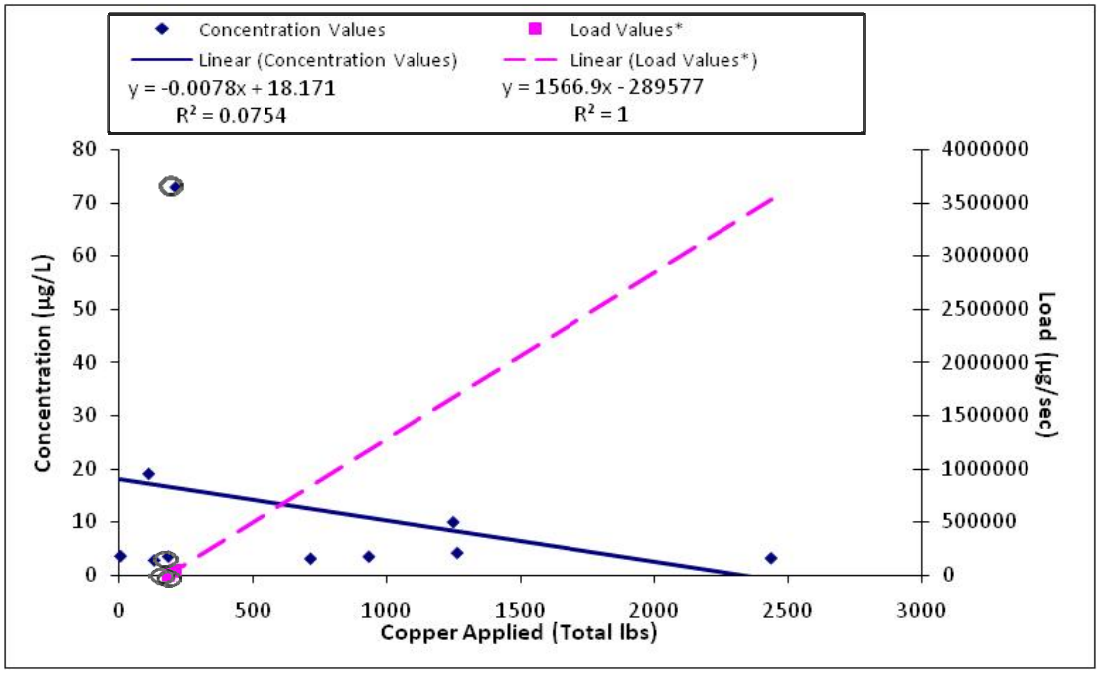
Ten exceedances occurred in the Duck Slough site subwatershed and it was possible to perform a regression analysis for copper as was performed for chlorpyrifos (Figures II-13, II-14). Although load relationships are plotted, there are too few data points to obtain a meaningful relationship. Consequently, the discussion below applies only to the relationship between concentration and applications. As was true for the data from Dry Creek, there was a slightly negative slope for both total pounds AI and pounds AI per acre. However, the relationship was non-significant indicating the slope was not different from 0 and concentration was not a function of application (Figures II-13, II-14). This relationship suggests that a small number of applications in the watershed are responsible for the exceedances.

Figure II-13. Copper exceedance concentrations and loads compared to application rates (average lbs per acre) for the Duck Slough @ Hwy 99 site subwatershed for applications within twelve weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for 8 of the 10 exceedance dates.

Figure II-14. Copper exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Duck Slough @Hwy 99 site subwatershed for applications within twelve weeks of exceedance dates. If there were no associated PUR data with an exceedance date, the date is not included on graph.



*Loads were unavailable for 8 of the 10 exceedance dates.

In the few months prior to the each exceedance, there were between one and five applications of copper to parcels in 16 different sections (Tables II-14, II-15). Application details prior to 2008 exceedances are listed in Tables II-16, II-17. Applications were made to variety of crops including almonds, tomatoes, peaches, plums, apricots, nectarines, walnuts, alfalfa, and pistachios. The average application rate was 4.11 pounds AI per acre.

To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections associated with each exceedance (Tables II-16, II-17). As was true in past years, sections with multiple applications had applications spread over several parcels and the application method was specified as ground.

Table II-14. Duck Slough @ Highway 99 site subwatershed. All TRS that had more than one application associated with an exceedance for copper in 2006-2008. Table summarizes the number of applications associated with an exceedance for a given date and TRS.

TRS*	Copper Applications per Date of Exceedances							
	8/8/2006	9/13/2006	2/12/2007	4/24/2007	6/26/2007	7/24/2007	2/25/2008	7/29/2008
8S14E11			1	1			3	
8S14E14	2							
8S15E10			4	1				
8S15E11			3	2			3	
8S15E12	2			5	5			2
8S15E14			2	1	1			1
8S15E15	2		3	3	3			
8S15E16				1	1			
8S15E17	1			5	1			
8S15E18					1	1		
8S15E24	2							
8S16E7				1	1	1		
8S16E19								1
8S14E13			1					
8S16E18							1	
8S16E17							1	

*Bolded TRS are members of the Coalition

Table II-15. Duck Slough @ Whealan Rd site subwatershed. All TRS that had more than one application associated with an exceedance for copper in 2008. Table summarizes the number of applications associated with an exceedance for a given date and TRS.

TRS	Date of associated exceedance	
	6/24/2008	8/26/2008
8S15E11	1	
8S15E12	2	2
8S15E14	1	1
8S16E19	1	1

*Bolded TRS are members of the Coalition.

Table II-16. Duck Slough @ Hwy 99 site subwatershed. TRS' with copper applications in the three months prior to each 2008 exceedance date. Includes pounds applied and acres treated. If an exceedance date is not included in this table, there were no relevant copper applications.

TRS*	Exceedance Date					
	2/25/2008			7/29/2008		
	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated
8S14E11	1/10/2008	46.98	7			
	1/11/2008	196.00	10			
	1/14/2008	328.48	77			
8S15E11	12/13/2007	22.50	8			
	12/13/2007	90.03	32			
	12/17/2007	27.66	10			
8S16E17	1/18/2008	29.50	16			
8S16E18	12/13/2007	53.43	19			
8S15E12				5/12/2008	75.32	35
				5/13/2008	75.32	35
8S15E14				5/24/2008	17.63	25.5
8S16E19				6/2/2008	17.87	25.84

*Bolded TRS are members of the Coalition.

Table II-17. Duck Slough @ Whealan Rd site subwatershed. TRS' with copper applications in the three months prior to each 2008 exceedance date. Includes pounds applied and acres treated. If an exceedance date is not included in this table, there were no relevant copper applications.

TRS*	Exceedance Date					
	6/24/2008			8/26/2008		
	Application Date	Pounds Applied	Acres Treated	Application Date	Pounds Applied	Acres Treated
8S15E11	4/25/2008	27.66	15			
8S15E12	5/12/2008	75.32	35	5/12/2008	75.32	35
	5/13/2008	75.32	35	5/13/2008	75.32	35
8S15E14	5/24/2008	17.63	25.5	5/24/2008	17.63	25.5
8S16E19	6/2/2008	17.87	25.84	6/2/2008	17.87	25.84

*Bolded TRS are members of the Coalition.

Priority D Constituents

As a result of 2008 monitoring, *Hyalella azteca* is now listed as a Priority D constituent in the Duck Slough site subwatershed. Samples collected in both the storm and irrigation seasons experienced toxicity during 2008.

Priority E Constituents

Four Priority E constituents experienced exceedances during 2008: pH, *E. coli,* lead and *Selenastrum* toxicity. pH was measured at 8.65 during March 2008 making it the third pH exceedance experienced at Duck Slough @ Hwy 99. Both storm season samples contained exceedance levels of *E. coli* at >2400 MPN/100mL and the April 2008 sample had an exceedance of *E. coli* at 280 MPN/100mL. There were two exceedances of lead and two occurrences of *Selenastrum* toxicity during 2008.

2009 Management Plan Monitoring

Duck Slough @ Hwy 99 is not scheduled to be monitored as either a Core or Assessment Monitoring location in 2009. Therefore the Coalition will conduct Management Plan Monitoring at this location for *Selenastrum* toxicity in April, chlorpyrifos in May, July, and September, and copper (dissolved and total) in June, July, August, and September 2009. Upstream Management Plan Monitoring will not be conducted in 2009.

Outreach

The Coalition conducts numerous types of outreach to its membership:

- General grower meetings on a county level,
- Subwatershed specific grower meetings,
- Crop specific grower meetings (may be specified by crop, chemical use or seasonal practices i.e. dormant season orchard),
- Individual contacts,
- Mailings of crop specific BMP literature.

All members in the Coalition receive notices of county meetings and are invited to attend. Duck Slough growers attended the annual meeting in Merced in December. In addition, because of its priority subwatershed designation, selected growers will be targeted for subwatershed-level meetings and individual contacts. In March 2009, a subwatershed meeting was held in Le Grand and included presentations by both Coalition representatives and Regional Board staff. Of the 88 growers identified as operating in Duck Slough, 22 growers attended the meeting. These growers represented approximately 40% of the acreage in the watershed (6,800 of 17,200 acres). Individual grower meetings will be scheduled after the appropriate growers along the waterbody are identified. These meetings will be held in late 2009 and early 2010.

Evaluation

The individual contacts will allow the Coalition to build on its baseline survey results by providing growers with an opportunity to complete more detailed checklists that can be used to gain parcel-specific information in regards to agricultural discharge and management practices currently implemented on the properties adjacent to Dry Creek. During the individual grower visits the Coalition will offer resources (i.e. management practice handbooks, information to obtain NRCS-EQIP funds) to aid them in implementing additional management practices if it is determined that additional practices are needed.

As stated in the September 2008 Management Plan, the Coalition's strategy for the Duck Slough subwatershed was to first conduct a grower group meeting in spring 2009 and have growers fill out grower group surveys. This meeting was held on March 26, 2008 and grower group surveys are being compiled to evaluate the effectiveness of this meeting.

III. PRAIRIE FLOWER DRAIN

Management Plan Constituents

Priority A

- Chlorpyrifos

Priority D

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

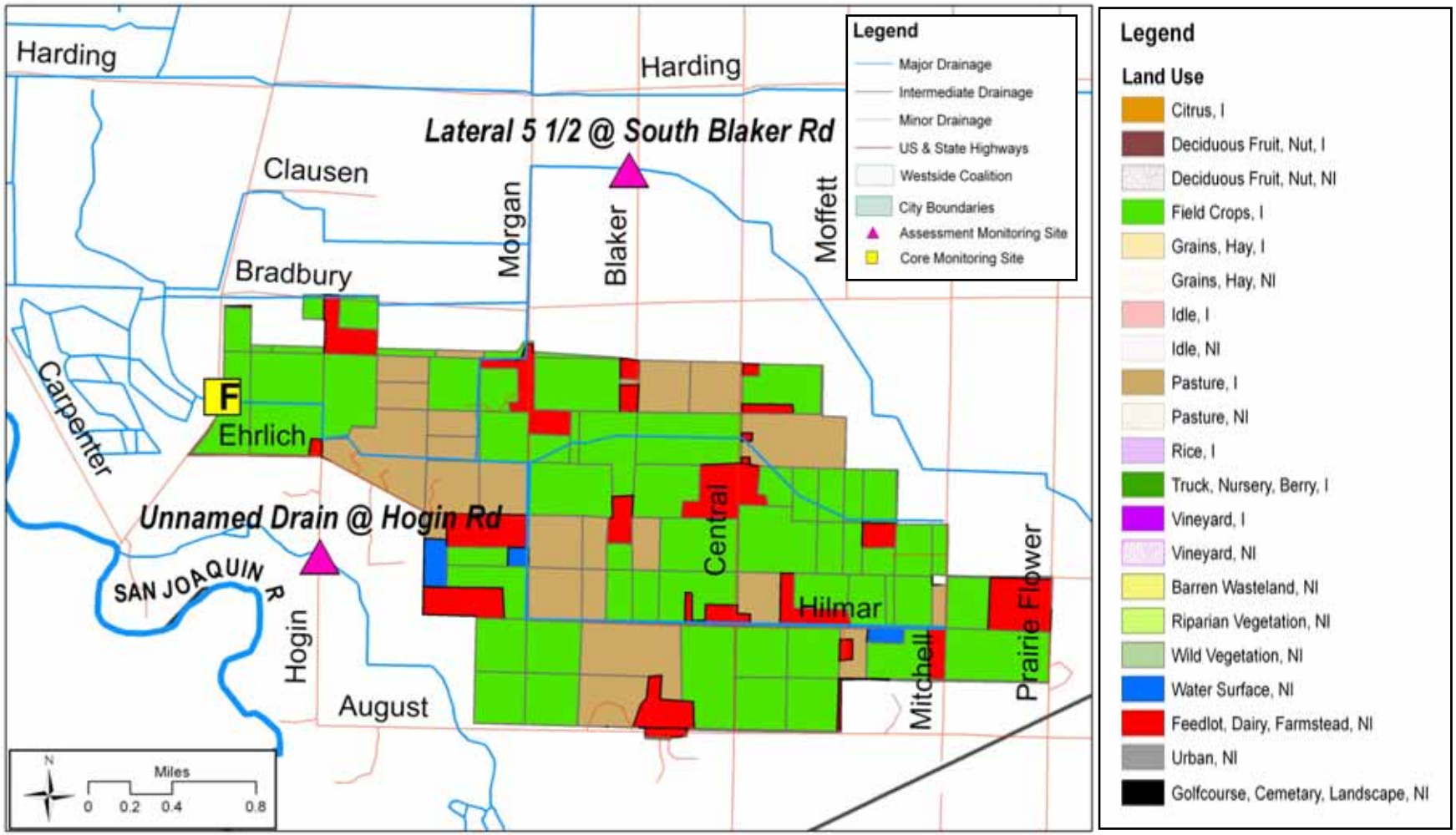
Priority E

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

Description of Prairie Flower Drain @ Crows Landing Road Site Subwatershed

Prairie Flower Drain @ Crows Landing Rd (4,080 irrigated acres) is located in the eastern part of the Coalition region in Stanislaus County, just east of the San Joaquin River. Relative to other drains in the western portion of the Coalition region, Prairie Flower Drain is longer and appears to drain mostly irrigated agriculture. Dairies and feedlots are ubiquitous in this part of the Coalition region and this drain may receive runoff from several dairies immediately upstream. In addition to pasture and dairy, upstream land use consists of field crops (Figure III-1). Many of the drains in the eastern part of the Coalition region, including Prairie Flower Drain, were constructed to intercept shallow ground water and lower the water table sufficiently to allow agriculture. Consequently, agriculture in the watershed tends to be dominated by shallow rooted field crops.

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



Subwatershed Monitoring History

Monitoring was initiated in the Prairie Flower Drain site subwatershed at Prairie Flower Drain @ Crows Landing Road during the storm season of 2005 and the site has been monitored through the fall season of 2008 (Table III-1). Samples were collected from this site for field parameters and the analysis of water chemistry and toxicity. Specific information on the analysis conducted across each of the monitoring seasons is provided below (Table III-2). Management Plan Monitoring for the Coalition was initiated during the 2007 irrigation season and included additional sampling at Prairie Flower Drain @ Crows Landing Road for chlorpyrifos in August and September and for *Pimephales* sp. toxicity in July (Table III-3). However, the *Pimephales* toxicity occurred during the same sampling event in 2006 for both the original sample and the resample collected a week later. An upstream sample was collected in 2008 and no *Pimephales* toxicity was experienced. Therefore, *Pimephales* is not prioritized for this site subwatershed in this Management Plan update. Upstream Management Plan Monitoring for nitrate, chlorpyrifos, and water column toxicity (*Ceriodaphnia* and *Pimephales*) occurred in the 2008 irrigation season at Prairie Flower Drain @ Morgan Road during specific months of the 2008 irrigation season (Table III-4). This location was selected based on a review of PUR data indicating likely upstream sources. The upstream monitoring site was selected to cut the watershed into smaller areas which will allow an analysis of the contribution of each portion of the watershed to the load measured at the Prairie Flower Drain @ Crows Landing Road site. Sampling locations for the Prairie Flower Drain subwatershed are provided in Table III-5 and Figures III-2, III-3.

Prairie Flower Drain is not considered impaired under the current Basin Plan, however the section of the San Joaquin River which receives water from Prairie Flower Drain, is listed as impaired for boron, chlorpyrifos, DDT, diazinon, electrical conductivity, Group A pesticides, mercury and unknown toxicity.

Prairie Flower Drain @ Crows Landing Rd will be a Core Monitoring location under the new Monitoring Reporting Program Plan (MRPP). However, the Coalition will continue to monitor for Management Plan constituents as outlined in this section and has monitored for Group A pesticides from October 2008 to April 2009.

Table III-1. Prairie Flower Drain @ Crows Landing Rd sampling events per season and year. An irrigation season sampling event encompasses normal monitoring and any associated resampling, Management Plan Monitoring, and sediment sampling. A storm event encompasses normal monitoring and any associated resampling. A fall event encompasses normal monitoring.

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

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

Table III-2. Number of analyses performed per analyte in each sampling season and year for the Prairie Flower Drain @ Crows Landing Rd. Only environmental samples with a sample replicate and lab replicate number of one are shown.

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
Field and Physical Parameters										
EPA 110.2	Color	2	5	2	5	3	6	2	6	
EPA 160.1	Dissolved Solids	2	5	2	5	2	6	3	6	2
EPA 160.2	Suspended Solids							1		2
EPA 180.1	Turbidity	2	5	2	5	2	6	3	6	2
EPA 405.1	BOD				1	2	2			
EPA 415.1	Total Organic Carbon	2	5	2	5	2	6	3	6	2
SM 9223 B	E. coli	2	5	2	5	2	6	3	6	2
NA	Dissolved Oxygen	2	5	4	6	3	13	5	10	2
NA	Specific Conductivity	2	5	4	6	3	13	5	10	2
NA	pH	2	5	4	6	3	13	5	10	2
Carbamates										
EPA 8321A	Aldicarb				5	2	6	2	6	
EPA 8321A	Carbaryl				5	2	6	2	6	
EPA 8321A	Carbofuran				5	2	6	2	6	
EPA 8321A	Diuron				5	2	6	2	6	
EPA 8321A	Linuron				5	2	6	2	6	
EPA 8321A	Methiocarb				5	2	6	2	6	
EPA 8321A	Methomyl				5	2	6	2	6	
EPA 8321A	Oxamyl				5	2	6	2	6	
Organochlorines										
EPA 8081A	DDD(p,p')				5	2	6	2	6	
EPA 8081A	DDE(p,p')				5	2	6	2	6	
EPA 8081A	DDT(p,p')				5	2	6	2	6	
EPA 8081A	Dicofol				5	2	6	2	6	
EPA 8081A	Dieldrin				5	2	6	2	6	
EPA 8081A	Endrin				5	2	6	2	6	
EPA 8081A	Methoxychlor				5	2	6	2	6	
Organophosphates										

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

Method	Analyte	2005		2006		2007		2008		
		Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall
EPA 200.8	Copper				5	2	6	2	6	
EPA 200.8	Lead				5	2	6	2	6	
EPA 200.8	Nickel				5	2	6	2	6	
EPA 200.8	Selenium				5	2	2	2	6	
EPA 200.8	Zinc				5	2	6	2	6	
Nutrients										
EPA 130.2	Hardness as CaCO3				5	2	6	2	6	
EPA 300.0	Nitrate as N				5	2	6	2	6	
EPA 350.2	Ammonia as N				5	2	6	3	6	2
EPA 351.3	Nitrogen, Total Kjeldahl				5	2	6	3	6	2
EPA 354.1	Nitrite as N				5	2	6	2	6	
EPA 353.3	Nitrate + Nitrite as N							1		2
EPA 365.2	OrthoPhosphate as P				5	2	6	3	6	2
EPA 365.2	Phosphate as P				5	2	6	3	6	2
Toxicity										
EPA 821/R-02-012	*Ceriodaphnia dubia*	2	5	3	5	2	8	2	6	
EPA 821/R-02-012	*Pimephales promelas*	2	5	2	6	2	8	2	6	
EPA 821/R-02-013	*Selenastrum capricornutum*	2	5	2	5	2	8	4	8	
EPA 600/R-99-064	*Hyalella azteca*		5	1	1	1	3	1	2	

Table III-3. Prairie Flower Drain @ Crows Landing Rd. 2007 Management Plan additional (A) sampling schedule for chlorpyrifos and *Pimephales* toxicity. "X" indicates the site, month and analyte sampled.

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

Table III-4. Prairie Flower Drain site subwatershed. 2008 Management Plan upstream (U) sampling schedule for chlorpyrifos, nitrate, *Ceriodaphnia* toxicity, and *Pimephales* toxicity. "X" indicates the site, month and analyte sampled.

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

Table III-5. Coordinates of the Prairie Flower Drain site subwatershed sampling locations.

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

* Original ESJWQC sampling site
[U] Upstream sites

Figure III-2. Site subwatershed map of land use for the Prairie Flower Drain @ Morgan Rd upstream sample site. "F"=Prairie Flower Drain @ Crows Landing Rd.

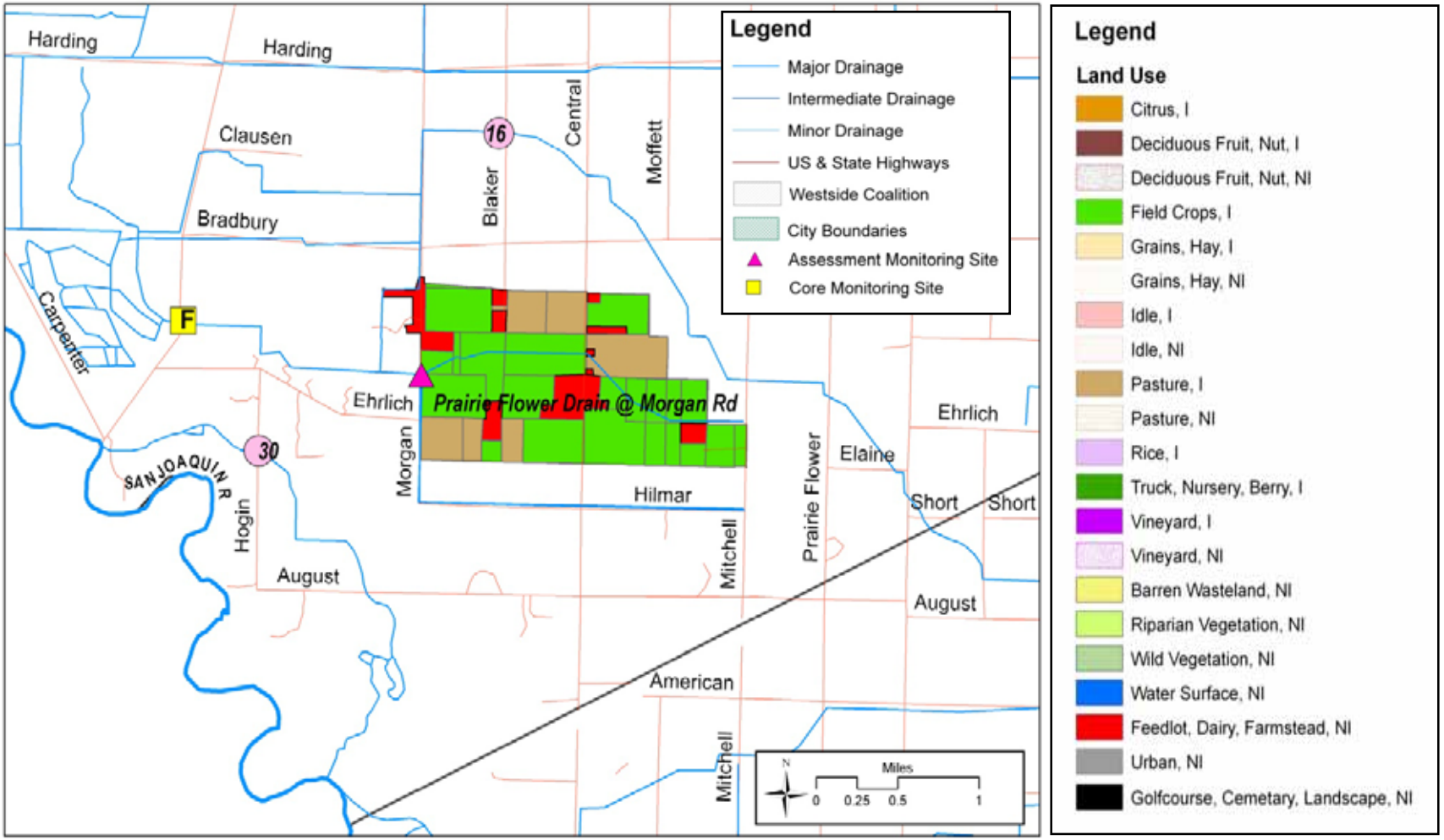
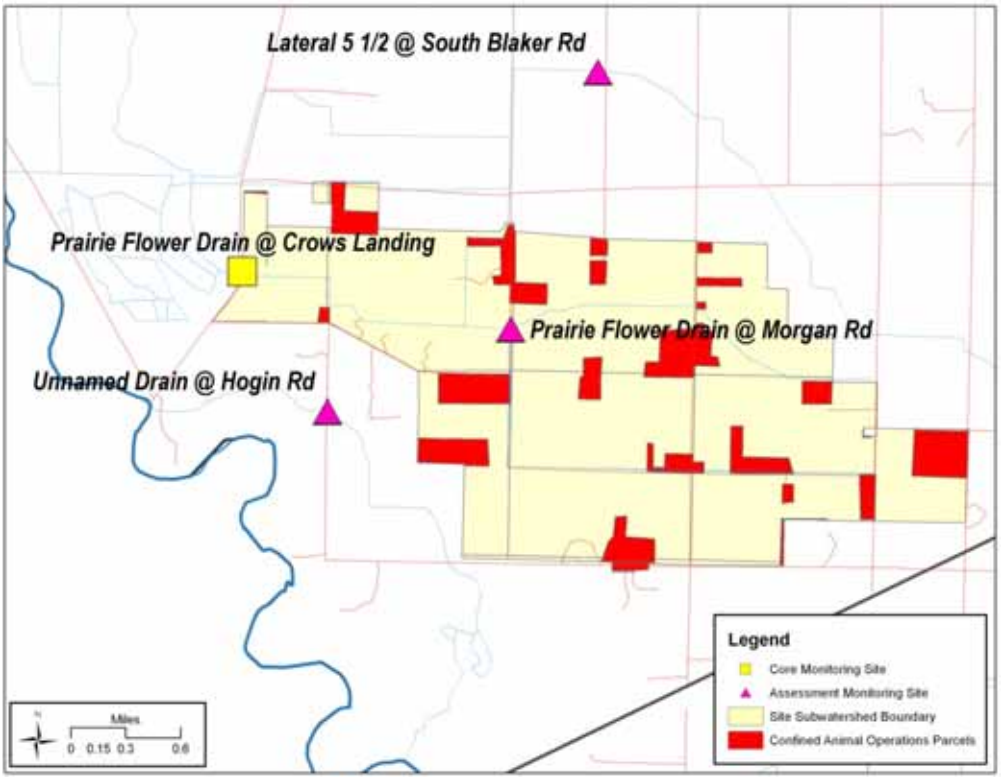


Figure III-3. Prairie Flower Drain site subwatershed including the upstream sampling location, TRS, and confined animal operation parcels.



Exceedance History

During Coalition monitoring, exceedances of WQTLs for field and physical parameters, *E. coli,* nutrients, metals, pesticides, and water column and sediment toxicity occurred within the Prairie Flower Drain site subwatershed (Table III-6). During the irrigation season of 2008, exceedances detected at the normal monitoring and upstream Management Plan Monitoring sites included dissolved oxygen (8), specific conductivity (16), total dissolved solids (6), *E. coli* (5), ammonia (1), nitrate (11), chlorpyrifos (1), dimethoate (1), and, malathion (1). Two sediment samples tested toxic to *Hyalella azteca* and four water samples tested toxic to *Selenastrum capricornutum*. Samples collected over the entire four years of monitoring at the Prairie Flower Drain sample site resulted in exceedances including 18 of DO, five of pH, 54 of EC, 32 of TDS, 24 of *E. coli*, 25 of nitrate, one of nitrite, two of ammonia, four of chlorpyrifos, and one each of arsenic, dimethoate, and malathion. Toxicity has occurred twice to *Ceriodaphnia dubia,* seven times to *Selenastrum capricornutum* and twice to *Pimephales promelas*. Sediment toxicity to *Hyalella azteca* has occurred six times. All exceedances are listed in Table III-3 by season and date and are based on water quality trigger limits (WQTL) listed in the introduction to the ESJWQC Management Plan. The priority (A-E) level assigned to each constituent is listed in the bottom row of Table III-6 for those analytes with two or more exceedances over the last three years.

Table III-6. All exceedances experienced in samples collected from locations within the Prairie Flower Drain site subwatershed between February 2005 and December 2008 (sorted by season and date).

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Dissolved Solids, mg/L	*E. coli*, MPN/100 mL	Ammonia as N, mg/L	Nitrate as N, mg/L	Nitrite as N, mg/L	Arsenic, µg/L	Chlorpyrifos, µg/L	Dimethoate, µg/L	Malathion, µg/L	*Ceriodaphnia dubia*, Survival (%)	*Pimephales promelas*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)
Prairie Flower Drain @ Crows Landing Rd	Irrigation	11-May-05			3168	1600	500											
Prairie Flower Drain @ Crows Landing Rd	Irrigation	15-Jun-05			1705	1300	300											
Prairie Flower Drain @ Crows Landing Rd	Irrigation	13-Jul-05	3.2		1723	1100	1600											
Prairie Flower Drain @ Crows Landing Rd	Irrigation	17-Aug-05			1779	990	1600					0.029						
Prairie Flower Drain @ Crows Landing Rd	Irrigation	21-Sep-05	5.22		791	460	500					0.018						83.8
Prairie Flower Drain @ Crows Landing Rd	Irrigation	18-May-06			2958	1700	550											
Prairie Flower Drain @ Crows Landing Rd	Irrigation	15-Jun-06			2660	1700	1300		21									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	13-Jul-06	5.45	8.85	1560	720	790	18								8		
Prairie Flower Drain @ Crows Landing Rd	Irrigation	20-Jul-06	6.41		1950											70		
Prairie Flower Drain @ Crows Landing Rd	Irrigation	10-Aug-06			2302	1800	820		17	1								
Prairie Flower Drain @ Crows Landing Rd	Irrigation	14-Sep-06	6.01		1276	760	2400		11									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	17-Apr-07			2127	1700			25									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	15-May-07	5.59		2473	1500	920		32								1071154	
Prairie Flower Drain @ Crows Landing Rd	Irrigation	23-May-07			2390													
Prairie Flower Drain @ Crows Landing Rd	Irrigation	19-Jun-07		8.54	2304	1500			41		12							
Prairie Flower Drain @ Crows Landing Rd	Irrigation	17-Jul-07	4.3		1067	730			13									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	14-Aug-07			1126	700	260		16									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	16-Aug-07			2562													58
Prairie Flower Drain @ Crows Landing Rd	Irrigation	28-Aug-07	3.64		1015							0.094						
Prairie Flower Drain @ Crows Landing Rd	Irrigation	11-Sep-07	7.86		1097	540	2400								0			16
Prairie Flower Drain @ Crows Landing Rd	Irrigation	18-Sep-07			2262													
Prairie Flower Drain @ Crows Landing Rd	Irrigation	25-Sep-07			2489													
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*22-Apr-08*	*3.29*		*2574*				*35*									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	22-Apr-08			2548	1700	370		23								403571	
Prairie Flower Drain @ Crows Landing Rd	Irrigation	29-Apr-08	5.44		1739												517549	
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*20-May-08*	*1.17*		*2026*				*22*									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	20-May-08			2526	1600	610		26								771556	
Prairie Flower Drain @ Crows Landing Rd	Irrigation	27-May-08			2273												215568	
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*17-Jun-08*			*2893*				*30*									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	17-Jun-08			2049	1200	1300	2.1	19									

Station Name	Season	Sample Date	Oxygen, Dissolved, mg/L	pH, none	Specific Conductivity, µS/cm	Dissolved Solids, mg/L	*E. coli*, MPN/100 mL	Ammonia as N, mg/L	Nitrate as N, mg/L	Nitrite as N, mg/L	Arsenic, µg/L	Chlorpyrifos, µg/L	Dimethoate, µg/L	Malathion, µg/L	*Ceriodaphnia dubia*, Survival (%)	*Pimephales promelas*, Survival (%)	*Selenastrum capricornutum*, Total Cell Count	*Hyalella azteca*, Survival (%)
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*22-Jul-08*	*2.76*		*1417*													
Prairie Flower Drain @ Crows Landing Rd	Irrigation	22-Jul-08	2.51		1012	620	250		11				3					
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*19-Aug-08*	*3.63*		*1300*				*20*									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	19-Aug-08	4.93		956	610	440		13			0.024		0.1				
Prairie Flower Drain @ Crows Landing Rd	Irrigation	28-Aug-08			1114													87
Prairie Flower Drain @ Morgan Rd	*Irrigation*	*23-Sep-08*	*3.3*		*2675*				*29*									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	23-Sep-08			2525	1800			33									
Prairie Flower Drain @ Crows Landing Rd	Irrigation	2-Oct-08			2449													83
Prairie Flower Drain @ Crows Landing Rd	Storm	15-Feb-05			2561	1600												
Prairie Flower Drain @ Crows Landing Rd	Storm	22-Mar-05	6.5		2568	1600	1600											
Prairie Flower Drain @ Crows Landing Rd	Storm	1-Mar-06			2419	1600	900											
Prairie Flower Drain @ Crows Landing Rd	Storm	16-Mar-06		8.77	2728	1600	300								75			
Prairie Flower Drain @ Crows Landing Rd	Storm	24-Mar-06			2782													
Prairie Flower Drain @ Crows Landing Rd	Storm	2-May-06			2724													88.75
Prairie Flower Drain @ Crows Landing Rd	Storm	11-Feb-07		6.12	2659	1600	2400		24									
Prairie Flower Drain @ Crows Landing Rd	Storm	1-Mar-07		8.57	2592	1500			42									
Prairie Flower Drain @ Crows Landing Rd	Storm	7-Mar-07			4798													
Prairie Flower Drain @ Crows Landing Rd	Storm	24-Jan-08			2371	1500	1100		23								797608	
Prairie Flower Drain @ Crows Landing Rd	Storm	30-Jan-08			2944													
Prairie Flower Drain @ Crows Landing Rd	Storm	26-Feb-08			2722	1600			28								442649	
Prairie Flower Drain @ Crows Landing Rd	Storm	4-Mar-08			2639													
Prairie Flower Drain @ Crows Landing Rd	Fall	21-Oct-08			1742	1100	370		27									
Prairie Flower Drain @ Crows Landing Rd	Fall	11-Nov-08			2151	1500			39									
Prairie Flower Drain @ Crows Landing Rd	Fall	16-Dec-08			2298													
Priorities			**E**	**E**	**E**	**E**	**E**	**E**	**D**	**NP**	**NP**	**A**	**NP**	**NP**	**D**	**NP[1]**	**D**	**D**

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

NP[1] – Not prioritized; both toxic samples were from the same sampling event (sample and resample to test for persistence).

2007 and 2008 Management Plan Monitoring Results

In 2007, Management Plan Monitoring was implemented at the Prairie Flower Drain monitoring site for chlorpyrifos and *Pimephales* sp. toxicity. Additional monitoring occurred during the months in which exceedances of priority constituents or toxicity were detected during the previous year at this site (Table III-3). Additional monitoring during the 2007 irrigation season was designed to increase the temporal coverage of monitoring during the months when exceedances had occurred in the past, in particular as they co-occurred with applications of relevant pesticides in the site subwatershed. Management Plan sampling occurred for *Pimephales* toxicity in July and for chlorpyrifos in August and September of 2007. Table III-7 provides monitoring results for chlorpyrifos and *Pimephales* toxicity from all sampling events during the 2007 irrigation season. Chlorpyrifos was detected in samples collected in July and August. The normal monitoring sample in July contained 0.009 µg/L of chlorpyrifos; no Management Plan Monitoring (MPM) was conducted during this month. In August, the normal monitoring sample did not contain chlorpyrifos above the detection limit however the MPM sample (collected two weeks later) contained 0.094 µg/L of chlorpyrifos. There were no other detections of chlorpyrifos at this site in 2007. There was no *Pimephales* toxicity detected in any of the samples collected in 2007.

Upstream Management Plan Monitoring for chlorpyrifos, nitrate, and toxicity to *Ceriodaphnia dubia* and *Pimephales promelas* occurred during the 2008 irrigation season at Prairie Flower Drain @ Morgan Road (Table III-4). Table III-7 provides monitoring results for chlorpyrifos, nitrate, *Ceriodaphnia*, and *Pimephales* toxicity from all sampling events during the 2008 irrigation season. Chlorpyrifos exceeded the WQTL once on August 19, 2008 during normal monitoring (0.024 µg/L). With the exception of July upstream Management Plan Monitoring, nitrate exceedances were experienced during every sampling event in 2008 at both monitoring locations. There was neither *Ceriodaphnia* nor *Pimephales* toxicity during the 2008 irrigation season.

Table III-7. Prairie Flower Drain site subwatershed. Normal monitoring (NM) and Management Plan Monitoring (MPM) results where 'A' indicates additional MPM (2007) and 'US' indicates upstream MPM (2008) for chlorpyrifos, nitrate, *Ceriodaphnia dubia* toxicity, and *Pimephales promelas* toxicity from the 2007-2008 irrigation seasons. Exceedance values are in bold.

	Month:	April	May	June	July	August	September
2007 NM (@ Crows Landing Rd)	Date	4/17/07	5/15/07	6/19/07	7/17/07	8/14/07	9/25/07
	Chlorpyrifos (µg/L)	<0.00259	<0.00259	<0.00259	0.009	<0.003	<0.003
	Nitrate (mg/L)	**25**	**41**	**32**	**13**	**16**	9.8
	Ceriodaphnia toxicity (Survival %)	100	90	95	100	100	**0**
	Pimephales toxicity (% survival)	97.5	100	100	97.5	100	100
2007 MPM A (@ Crows Landing Rd)	Date	NA	NA	NA	7/31/07	8/28/07	9/25/07
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	**0.094**	<0.003
	Nitrate (mg/L)	NA	NA	NA	NA	NA	NA

	Month:	April	May	June	July	August	September
	Ceriodaphnia toxicity (Survival %)	NA	NA	NA	NA	NA	NA
	Pimephales toxicity (% survival)	NA	NA	NA	100	NA	NA
2008 NM (@ Crows Landing Rd)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	<0.003	<0.003	<0.003	<0.003	**0.024**	<0.003
	Nitrate (mg/L)	**23**	**26**	**19**	**11**	**13**	**33**
	Ceriodaphnia toxicity (Survival %)	100	95	100	95	100	95
	Pimephales toxicity (% survival)	100	100	100	100	100	100
2008 MPM US (@ Morgan Rd)	Date	4/22/08	5/20/08	6/17/08	7/22/08	8/19/08	9/23/08
	Chlorpyrifos (µg/L)	NA	NA	NA	NA	<0.003	<0.003
	Nitrate (mg/L)	**35**	**22**	**30**	0.053	**20**	**29**
	Ceriodaphnia toxicity (Survival %)	NA	NA	NA	NA	NA	100
	Pimephales toxicity (% survival)	NA	NA	NA	100	NA	NA

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

Load Calculations

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

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

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

Table III-8. Chlorpyrifos loads calculated from concentration and discharge measured on each sample date for Prairie Flower Drain @ Crows Landing Rd and Prairie Flower Drain @ Morgan Rd monitoring sites (includes all detections).

Station	Analyte	Sample Date	Discharge cfs	Concentration µg/L	Loading Rate µg/sec
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	17-Aug-05	0	0.029	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	21-Sep-05	0	0.018	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	13-Jul-06	0	0.014	0
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	17-Jul-07	2.32	0.009	0.59
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	28-Aug-07	NR	0.094	NA
Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	19-Aug-08	4.67	0.024	3.17

NR - Not Recorded: miscommunication occurred and no discharge was taken.
NA – Unable to calculate due to lack of information.

Source Identification

Priority A Constituents

Chlorpyrifos

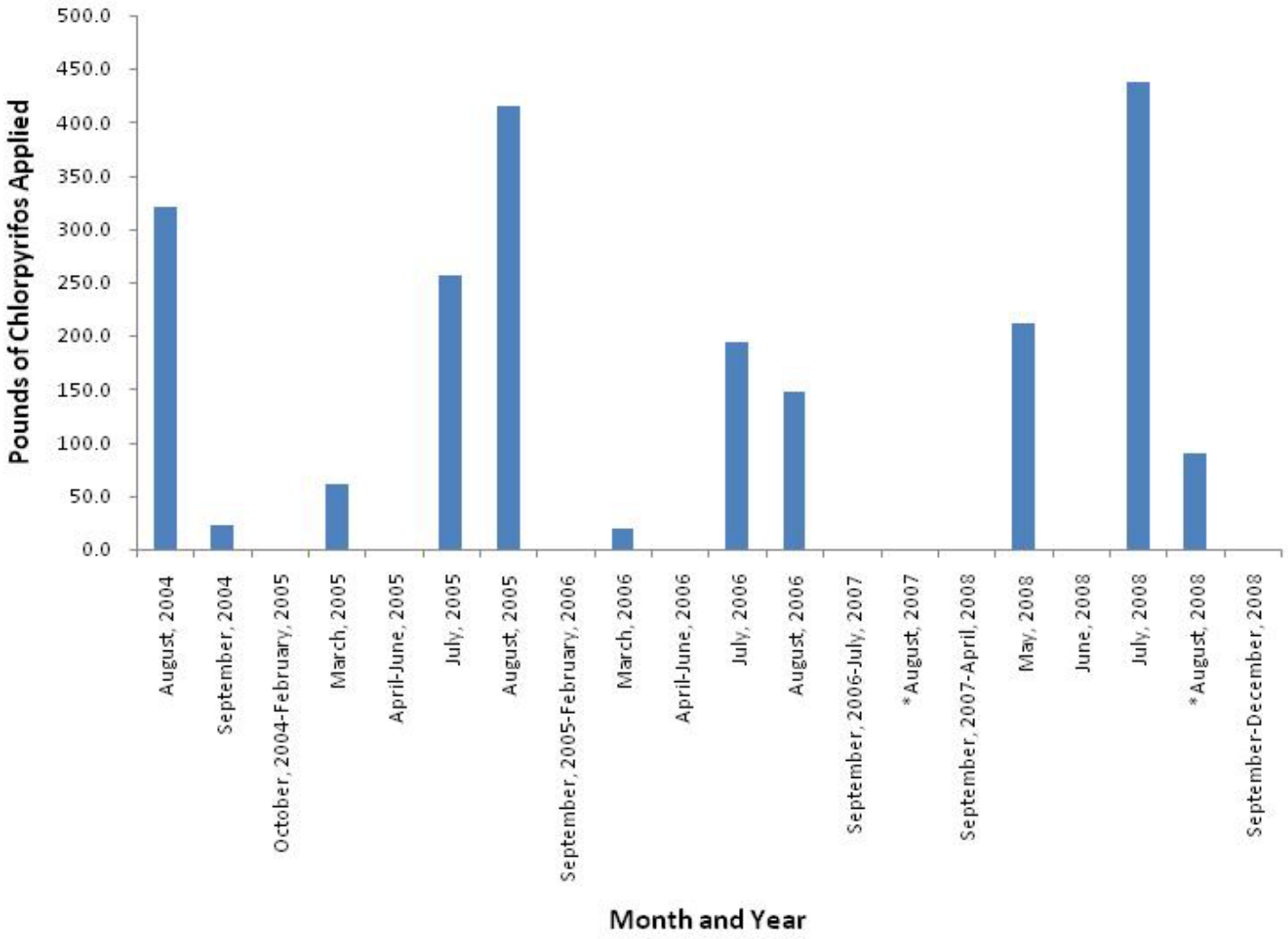
Chlorpyrifos is the only priority A constituent managed within the Prairie Flower Drain @ Crows Landing Rd site subwatershed. The WQTL for chlorpyrifos was exceeded at this site during the months of March (2005, 2006), July (2005, 2006), August (2004, 2005, 2006, 2008) and September (2004) (Table III-6). To identify potential sources of chlorpyrifos, the Coalition uses Pesticide Use Reports (PURs) to examine the amount and timing of pesticide applications and the types of crops to which the active ingredients are applied relative to exceedance dates. Township, range and section (TRS) in which chlorpyrifos was applied within one month of the exceedance date are identified. In the years 2004-2006, July and August appear to be the peak application months with a total of 672 pounds of product applied in these two months in 2005, and 341 pounds applied in these two months in 2006, which for both years accounts for over 90% of the total pounds applied in the entire year (Figure III-4). There was no reported use of chlorpyrifos in 2007. It should be noted that chlorpyrifos use decreased significantly from 2005 to 2006 with less than half the number of applications and pounds applied in 2006 as compared to 2005 (Table III-9, Figure III-4). However, 528 total pounds of chlorpyrifos were applied during the peak use months of July and August in 2008. One exceedance occurred on August 19, 2008 during normal monitoring.

Table III-9. Number of applications, total pounds applied and total acres treated by month for August 2004 through December 2008 in the Prairie Flower Drain @ Crows Landing Road site subwatershed. If a month is not included in the table, no applications were made.

Month/Year*	Number of Chlorpyrifos Applications	Pounds of AI Applied	Acres Treated
August, 2004	5	321.0	321
September, 2004	1	22.5	30
March, 2005	1	61.0	120
July, 2005	5	256.6	312
August, 2005	8	415.7	485
March, 2006	1	19.9	40
July, 2006	4	194.2	191
August, 2006	3	147.4	207
May, 2008	2	212.1	140
July, 2008	6	437.8	561
August, 2008	4	90.5	89
Summaries by Year			
2004 Total	6	343.5	351
2005 Total	14	733.3	917
2006 Total	8	361.5	438
2008 Total	12	740.4	790
Total	**40**	**2178.7**	**2496**

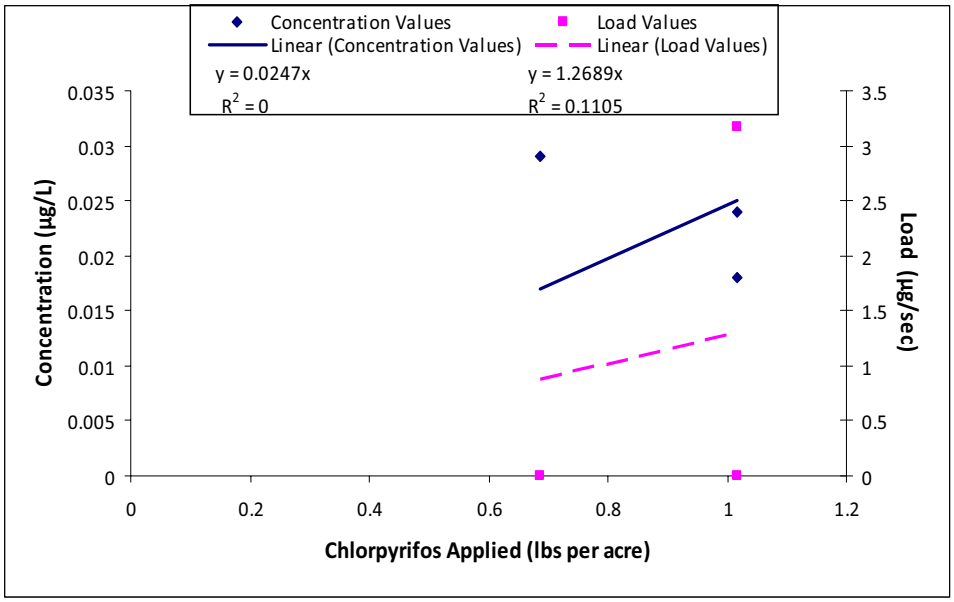
*No applications of chlorpyrifos reported for 2007.

Figure III-4. Pounds of chlorpyrifos added to TRS within the Prairie Flower Drain site subwatershed by month for 2004-2008. Asterisk (*) denotes months with exceedances. No use of chlorpyrifos was reported for 2007.



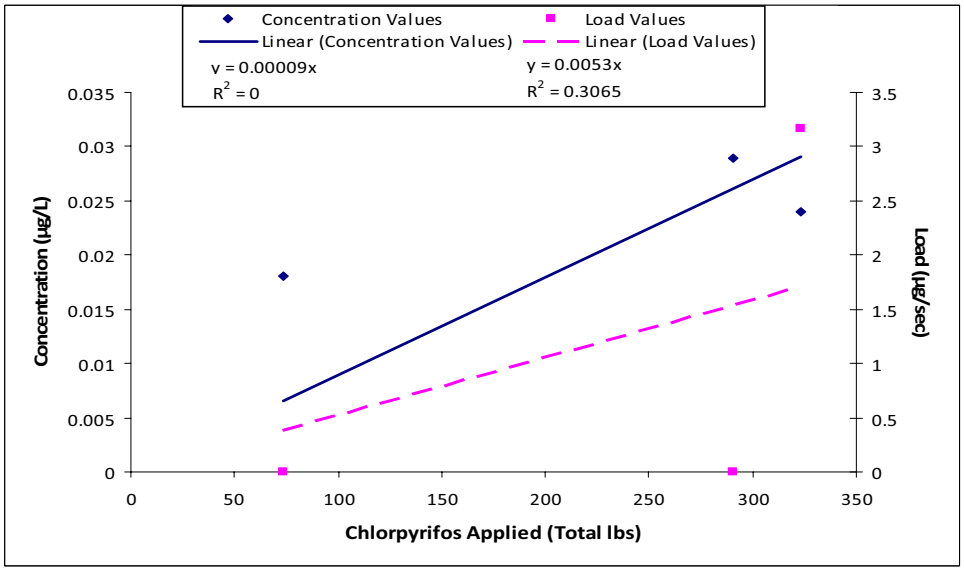
Three exceedances where PUR data were available make it theoretically possible to use the regression approach; however the three exceedance dates are not sufficient to establish any reliable relationships (Figures III-5, III-6).

Figure III-5. Chlorpyrifos exceedance concentrations and loads compared to application rates (average lbs per acre) for the Prairie Flower Drain @ Crows Landing Rd site subwatershed for applications within 4 weeks of exceedance dates.



There were no chlorpyrifos applications in 2007; the 8/28/2007 exceedance is not included on this chart.

Figure III-6. Chlorpyrifos exceedance concentrations and loads compared to application rates (total lbs across all acres) for the Prairie Flower Drain @ Crows Landing Rd site subwatershed for applications within four weeks of exceedance dates.



There were no chlorpyrifos applications in 2007; the 8/28/2007 exceedance is not included on this chart.

The average application rate of chlorpyrifos in the Prairie Flower Drain subwatershed from 2005 and 2008 is 0.84 lbs AI/acre (Table III-10). Applications occurred to alfalfa and corn.

Table III-10. Average pound active ingredient (AI) per acre for chlorpyrifos based on PUR data from 2004-2008 within the Prairie Flower Drain @ Crows Landing Rd subwatershed.

Chemical Name	Commodity	Product Name	Average Lbs AI per acre
CHLORPYRIFOS	ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	LOCK-ON INSECTICIDE	0.5007
	CORN (FORAGE - FODDER)	NUFOS 4E	1.0168
	CORN FOR/FOD	NUFOS 4E	1.0168
Average pounds chlorpyrifos applied per acre (2004-2008)			**0.84**

*No applications of chlorpyrifos reported for 2007.

To determine if there were specific parcels associated with exceedances on a continuing basis, the Coalition examined the sections (TRS) associated with each exceedance (Table III-11). There were five sections associated with exceedances, each section had between one and four applications in the four weeks prior to sampling. Two sections were associated with two exceedances, the other three sections were associated with one exceedance each. Applications were made to both corn and alfalfa for the August 2005 exceedance and a single application was made to corn prior to the September 2005 exceedance. Both aerial and ground applications were made prior to the August exceedance and the corn application was made by ground prior to the September exceedance. Prior to the August 2008 exceedance, applications were made aerially to corn fields.

Of the two sections associated with exceedances in 2008, 6E9S10 and 6E9S11, Coalition members own only a small portion of the acreage (Figures III-7, III-8). A large amount of the acreage is owned and farmed by dairies and it is assumed that the land not covered by the Coalition is part of the dairy program. This pattern of ownership suggests that it will be difficult to improve water quality in this site subwatershed. It is difficult to receive cooperation from nonmembers as well as track implementation of management practices on nonmember land, if any are implemented.

Table III-11. Prairie Flower Drain @ Crows Landing Rd. All TRS' that had more than one application associated with an exceedance of chlorpyrifos in 2005 and 2008. Table summarizes the number of applications associated with an exceedance for a given date and TRS.

TRS[1]	Chlorpyrifos Applications per Date of Exceedance		
	8/17/2005	9/21/2005	8/19/2008
6S9E10	1		
6S9E11		1	2
6S9E12	3		4
6S9E4	1		
6S9E9	1		

*Bolded TRS are members of the Coalition

[2] No chlorpyrifos was reported for 2007.

Table III-12. Prairie Flower Drain @ Crows Landing Rd. TRS' with chlorpyrifos applications in the month prior to each exceedance date in 2008. Includes pounds applied and acres treated. If an exceedance is not included in this table, there were no relevant chlorpyrifos applications.

TRS*	Exceedance Date		
	8/19/2008		
	Application Date	Pounds Applied	Acres Treated
6S9E11	7/25/2008	15.25	15
	7/25/2008	217.59	214
6S9E12	8/5/2008	5.08	5
	8/5/2008	10.17	10
	8/5/2008	36.60	36
	8/5/2008	38.64	38

[1] Bolded TRS are members of the Coalition.

Figure III-7. Prairie Flower Drain @ Crows Landing Rd. TRS' that have had applications co-occurring with a chlorpyrifos exceedance.

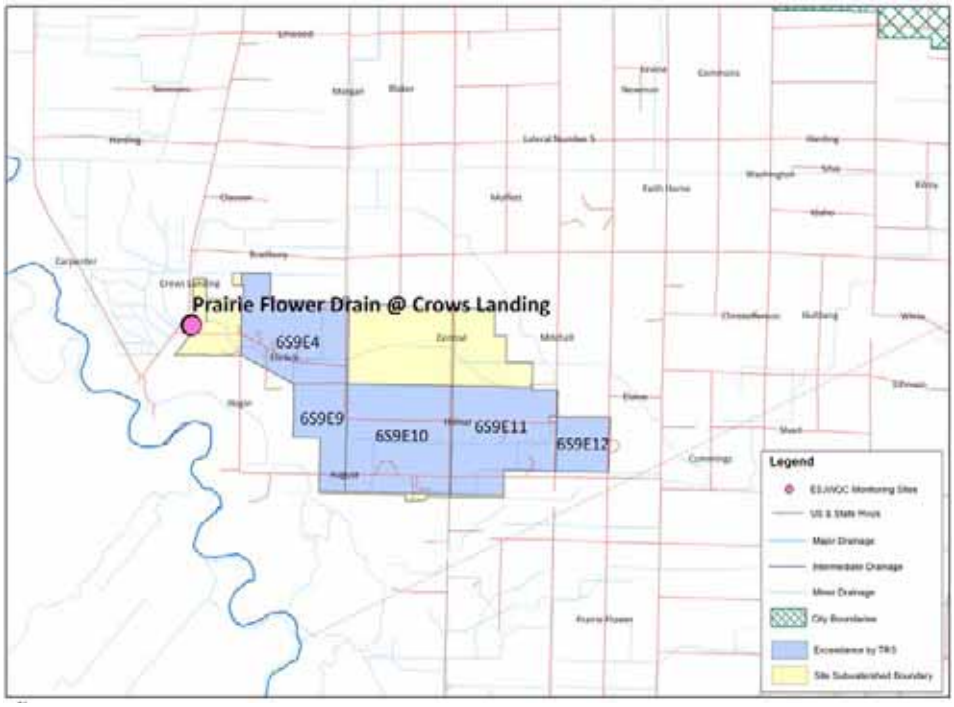
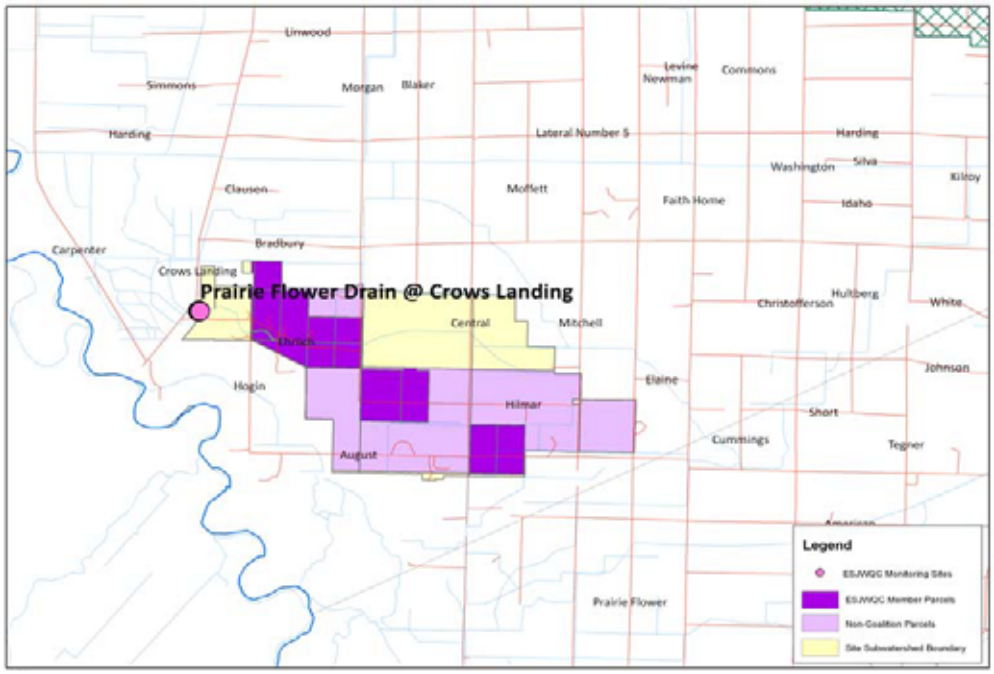


Figure III-8. Prairie Flower Drain @ Crows Landing Rd. Member APNs relative to TRS' with applications co-occurring with chlorpyrifos exceedances.



Priority D Constituents

Prairie Flower Drain is listed for the following priority D constituents: nitrate, water column toxicity to *Pimephales promelas, Ceriodaphnia dubia,* and *Selenastrum capricornutum* (result of 2008 monitoring), and sediment toxicity to *Hyalella azteca*. Toxicity to Selenastrum occurred several times during 2008. There was no toxicity to *Pimephales* or *Ceriodaphnia*. Exceedances of the nitrate WQTL occurred every sample event.

Nitrate

There were 15 additional exceedances of the nitrate WQTL in the Prairie Flower Drain site subwatershed in 2008. Sources of nitrate are discussed in the introduction of the ESJWQC Management Plan submitted in September and include fertilizer applications and dairy manure waste. Prairie Flower Drain subwatershed contains approximately 443 acres of confined animal operations most of which are dairies. Based on surveys filled out by growers in this subwatershed, both members and nonmembers applied dairy waste to corn, oats, alfalfa, almonds, Sudan grass and sorghum (a total of 1,413 member acres). In addition, nitrate contamination of ground water is common in the region, and Prairie Flower Drain intercepts shallow ground water. It is not clear if the nitrates are originating with recent applications of dairy waste that may be reaching surface waters, or from past contamination of ground water which is being intercepted by the drain. The Coalition does not have the capabilities to track fertilizer applications and therefore cannot determine the exact source of the nitrate exceedances. Exceedances prior to 2008 occurred in most of the months of the year including February, March, May, June, July, August, and September. In 2008, exceedances occurred during upstream sampling at Morgan Rd in all months except July, indicating that ground water and/or dairy discharge are the likely sources. It is unlikely that applications of manure would occur in every month.

Selenastrum toxicity

Toxicity to *Selenastrum* occurred in January, February, April, and May in the absence of any exceedances of herbicides.

Hyalella toxicity

Sediment toxicity to *Hyalella* occurred on August 28, 2008 and also in the resample collected on October 2, 2008. Both samples had survival greater than 80% compared to the control. The Coalition will not conduct management plan sampling for sediment toxicities due to the dynamics of sediment fate and transport from upstream to downstream. For example, sediment tends to be mobilized and moved downstream only when flows are high. These flows generally occur periodically in Coalition waterbodies. Consequently, sampling more than twice (once during irrigation flows and once during storm flows) in a year is unlikely to provide additional information about sediment quality and sources. Associated PUR data has been provided in previous

SAMRs and all TRS within this site subwatershed there have been one or more applications of chemicals that could potentially lead to *Hyalella* toxicity. Under the new MRPP (submitted on August 25, 2008) the Coalition will begin to test for total organic carbon and grain size in all sediments and pyrethroids and chlorpyrifos in sediment that exhibits toxicity.

Priority E Constituents

The following priority E constituents are listed under the Prairie Flower Drain management plan: ammonia (result of 2008 monitoring), dissolved oxygen, pH, specific conductance, dissolved solids, color, and *E. coli*. Exceedances of DO, pH, SC, TDS, and *E. coli* continued in 2008 and ammonia was added as a result of 2008 monitoring. The Coalition no longer monitors for color. These constituents will remain low priority for the foreseeable future.

2009 Management Plan Monitoring

Prairie Flower Drain @ Crows Landing will be monitored as a Core Monitoring location in 2009. In addition, this site will be monitored for the following Management Plan constituents during the 2009 irrigation season: chlorpyrifos (August) and *Selenastrum* (April, May and August). In addition, *Selenastrum* toxicity will be monitored during a first and second storm event during the winter of 2009/2010. The Coalition will continue to monitor for nitrate/nitrate each month of the year.

Outreach

The Coalition conducts numerous types of outreach to its membership:

- General grower meetings on a county level,
- Subwatershed specific grower meetings,
- Crop specific grower meetings (may be specified by crop, chemical use or seasonal practices i.e. dormant season orchard),
- Individual contacts,
- Mailings of crop specific BMP literature.

A subwatershed meeting was projected for the early spring of 2009, but the Coalition was unable to schedule the meeting prior to the beginning of the growing season.

Evaluation

The Coalition plans to build upon the baseline survey results by making individual contacts with growers and filling out detailed checklists that can be used to gain information about individual parcels and the management practices currently being implemented. The Coalition will offer resources (i.e. management practice handbooks, information to obtain NRCS-EQIP funds) to the grower to aid them in implementing

additional management practices. The Coalition will return in a year to interview the grower again and determine if any additional management practices were used.