San Joaquin County and Delta Water Quality Coalition

Lead Agency:
San Joaquin County Resource Conservation District

March 1, 2010

Pamela Creedon
Chris Jimmerson
Irrigated Lands Conditional Waiver Program
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

Dear Ms. Creedon,

The San Joaquin County and Delta Water Quality Coalition (SJCDWQC) is submitting the 2010 Annual Monitoring Report (AMR) and Quarterly Monitoring Data Report (fourth quarter) for review by the Central Valley Regional Water Quality Control Board (CVRWQCB) as required by the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Resolution Order No. R5-2006-0053, Monitoring and Reporting Program Order No. R5-2008-0005 (MRP).

The attached documents report on the Coalition's monitoring program for the period of October 1, 2008 to December 31, 2009 and covers monitoring, reporting, outreach and education activities that occurred during this time. The Quarterly Monitoring Data Report is specific to the data collected from October 1, 2009 and December 31, 2009 (fourth quarter).

In every aspect, the Coalition seeks the best quality in its monitoring program by using the most scientifically reliable field and laboratory protocols, ensuring complete quality control and quality assurance of the data received from laboratories, and reporting on that data accurately and punctually to both the CVRWQCB and to the members of the Coalition. The Coalition and its technical staff process and review an immense quantity of data and provide a large number of reports in a timely manner to the CVRWQCB.

The Coalition's monitoring program met MRP requirements as described in the attached AMR. Sampling occurred during all fifteen months (including one storm event and two sediment events) and all data generated are an accurate reflection of conditions in the Coalition region. Overall, there was compliance with completeness, accuracy, and precision requirements for data collected from October 2008 through December 2009. Each of the five MRP programmatic questions is addressed in the Conclusions and Recommendations section of the AMR.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment for violations."

This letter will be submitted with an original signature when the printed AMR is submitted to the CVRWQCB

Submitted respectfully,

Michael L. Johnson
SJCDWQC Technical Program Manager
Michael L. Johnson, LLC

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Annual Monitoring Report

San Joaquin County & Delta Water Quality Coalition

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AMR Requirements – Section Key

Required Section - MRP	Section Name/Location - AMR
1. Signed Transmittal Letter;	Cover Letter
2. Title page;	San Joaquin County & Delta Water Quality Coalition AMR
3. Table of contents;	Table of Contents, List of Tables, List of Figures
4. Executive Summary;	Executive Summary
5. Description of the Coalition Group geographical area;	Geographical Area
6. Monitoring objectives and design;	Monitoring Objectives and Design
7. Sampling site descriptions and rainfall records for the time period covered under the AMR;	Sampling Site Descriptions and Rainfall Record
8. Location map(s) of sampling sites, crops and land uses;	Sampling Site Descriptions and Rainfall Record, Appendix VIII (Land Use Maps and 2009 Annual Site Photos)
9. Tabulated results of all analyses arranged in tabular form so that the required information is readily discernible (example table is included in (MRP Order Attachment C);	Appendix II (Monitoring Results)
10. Discussion of data to clearly illustrate compliance with the Coalition Group Conditional Waiver, water quality standards, and trigger limits;	Discussion of Results, Conclusions and Recommendations
11. Electronic data submitted in a SWAMP comparable format;	SWAMP Comparability Access Database (attached CD)
12. Sampling and analytical methods used;	Sampling and Analytical Methods
13. Copy of chain-of-custody forms;	Appendix I (Chain of Custody Forms)
14. Field data sheets, signed laboratory reports, laboratory raw data (as identified in Attachment C);	Appendix IX (Field Sheets), Quarterly Data Submittal (attached CD, attached printed hard copies), Appendix VI (Toxicity Identification Evaluation Report)
15. Associated laboratory and field quality control samples results;	Appendix III (Lab and Field QC Results)
16. Summary of Quality Assurance Evaluation results (as identified in Attachment C for Precision, Accuracy and Completeness) ;	Precision, Accuracy and Completeness

Required Section - MRP	Section Name/Location - AMR
17. Specify the method used to obtain flow at each monitoring site during each monitoring event;	Sampling and Analytical Methods
18. Electronic or hard copies of photos obtained from all monitoring sites, clearly labeled with site ID and date.	Appendix VIII (Land Use Maps and 2009 Annual Site Photos)
19. Summary of Exceedance Reports submitted during the reporting period and related pesticide use information;	Discussion of Results, Appendix IV (Pesticide Use Reports), Appendix V (Exceedance Reports) PUR Access Database (attached CD)
20. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;	Actions Taken To Address Water Quality Exceedances, Appendix VII (Meetings, Agendas and Handouts)
21. Status update on preparation and implementation of all Management Plans and other special projects; and	Management Plan Status and Special Projects
22. Conclusions and recommendations.	Conclusions and Recommendations

List of Acronyms

A	Assessment
AG	Agriculture
AMR	Annual Monitoring Report
AWEP	Agricultural Water Enhancement Program
BMP	Best Management Practice
BU	Beneficial Use
C	Core
CDEC	California Data Exchange Center
CDPR	California Department of Pesticide Regulation
CEDEN	California Environmental Data Exchange Network
COC	Chain of Custody
CURES	Coalition for Urban and Rural Environmental Stewardship
CVRWQCB	Central Valley Regional Water Quality Control Board
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DQO	Data Quality Objective
DWR	(California) Department of Water Resources
EC_{50}	Effective Concentration of 50% of the measured endpoint
EPA	Environmental Protection Agency
FB	Field Blank
FD	Field Duplicate
HCH	Hexachlorocyclohexane
ID	Identification
ILRP	Irrigated Land and Regulatory Program
K_{oc}	Organic Carbon Partitioning Coefficient
LABQA	Laboratory Quality Assurance
LC_{50}	Lethal Concentration at 50% mortality
LCS	Laboratory Control Spike
LCSD	Laboratory Control Spike Duplicate
MCL	Maximum Contaminant Level
MDL	Maximum Daily Load
MLJ-LLC	Michael L. Johnson, LLC

MPM	Management Plan Monitoring
MPN	Most Probable Number
MRP	Monitoring and Reporting Program Order No. R5-2008-0005
MRPP	Monitoring and Reporting Program Plan
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MUN	Municipal and Domestic Supply (beneficial use)
NA	Not Applicable
ND	Not Detected
NM	Normal Monitoring
OP	Organophosphate pesticides
PCA	Pesticide Control Advisor
pH	Power of Hydrogen
PR	Percent Recovery
PTFE	Polytetraflouroethylene (Teflon™)
PUR	Pesticide Use Report
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RfD	Reference Dose
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SC	Specific Conductance
SJCDWQC	San Joaquin County & Delta Water Quality Coalition
SG	Statistically significantly different from control; Greater than 80% threshold
SL	Statistically significantly different from control; Less than 80% threshold
SOP	Standard operating procedure
SWAMP	Surface Water Ambient Monitoring Program
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRS	Township, Range, Section
TSS	Total Suspended Solids
UC	University of California
UCD RDC	University of California, Davis Regional Data Center
US EPA	United States Environmental Protection Agency
VOA	Volatile Organic Analyte

WQTL	Water Quality Trigger Limit
YSI	Yellow Springs Instruments

List of Units

cfs	cubic feet per second
L	Liter
lbs	pounds
mg	milligram
NTU	Nephelometric Turbidity Units
ppm	parts per million
sec	second
TUa	Toxic Unit (acute)
TUc	Toxic Unit (chronic)
µg	microgram
µS	microsiemens

List of Terms

Agricultural Commissioner – County Agriculture Commissioner

ArcGIS – Geographic Information Systems mapping software

Central Valley or Valley – California Central Valley

Coalition –San Joaquin County and Delta Water Quality Coalition

Coalition/SJCDWQC region – The region within the Central Valley that is monitored by the San Joaquin County and Delta Water Quality Coalition.

Drainage –water that moves horizontally across the surface or vertically into the subsurface from land

Landowners – one or more persons responsible for the management of the irrigated land

Non project QA sample – sample results from another project other than the Coalition included to meet laboratory QC requirements.

Regional Board – Central Valley Regional Water Quality Control Board

Site subwatershed – Starting from the sampling site, all water bodies that drain, directly or indirectly, into the water body before the point where sampling occurs.

Special study – a study conducted outside of normal monitoring activities that involves monitoring specific constituents in an effort to determine the mechanism responsible for the exceedances; also includes TMDL monitoring.

Subwatershed – The topographic perimeter of the catchment area of a stream tributary. (EPA terms of environment: (http://www.epa.gov/OCEPAterms/sterms.html)

Waiver – Central Valley Regional Water Quality Control Board Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands, Order No. R5-2008-0005 amending Order No. R5-2006-0053.

Water body –standing or flowing water of any size that may or may not move into a larger body of water, including lakes, reservoirs, ponds, rivers, streams, tributaries, creeks, sloughs, canals, laterals and drainage ditches.

Watershed – The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point. (EPA terms of environment: http://www.epa.gov/OCEPAterms/wterms.html)

Executive Summary

The San Joaquin County and Delta Water Quality Coalition (SJCDWQC) area includes parts of San Joaquin, Contra Costa, Alameda and Calaveras counties. Within the Coalition area, the lower reaches of the San Joaquin River drain the California Central Valley. There are three major rivers in the Coalition area other than the San Joaquin River: Stanislaus River, Calaveras River, and Mokelumne River. The watershed of the Coalition area is the crest of the Sierra Nevada, and the drainage area is bounded by the San Joaquin River on the west, the Stanislaus River on the south, and the Mokelumne River on the north.

The Coalition area was divided into six zones based on hydrology, crop types, land use, soil types, and rainfall. The zone names are based on the Core Monitoring location within that area and include: 1) Mokelumne River @ Bruella Zone, 2) French Camp @ Airport Way Zone, 3) Terminous Tract Drain @ Hwy 12 Zone, 4) Roberts Island Drain @ Holt Ave Zone, 5) Lower San Joaquin Zone, and 6) Contra Costa Zone. Zone 5 is not named after a Core Monitoring location since the Coalition has not previously monitored in this area. Zone 6 does not have a Core Monitoring location due to the increase of urbanization within the Contra Costa county and lack of agriculture in the southern portion of this zone.

MONITORING PROGRAM OBJECTIVES

Water quality monitoring was conducted during every month from October 2008 through December 2009 as described in the SJCDWQC Monitoring and Reporting Program Plan (MRPP) submitted on August 25, 2008. The primary objectives of the monitoring program were to characterize discharge from agriculture and to determine if implementation of management practices was effective in reducing or eliminating discharge. The Coalition monitored 10 sites monthly from October 2008 through March 2009 and six sites from April 2009 through December 2009 as part of the normal monitoring schedule (SJCDWQC MRPP amended on March 12, 2009). In addition, three sites were monitored for Management Plan Monitoring as outlined in the SJCDWQC Management Plan (submitted September 30, 2008) including Duck Creek which was monitored monthly for normal monitoring from October 2008 through March 2009. The Coalition sampled for numerous water quality parameters and constituents including 45 pesticides, *E. coli*, physical parameters (total dissolved solids, total suspended solids and turbidity), nine metals, total organic carbon, five nutrients, field parameters (dissolved oxygen, pH, specific conductivity), water column toxicity to *Ceriodaphnia dubia*, *Pimephales promelas* and *Selenastrum capricornutum* and sediment toxicity to *Hyalella azteca*. Monitoring constituents are established by the Irrigated Lands Regulatory Program (ILRP) Monitoring and Reporting Program (MRP) (Order No. R5-2008-0005).

The monitoring program was substantially different during the reporting period relative to the previous years. Within each zone, a Core Monitoring site and an Assessment Monitoring site were established. Core sites are meant to establish trends in water quality over a longer period of time and will be monitored continuously over several years. There are fewer constituents monitored at core sites, primarily physical parameters and nutrients. Assessment monitoring sites are meant to characterize discharge in the zone in which they are located. Assessment Monitoring includes the full suite of constituents. Assessment sites are rotated every year to a new site. Core sites are monitored for assessment constituents on a rotating schedule (see SJCDWQC MRPP amended on March 12, 2009 for a complete schedule).

MONITORING PROGRAM COMPLIANCE

For the period of October 2008 through December 2009, the Coalition was able to meet its monitoring program objectives by determining the concentration and load of waste in discharges to surface waters, evaluating compliance with existing narrative and numeric water quality limit triggers to determine if implementation of additional management practices is necessary to improve and/or protect water quality and assessing the impact of storm water discharges from irrigated agriculture to surface water. The Coalition used the results from surveys of management practices to determine the implementation of management practices to reduce discharge of specific wastes that impact water quality in receiving waters of the Coalition region.

Coalition monitoring conducted between October 1, 2008 and December 31, 2009 resulted in exceedances of Water Quality Trigger Limits (WQTLs) for dissolved oxygen (DO), power of hydrogen (pH), specific conductance (SC), *E. coli*, total dissolved solids (TDS), ammonia, arsenic, boron, molybdenum, chlorpyrifos, dichlorodiphenyltrichloroethane (DDT), hexachlorocyclohexane (HCH), and paraquat dichloride. Water column toxicity to *Ceriodaphnia dubia, Pimephales promelas,* and *Selenastrum capricornutum* and sediment toxicity to *Hyalella azteca* occurred between October 2008 and December 2009.

The most common exceedances were for DO (62 - 49%), TDS (38 - 36%), SC (36 - 28%), and *E. coli* (18 - 17%). Exceedances of the arsenic WQTL were common (17 – 36%), and boron and molybdenum were the only other metals to exceed the WQTLs. All metals exceedances occurred within the Webb Tract Delta island which was not actively farmed during this time period. There were 13 pesticide exceedances; the most common pesticide exceedance was for the chlorpyrifos WQTL (less than 1% of all pesticides analyzed for). Seven of the nine chlorpyrifos exceedances occurred in samples collected for Management Plan Monitoring and one of the exceedances occurred at a location that was removed from the Coalition's MRPP due to the density of upstream dairies. Exceedances of physical parameters (141 of 488 samples, 28.9%) and *E. coli* (18 of 107 samples, 16.8%) were more common than exceedances of pesticides (13 of 3124 samples, 0.4%) or metals (19 of 674 samples, 2.8%).

Of the five samples that tested toxic to one or more water column species, all five had endpoints less than 50% compared to the control. Toxicity Identification Evaluations (TIEs) were initiated on four of the samples to determine the cause of toxicity. One toxic sample contained extremely high amounts of ammonia and the water could not be brought up to the required test conditions and a TIE could not be performed (sample was toxic to both *Ceriodaphnia* and *Pimephales*). However, based on the concentration of ammonia in the sample, the presumed cause of the toxicity was ammonia. Organophosphate and pyrethroid pesticides were the cause of toxicity in two samples and the cause could not be determined in the other two samples. One toxic sample contained extremely high amounts of ammonia and the water could not be brought up to the required test conditions and a TIE could not be performed. Of the five toxic samples, two were collected specifically for Management Plan Monitoring.

A single sediment field duplicate sample was toxic to *Hyalella* however the associated environmental sample was not toxic. The survival in the sample was 83% and therefore no additional analysis was conducted and the reduction in survival is not considered ecologically significant.

The series of actions taken to determine the potential sources of exceedances include: 1) the use of PURs to identify relevant applications that occurred upstream of the sample site and within a specified time period prior to the sampling event, 2) an analysis of monitoring data and toxicity results to better understand the potential sources and toxicity of detected constituents, and 3) special studies where appropriate and cost effective to determine the sources of constituents such as *E. coli* or the potential causes of exceedances such as low DO.

Grower notification, management practice outreach and education, and management practice tracking and implementation are additional actions taken by the Coalition to ensure that growers are aware of downstream water and sediment quality issues as well as the importance of implementing various management practices within their farm operations. The Coalition provides growers with information on management practices to reduce storm water runoff, discharge of irrigation water, and mobilization of sediments into receiving waters. Relevant management practices were detailed in a handbook developed by the Coalition for Urban and Rural Environmental Stewardship (CURES) and mailed to all members in October, 2008. Additional management practices such as the use of alternative products, structural changes to manage drain water, and pesticide application practices for minimizing spray drift, were presented at meetings. To evaluate and establish a baseline of current management practices, the Coalition requests that all members complete a general survey and return it to the Coalition. The general survey documents irrigation and storm water management practices, pest management strategies and drift management activities. The SJCDWQC submitted a General Survey Summary Report to the Regional Board on December 30, 2008.

The Coalition has developed a strategy to prioritize subwatersheds in order to conduct focused outreach with individual members. The purpose of the outreach is to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices. From 2008 to 2010 the Coalition has conducted focused outreach in the following site subwatersheds: Duck Creek @ Hwy 4, Lone Tree Creek @ Jack Tone Road, and Unnamed Drain to Lone Tree Creek @ Jack Tone Road (also known as Temple Creek). Growers were contacted during the fall of 2008, and winter and fall of 2009. Growers were asked to complete surveys documenting current practices and indicate which recommended practices they anticipated implementing in the upcoming year. Follow up with growers will be conducted in spring of 2010 to document implementation of new practices. It is anticipated to take more than one year of focused outreach to observe improvements in water quality and the Coalition will continue to work with growers in these priority subwatersheds during the irrigation season of 2010 to track changes in management practices.

The Coalition continues to be committed to collaboration with outside sponsors to secure unique opportunities that will enhance the Coalition's ability to achieve its goal of reducing the impact of agricultural discharge on water quality. The Coalition has recently been awarded a $175,000 grant through the California Department of Pesticide Regulation (CDPR) with a goal of reducing pesticide runoff (up to 10 percent) by 2011 from tomato, alfalfa, walnut, and wine grapes. With the funds, the Coalition is developing a crop specific management practice workbook that will enable individual farmers to easily make management practice decisions specific to their operations. The Coalition anticipates the completion of the handbook by spring of 2010 to allow for grower practice changes during the irrigation season of 2010.

CONCLUSIONS

The results of the monitoring program from October 2008 through December 2009 indicate that although there has been substantial improvement in water quality in many areas, water quality is still not protective of beneficial uses across most of the Coalition region. The most common exceedances of WQTLs involve physical parameters such as DO, TDS, and SC which resulted in impaired Agricultural and Aquatic Life Beneficial Uses. Other parameters such as *E. coli* also experienced numerous exceedances which resulted in impaired Recreational and Aquatic Life Beneficial Uses. The most common causes of impairment of the Municipal

Beneficial Use were elevated concentrations of arsenic. Wastes from irrigated lands is but one of many possible sources of impairments to beneficial uses.

For many parameters, it is not clear to what extent WQTL exceedances are the result of current agricultural activities. Source identification is difficult especially for non-conserved constituents. There are numerous non-conserved constituents that cannot be traced upstream, e.g. dissolved oxygen. For example, locations in the Delta experienced numerous exceedances of SC and TDS which are the result of the high salt content water of the Delta being used for irrigation or being pumped from Delta islands to allow agriculture. Also, as discussed several times in previous semi-annual reports, *E. coli* source tracking analysis identified the coliform bacteria in the system as originating predominantly from human sources.

Many pesticides are the result of agricultural applications and enter surface waters as a result of drift or runoff in either storm water or irrigation return flows. The Coalition is continuing to identify sources of WQTL exceedances through PUR, assessment of water quality data and evaluation of current management practices. The Coalition's sourcing strategy is further described in the Coalition's Management Plan.

The Coalition's outreach program is focused on general meetings for growers across the entire Coalition region. Information on management practices is provided by the Coalition in several forums that range from meetings with one or two growers to large meetings sponsored by the County Agricultural Commissioner. It appears that this outreach strategy is being successful and it is anticipated that in 2011 the water quality benefits of the outreach strategy within the Coalition region should be fully realized.

SJCDWQC Geographical Area

The SJCDWQC area includes parts of San Joaquin, Contra Costa, Alameda and Calaveras counties. Within the Coalition area, the lower reaches of the San Joaquin River drain the California Central Valley. Drainage water is either exported to the San Francisco Bay through the Delta or conveyed southward via the State Water Project and the Delta Mendota Canal. There are three major rivers in the Coalition area other than the San Joaquin River: Stanislaus River, Calaveras River, and Mokelumne River. These east side tributaries of the San Joaquin River drain a major portion of the Sierra Nevada Mountain Range from east to west. The watershed of the Coalition area is the crest of the Sierra Nevada, and the drainage area is bounded by the San Joaquin River on the west, the Stanislaus River on the south, and the Mokelumne River on the north.

Irrigated Land

Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains approximately 2,156,031 acres of which 609,134 acres (28%) are considered irrigated agriculture (Table 1). For Alameda, Calaveras, Contra Costa, San Joaquin, and Stanislaus counties, the Coalition used the California Department of Water Resources (DWR) land use estimates for irrigated agriculture since the Coalition boundaries do not completely represent county boundaries; the exception being San Joaquin County which used DWR agricultural land and water use estimates (Table 1).

Table 1. Acreage of irrigated land in SJCDWQC counties and available DWR data.

County	Irrigated Land Area (acres)	Data Source Year (Agricultural Land and Water Use)	Data Source Year (Land Use Survey)
San Joaquin	539,000	2001	1996 (Not Used)
Contra Costa	48,920	1995	1995
Alameda	937	2006	2006
Calaveras	1,077	2000	2000
Stanislaus	19,200	2004	2004
Total	**609,134**		

DWR Agricultural Land Use: http://www.water.ca.gov/landwateruse/anaglwu.cfm
DWR Land Use Survey: http://www.water.ca.gov/landwateruse/lusrvymain.cfm

Geographical Characteristics and Land Use

The Coalition area was divided into six zones to facilitate completion of a comprehensive monitoring program (Figure 1). These zones were designated based on hydrology, crop types, land use, soil types, and rainfall (Table 2). The zone names are based on the Core Monitoring location within that area and include: 1) Mokelumne River @ Bruella Zone, 2) French Camp @ Airport Way Zone, 3) Terminous Tract Drain @ Hwy 12 Zone, 4) Roberts Island Drain @ Holt Ave Zone, 5) Lower San Joaquin Zone, and 6) Contra Costa Zone. Zone 5 is not named after a Core Monitoring location since the Coalition has not previously monitored in this area. Zone 6 does not have a Core Monitoring location due to the increase of urbanization within the Contra Costa county and lack of agriculture in the southern portion of this zone. Descriptions of zone-specific climate, water drainage and flow, soil characteristics and land use are included in the Coalition's Monitoring and Reporting Program Plan (MRPP, submitted August 25, 2008). Land use maps for each zone are included in Figures 2 -7 with a land use key provided in Figure 8.

Figure 1. Zone boundaries (1-6) within the SJCDWQC.

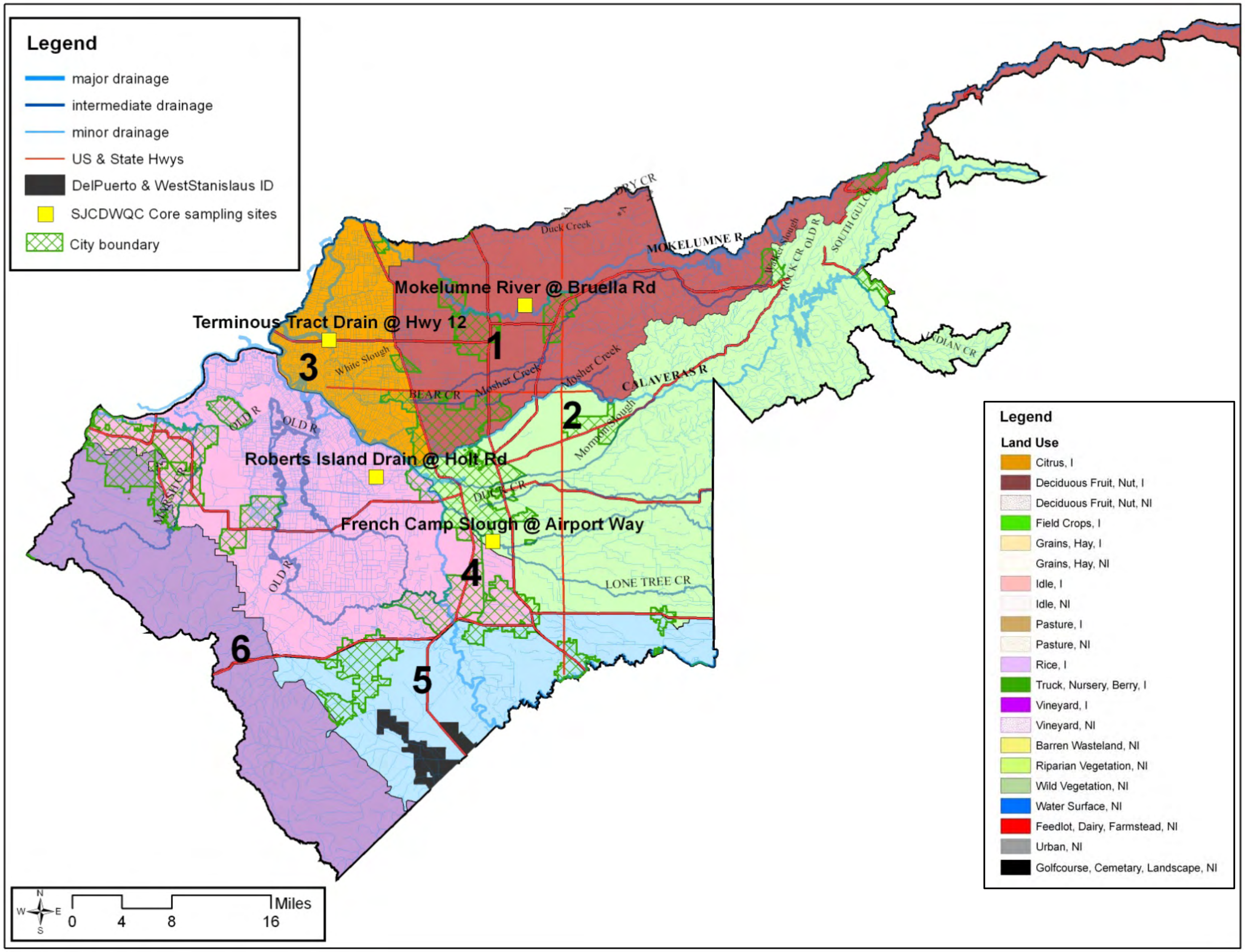


Table 2. Land use and soil percentages for SJCDWQC zones.

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
	Mokelumne River @ Bruella Zone	French Camp Slough @ Airport Way Zone	Terminous Tract Drain @ Hwy 12 Zone	Roberts Island Drain @ Holt Ave Zone	Lower San Joaquin Zone	Contra Costa Zone
Total Acres	663,562.16	687,956.99	120,112.03	479,455.35	302,772.49	587,924.97
Irrigated Acres	114,067.73	158,304.64	73,253.05	192,546.54	101,786.85	2,294.19
Soil (average %):						
Sand	51.15	41.95	42.04	38.74	47.49	34.20
Silt	27.82	30.54	32.28	33.19	25.69	32.91
Clay	21.03	27.51	25.68	28.07	26.82	32.89
Land Use (% of irrigated acres):						
Deciduous Fruits/Nuts	15.31	31.33	0.86	5.71	40.86	49.86
Field Crops	8.37	10.58	49.10	31.53	14.43	11.73
Grains/Hay	4.52	16.57	16.31	12.47	11.54	13.19
Pasture	17.57	14.37	8.76	24.82	16.17	2.61
Vineyard	45.57	9.55	7.12	1.74	3.68	0.00
Dairies/Feedlots:						
% of total acres	0.32	0.53	0.45	0.51	0.59	0.02
Number of operations	474	521	73	512	285	30
Urban (% of total acres)	5.98	5.54	21.45	10.87	5.71	1.85
Depth to groundwater:						
Weighted average	99	91.94	17.1	17.32	31.94	30*
% area of groundwater	100	62	4	7	18	0.78

*only one contour/area data point exists

Figure 2. Land use for Mokelumne River @ Bruella Rd Zone (Zone 1). See Figure 8 for a land use legend.

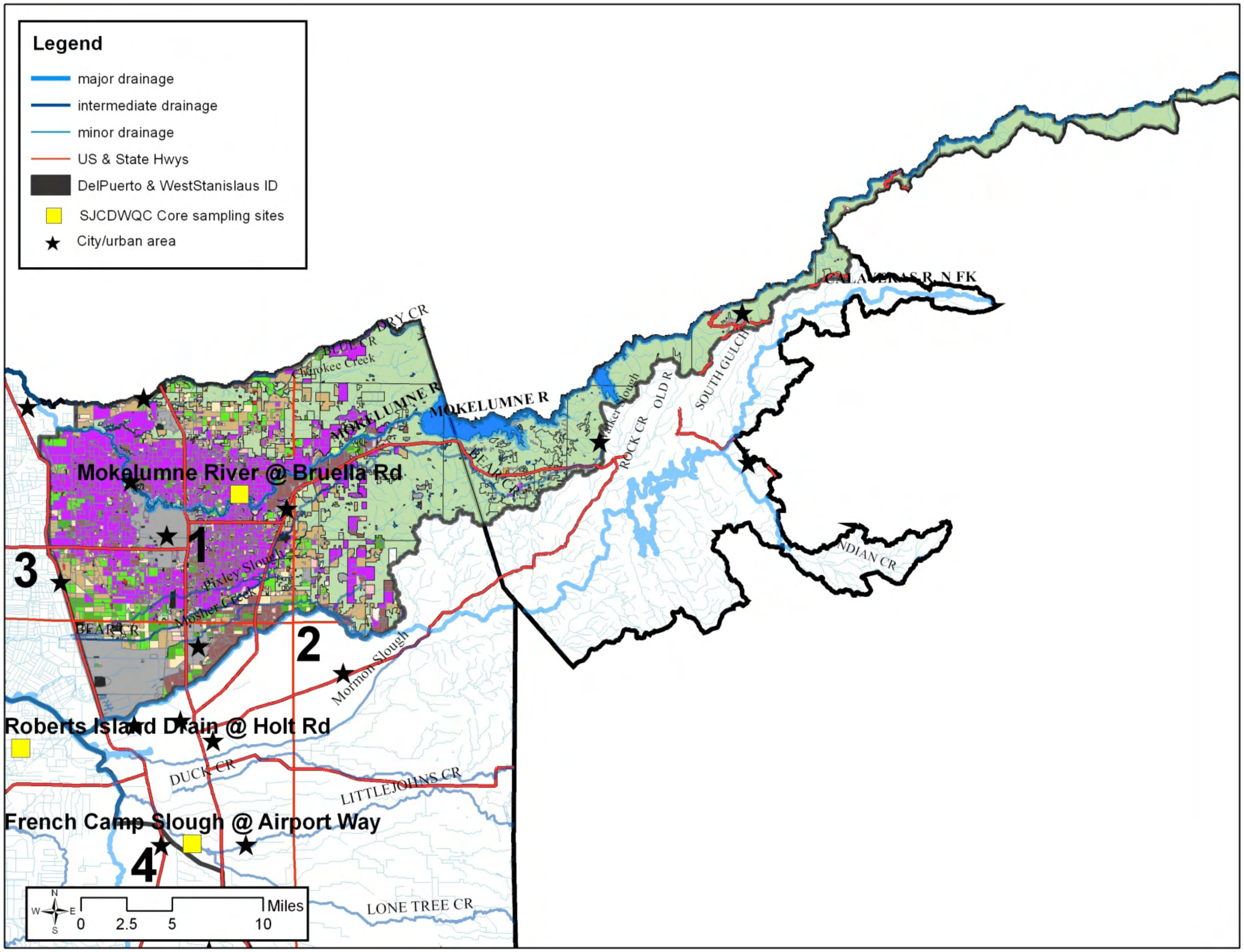


Figure 3. Land use for French Camp Slough @ Airport Way Zone (Zone 2). See Figure 8 for a land use legend.

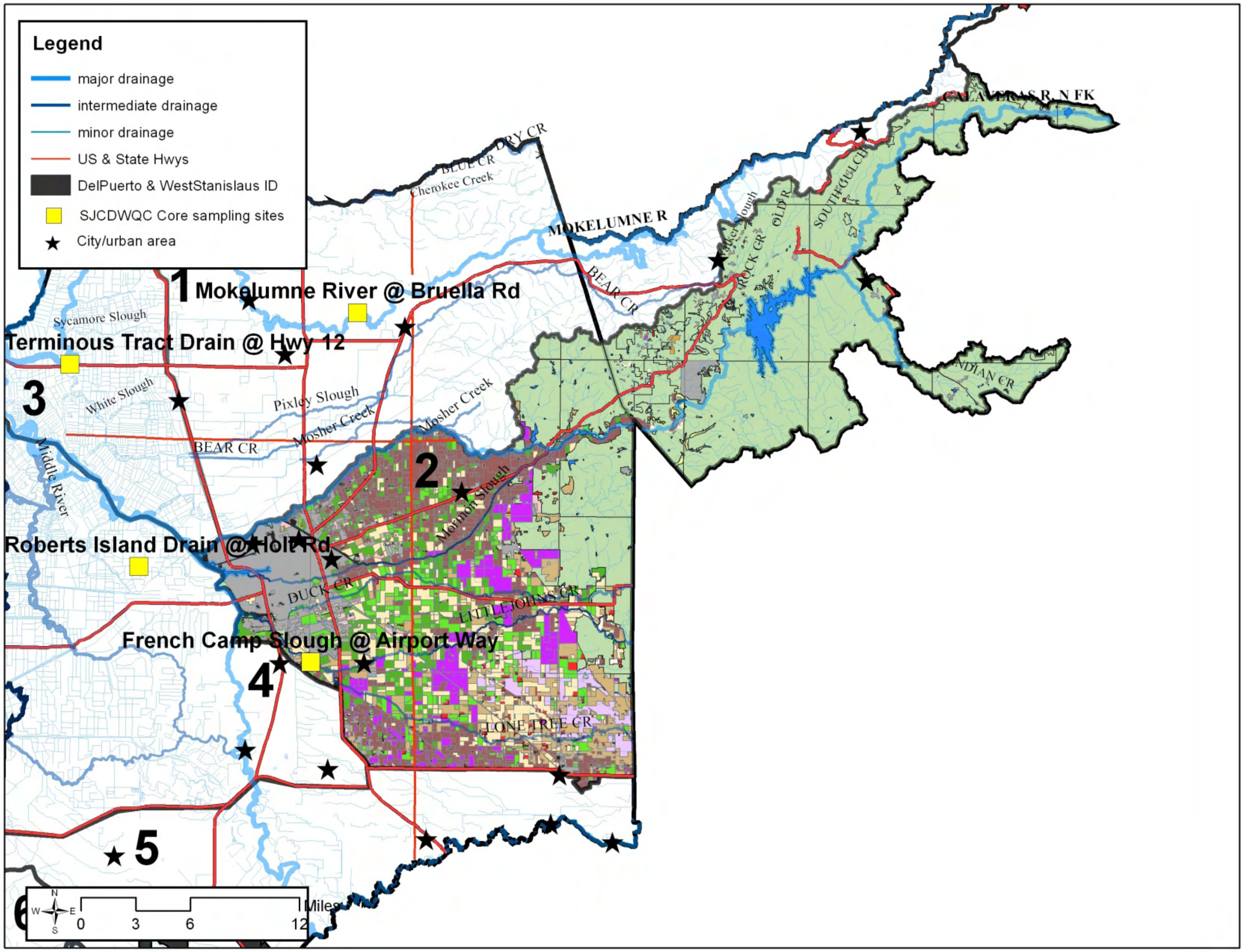


Figure 4. Land use for Terminous Tract @ Hwy 12 Zone (Zone 3). See Figure 8 for a land use legend.

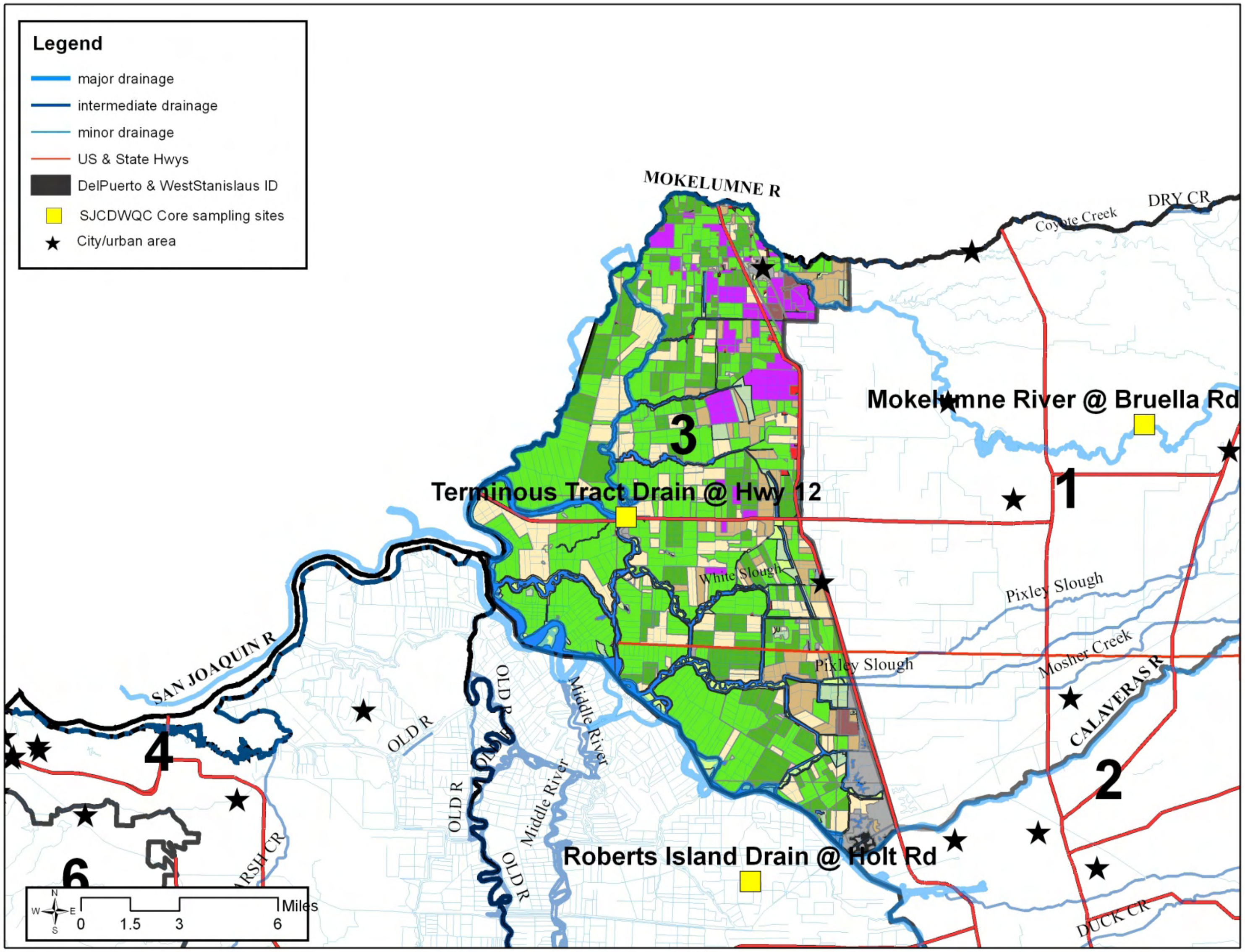


Figure 5. Land use for Roberts Island Drain @ Holt Rd Zone (Zone 4). See Figure 8 for a land use legend.

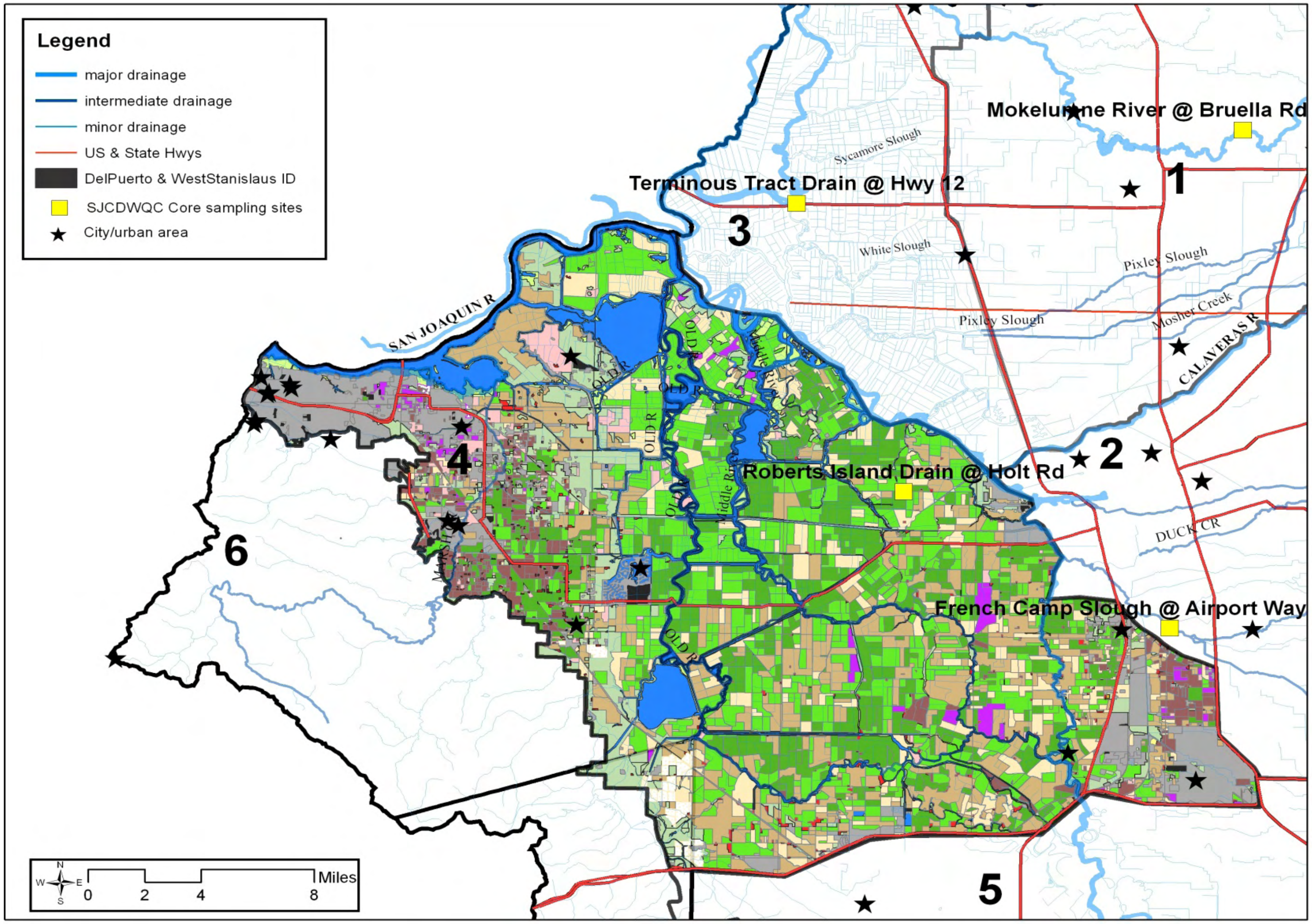


Figure 6. Land use for Lower San Joaquin Zone (Zone 5). See Figure 8 for a land use legend.

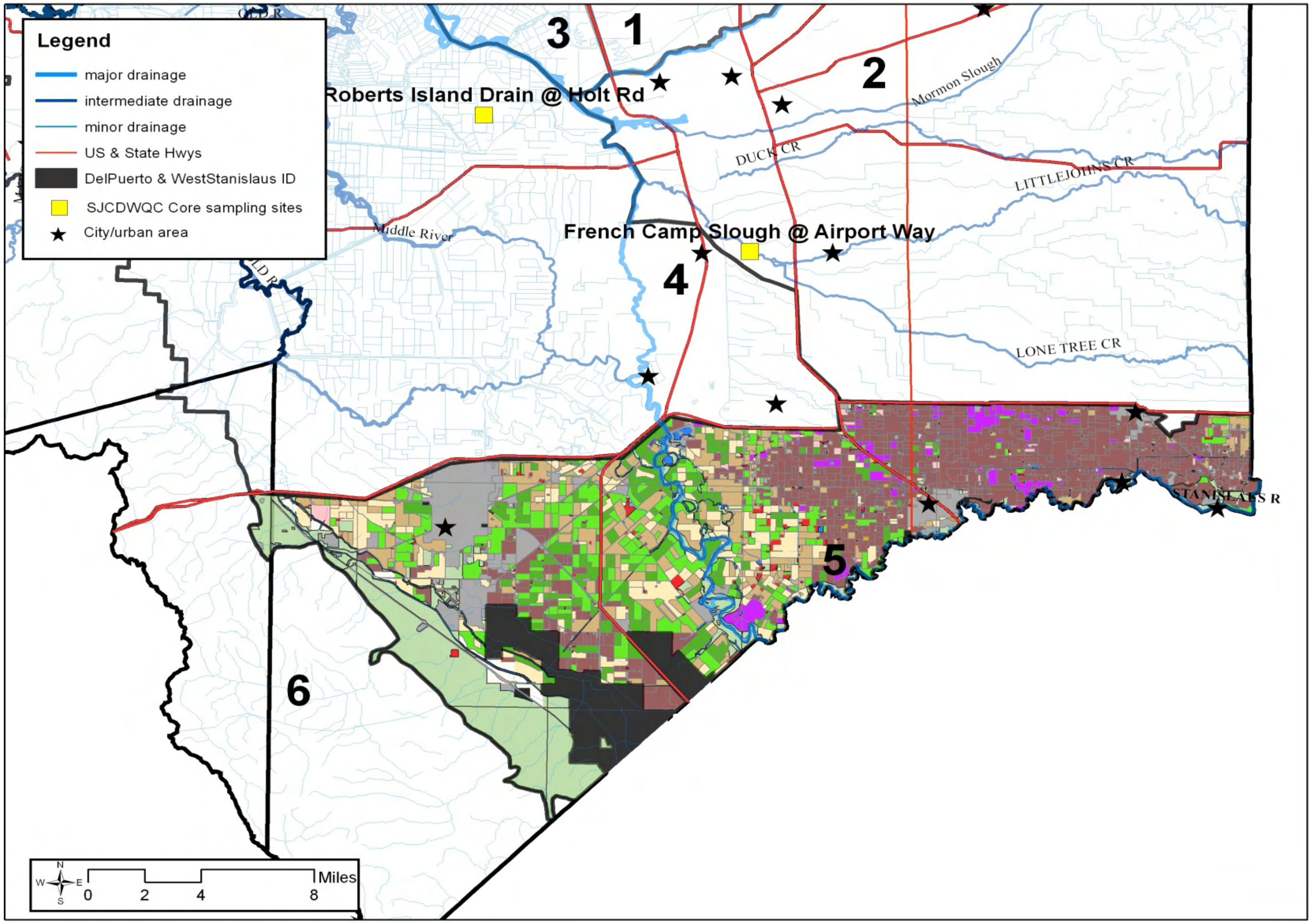


Figure 7. Land use for Contra Costa Zone (Zone 6). See Figure 8 for a land use legend.

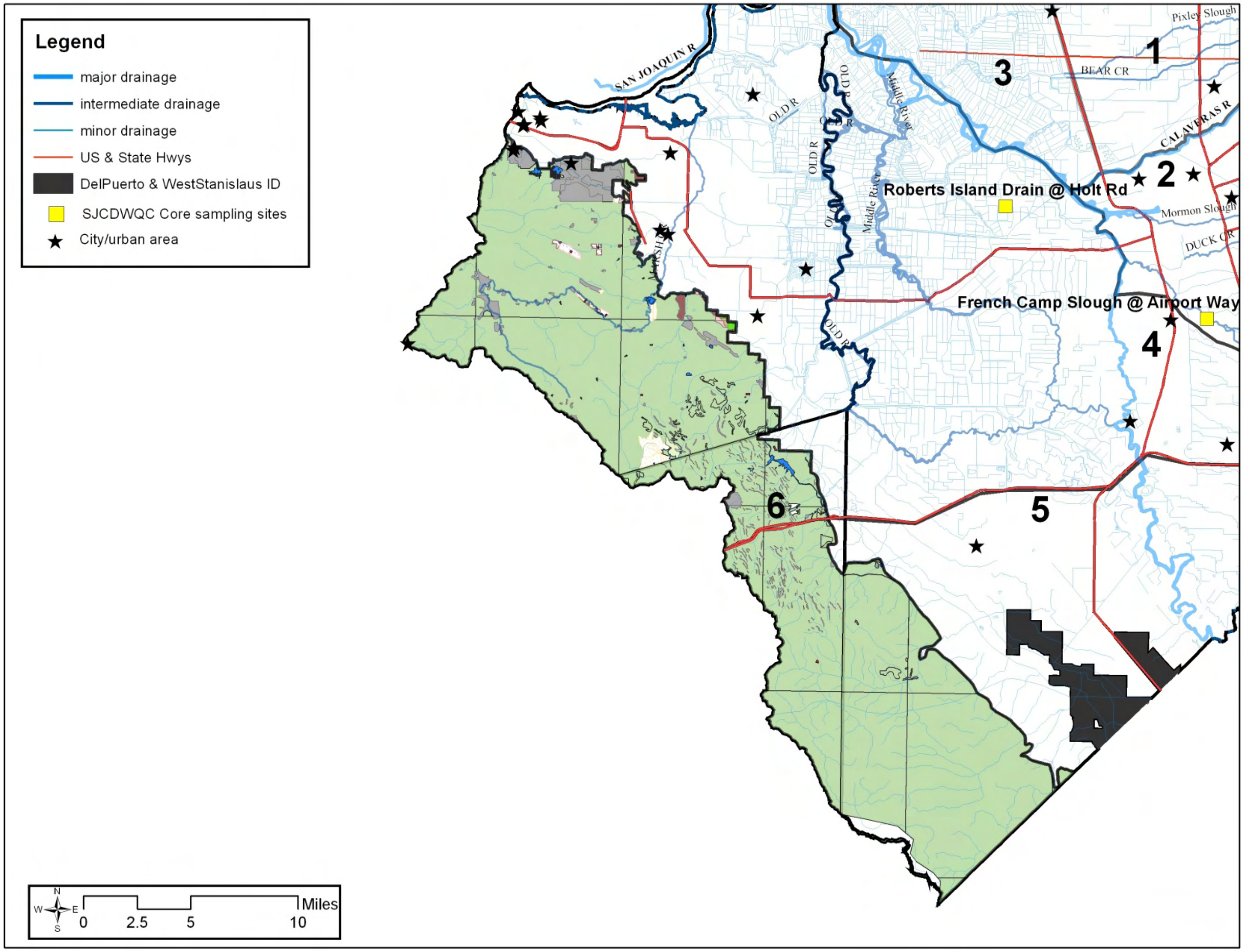
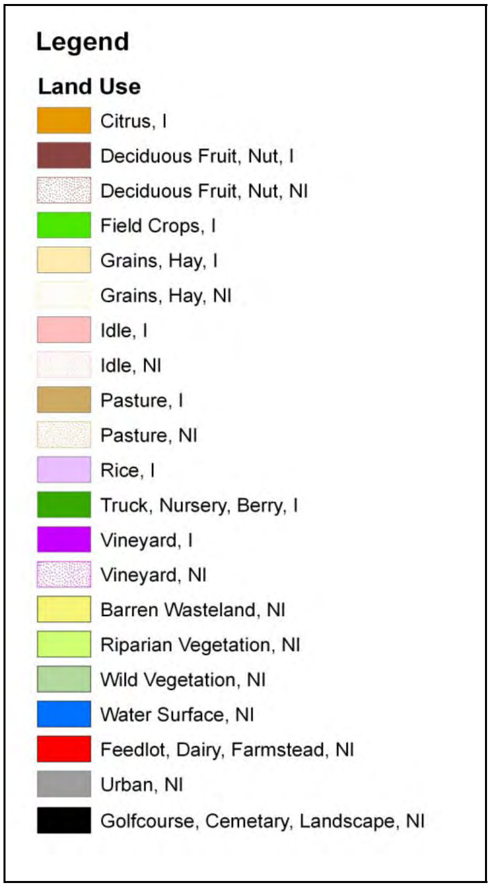


Figure 8. Land Use legend for SJCDWQC.



Source:
Land use survey data. CA Department of Water Resources (available for each county). Alameda (2006). Contra Costa (1995). Calaveras (2000). Alameda (2006).
US Geological Survey. 1999. California Resources Agency. Statewide coverages. Obtained from California Spatial Information Library.

Monitoring Objectives and Design

Monitoring October 2008 – December 2009

From October 2008 through December 2009 the Coalition conducted both normal monitoring and Management Plan Monitoring based on an approved MRPP (submitted on August 25, 2008) and Management Plan (submitted on September 30, 2008).

As part of normal monitoring the Coalition conducted sampling once a month with at least one storm event and collected sediment samples twice between October 2008 and December 2009. The following section briefly describes the objectives of normal monitoring (Core (C), Assessment (A) and Sediment Monitoring) and Management Plan Monitoring (MPM) as well as the overall Coalition sampling design including sampling seasons and storm triggers.

Monitoring Objectives

The objectives of the SJCDWQC monitoring program are to:

1. Determine the concentration and load of waste in discharges to surface waters.
2. Evaluate compliance with existing narrative and numeric water quality objectives to determine if implementation of additional management practices is necessary to improve and/or protect water quality.
3. Assess the impact of waste discharges from irrigated agriculture to surface water.
4. Determine the degree of implementation of management practices to reduce discharge of specific wastes that impact water quality in watersheds within the coalition region.
5. Determine the effectiveness of management practices and strategies to reduce discharges of wastes that impact water quality.

In order to achieve the objectives listed above, the Coalition monitored 10 sites monthly from October 2008 through March 2009 and six sites from April 2009 through December 2009 as part of the normal monitoring schedule (SJCDWQC MRPP amended on March 12, 2009). In addition, three sites were monitored for MPM as outlined in the SJCDWQC Management Plan including Duck Creek which was monitored monthly for normal monitoring from October 2008 through March 2009.

The Coalition sampled for numerous water quality parameters and constituents including 45 pesticides, *E. coli*, physical parameters (total dissolved solids, total suspended solids and turbidity), nine metals, total organic carbon, five nutrients, field parameters (dissolved oxygen, pH, specific conductivity), water toxicity to *Ceriodaphnia dubia*, *Pimephales promelas* and *Selenastrum capricornutum,* sediment toxicity to *Hyalella azteca* and sediment chemistry (grain size and total organic carbon) (Tables 3 and 4). Monitoring constituents are established by the Monitoring and

Reporting Program (MRP) (Order No. R5-2008-0005) and are discussed in more detail at the end of this section.

Table 3. Monitoring Parameters.

Constituents, Parameters, and Tests	Monitoring Type
TMDL/CWA 303(d) listed*	
Aldrin	As needed to characterize 303d listed waterbodies
Chlordane	As needed to characterize 303d listed waterbodies
Heptachlor	As needed to characterize 303d listed waterbodies
Heptachlor epoxide	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (including Lindane) (gamma-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (alpha-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (beta-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (delta-HCH)	As needed to characterize 303d listed waterbodies
Endosulfan I	As needed to characterize 303d listed waterbodies
Endosulfan II	As needed to characterize 303d listed waterbodies
Toxaphene	As needed to characterize 303d listed waterbodies
Photo Monitoring	
Photograph of monitoring location	With every monitoring event
WATER COLUMN SAMPLING	
Physical Parameters and General Chemistry	
Flow (field measure)	Assessment and Core
pH (field measure)	Assessment and Core
Electrical Conductivity (field measure)	Assessment and Core
Dissolved Oxygen (field measure)	Assessment and Core
Temperature (field measure)	Assessment and Core
Turbidity	Assessment and Core
Total Dissolved Solids	Assessment and Core
Total Suspended Solids	Assessment and Core
Hardness	Assessment and Core
Total Organic Carbon (TOC)	Assessment and Core
Pathogens	
E. coli	Assessment and Core
Water Column Toxicity Test	
Algae -*Selenastrum capricornutum*	Assessment
Water Flea – *Ceriodaphnia dubia*	Assessment
Fathead Minnow - *Pimephales promelas*	Assessment
Toxicity Identification Evaluation**	As needed based on criteria described in MRP Part II.E
Pesticides	
Carbamates	

Constituents, Parameters, and Tests	Monitoring Type
Aldicarb	Assessment
Carbaryl	Assessment
Carbofuran	Assessment
Methiocarb	Assessment
Methomyl	Assessment
Oxamyl	Assessment
Organochlorines	
DDD	Assessment
DDE	Assessment
DDT	Assessment
Dicofol	Assessment
Dieldrin	Assessment
Endrin	Assessment
Methoxychlor	Assessment
Organophosphates	
Azinphos-methyl	Assessment
Chlorpyrifos	Assessment
Diazinon	Assessment
Dichlorvos	Assessment
Dimethoate	Assessment
Dimeton-s	Assessment
Disulfoton (Disyton)	Assessment
Malathion	Assessment
Methamidophos	Assessment
Methidathion	Assessment
Parathion-methyl	Assessment
Phorate	Assessment
Phosmet	Assessment
Herbicides	
Atrazine	Assessment
Cyanazine	Assessment
Diuron	Assessment
Glyphosate	Assessment
Linuron	Assessment
Paraquat dichloride	Assessment
Simazine	Assessment
Trifluralin	Assessment
Metals	
Arsenic (total)	Assessment
Boron (total)	Assessment
Cadmium (total and dissolved)	Assessment

Constituents, Parameters, and Tests	Monitoring Type
Copper (total and dissolved)	Assessment
Lead (total and dissolved)	Assessment
Nickel (total and dissolved)	Assessment
Molybdenum (total)	Assessment
Selenium (total)	Assessment
Zinc (total and dissolved)	Assessment
Nutrients	
Total Kjeldahl Nitrogen	Assessment and Core
Nitrate plus Nitrite as Nitrogen	Assessment and Core
Total Ammonia	Assessment and Core
Unionized Ammonia (calculated value)	Assessment and Core
Total Phosphorous (as P)	Assessment and Core
Soluble Orthophosphate	Assessment and Core
SEDIMENT SAMPLING	
Sediment Toxicity	
Hyalella azteca	Assessment
Pesticides (as needed based on criteria described in MRP Part II.E.2)	
Bifenthrin	As needed based on criteria described in MRP Part II.E
Cyfluthrin	As needed based on criteria described in MRP Part II.E
Cypermethrin	As needed based on criteria described in MRP Part II.E
Esfenvalerate	As needed based on criteria described in MRP Part II.E
Lambda-Cyhalothrin	As needed based on criteria described in MRP Part II.E
Permethrin	As needed based on criteria described in MRP Part II.E
Fenpropathrin	As needed based on criteria described in MRP Part II.E
Chlorpyrifos	As needed based on criteria described in MRP Part II.E
Other sediment parameters	
Total Organic Carbon	Assessment
Grain Size	Assessment

*303(d) constituents (Group A pesticides) used by agriculture were last reported in 2006. If there are no detections and no reported use for these constituents will be dropped from monitoring in 2010.

** Specific TIE manipulations utilized in each test will be reported.

Table 4. Normal monitoring schedule for October 2008 – December 2009 including site name, ID, zone and constituent groups.

Zone	Monitoring Location Type	Monitoring Location	Group A Pesticides	Physical Parameters	Nutrients	Pathogens	Carbamates	Organochlorines	Organo-phosphates	Herbicides	Metals (total and dissolved)	Water Column Toxicity	Sediment
1	C	Mokelumne River @ Bruella Rd	X	X	X	X		**X**					
1	A	Bear Creek @ North Alpine Rd		X	X	X	X	X	X	X	X	X	X
2	C	French Camp Slough @ Airport Way	X	X	X	X	**X**	**X**	**X**				
2	A	Duck Creek @ Highway 4	X	X	X	X	X	X	X	X	X	X	X
3	C	Terminous Tract Drain @ Hwy 12	X	X	X	X		X					
3	A	Drain @ Woodbridge Rd	X	X	X	X	X	X	X	X	X	X	X
4	C	Roberts Island Drain @ Holt Rd	X	X	X	X		**X**				**X***	
4	A	South Webb Tract Drain		X	X	X	X	X	X	X	X	X	X
5	C	Walthall Slough @ Woodward Ave	X	X	X	X	X	X	X	X	X	X	X
5	A	Stanislaus River Drain @ South Airport Way†	X	X	X	X	X	X	X	X	X	X	X

Bolded Xs are additional constituents added due to single exceedances that have occurred at Core Monitoring locations.

Grayed rows are sites that were omitted from the monitoring schedule on April 6, 2009 based on an amended MRPP.

C = Core Monitoring location, A = Assessment Monitoring location

*only *Ceriodaphnia dubia*.

†Stanislaus River Drain @ South Airport Way was omitted from the monitoring schedule in January 2009 due to upstream dairy issues and was replaced by Walthall Slough @ Woodward Ave.

Monitoring Design

Normal Monitoring

Starting October 2008 the Coalition began monitoring under a new MRPP (submitted August 25, 2008 and approved on September 18, 2008) that includes a schedule of Core and Assessment Monitoring locations to be monitored monthly. Previous to the August 2008 MRPP the Coalition monitored only during the irrigation season (April – September) and twice during the storm season as determined by a 24 hour rainfall trigger (December – March). 2008 was the first year in which the Coalition monitored from October to December (now called the "fall" season). For reference, Table 5 illustrates the locations and seasons that the Coalition has monitored from 2004-2009.

Sampling occurred at five Core and five Assessment sites under the original 2008 MRPP prior to an amendment which updates the SJCDWQC monitoring strategy to monitor five Core Monitoring sites and one Assessment Monitoring site each year. Each year the monitoring schedule rotates to a new Assessment Monitoring location in a different zone. During that year the associated Core Monitoring location in the same zone will be monitored for all assessment constituents (see the SJCDWQC MRPP amended on March 12, 2009 for a full monitoring schedule). Walthall Slough is a Core Monitoring location that was sampled for all assessment constituents during 2009 (Table 8).

Core Monitoring

Core Monitoring is designed to track water and sediment quality trends over extended periods of time. Core Monitoring is not limited to large volume water bodies, but includes a diversity of water body size and flows. Data generated from the Core Monitoring sites will be used to establish trend information about the effectiveness of the Coalition's efforts to reduce or eliminate the impact of irrigated agriculture on surface waters.

Assessment Monitoring

Assessment Monitoring focuses on a diversity of monitoring sites that are representative of individual zones. Assessment Monitoring sites are selected in order to adequately characterize quality for all waters of the State within the Coalition region. In conjunction with Core Monitoring for trends and Special Projects focused on specific problems, Assessment Monitoring demonstrates the effectiveness of management practices and identifies locations for implementation of new management practices as needed.

Sediment Monitoring

Sediment samples are collected bi-yearly. Storm sediment samples are collected after the major rainfall events and before the height of the irrigation season when water flows and levels are low (between March 1 and April 30). Irrigation sediment samples are collected at the end of the irrigation season, again when water levels are low and safe enough to sample sediment (between August 15 and October 15). Storm sediment samples were collected on April 14, 2009 and irrigation sediment samples were collected on August 19, 2009.

Table 5. Sample sites and years monitored.

Station Name	2004	2005		2006		2007		2008			2009			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm*	Winter	Irrigation	Fall
Bear Creek @ North Alpine Rd								x		x	x	x		
Calaveras River @ Belota Intake	x													
Delta Drain- Terminous Tract off Glasscock Rd		x	x	x										
Delta Drain- Terminous Tract off Guard Rd		x	x	x										
Drain @ Woodbridge Rd								x[4]		x	x	x		
Duck Creek @ Drais Rd[1]									x					
Duck Creek @ Hwy 4	x				x	x	x	x	x	x	x	x	x	
French Camp Slough @ Airport Way		x	x	x	x	x	x	x	x	x	x	x	x	x
Grant Line Canal @ Clifton Court Rd		x	x	x	x	x	x	x	x					
Grant Line Canal near Calpack Rd		x	x	x	x	x	x	x	x					
Kellogg Creek @ Hwy 4		x	x	x										
Kellogg Creek along Hoffman Ln			x	x	x	x	x	Dry	x					
Littlejohns Creek @ Escalon-Bellota Rd[1]									x					
Littlejohns Creek @ Jack Tone Rd	x	x	x	x	x	x	x	x	x					
Lone Tree Creek @ Brennan Rd[1]			x	x					x					
Lone Tree Creek @ Jack Tone Rd	x	x	x	x	x	x	x	x	x				x	
Lone Tree Creek @ Valley Home Rd[1]									x					
Marsh Creek @ Balfour Ave		x	x	x										
Marsh Creek @ Concord Ave			x	x	x	x	x	x	x[2]					
Marsh Creek @ Marsh Creek Rd Upper[1]							x							
Marsh Creek @ Marsh Creek Rd Lower[1]							x							
Mokelumne River @ Bruella Rd	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Mokelumne River @ Fish Hatchery[1]			x											
Mormon Slough @ Jack Tone Rd					x	x	x	x	x					
Potato Slough @ Hwy 12	x	x	x	x										
Roberts Island Drain @ Holt Rd					x	x	x	x	x	x	x	x	x	x
Roberts Island Drain along House Rd					x	x	x	x	x					
Sand Creek @ Hwy 4 Bypass					x	x	x	x	x					
South Webb Tract Drain								x	x[3]	x	x	x	x	x

Station Name	2004	2005		2006		2007		2008			2009			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm*	Winter	Irrigation	Fall
Stanislaus River Drain @ South Airport Way								x		x	x			
Terminous Tract Drain @ Hwy 12		x	x	x	x	x	x	x	x	x	x	x	x	x
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd					x	x	x	x	x				x	
Unnamed Drain to Lone Tree Creek @ Wagner Rd[1]									x					
Walthall Slough @ Woodward Ave												x	x	x

[1]Upstream sampling of normal monitoring locations conducted for source identification.
[2]Monitored April-August, then replaced by South Webb Tract Drain
[3]Monitored September only; replaced Marsh Creek @ Concord Ave
[4]Site was not sampled due to no access (Fall 2 December 9, 2008)
A blank cell indicates that no sampling occurred at that site during the specified season.
*Storm samples were collected November 4, 2008.
"Dry" indicates that the site was dry during one or more events during the specified monitoring season.

Management Plan Monitoring

During the irrigation season of 2009 Management Plan Monitoring occurred at three sites: Duck Creek @ Hwy 4, Lone Tree Creek @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Temple Creek). The Coalition conducted additional monitoring as part of the SJCDWQC Management Plan's strategy to identify contaminant sources and evaluate effectiveness of newly implemented management practices at sites where exceedances previously occurred more than once. This additional monitoring included toxicity analysis for *Ceriodaphnia* and *Selenastrum,* as well as analyses for copper and chlorpyrifos (Table 6). Details on the process and the schedule of 2009 Management Plan Monitoring are found in the SJCDWQC Management Plan Update submitted April 1, 2009 to the Regional Board.

Table 6. Management Plan Monitoring sites and constituents for the 2009 irrigation season.

Site Name	Year	Month	*Ceriodaphnia*	*Selenastrum*	Copper	Chlorpyrifos
Duck Creek @ Hwy 4	2009	April	X	X		X
Lone Tree Creek @ Jack Tone Rd	2009	April		X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	April			X	
Duck Creek @ Hwy 4	2009	May		X		X
Lone Tree Creek @ Jack Tone Rd	2009	May		X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	May		X	X	X
Duck Creek @ Hwy 4	2009	June				X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	June				X
Duck Creek @ Hwy 4	2009	July	X			X
Lone Tree Creek @ Jack Tone Rd	2009	July			X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	July			X	X
Duck Creek @ Hwy 4	2009	August				X
Lone Tree Creek @ Jack Tone Rd	2009	August			X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	August			X	
Duck Creek @ Hwy 4	2009	September	X			X
Lone Tree Creek @ Jack Tone Rd	2009	September			X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2009	September	X		X	X

Monitoring Seasons

The Coalition groups its monitoring by "seasons": fall, winter, irrigation and storm. Fall monitoring occurs during a time period after irrigation has finished and generally before dormant sprays (October – December). Winter monitoring occurs between January and March when dormant sprays are expected as well as significant rainfalls. Irrigation season sampling is scheduled to characterize the discharge from irrigated agriculture and irrigation return flows (April – September) (Table 7). A storm event can occur at anytime of the year but is expected to occur during the winter season. Additional detail regarding storm sampling events and their rainfall trigger is included in the section "Sampling Site Descriptions and Rainfall Records".

Table 7. Description of Monitoring Seasons.

Season	Month Range	Description
Fall	October-December	No irrigation.
Winter	January-March	No irrigation, possible dormant sprays.
Storm	Anytime	Storm is triggered by > 0.5 inches within 24 hours; may occur during any month although generally occurs between January and March.
Irrigation	April-September	Summer months with possible irrigation.

Monitoring Constituents

All monitoring constituents are listed in Table 3. The following section describes agricultural sources of the constituent groups analyzed for by the coalition.

Pesticides and Toxicity

Pesticides can be found in the water column or sediment as a result of applications to fields that are subsequently irrigated. Irrigation return flows from fields or storm water runoff can move sediment and chemicals to surface waters. In addition, pesticides can enter surface waters as a result of spray drift. The concentrations can be compared to numeric and narrative water quality triggers to determine if exceedances have been experienced. Toxicity testing is complementary to chemical analyses and can provide an independent and more direct assessment of the level of impairment in the water body. The objective of the Coalition is to use the results of toxicity testing along with water chemistry analysis to assess the impact of discharges from irrigated agriculture.

Nutrients and Physical Parameters

Excessive nutrients can cause eutrophication of surface waters resulting in low dissolved oxygen and an inability to support normal aquatic communities. The Coalition's objective is to determine if exceedances are occurring and to determine if potential sources can be identified through analysis of monitoring data. However, sources of nutrients, organic carbon and low dissolved oxygen are difficult to identify. If current monitoring data are not sufficient, the Coalition may conduct further investigations to identify sources. Such investigations may include special studies when they are determined to be cost effective. By understanding the sources of constituents responsible for the exceedances, the Coalition can properly recommend management practices to address exceedances of nutrients and physical parameters.

Field Parameters

Much like physical parameters, exceedances of water quality objectives for pH, DO, and SC are difficult to track to sources. All of these parameters are non-conserved meaning that they can increase or decrease as water moves downstream. These parameters are the result of processes occurring in the water column and sediment and can vary diurnally. As with nutrients and physical parameters, the Coalition's objective is to determine if exceedances are occurring and to investigate potential sources through analysis of monitoring data and special studies where they are cost effective. By understanding the sources of constituents that may affect field parameters, the Coalition can properly recommend management practices to address the exceedances.

E. coli

E. coli inhabits the intestinal tracts of animals and is voided in fecal material. *E. coli* may persist in the presence of oxygen in the environment for periods of time after being voided. The bacteria are also known to reproduce and magnify in the environment. However, conditions under which this occurs are not well understood and require additional research. Any species of vertebrate that voids feces can contribute *E. coli* to surface waters, including humans, companion animals such as dogs and cats, cows, chickens, waterfowl (ducks and geese), raccoons, otters, ground squirrels, feral pigs, and in some locations deer. Consequently, there may be a large amount of bacteria in any environmental sample that is collected.

As a result of *E. coli* detections in samples collected for Coalition monitoring, a special study was conducted in 2006 to identify the contributing sources of *E. coli* in Coalition water bodies. Results from this study indicated that the most prominent source of bacteria being discharged into water bodies is human, with smaller contributions coming from cattle and chickens. A full report of the *E. coli* special study was submitted to the Central Valley Regional water Quality Control Board (CVRWQCB) on September 9, 2007.

E. coli from humans can enter aquatic systems from leaky septic systems, leaky sanitary sewer lines, improperly treated discharge from waste water treatment plants, application of biosolids to agricultural land, and direct inputs from individuals who defecate in or near water bodies. Input from cows can occur from dairies, grazing in irrigated pastures, and various manure sources. *E. coli* from chickens can enter from poultry operations or manure sources. Irrigated agriculture is responsible for management if *E. coli* contamination is the result of runoff from irrigated pasture or manure applications for fertilizer.

Metals

Nine metals are analyzed for Coalition monitoring including arsenic, boron, cadmium, copper, lead, molybdenum, nickel, selenium and zinc. Five of these metals are analyzed for both dissolved and total concentrations, and three metals are analyzed only for total recoverable metal. Dissolved metals were added to the Coalition monitoring plan in 2008 as a result of a new provision in MRP Order R5-2008-0005. The EPA recommends "the use of dissolved metal to set and measure compliance with aquatic life water quality standards." The EPA states that dissolved metal "more closely approximates the bioavailable fraction of the metal in the water column than does the total recoverable metal." In order to assess compliance with water quality standards the Coalition analyzes for dissolved fractions of cadmium, copper, lead, nickel and zinc. The remaining metals are analyzed for total concentrations only.

The Coalition samples for four basic classes of metals: 1) those that are naturally present because of underlying geologic materials but generally not applied by agriculture (boron, selenium, 2) those that are naturally present because of underlying geologic materials but are applied by agriculture (copper, zinc, nickel), 3) those that may be legacy pesticides but also have numerous nonagricultural sources (lead, arsenic), and 4) those that are found solely as a result of nonagricultural anthropogenic sources (cadmium). These categories are not all mutually exclusive and in fact, all metals belong to the first category. For example, nickel is a plant micronutrient that may be incorporated into fertilizer mixes, although normally there is a sufficient quantity of nickel in soils to supply the needs of crops. As a result, although it may be applied by agriculture, exceedances would be expected to primarily be a result of natural weathering of soils.

Natural weathering of geologic materials can release to surface waters metals and metalloid elements such as selenium, arsenic, and boron. Selenium salts are naturally elevated in the southwest portion of the San Joaquin Valley and are transported to surface waters during storm runoff. These salts are so problematic that there is a prohibition of discharge of irrigation tail water in some locations in the Valley. Arsenic appears to be naturally elevated in several locations in the San Joaquin Valley. Zinc and nickel are also found in soils and can be found in surface waters at levels that reflect background concentrations. Both of these metals can be applied during agricultural operations as well, and the difference between applications and natural weathering must be understood to properly manage the amounts reaching surface waters. Understanding background levels of these elements will be an important task for the Coalition when trying to understand the impacts of agricultural inputs to surface waters.

While all other metals can be released as a result of the weathering of geologic materials, elevated levels of most metals are a result of anthropogenic inputs. Lead was used as a pesticide during the last century but was used in declining amounts over the last several decades before being prohibited in the 1990s. Lead was also used in gasoline until the early 1980s when it was replaced by other fuel oxygenates. Lead-based paint was routinely used until the latter parts of the last century but is still present in many old buildings and structures. Lead is also a component of batteries, and is the material in solder in numerous electronic devices including televisions, computers, and cell phones. These sources can be distinguished through sophisticated analytical tests that are beyond the capabilities of the Coalition. Copper is routinely used by agriculture on a number of crops and could be found in surface waters as a result of applications. Additional sources include road surfaces where wearing of brake pads can result in substantial loading to surface waters.

Because fertilizer applications and the micronutrient constituents included in fertilizer mixes are not reported, there is no way the Coalition can distinguish between natural and anthropogenic sources with normal monitoring data. Several of these metals can be identified to source using sophisticated analytical equipment and techniques, but these tests are beyond the capabilities of the Coalition. Consequently, the Coalition will use monitoring data to determine if exceedances are occurring, and will attempt to establish background concentrations of some metals in surface waters to determine if concentrations are a result of natural or anthropogenic inputs to the water.

Sampling Site Descriptions and Rainfall Records

The site names, zones, sample types, station codes and locations of all sites monitored between October 2008 and December 2009 are provided in Table 8. Duck Creek @ Hwy 4 is listed twice in Table 8 since it was monitored for assessment site constituents from October 2008 through March 2009 in addition to Management Plan Monitoring constituents. A narrative description of each site subwatershed with respect to hydrology and agricultural production follows below.

Table 8. SJCDWQC sampling locations – October 2008 to December 2009.

Zone	Type	Site Name	Station Code	Latitude	Longitude
1	A	Bear Creek @ North Alpine Rd	531BCANAR	38.07431	-121.2109
1	C	Mokelumne River @ Bruella Rd	531XMRABR	38.1601	-121.2051
2	A*	Duck Creek @ Highway 4	531XDCAHF	37.9491	-121.181
2	C	French Camp Slough @ Airport Way	531SJC504	37.8817	-121.2493
3	A	Drain @ Woodbridge Rd	544DAWRXX	38.15256	-121.50095
3	C	Terminous Tract Drain @ Hwy 12	544XTTHWT	38.1166	-121.4936
4	A	South Webb Tract Drain	544XXSWTD	38.06322	-121.6033
4	C	Roberts Island Drain @ Holt Rd	544RIDAHT	37.9556	-121.4223
5	A	Stanislaus River Drain @ South Airport Way	535SRDSAW	37.70967	-121.23920
5	C	Walthall Slough @ Woodward Ave	544WSAWAV	37.77046	-121.29227
2	MPM*	Duck Creek @ Highway 4	531XDCAHF	37.9491	-121.181
2	MPM	Lone Tree Creek @ Jack Tone Rd	531XLTCJR	37.8376	-121.1438
2	MPM	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.8536	-121.1457

A – Assessment Monitoring location
C – Core Monitoring location
MPM – Management Plan Monitoring
*Assessment site also sampled as MPM from October 2008 through March 2009.

Site Subwatershed Descriptions

The Coalition sampled a total of 12 site subwatersheds as part of normal monitoring and Management Plan monitoring between October 2008 and September 2009. Descriptions of the site subwatersheds for all sample sites are provided below alphabetically. Land use maps of each site subwatershed are included in Appendix VIII (Land Use Maps and 2009 Annual Site Photos).

- Bear Creek @ North Alpine Rd (21,059 irrigated acres) – This site drains a relatively large portion of irrigated land on the eastern side of the Coalition region, between the Mokelumne and Calaveras River. Land use in the site subwatershed includes vineyards, deciduous fruits and nuts, field crops, truck/nursery/berry crops, pasture, grains/hay and dairy.

- Drain @ Woodbridge Rd (4,539 irrigated acres) – This site is located on the northern side of the Coalition region. Water from the drain is pumped to the Mokelumne River close to the sample location. The site drains an area of land to the east of the site between Hog Slough and Sycamore Slough. Land use in the site subwatershed includes field crops, truck/nursery/berry crops, vineyards, pasture, grains/hay and dairy.

- Duck Creek @ Highway 4 (10,746 irrigated acres) – This site is located just to the east of the city of Stockton. Duck Creek drains a section of southern San Joaquin County between Stockton and the Lone Tree Creek site subwatershed. During the summer flow is typically low in the creek. The creek channel was dredged over several months early in the 2007 irrigation season. The predominant land uses for irrigated agriculture are field crops and irrigated pasture. There are also a relatively large amount of deciduous nuts in the site subwatershed and truck farm/nursery and berry crops are also grown.

- French Camp Slough @ Airport Way (82,974 irrigated acres) – The main water bodies draining this site subwatershed are Littlejohns Creek and Lone Tree Creek, which confluence to form French Camp Slough. This site was selected as a downstream companion site to the Littlejohns Creek @ Jack Tone Road and Lone Tree Creek @ Jack Tone Road sites. These water bodies drain agricultural land to the east of Manteca and Stockton and eventually flow through urban areas prior to their discharge to the San Joaquin River. This site represents all of the major types of agriculture present in the Coalition region including field crops, orchards, grains and hay, vineyards as well as irrigated pasture.

- Lone Tree Creek @ Jack Tone Road (29390 irrigated acres) – This site is upstream from the French Camp Slough @ Airport Way site. This site drains a large portion of the southern SJCDWQC region and confluences downstream with Littlejohns Creek and eventually French Camp Slough, flowing through urban areas before emptying into the Delta. The main agricultural land use upstream consists of deciduous nuts, field crops, irrigated pastures and dairies.

- Mokelumne River @ Bruella Road (12,465 irrigated acres) – Upstream agriculture is primarily vineyards although some orchards are immediately adjacent to the site. Water released from Comanche Reservoir controls the amount of flow at this site as the vineyards are primarily irrigated by drip and the orchards are irrigated by microspray. This site integrates the signal from a relatively large upstream area.

- Roberts Island Drain @ Holt Road (1,171 irrigated acres) – This site subwatershed is a portion of Roberts Island that is drained by the pump along McDonald Road west of the sample site. It is located south of Roberts Island Drain along House Road. The primary agriculture upstream of the sample site is asparagus, field crops, grains, hay (alfalfa) and pasture.

- South Webb Tract Drain (3,314 irrigated acres) – Webb Tract is a central Delta island located just north of Franks Tract near Discovery Bay. There are two pumps on the island, however the south pump moves a large portion of the water and the north pump runs only occasionally. This site subwatershed includes row crops, usually corn.

- Stanislaus River Drain @ South Airport Way (2,736 irrigated acres) — Stanislaus River Drain is located south of Manteca and drains a small area where the primary agricultural uses are irrigated pasture, grains and hay, field crops, and dairy. This site represents the southernmost region of Walthall Slough @ Woodward Ave site subwatershed. This site was monitored during the 2008 fall monitoring season, but was dropped after December 2008 sampling due to the large number of upstream dairies and minimal irrigated agriculture acreage not covered by the Dairy Program Waiver. Per approval by the Regional Board, this location was replaced with Walthall Slough @ Woodward Ave.

- Terminous Tract Drain @ Highway 12 (9,889 irrigated acres) – This site drains all of the acreage north of State Highway 12 and most of the acreage south of the highway on Terminous Tract. This sampling site is located near the confluence of White Slough/Potato Slough and the Mokelumne River. The primary agricultural crops are field crops, turf, grains and hay.

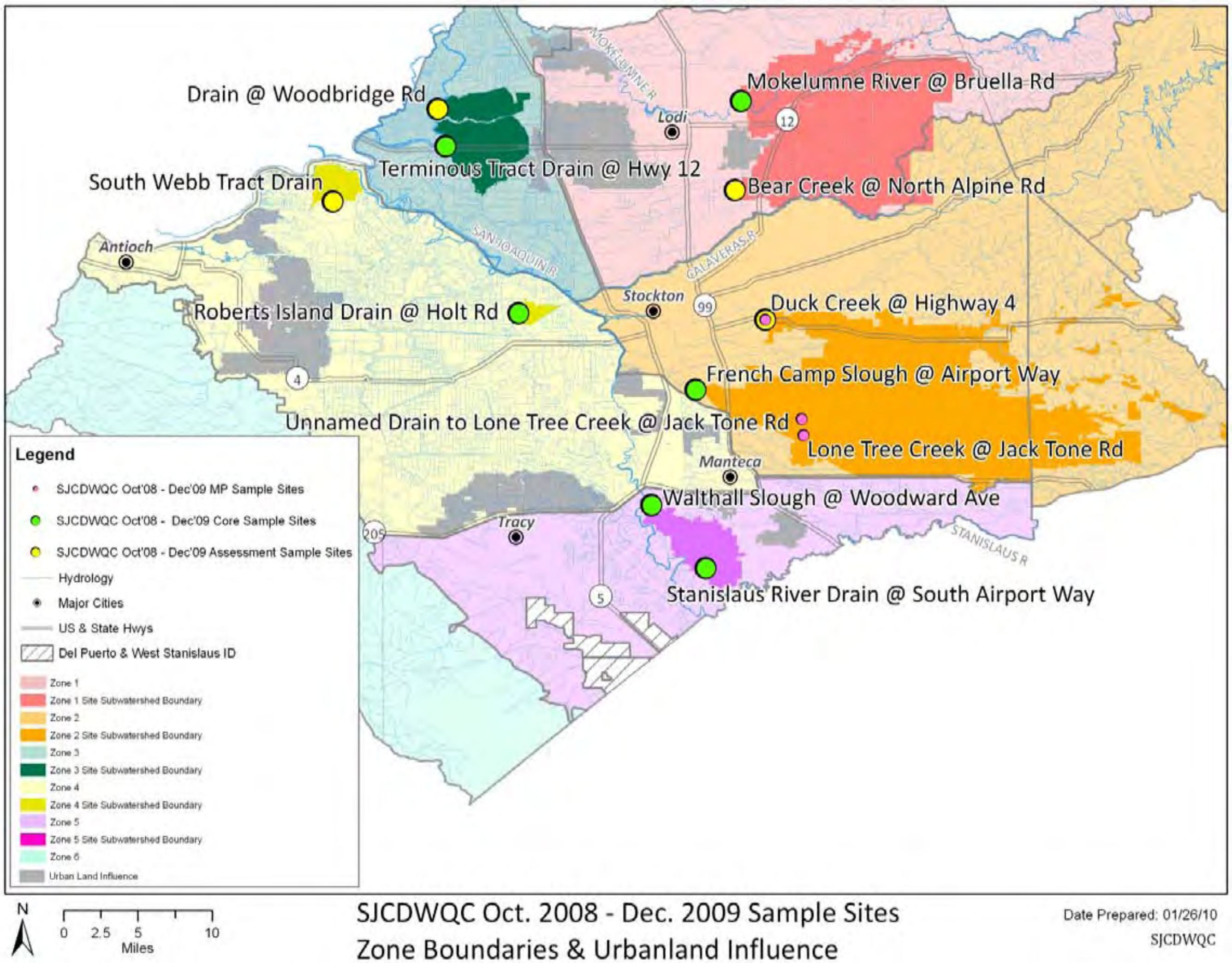
- Unnamed Drain to Lone Tree Creek @ Jack Tone Road (26,530 irrigated acres) – This site subwatershed is located to the north of the Lone Tree Creek site subwatershed and south of Littlejohns Creek. The drain forms in the eastern portion of San Joaquin County and flows west eventually confluencing with Lone Tree Creek just west of Jack Tone

Road. Unlike most of the SJCDWQC area, rice is a major crop in the site subwatershed. Agriculture in the site subwatershed also consists of deciduous orchards, field crops, and grains.

- Walthall Slough @ Woodward Ave (7,633 irrigated acres) – This site is located just upstream of the residential area which is at the confluence of Walthall Slough and the San Joaquin River. The site subwatershed drains land to the south and east. Land use includes dairy, pasture, field crops, truck/nursery/berry crops, fruits/nuts and grains/hay.

Sample Site Locations

Figure 9. Coalition map of site subwatershed sample locations relative to zone boundaries October 2008-December 2009.



Record of Rainfall

The SJCDWQC considers a sampling event a "storm sampling event" when there has been at least 0.50 inches of rain within a 24 hour period. Monthly sampling is pre-scheduled and, if a storm is forecasted within a week before a scheduled sampling event or within two days after the scheduled sampling event, the Coalition moves its sampling date to capture the storm. The Coalition sampled one storm between October 2008 and December 2009. Below is a description of all the storms that occurred during that time period, including whether or not they were sampled.

Daily rainfall records are graphed for the two major cities in the Coalition region Modesto, and Stockton in Figure 10 (October 2008 – December 2008), Figure 11 (January 2009 – March 2009), Figure 12 (April 2009 – June 2009), Figure 13 (July 2009 – September 2009) and Figure 14 (October 2009 – December 2009).

October 2008 – December 2008

The first part of October was very dry with little to no measurable precipitation in Stockton or Modesto. A storm system developed the last two days of the month and continued into the first part of November. Storm monitoring occurred on November 4, 2008 and was the only storm event sampled between October 2008 and December 2009.

Rainfall during the November precipitation event varied over the geographic sampling area but came close to surpassing the 0.5 inches in 24 hours trigger in Stockton on November 2. During the five-day rain event (October 30- November 3, 2008) the Stockton station reported 0.58 inches and 0.06 inches in Modesto (Figure 10). This storm originated in the North Pacific and blew southward along the coast of California; rain fell throughout the entire state as the system drifted east and overland. A heavy cell of the storm passed just north of the sample area, with areas in Sacramento reporting as much as 1.8 inches, although areas in Modesto reported only 0.06 inches (Figure 10). After October, the Stockton area reported seasonal rainfall of approximately 60% of the historical average (historical average from California Data Exchange Center (CDEC) for Stockton is 0.75 inches). The next measureable precipitation occurred from November 25-26, 2008; Modesto reported 0.36 inches and Stockton did not report any rainfall (Figure 10).

December had one long storm system that lasted thirteen days (December 13-25, 2008). This system did not have any heavy precipitation days surpassing the sampling trigger of 0.50 inches. This system did bring sizable amounts of precipitation to the region with overall precipitation recorded as 1.19 inches in Stockton and 1.39 inches in Modesto (Figure 10). With this system being spread out over almost two weeks and resulting in light precipitation, no storm sampling took place. Prior scheduled sampling did occur on December 9. 2008. By the end of December, the Stockton area reported seasonal rainfall of approximately 81% and the Modesto area reported 73% (historical average from CDEC for Stockton reported 2.78 inches and 2.15 inches in Modesto).

January 2009 – March 2009

During the first part of January two small storms made their way across the state. The first storm occurred on January 2, 2009 resulting in 0.25 inches of precipitation in Stockton and 0.08 inches in Modesto. The second storm occurred on January 5, 2009, resulting in 0.04 inches in Stockton and 0.03 inches in Modesto (Figure 11). No sampling was conducted due to the amounts of precipitation being less than 0.50 inches.

The next storm system occurred on January 21, 2009 and lasted until January 25, 2009 resulting in considerable amounts of precipitation to the region. The total rainfall for the five day event was 1.42 inches in Stockton and 0.5 inches in Modesto (Figure 11). Sampling occurred in January on January 13, 2009 and at that time the weather forecast did not indicate a storm of this magnitude. Since the Coalition had already sampled the week prior, a second sampling event was not conducted during the month of January to capture this storm runoff.

February had several small storms but none of them resulted in precipitation greater the 0.50 inches in 24 hours. The first system on February 5-6, 2009 resulted in 0.27 inches of precipitation in Stockton and 0.21 inches in Modesto. The next storm on February 11-18, 2009 resulted in 1.1 inches of precipitation in Stockton and 1.07 inches in Modesto over the eight day storm event; however, the trigger of 0.50 inches in 24 hours was not met. Most days reported less than 0.33 inches of precipitation in the SJCDWQC region. The storm that came four days later from February 22-26 was another small storm with a total of 0.28 inches of precipitation in Stockton and 0.21 inches in Modesto over four days (Figure 11).

In the first part of March a small storm lasted from March 1-4, 2009. This system did not result in significant precipitation; Stockton reported 0.31 inches and Modesto reported 0.34 inches for all four days. From March 21-22, 2009 a small system brought precipitation that measured less than 0.19 inches in the region (Figure 11). None of the storm systems in February or March surpassed the sampling trigger limit and therefore no storm sampling was conducted.

April 2009 – September 2009

During the first part of April, 2009 a storm occurred that lasted five days from April 6-10; only 0.18 inches of precipitation were recorded in Stockton over all five days (Figure 12). The next system came through the region on the first day of May, 2009, with 0.26 inches recorded in Stockton and 0.20 inches recorded in Modesto. The last storm was on June 4 and 5, but resulted in a few hours of light precipitation to the area amounting to 0.04 inches in Stockton (Figure 12).

July 2009 – September 2009

July through September had typical Mediterranean climate; hot and dry with almost no measureable precipitation. The only measurable precipitation came with a small storm system between September 11 and September 14, 2009 resulting in 0.22 inches of precipitation in Stockton and 0.23 inches in Modesto (Figure 13).

October 2009 – December 2009

The fall was dry in the SJCDWQC and very few storms resulted in little runoff in the region. The SJCDWQC area had only had 3.17 inches of recordable precipitation in the three month period between October 1 and December 31, 2009.

One heavy cell passed over Stockton and Modesto reporting as much as 1.59 inches on October 13, 2009. Runoff from this storm did not occur due to the timing because the very dry conditions early in the year require a large amount of rain to saturate the ground and result in runoff.

In the month of November, the Stockton area only recorded 0.12 inches of precipitation and 0.15 inches in Modesto.

In December, a few small storms brought a total of 1.56 inches in Stockton and 1.37 inches in Modesto. However, the largest of these storms did not surpass the 0.50 inches in 24 hours trigger. On December 7, 2009, Stockton received 0.35 inches and Modesto received 0.41 inches of precipitation; however, this was not enough precipitation to result in storm sampling. Coalition sampling occurred as scheduled on December 8, 2009 and there was no evidence of runoff from the preceding day's rain event (Figure 14).

The next storm of December that bought precipitation started on December 10 and ended on December 13, 2009, with most of the precipitation occurring during the last two days. The rainfall on December 12th was 0.33 inches in Stockton and 0.23 inches in Modesto. The next day, Stockton received 0.49 inches of precipitation and Modesto reported 0.06 inches. This event did not make the trigger limit and since sampling had already occurred for the month of December the Coalition did not sample after this event (Figure 14). The end of December had three storm systems, the first was on December 21, 2009 the second was on December 26-28 and the last was December 30, 2009. Together these last three systems brought less than 0.27 inches of measurable precipitation to Stockton and 0.42 inches to Modesto.

Figure 10. Local weather conditions between October 12, 2008 - December 31, 2008.
Storm sampling occurred on November 4, 2008. All data recorded in Merced, CA and reported on weatherunderground.com.

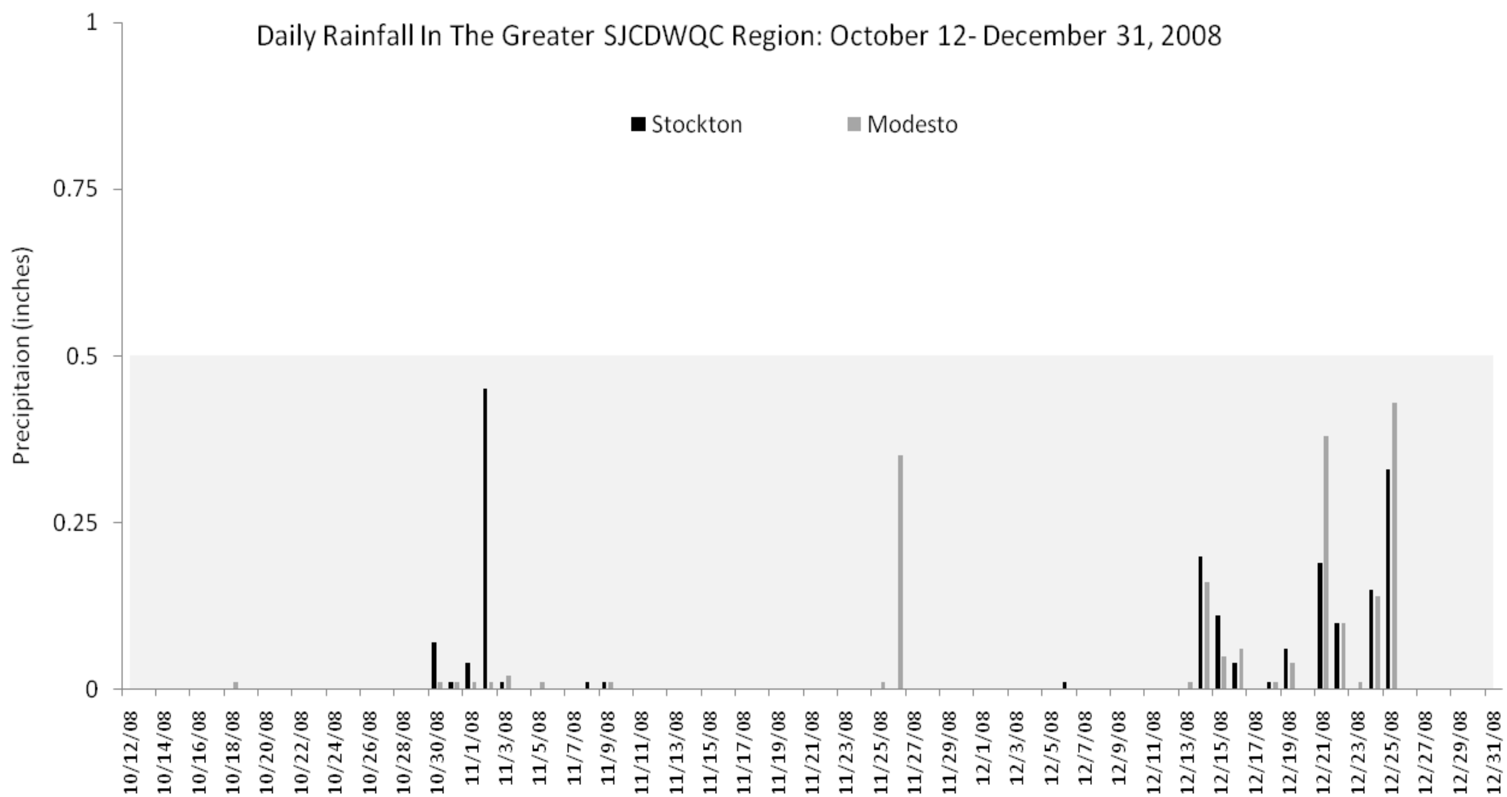


Figure 11. Local weather conditions between January 1 - March 31, 2009.
All data recorded in Merced, CA and reported on weatherunderground.com.

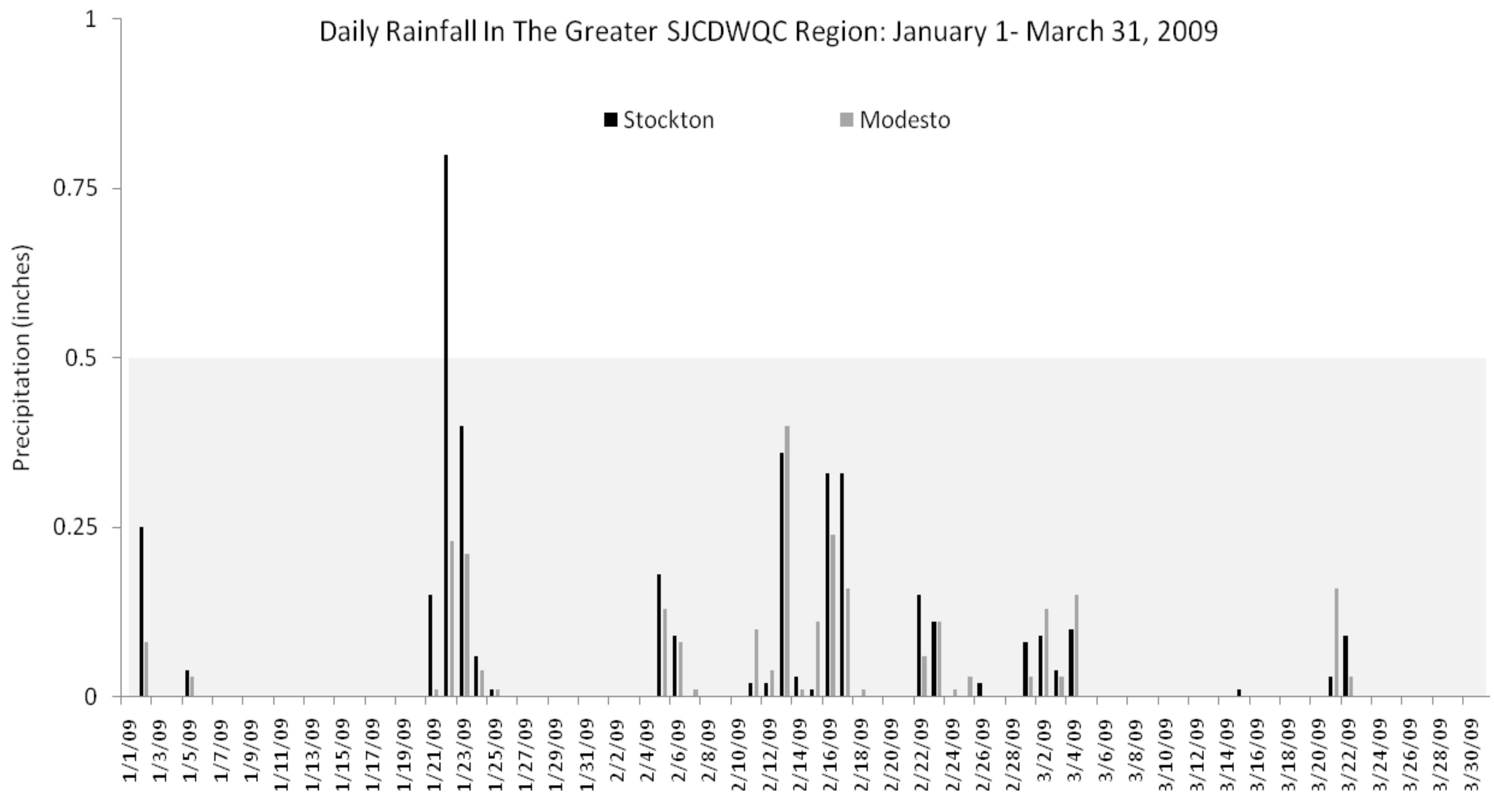


Figure 12. Local weather conditions between April 1, 2009 - June 30, 2009.
All data recorded in Merced, CA and reported on weatherunderground.com.

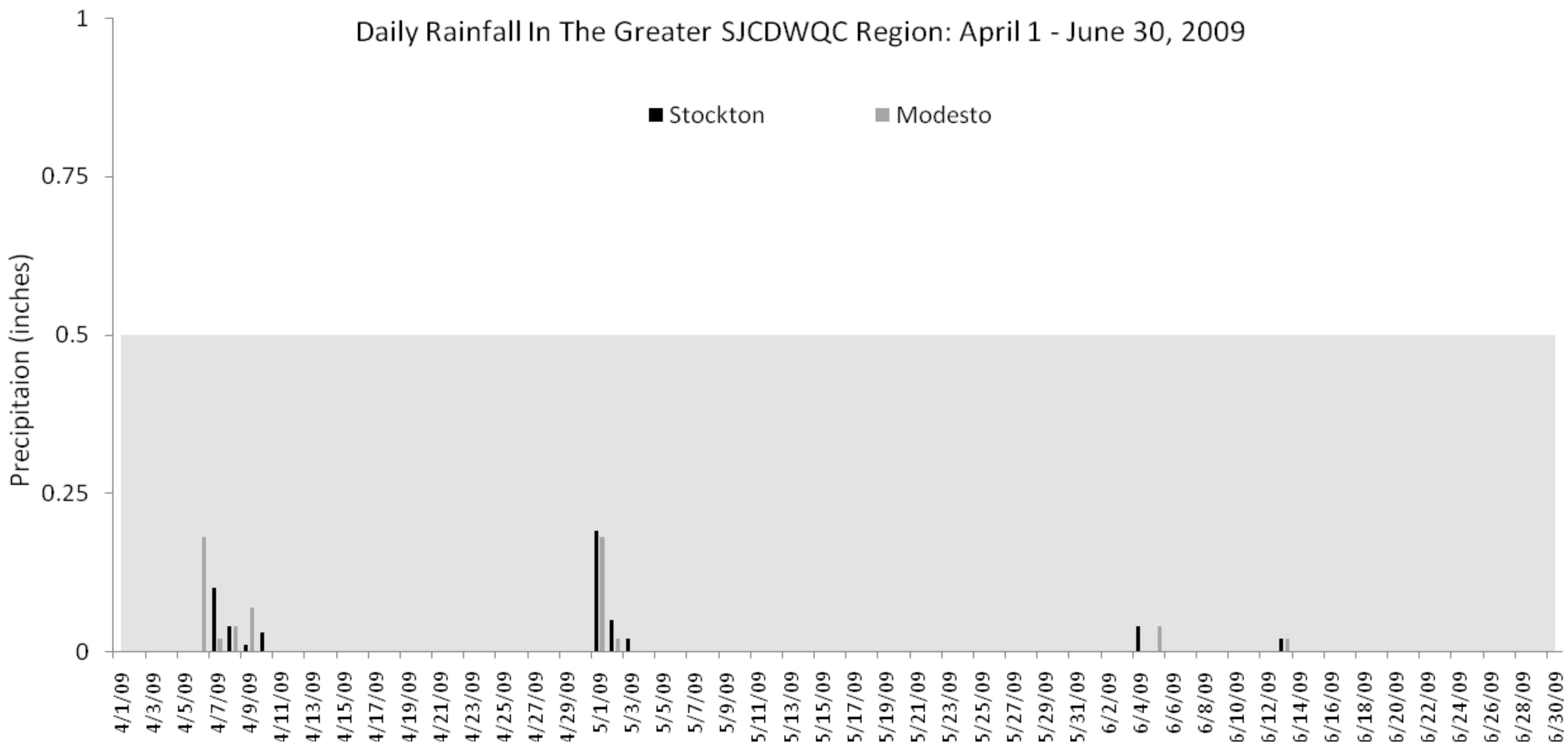


Figure 13. Local weather conditions between July 1, 2009 - September 30, 2009.
All data recorded in Merced, CA and reported on weatherunderground.com.

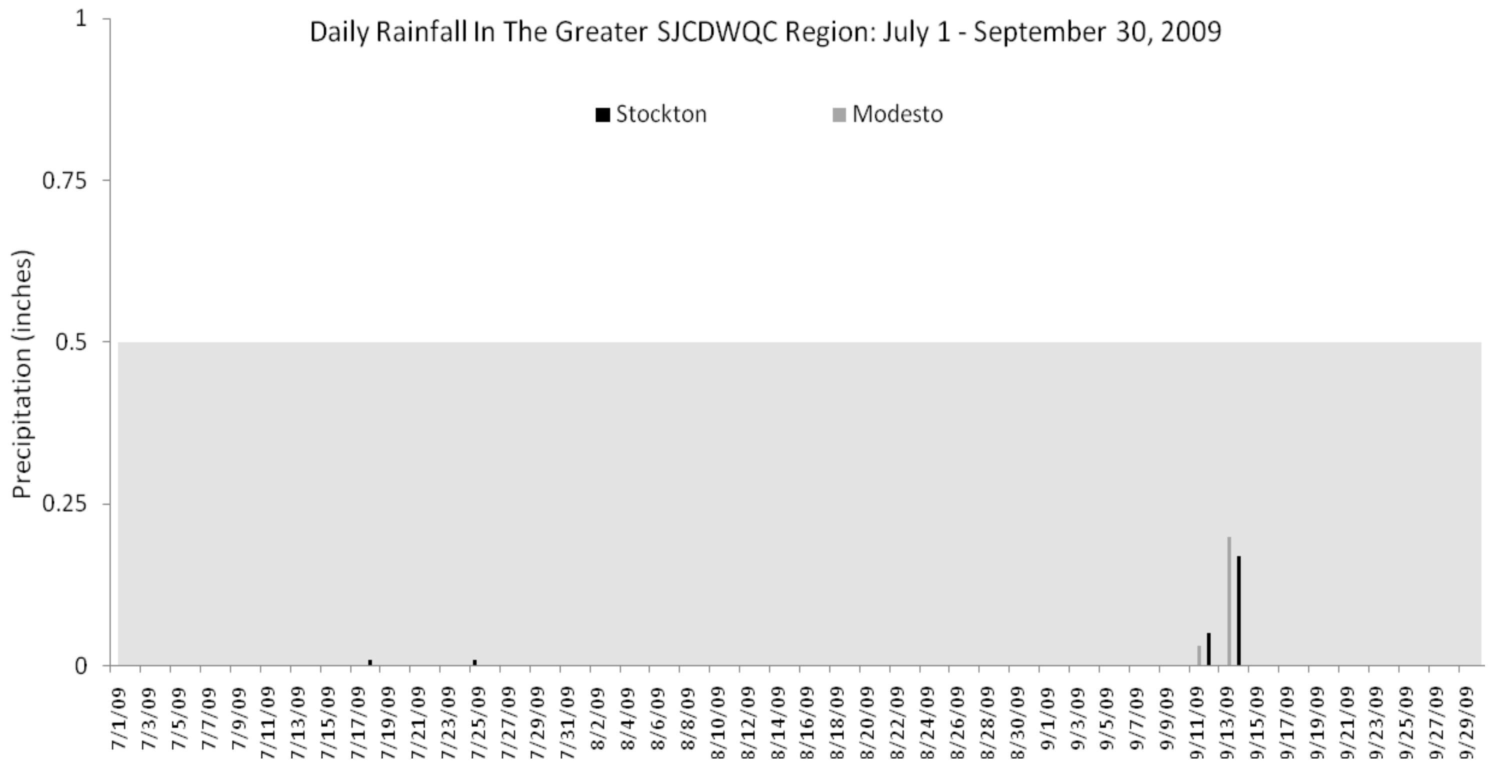
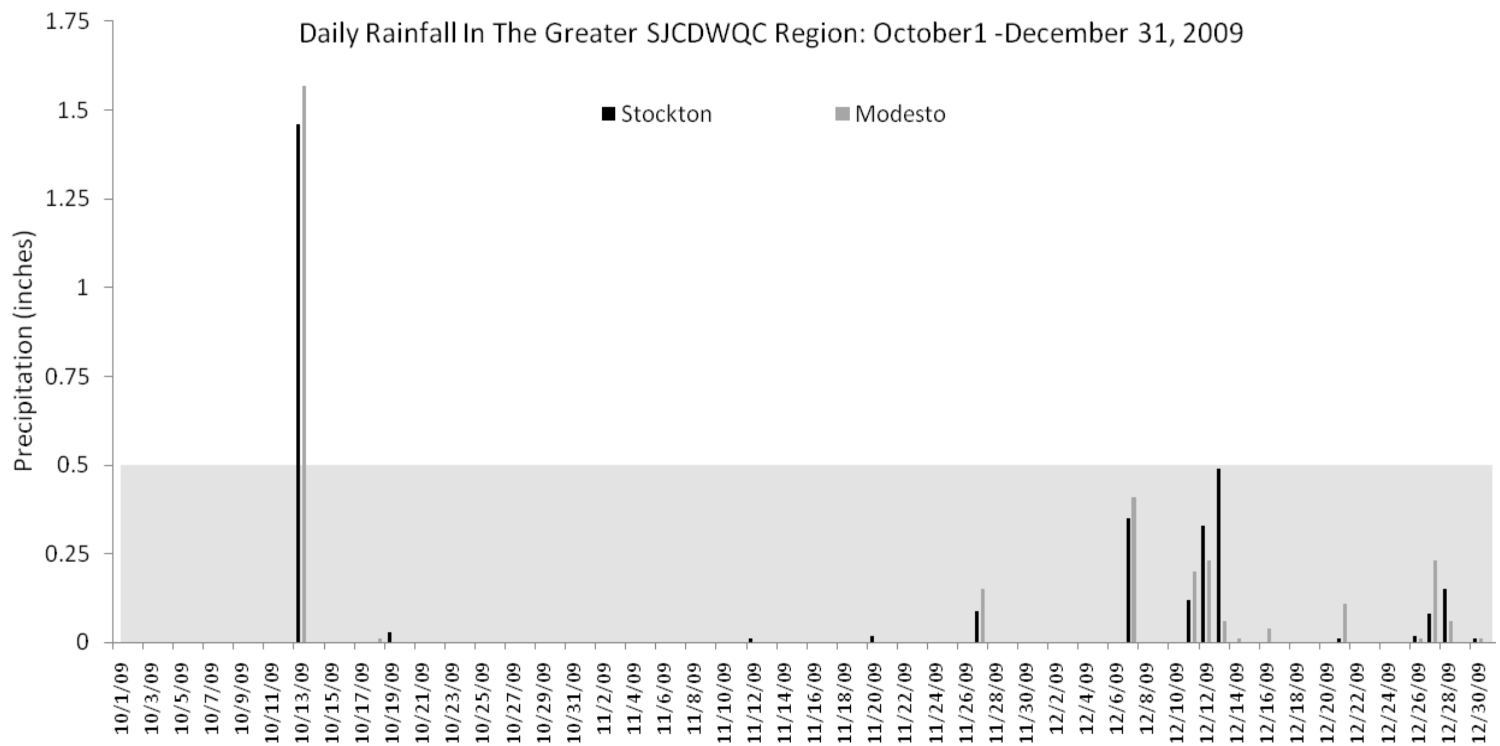


Figure 14. Local weather conditions between October 1, 2009 - December 31, 2009.
All data recorded in Merced, CA and reported on weatherunderground.com.



Monitoring Results

Sample Details

Full monitoring results from sampling that occurred from October 2008 through December 2009 are included in Appendix II and III. The results include field parameters, organic (pesticides), inorganics (including metals and *E. coli*), toxicity (water and sediment), sediment chemistry and loads for any detectable analyte with corresponding site flow.

Monitoring data include results from samples taken for normal monitoring, Management Plan Monitoring and sediment monitoring events. Each sampling location, sampling date, sampling time and type of monitoring is listed in Table 9.

Loads are calculated for all detections (Appendix II, Table II-8) according to the following formula:

Instantaneous Load (µg/sec) = Discharge (cfs) X 28.317L x Concentration (milligram/L x 1,000 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 Board with a context for the concentrations of various constituents at the time that samples were collected.

Original Chain of Custody (COC) forms were scanned and converted to pdf files for submission with this report (Appendix I). COCs were faxed to Michael L. Johnson, LLC (MLJ-LLC) after the receipt of samples by the laboratory. As such, they are complete and accurate records of sample handling and processing and reflect the timing of sample collection and delivery to the laboratories. Sample collection and delivery was performed according to the SJCDWQC Quality Assurance Project Plan (QAPP). If there were any discrepancies between the COC and sample delivery, the issues were resolved and documented either directly on the COC or on an anomaly form filled out by the laboratory. Documentation of COC anomalies can be found in Table I-1 of Appendix I.

All field data sheets can be found in Appendix IX. Laboratory reports (including Level III data) for the last quarter of 2009 will be submitted along with this report; Level III laboratory reports from October 2008 through September 2009 have already been submitted to the Regional Board.

Table 9. Sample details for October 2008-December 2009 sorted by station name, sample date and monitoring event. Non contiguous water bodies are noted under Season, Group.

Station Name†	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Bear Creek @ North Alpine Rd	531BCANAR	NM	Fall1	10/14/2008	09:10	None	Discharge recorded as zero due to no measurable flow.
Bear Creek @ North Alpine Rd	531BCANAR	NM	Storm2	11/4/2008	09:00	None	Too shallow to measure discharge.
Bear Creek @ North Alpine Rd	531BCANAR	NM	Fall2, Non Contiguous	12/9/2008	08:30	None	Non contiguous water body, discharge recorded as zero.
Bear Creek @ North Alpine Rd	531BCANAR	NM	Winter1, Non Contiguous	1/13/2009	08:40	None	Non contiguous water body, discharge recorded as zero.
Bear Creek @ North Alpine Rd	531BCANAR	NM	Winter2	2/10/2009	12:40	None	
Bear Creek @ North Alpine Rd	531BCANAR	NM	Winter3	3/10/2009	13:00	None	
Drain @ Woodbridge Rd	544DAWRXX	NM	Fall1	10/14/2008	08:00	None	Discharge recorded as zero due to no measurable flow.
Drain @ Woodbridge Rd	544DAWRXX	NM	Storm2	11/4/2008	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Fall2	12/9/2008	08:00	No Access	No samples collected; need to obtain permission from Reclamation District.
Drain @ Woodbridge Rd	544DAWRXX	NM	Winter1	1/13/2009	11:50	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Winter2	2/10/2009	14:50	None	Discharge recorded as zero due to no measurable flow.
Drain @ Woodbridge Rd	544DAWRXX	NM	Winter3	3/10/2009	08:10	None	Too deep to measure discharge.
Duck Creek @ Hwy 4	531XDCAHF	NM	Fall1	10/14/2008	10:50	None	Discharge recorded as zero due to flow moving in upstream direction, from southwest to northeast.
Duck Creek @ Hwy 4	531XDCAHF	NM	Storm2, Non Contiguous	11/4/2008	16:00	None	Non contiguous water body, discharge recorded as zero.
Duck Creek @ Hwy 4	531XDCAHF	NM	Fall2	12/9/2008	09:50	None	
Duck Creek @ Hwy 4	531XDCAHF	NM	Winter1, Non Contiguous	1/13/2009	10:00	None	Non contiguous water body, discharge recorded as zero; No flow over bridge base.
Duck Creek @ Hwy 4	531XDCAHF	NM	Winter2, Non Contiguous	2/10/2009	10:40	None	Non contiguous water body, discharge recorded as zero.
Duck Creek @ Hwy 4	531XDCAHF	NM	Winter3	3/10/2009	14:10	None	Discharge recorded as zero due to no measurable flow.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation1, Management Plan Monitoring	4/14/2009	08:30	None	April MPM for *Selenastrum* and *Ceriodaphnia* toxicity and chlorpyrifos.

Station Name†	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation2, Management Plan Monitoring	5/12/2009	08:40	None	May MPM for *Selenastrum* toxicity and chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation3, Management Plan Monitoring	6/9/2009	08:20	None	June MPM for chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation4, Management Plan Monitoring	7/14/2009	08:40	None	July MPM for *Ceriodaphnia* toxicity and chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation5, Management Plan Monitoring	8/11/2009	08:40	None	August MPM for chlorpyrifos; Too deep to measure discharge.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation6, Management Plan Monitoring	9/15/2009	09:20	None	September MPM for *Ceriodaphnia* toxicity and chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	NM	Fall1	10/14/2008	13:40	None	
French Camp Slough @ Airport Way	531SJC504	NM	Storm2	11/4/2008	10:50	None	Too shallow to measure discharge.
French Camp Slough @ Airport Way	531SJC504	NM	Fall2, Non Contiguous	12/9/2008	11:10	None	Non contiguous water body, discharge recorded as zero.
French Camp Slough @ Airport Way	531SJC504	NM	Winter1, Non Contiguous	1/13/2009	12:40	None	Non contiguous water body, discharge recorded as zero. Breakage to pesticide bottles occurred on 01/14/09; all other analysis were conducted on samples collected on 01/13/09.
French Camp Slough @ Airport Way	531SJC504	NM	Winter1, Non Contiguous	1/15/2009	14:40	None	Samples collected to replace pesticide bottles that broke between collection on 01/13/09 and delivery on 01/14/09; Non contiguous water body, discharge recorded as zero.
French Camp Slough @ Airport Way	531SJC504	NM	Winter2	2/10/2009	09:10	None	
French Camp Slough @ Airport Way	531SJC504	NM	Winter3	3/10/2009	13:50	None	
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation1	4/14/2009	11:00	None	
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation2	5/12/2009	10:40	None	
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation3	6/9/2009	09:50	None	
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation4	7/14/2009	10:40	None	
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation5	8/11/2009	10:20	None	
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation6	9/15/2009	12:00	None	

Station Name†	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
French Camp Slough @ Airport Way	531SJC504	NM	Fall1	10/6/2009	09:40	None	
French Camp Slough @ Airport Way	531SJC504	NM	Fall2, Non Contiguous	11/10/2009	10:00	None	Non contiguous water body, discharge recorded as zero.
French Camp Slough @ Airport Way	531SJC504	NM	Fall3, Non Contiguous	12/8/2009	09:00	None	Non contiguous water body, discharge recorded as zero.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation1, Management Plan Monitoring	4/14/2009	10:30	None	April MPM for *Selenastrum* toxicity; Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation2, Management Plan Monitoring	5/12/2009	10:00	None	May MPM for *Selenastrum* toxicity; Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation4, Management Plan Monitoring	7/14/2009	10:10	None	July MPM for chlorpyrifos and copper; Too deep to measure discharge.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation5, Management Plan Monitoring	8/11/2009	10:00	None	August MPM for chlorpyrifos and copper; Too deep to measure discharge.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation6, Management Plan Monitoring	9/15/2009	11:10	None	September MPM for copper; Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall1	10/14/2008	08:00	None	
Mokelumne River @ Bruella Rd	531XMRABR	NM	Storm2	11/4/2008	08:00	None	
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall2	12/9/2008	07:50	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter1	1/13/2009	07:50	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter2	2/10/2009	13:50	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter3	3/10/2009	11:50	None	
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation1	4/14/2009	07:50	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation2	5/12/2009	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation3	6/9/2009	07:50	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation4	7/14/2009	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation5	8/11/2009	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation6	9/15/2009	08:20	None	Too deep to measure discharge.

Station Name†	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall1	10/6/2009	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall2	11/10/2009	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall3	12/8/2009	08:00	None	Too deep to measure discharge.
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall1	10/14/2008	14:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Storm2	11/4/2008	11:30	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall2	12/9/2008	13:30	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Winter1	1/13/2009	08:00	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Winter2	2/10/2009	08:00	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Winter3	3/10/2009	11:10	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation1	4/14/2009	12:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation2	5/12/2009	12:10	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation3	6/9/2009	12:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation4	7/14/2009	12:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation5	8/11/2009	12:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation6	9/15/2009	12:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall1	10/6/2009	11:10	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall2	11/10/2009	12:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall3	12/8/2009	12:20	None	
South Webb Tract Drain	544XXSWTD	NM	Fall1	10/14/2008	12:10	None	Discharge recorded as zero due to no measurable flow.
South Webb Tract Drain	544XXSWTD	NM	Storm2	11/4/2008	13:20	None	
South Webb Tract Drain	544XXSWTD	NM	Fall2	12/9/2008	12:30	None	Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	NM	Winter1	1/14/2009	09:00	None	Too deep to measure discharge.
South Webb Tract Drain	544XXSWTD	NM	Winter2	2/10/2009	11:00	None	Too deep to measure discharge.
South Webb Tract Drain	544XXSWTD	NM	Winter3	3/10/2009	09:00	None	Too deep to measure discharge.

Station Name†	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
South Webb Tract Drain	544XXSWTD	NM, SED	Irrigation1	4/14/2009	10:10	None	Sediment chemistry analyzed for toxic samples only; Discharge recorded as zero due to no measurable flow.
South Webb Tract Drain	544XXSWTD	NM	Irrigation2	5/12/2009	10:00	None	Discharge recorded as zero due to no measurable flow.
South Webb Tract Drain	544XXSWTD	NM	Irrigation3	6/9/2009	10:00	None	Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	NM	Irrigation4	7/14/2009	10:10	None	Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	NM	Irrigation5	8/11/2009	10:10	None	Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	SED	Irrigation5	8/19/2009	14:00	None	Sediment chemistry analyzed for toxic samples only; Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	NM	Irrigation6	9/15/2009	09:40	None	Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	NM	Fall1	10/6/2009	09:50	None	Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	NM	Fall2	11/10/2009	10:00	None	Pump station not running; Discharge recorded as zero.
South Webb Tract Drain	544XXSWTD	NM	Fall3	12/8/2009	10:00	None	Pump station not running; Discharge recorded as zero.
Stanislaus River Drain @ South Airport Way*	535SRDSAW	NM	Fall1	10/14/2008	14:30	None	Discharge recorded as zero due to no measurable flow.
Stanislaus River Drain @ South Airport Way*	535SRDSAW	NM	Storm2	11/4/2008	11:30	None	Too deep to measure discharge.
Stanislaus River Drain @ South Airport Way*	535SRDSAW	NM	Fall2	12/9/2008	11:50	None	Discharge recorded as zero due to no measurable flow.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall1	10/14/2008	09:30	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Storm2	11/4/2008	10:20	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall2	12/9/2008	09:30	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Winter1	1/13/2009	11:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Winter2	2/10/2009	14:30	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Winter3	3/10/2009	10:30	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation1	4/14/2009	07:50	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation2	5/12/2009	07:50	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation3	6/9/2009	07:50	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation4	7/14/2009	07:50	None	Too deep to measure discharge.

Station Name†	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation5	8/11/2009	07:50	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation6	9/15/2009	17:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall1	10/6/2009	07:50	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall2	11/10/2009	08:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall3	12/8/2009	08:00	None	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation1, Management Plan Monitoring	4/14/2009	09:40	None	April MPM for copper.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation2, Management Plan Monitoring	5/12/2009	09:30	None	May MPM for *Selenastrum* toxicity, copper, and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation3, Management Plan Monitoring	6/9/2009	09:10	None	June MPM for chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation4, Management Plan Monitoring	7/14/2009	09:40	None	July MPM for copper and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation5, Management Plan Monitoring	8/11/2009	09:20	None	August MPM for copper.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation6, Management Plan Monitoring	9/15/2009	10:20	None	September MPM for *Ceriodaphnia* toxicity, chlorpyrifos and copper.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter1	1/13/2009	13:20	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter2	2/10/2009	08:00	None	Discharge recorded as zero due to no measurable flow.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter3	3/10/2009	12:40	None	Discharge recorded as zero due to no measurable flow.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, SED	Irrigation1	4/14/2009	13:00	None	Sediment chemistry analyzed for toxic samples only.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation2	5/12/2009	12:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation3	6/9/2009	11:20	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation4	7/14/2009	12:20	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation5	8/11/2009	12:20	None	
Walthall Slough @ Woodward Ave	544WSAWAV	SED	Irrigation5	8/19/2009	10:40	None	Sediment chemistry analyzed for toxic samples only.

Station Name†	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation6	9/15/2009	14:00	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Fall1	10/6/2009	12:40	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Fall2	11/10/2009	11:40	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Fall3	12/8/2009	11:30	None	

†Three Assessment Monitoring sites were omitted from the normal monitoring schedule on April 6, 2009 based on an amended MRPP including Bear Creek @ North Alpine Rd, Drain @ Woodbridge Rd, and Duck Creek @ Hwy 4; monitoring at Duck Creek @ Hwy 4 continued for MPM constituents only.

*Replaced by Walthall Slough @ Woodward Ave in January 2009.

MPM-Management Plan Monitoring

NM-Normal Monitoring

SED-Sediment Monitoring

Sampling and Analytical Methods

Sample collection criteria and field instruments are provided in Tables 10 and 11, respectively. Site specific discharge methods are included in Table 12. Analytical methods and reporting limits (RLs) are provided in Table 13.

All methods and RLs stayed constant throughout the year, with one exception. The RL for trifluralin was decreased from 0.1 µg/L to 0.05 µg/L in July of 2009. All laboratory reports thereafter used the new reporting limit.

Eight constituents used MDL values different than those recorded in the SJCDWQC Quality Assurance Project Plan (QAPP); arsenic decreased from 0.01 µg/L to 0.008 µg/L, hardness decreased from 3.0 mg/L to 1.7 mg/L, nitrate + nitrite (as N) decreased from 0.05 mg/L to 0.02 mg/L, paraquat dichloride increased from 0.08 µg/L to 0.21 µg/L , Total Kjeldahl Nitrogen increased from 0.06 mg/L to 0.07 mg/L (starting with the May, 2009 sampling event), total organic carbon decreased from 0.30 mg/L to 0.10 mg/L , total phosphorus decreased from 0.04 mg/L to 0.01 mg/L , and soluble orthophosphate decreased from 0.01 mg/L to 0.006 mg/L. Table 13 accurately reflects the updated MDLs and RLs that were used in analysis from October 2008 through December 2009.

All field sampling methods were performed as outlined in the standard operating procedures (SOPs) provided in the SJCDWQC QAPP. No deviations from these procedures occurred during the monitoring. All analytical methods were performed as described in the QAPP.

Table 10. Sampling procedures, containers, sample volumes, preservation and storage techniques, and holding times.

Analytical Parameter	Sample Volume[1]	Sample Container	Initial Preservation/Holding Requirements	Holding Time[2]
Physical Parameters[3]				
Total Dissolved Solids	500 mL	1x 2000 mL Polyethylene	Store at 4°C	7 Days
Total Suspended Solids	500 mL			7 Days
Turbidity	150 mL			48 Hours
Nutrients				
Soluble Orthophosphate	1 L	1x 2000 mL Polyethylene	Store at 4°C	48 Hours
TKN, Ammonia, Total Phosphorus, Nitrate-Nitrite as N	500 mL	1x 500 mL Polyethylene	Preserve to ≤pH 2 with H_2SO_4, store at 4°C	28 Days
Metals/Trace Elements				
Metals/Trace Elements, Hardness[4]	500 mL	1x 500 mL Polyethylene	Filter as necessary; preserve to ≤pH 2 with HNO_3, store at 4°C	180 Days
Drinking Water				
E. coli (pathogens)	100 mL	1x 100 mL Polyethylene	Store at 4°C	24 Hours[5]
Total Organic Carbon	120 mL	3x 40 mL Amber glass VOA with PTFE-lined cap	Preserve with HCl, store at 4°C	28 Days
Pesticides				
Carbamates	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Organochlorines	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Organophosphates	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Herbicides (general)	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Herbicides (paraquat dichloride)	1 L	1x 1 L brown Polyethylene	Store at 4°C; extract within 7 days	21 days
Herbicides (glyphosate)	80 mL	2x 40 mL Glass VOA	Store at 4°C; freeze (-20°C) within 2 weeks	6 Months
Water Column Toxicity				
Aquatic Toxicity	5 Gallons	5x 1 Gallon Amber Glass	Store at 4°C	36 Hours
Sediment				
Sediment Toxicity	2 L	2x 1 L Glass	Store at 4°C, do not freeze	14 Days
Sediment Grain Size	250 mL	1x 250 mL Glass	Store at 4°C, do not freeze	28 days
Sediment Total Organic Carbon	250 mL	1x 250 mL Glass	Store at 4°C, freeze (-20°C) within 48 hours	12 Months
Sediment Chemistry	1 L	4x 250 mL Amber Glass	Store at 4°C, freeze (-20°C) within 48 hours	12 Months
Sediment Total Solids	250 mL	1x 250 mL Glass	Store at 4°C	7 Days

[1] Additional volumes may be required for Quality control (QC) analyses.
[2] Holding time after initial preservation or extraction.
[3] Volume of water necessary to analyze the physical parameters is typically combined in multiple 1L polyethylene bottles, which provides sufficient volume for re-analyses and lab spike duplicates. This is only possible when the same laboratory provides the analyses for all of the physical parameters.
[4] To include arsenic, boron, cadmium, copper, lead, nickel, molybdenum, selenium, and zinc.
[6] Samples for bacteria analyses should be set up as soon as possible.

Table 11. Field parameters and instruments used to collect measurements.

Parameter	Instrument
Dissolved oxygen	YSI Model 556
Temperature	YSI Model 556
pH	YSI Model 556
Specific Conductance	YSI Model 556
Flow	Marsh-McBirney Flow Mate 2000

Table 12. Site specific discharge methods.

Site	Discharge Method	Meter/ Gauge
Mokelumne River @ Bruella Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Bear Creek @ North Alpine Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
French Camp Slough @ Airport Way	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Duck Creek @ Highway 4	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Terminous Tract Drain @ Hwy 12	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Drain @ Woodbridge Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Roberts Island Drain @ Holt Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
South Webb Tract Drain	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Walthall Slough @ Woodward Ave	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Stanislaus River Drain @ South Airport Way	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Lone Tree Creek @ Jack Tone Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000

Table 13. Field and Laboratory Analytical Methods.

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Physical Parameters					
Flow	Fresh Water	Field Measure	1 cfs	NA	USGS R2Cross streamflow Method
pH	Fresh Water	Field Measure	0.1 pH units	NA	EPA 150.1
Electrical Conductivity	Fresh Water	Field Measure	100 µmhos/cm	NA	EPA 120.1
Dissolved oxygen	Fresh Water	Field Measure	0.1 mg/L	NA	SM 4500-O
Temperature	Fresh Water	Field Measure	0.1 °C	NA	SM 2550
Turbidity	Fresh Water	Caltest	0.5 NTU	0.020 NTU	EPA 180.1
Total Dissolved Solids	Fresh Water	Caltest	10 mg/L	4.0 mg/L	SM2540C
Total Suspended Solids	Fresh Water	Caltest	3 mg/L	2.0 mg/L	EPA 160.2
Hardness	Fresh Water	Caltest	10 mg/L	1.7 mg/L	SM2340C
Total Organic Carbon	Fresh Water	Caltest	0.5 mg/L	0.10 mg/L	EPA 415.1
Pathogens					
Escherichia coli	Fresh Water	Caltest	1 MPN/ 100 mL	1.0 MPN/ 100 mL	SM 9223
Toxicity					
Water Column Toxicity	Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-012
	Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-013
Sediment Toxicity	Sediment	AQUA-Science	NA	NA	EPA 600/R-99-064
Carbamates					
Aldicarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Carbaryl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Carbofuran	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Methiocarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Methomyl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Oxamyl	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Organochlorines					
DDD	Fresh Water	APPL Inc	0.01 µg/L	0.003 µg/L	EPA 8081A
DDE	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
DDT	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Dicofol	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8081A
Dieldrin	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endrin	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Methoxychlor	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Group A Pesticides					
Aldrin	Fresh Water	APPL Inc	0.01 µg/L	0.009 µg/L	EPA 8081A
Chlordane	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Heptachlor	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Heptachlor epoxide	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Hexachlorocyclohexane (alpha-HCH)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (beta-HCH)	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Hexachlorocyclohexane (gamma-BHC; Lindane)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (delta-HCH)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan I	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan II	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Toxaphene	Fresh Water	APPL Inc	0.5 µg/L	0.380 µg/L	EPA 8081A
Organophosphates					
Azinphos-methyl	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	EPA 8141A
Chlorpyrifos	Fresh Water	APPL Inc	0.015 µg/L	0.0026 µg/L	EPA 8141A
Diazinon	Fresh Water	APPL Inc	0.02 µg/L	0.004 µg/L	EPA 8141A
Dichlorvos	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	EPA 8141A
Dimethoate	Fresh Water	APPL Inc	0.1 µg/L	0.08 µg/L	EPA 8141A
Dimeton-s	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8141A
Disulfoton	Fresh Water	APPL Inc	0.05 µg/L	0.02 µg/L	EPA 8141A
Malathion	Fresh Water	APPL Inc	0.1 µg/L	0.05 µg/L	EPA 8141A
Methamidiphos	Fresh Water	APPL Inc	0.2 µg/L	0.08 µg/L	EPA 8141A
Methidathion	Fresh Water	APPL Inc	0.1 µg/L	0.04 µg/L	EPA 8141A
Parathion, methyl	Fresh Water	APPL Inc	0.1 µg/L	0.075 µg/L	EPA 8141A
Phorate	Fresh Water	APPL Inc	0.1 µg/L	0.07 µg/L	EPA 8141A
Phosmet	Fresh Water	APPL Inc	0.2 µg/L	0.06 µg/L	EPA 8141A
Herbicides					
Atrazine	Fresh Water	APPL Inc	0.5 µg/L	0.07 µg/L	EPA 619
Cyanazine	Fresh Water	APPL Inc	0.5 µg/L	0.09 µg/L	EPA 619
Diuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Glyphosate	Fresh Water	NCL Ltd	5 µg/L	4.0 µg/L	EPA 547M
Linuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Paraquat dichloride	Fresh Water	APPL Inc	0.5 µg/L	0.21 µg/L	EPA 549.2M
Simazine	Fresh Water	APPL Inc	0.5 µg/L	0.08 µg/L	EPA 619

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Trifluralin	Fresh Water	APPL Inc	0.05 µg/L[1]	0.036 µg/L	EPA 8141A
Metals					
Arsenic	Fresh Water	Caltest	0.5 µg/L	0.008 µg/L	EPA 200.8 (ICPMS Collision Cell)
Boron	Fresh Water	Caltest	10 µg/L	0.47 µg/L	EPA 200.8 (ICPMS Collision Cell)
Cadmium	Fresh Water	Caltest	0.1 µg/L	0.01 µg/L	EPA 200.8 (ICPMS Collision Cell)
Copper	Fresh Water	Caltest	0.5 µg/L	0.06 µg/L	EPA 200.8 (ICPMS Collision Cell)
Lead	Fresh Water	Caltest	0.25 µg/L	0.07 µg/L	EPA 200.8 (ICPMS Collision Cell)
Molybdenum	Fresh Water	Caltest	0.3 µg/L	0.02 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nickel	Fresh Water	Caltest	0.5 µg/L	0.01 µg/L	EPA 200.8 (ICPMS Collision Cell)
Selenium	Fresh Water	Caltest	1 µg/L	0.06 µg/L	EPA 200.8 (ICPMS Reaction Cell)
Zinc	Fresh Water	Caltest	1 µg/L	0.8 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nutrients					
Total Kjeldahl Nitrogen	Fresh Water	Caltest	0.5 mg/L	0.07[2] mg/L	EPA 351.3
Nitrate (as N)+ Nitrite (as N)	Fresh Water	Caltest	0.05 mg/L	0.02 mg/L	EPA 353.2
Total Ammonia	Fresh Water	Caltest	0.1 mg/L	0.040 mg/L	EPA 350.2
Total Phosphorus	Fresh Water	Caltest	0.01 mg/L	0.01 mg/L	EPA 365.2
Soluble Orthophosphate	Fresh Water	Caltest	0.01 mg/L	0.006 mg/L	EPA 365.2
Sediment					
Bifenthrin	Sediment	Caltest	0.0003 mg/kg	0.0003 mg/kg	EPA 8270 (GCMS/SIM)
Cyfluthrin	Sediment	Caltest	0.0003 mg/kg	0.0002 mg/kg	EPA 8270 (GCMS/SIM)
Cypermethrin	Sediment	Caltest	0.0003 mg/kg	0.0002 mg/kg	EPA 8270 (GCMS/SIM)
Esfenvalerate	Sediment	Caltest	0.0003 mg/kg	0.0002 mg/kg	EPA 8270 (GCMS/SIM)
Lambda-Cyhalothrin	Sediment	Caltest	0.0003 mg/kg	0.0003 mg/kg	EPA 8270 (GCMS/SIM)

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Permethrin	Sediment	Caltest	0.0003 mg/kg	0.0002 mg/kg	EPA 8270 (GCMS/SIM)
Fenpropathrin	Sediment	Caltest	0.0003 mg/kg	0.0002 mg/kg	EPA 8270 (GCMS/SIM)
Chlorpyrifos	Sediment	Caltest	0.003 mg/kg	0.002 mg/kg	EPA 8270 (GCMS/SIM)
Total Solids	Sediment	Caltest	0.10%	0.10%	SM2540B
Total Organic Carbon	Sediment	Caltest[3]	200 mg/kg	100 mg/kg	Walkley Black
Grain Size	Sediment	Caltest[3]	1% sand, silt, clay, gravel	0.4 µm	ASTM D-422-63, ASTM D4464M-85

[1] RL reported as 0.1 µg/L until July 2009.

[2] MDL reported as 0.06 mg/L until May 2009.

[3] Subcontracted to PTS Laboratories.

Precision, Accuracy and Completeness

Normal surface water monitoring occurred monthly for 10 sites from October 2008 through March 2009 and six sites from April 2009 through December 2009 (SJCDWQC MRPP amended on 03/12/09) with the following exception. No sites were dry and one site (Drain @ Woodbridge Rd) could not be sampled on December 9, 2008 due to a lack of access.

Stanislaus River Drain @ South Airport Way was dropped from the monitoring schedule in January 2009 due to upstream dairy drainage issues and was replaced by Walthall Slough @ South Airport Way. All updates to the monitoring schedule are included in the SJCDWQC MRPP (amended on 03/12/09) and are referenced in the Monitoring Objectives and Design section of this report.

Sediment sampling occurred twice during the irrigation season, once during the month of April and again during the month of August. Sediment was collected from all scheduled sites.

During the irrigation season, three Management Plan Monitoring sites were sampled in addition to the normal monitoring sites. See Table 6 and 8 in the Monitoring Objectives and Design section for a list of all Management Plan Monitoring locations and constituents sampled.

As required in the document "Irrigated Lands Regulatory Program General Procedures Sample Collection for Low Flow or No-Flow Conditions" the Coalition sampled both sediment and water under conditions of no flow and low flow. If a site had no flow, discharge was recorded as zero. If a water body had "puddle like conditions" the entire sample was flagged as "non contiguous". All results including field parameters, chemistry and toxicity are therefore associated with the non contiguous flag and any water quality exceedances should be evaluated should be evaluated relative to the fact that the water was neither flowing nor connected to a downstream water body.

From October 2008 through December 2009 the following sites were sampled when water was non contiguous:

- Bear Creek @ North Alpine Rd (12/9/08, 1/13/09)
- Duck Creek @ Hwy 4 (11/4/08, 1/13/09, 2/10/09)
- French Camp Slough @ Airport Way (12/9/08, 1/13/09*, 1/15/09*, 11/10/09, 12/8/09)

*In January 2009, samples were collected from French Camp Slough within two days of each other due to pesticide bottle breakage between collection and delivery to the analytical laboratories; pesticide samples were recollected two days after the original sample date.

Chemistry

All results are reported in the Monitoring Results section of this report (Appendix II). Each result is flagged if it does not meet data quality objectives (acceptability criteria) using Surface Water Ambient Monitoring Program (SWAMP) codes and can also be found in the SWAMP comparable database managed by the Coalition. The Coalition works with the University of California, Davis Regional Data Center (UCD RDC) to ensure that all data remain SWAMP comparable and that all data are suitable to be uploaded to the California Environmental Data Exchange Network (CEDEN). A copy of the database has been submitted to the Regional Board with the hardcopy of this report.

For some constituents the concentration of a constituent in the environmental sample may exceed the amount that the detector can detect and therefore requires a dilution. The result reported is the amount found in the diluted sample multiplied by the dilution factor to represent the amount of the analyte present in the original sample. The dilution factor is recorded and the reporting limit (RL) is generally increased by multiplying the RL for that analyte by the dilution factor. Therefore, for each dilution that occurs, there is a corresponding increase in the limit of quantification.

Chemistry Completeness

The constituents sampled from October 2008 through December 2009 are listed by site in Table 3. For normal and Management Plan Monitoring, not including laboratory or field quality control (QC) samples, 62 carbamate, 84 organochlorine, 47-51 herbicide, 69-81 organophosphate, 84 Group A pesticides, 107 *E. coli* and physical parameters, 107 nutrients, and 47-55 dissolved and total metal samples were collected and analyzed from October 2008 – December 2009 (Table 14). There was 100% completeness for environmental samples collected for chemistry analyses.

For each sampling event, a field duplicate (FD) and field blank (FB) were collected (each event had less than 20 samples). In addition, an equipment blank (EB) and travel blank (TB) were analyzed for dissolved metals and total metals, respectively. Field blanks and field duplicates each comprised 11.5-19.5% of organic samples, 11% of *E. coli* samples and nutrient samples, 11-19.5% of physical parameter samples, 15-16.5% of dissolved metal samples and 15-16.3% of total metal samples. Although requested, due to a laboratory error, the equipment blank collected in October 2008 was not analyzed for dissolved metals. Equipment blanks comprised 14-15.4% of dissolved metal samples. Travel blanks comprised 15-16.3% of total metal samples.

All chemistry batches were reviewed for quality assurance/control completeness. Fourteen batches were flagged as having incomplete quality control.

Six organochlorine batches from October 2008-March 2009 were run without toxaphene matrix spikes (MS), matrix spike duplicates (MSD) and laboratory control spike (LCS) samples due to laboratory error.

In an October 2008 Total Kjeldahl Nitrogen batch, the original MS and MSD failed acceptability criteria; therefore the laboratory re-extracted and re-analyzed the MS in a separate batch.

Samples collected from French Camp Slough on January 13, 2009 could not be analyzed by the laboratory due to bottle breakage upon receipt of the samples by laboratory personnel the following morning. The samples were recollected on January 14, 2009. Due to the French Camp Slough samples being analyzed separately, five pesticide batches were run without MS and MSDs; however the MS collected the day before can be used to assess the potential for matrix interference since there will have been little change in the sample matrix within 24 hours. The batches run without a MSD were run with the laboratory control spike duplicate (LCSD) instead.

South Webb Tract Drain was inaccessible on January 13, 2009 due to ferry maintenance and was therefore sampled on January 14, 2009. A larger volume container was not used to sample for *E. coli* at South Webb Tract Drain so there was insufficient volume to run a laboratory duplicate in this batch, causing the batch to be flagged as having incomplete quality control. There was however a laboratory duplicate performed within 24 hours of this batch that met acceptability requirements for *E. coli.*

Samples collected for methamidophos analysis in March 2009 were split into two analytical batches. The MS and MSD were performed with the first batch but due to insufficient volume a second MS and MSD were not performed. A LCS and LCSD were run with the second batch meeting precision and accuracy requirements. The batch was also flagged as having incomplete quality control. The MSs that were performed on the samples collected in March 2009 had recoveries within acceptability criteria and although there was insufficient volume for the MS to be run with both batches, since the batches were run within 24 hours of each other, it can be concluded that matrix interference was not an issue for either methamidophos batch.

Chemistry Precision and Accuracy

A review of the number of samples analyzed and the percentage per analyte that meets acceptability criteria are listed in the tables following this section. A brief overview is listed below to assess overall precision and accuracy per analyte (sorted alphabetically; all pesticides and metals are grouped and discussed together).

- ***Ammonia as N:*** Unionized ammonia values determined using the fraction of unionized ammonia in the total ammonia result based on field temperature and pH. Unionized ammonia values were calculated with the following formula:

  Ammonia as N, unionized = Ammonia as N, total * f

  Where:

  f = unionized ammonia fraction of total ammonia
  = 1/(10(pK_a-pH)+ 1
  pK_a = the temperature related equilibrium constant
  = 0.0901821 + (2729.92/T_k)
  T_k = temperature in degrees Kelvin
  = field temperature (°C) +273.2
  pH = field pH

  Ammonia and calculated unionized ammonia results can be found in Table 4 in Appendix II and Table 7 in Appendix III.

  One hundred percent of field blanks met acceptance criteria. Seventy-three percent of field duplicates had a relative percent difference (RPD) value < 25%. One hundred percent of laboratory blanks were less than the RL. LCSs were analyzed with each batch and 100% met acceptance criteria. MS and MSDs were all within acceptability criteria, meeting requirements of accuracy and precision.

- ***E. coli:*** Sterility checks of laboratory blanks, negative control and positive control samples were run for each batch. One hundred percent of laboratory blanks met acceptability criteria. One hundred percent of field blanks collected had *E. coli* numbers less than the reporting limit of 1. Due to the nature of the analysis method and *E. coli* distribution within the water column, precision of *E. coli* analysis is conducted by evaluating R_{log} values of environmental and duplicate samples with the R_{log} criterion developed by the laboratory using similar samples. The mean R_{log} for the laboratory was calculated to be 0.40. This value multiplied by 3.27 resulted in a precision criterion of 1.30. All laboratory duplicates had R_{log} values below the criteria acceptance level.

- ***Hardness:*** From October 2008 – May 2009 hardness was analyzed from unfiltered samples. Hardness is used to determine the bioavailable fraction of the dissolved metals detected in a sample. Therefore, starting in June 2009 the Coalition instructed the laboratory to analyze the hardness from the samples filtered for dissolved metals analysis. In addition, the metals analytical laboratory conducted a brief analysis and it was determined that there is little to no difference between the hardness analyzed in the unfiltered sample versus the hardness analyzed in the filtered sample. This study was done on a couple of Coalition samples to ensure that the hardness analysis performed prior to June 2009 accurately reflects the hardness in the associated filtered metal sample. For this report hardness is reported with a fraction of "none" analysis performed on unfiltered samples (October 2008 through May 2009) and with a fraction of "dissolved" for analysis performed on filtered samples (June 2009 through December 2009).

One hundred percent of hardness field blanks and field duplicates met acceptability criteria. One hundred percent of hardness lab blanks and laboratory control spikes met the acceptance criteria. Eighty-six percent of hardness MS met the acceptability criteria (38 of 44). Three of the MS that did not meet the acceptability criteria were non-project samples from two different batches. The probable cause of the low recoveries was matrix interference; three of the samples were from non-Coalition projects. One hundred percent of hardness MSDs met the acceptability criteria for precision, RPD < 25%.

One hundred percent of dissolved hardness field blanks met acceptability criteria. Eighty-six percent of dissolved hardness field duplicates had relative percent differences (RPDs) less than 25%. One hundred percent of dissolved hardness lab blanks and LCSs met the acceptance criteria. Sixty-seven percent of dissolved hardness MS met the acceptability criteria. All six MS (from three batches) that did not meet the acceptance criteria were due to possible matrix interferences. Batch quality control (QC) data accepted based on LCS and RPD results. One hundred percent of dissolved hardness MSDs met the acceptability criteria for precision, RPD < 25%.

- ***Inorganic sediment (grain size and TOC):*** Sediment grain size and total organic carbon were analyzed for both sets of sediment samples collected during the October 2008 – December 2009 sampling period (April 14 and August 19, 2009).

  Currently there is no standard method for evaluating grain size precision. Due to the nature of sediment and grain size analysis, results should be evaluated with the understanding that samples are not homogenous in grain size due to 1) settling of sediment within the sample container (affects laboratory duplicate precision) and 2) heterogeneity of the sediment in the field (affects field duplicate precision).

  The Coalition QAPP lists the acceptable limit criterion for grain size duplicates as RSD ≤ 20% where RSD is the relative standard deviation. The RSD is traditionally defined as the standard deviation divided by the mean (equivalent to the Coefficient of Variation). The Coalition discussed with the sediment laboratory possible methods for evaluating sediment grain size precision, and it was agreed that evaluating the relative percent difference between grain size standard deviations of the environmental sample and the duplicate sample is the most suitable and accurate method for determining precision. Individual grain size classes are reported as a percentage based on the composition of the entire sample and therefore are not values that can be evaluated individually (they are not independent variables). Therefore it is more accurate to assess precision of the entire sample rather than each grain size class for both field and laboratory duplicates.

The grain size standard deviation (SD) for all classes of a single sample was calculated using the following Folk and Ward 1957 Logarithmic equation:

$$SD = \sigma_1 = \frac{\Phi_{84} - \Phi_{16}}{4} + \frac{\Phi_{95} - \Phi_5}{6.6}$$

Where Φ_{84} = phi value of the 84th percentile sediment grain size category
Φ_{16} = phi value of the 16th percentile sediment grain size category
Φ_{95} = phi value of the 95th percentile sediment grain size category
Φ_{5} = phi value of the 5th percentile sediment grain size category

Precision was calculated based on the relative percent difference between the standard deviation of the environmental sample and the standard deviation of a duplicate sample using the following formula:

$$RPD_{SD} = \left| \frac{2(SD_i - SD_D)}{(SD_i + SD_D)} \right| \times 100$$

SD_i= standard deviation of the initial or environmental sample based on the Folk and War Logarithmic equation
SD_D= standard deviation of the field or laboratory duplicate sample based on the Folk and War Logarithmic equation

The criterion used in this report to assess precision for sediment grain size and sediment total organic carbon is $RPD_{SD} \leq 20\%$. All four of the calculated grain size relative percent difference results for both sediment sampling dates were within the acceptability criteria for precision.

One hundred percent of the sediment TOC lab blank samples had results less than the RL. One hundred percent of the field duplicate and lab duplicate samples were within acceptability criteria (RSD < 20). Both TOC certified reference materials were within acceptability criteria (PR 21-199).

- ***Metals (dissolved):*** One hundred percent of dissolved metal field blanks met field precision criteria except for dissolved zinc. Two dissolved zinc field blank samples exceeded the reporting limit and were greater than one fifth of the environmental sample. The first dissolved zinc field blank exceedance occurred in November 2008 (environmental sample = 4 µg/L, field blank = 1 µg/L). The second occurred in January 2009, with a field blank result of 8 µg/L and no zinc detected in the environmental sample. The lab re-prepped and re-analyzed the samples in triplicate and confirmed the original results. The associated equipment blank (used to assess contamination of the filtering equipment) had no detectable amounts of dissolved zinc. Field crew were questioned and it does not appear that the field blank was switched with the field sample however that is a possibility and would explain the large amount of dissolved zinc found in the field blank and the lack of zinc detected in the environmental sample. Contamination in the field may be due to contamination of the field blank water, the field blank storage container, the field blank bottle, or contamination from the sampler. All sampling SOPs (which include the steps to prevent contamination presented in the total metals analysis section above) were followed. Other sources of contamination may have occurred during transport from the field to the laboratory (all bottles were closed tightly and only touched when being put in the cooler by the sampler and taken from the cooler by the laboratory with gloved hands) and/or during the laboratory extraction process. Equipment blanks were analyzed starting in October 2008 with all dissolved metal batches, and 100% of dissolved metals met acceptability criteria for at least 90% of samples. Only one of 13 dissolved zinc equipment blanks did not meet the criteria, < RL and < 1/5 environmental sample. The equipment blank result was 2.6 µg/L, the environmental and field blank results were non-detect but a zinc exceedance was present in the field duplicate sample (1.5 µg/L). Laboratory blanks were run with each metals batch and 100% met acceptability criteria.

All field duplicates except for zinc met the acceptability criteria (RPDs < 25%) for at least 90% of samples. The RPDs outside the acceptance limits for zinc were 66.6% and 28.5%. All the zinc field duplicates and associated environmental samples were above the RL of 1 µg/L. LCSs were within acceptable recovery limits for 100% of dissolved metals run. One hundred percent of dissolved metals MSs met acceptance criteria. All MSDs met acceptability criteria for precision (RPD < 25%).

- ***Metals (total):*** One hundred percent of field blanks met acceptability criteria except for a single zinc field blank sample. The single zinc field blank sample exceeded the reporting limit and was greater than one fifth of the environmental sample (environmental sample = 2.1 µg/L, field blank = 1.1 µg/L). Due to past detections in field blanks, travel blanks were sent from the lab and traveled with the sampling crew from beginning to end. The travel blank associated with the field blank was 0.8 µg/L. Contamination in the field may be due to contamination of the field blank water, the field blank storage container, the field blank bottle, or contamination from the sampler.

The field blank bottle came directly from the laboratory and is certified pre-clean. The bottle was not opened until right before filling it with DI water. Clean gloves were used when filling the bottle with DI water from the LDPE container and neither the lid nor the opening of the bottle was touched. The cap was immediately returned to the bottle and screwed on tightly after filling. All sampling SOPs (which include the above steps to prevent contamination) were followed. Other sources of contamination may have occurred during transport from the field to the laboratory (all bottles were closed tightly and only touched with gloved hands when being put in the cooler by the sampler and taken from the cooler by the laboratory) and/or during the laboratory extraction process.

Laboratory blanks were run with each metals batch and 100% met acceptability criteria.

All field duplicates, except for lead, molybdenum, and zinc met acceptability criteria (RPDs < 25%) for at least 90% of samples. The RPDs outside the acceptance limits for lead were 60%, 124.3%, 26.1%, 31.5%, 33.6%, for molybdenum were 41.5%, 95.3%, 44.4%, and the zinc RPDs were 40%, 54.5%, 40%, 45.9%, 66.6%, 33.3%, 47% and 31.5%. Half of the lead and molybdenum samples associated with RPDs above 25 had detections below the RL. When detections are below the RL it is difficult to maintain precision due to the limitations of the instrument quantification. Zinc results with RPDs above 25 were mostly above the RL (except for two environmental samples). A review of the field sheets describe the sample sites as having cloudy or murky, brown colored water with low to moderate turbidity (6.9-49 NTU) and low to no flow. It is possible that metals present in the sediment could have been mobilized in the water column while the samples were being collected. All field SOPs were followed by the field crew including collecting the environmental and field duplicate samples at the same time.

LCSs were within acceptable recovery limits for 100% of samples analyzed for total metals. MS recoveries were within control limits for 97% of all total metals samples analyzed. MS had recoveries within acceptable criteria for more than 90% of the samples except for boron. Seventy-four percent of boron MS were within control limits (PR 75-125). Nine of 34 boron MS were outside of the control limits with three recovering below control limits. For three of the batches with a MS that recovered outside of recovery criteria, the samples were spiked with an amount less than half of what was detected in the environmental sample. Poor recoveries are most likely due to the amount of boron in the sample being detected at a level over twice the amount with which the sample was spiked. In all cases, LCSs extracted and run in the same batch were within acceptable recovery limits. None of the MS/MSDs were re-analyzed since the associated LCS recovered within acceptability criteria. All MSDs met acceptability criteria for precision (RPD < 25%).

- ***Nitrate + Nitrite as N:*** Ninety-three percent of field blanks met acceptance criteria. Eighty percent of field duplicates had RPD values < 25%. One hundred percent of LCSs and lab blanks met acceptance criteria. MSs met acceptance criteria for 97% of samples. The one MS not meeting the acceptance criteria was recovered below control limits due to possible matrix interference. One hundred percent of MSDs met the acceptability criteria for precision, RPD < 25%.

- ***Nitrogen, Total Kjeldahl (TKN):*** One hundred percent of field blanks were < RL or < 1/5 of the environmental sample. Field duplicates met the acceptance criteria, RPD < 25%, in 73% of the samples analyzed. The RPDs outside acceptance limits were 62.3%, 76.2%, 26.4% and 35.3%, and all associated field duplicate and environmental results were above the RL of 0.1 mg/L. Ninety-six percent (24 of 25) of laboratory blanks were < RL of 0.1 mg/L. The flagged blank result was a low detection of 0.11 mg/L. MSs met acceptance criteria in 89.6% of the samples. Four of the five MS/MSD samples that did not meet control limits were non-project samples and were below the acceptable limits due to possible matrix interference. In each case the LCS was within the acceptability criteria. Ninety-six percent (23 of 24) of MSDs had RPDs < 25%.

- ***Orthophosphate as P:*** Field blanks met acceptability criteria for 100% of samples analyzed. Eighty percent of field duplicates had RPDs < 25% (12 of 15). Laboratory blanks and LCSs were run with every batch and 100% met acceptability criteria. MS met acceptability criteria in 87.5% of the samples (28 of 32). The four samples recovered below control limits were two MS/MSD pairs, one of which was performed on non-project samples. The LCS associated with low MSs were within control limits. One hundred percent of MSDs had RPDs less than 25%.

- ***Pesticides:*** For the October 2008 – December 2009 sampling period, pesticides were analyzed in eight different groups: organochlorines (EPA 8081A), Group A pesticides (EPA 8081A), organophoshates (EPA 8141A), carbamates (EPA 8321A), methamidophos (EPA 8141A), paraquat (EPA 549.2), glyphosate (EPA 547M) and triazines (EPA 619). One hundred percent of pesticide field blanks met acceptability criteria for at least 90% of the samples. One hundred percent of field duplicates met acceptability criteria (RPD < 25%). Lab blanks were run with each batch and 100% of the samples met acceptability criteria.

Surrogates were run for each applicable pesticide analysis (surrogates are not performed for glyphosate and paraquat analysis). Surrogate recoveries were within specific acceptance criteria for 98.4% of all samples analyzed. All batches with laboratory quality control samples outside of acceptability criteria have been flagged in addition to the specific sample acceptability criteria. When a surrogate is recovered outside of the acceptability criteria, the associated environmental sample is flagged as well. Batches are approved by evaluating all measures of precision and accuracy and although a single quality control sample may be outside of acceptability criteria, the entire batch may be accepted due to other quality control samples within that batch meeting acceptability criteria.

MSs and LCSs were performed for each batch to assess accuracy as well as possible matrix interference. Either a MSD and/or a LCSD was performed per batch to assess precision. Ninety-eight percent of matrix spike samples run were within acceptability criteria. The individual pesticides with less than 90% of samples within acceptable recoveries for matrix spikes include cyanazine (83%), HCH, delta (73%) and phosmet (77%). Two cyanazine batches had MS and MSDs above acceptance limits and a single batch had just the MS above the acceptance limit (PR 22-172). All of the associated cyanazine LCSs were within control limits except for one, and all of the environmental samples were non-detect. Five HCH, delta batches had a MS and/or MSD above acceptance limits (PR 12-97). The batches were not re-injected and re-analyzed due to the high MS recoveries; in addition, all LCSs had acceptable recoveries and all environmental samples analyzed were non-detect. MS, MSDs, and LCSs were all below acceptance limits (PR 50-150) in three phosmet batches due to problems with the laboratories vendor-supplied calibration standards. The phosmet percent recoveries below limits ranged from no recovery up to 47.4%. The samples were not re-analyzed since the problem was not recognized until after hold times had expired for the samples. Once the issue was identified, the laboratory contacted the vendor and a new standard was prepared and shipped. A single phosmet MS was below acceptance limits in another batch, but the results were accepted due to the LCS being within limits and all environmental samples being non-detect. Therefore, the low recoveries with the phosmet matrix and LCSs were attributed to incorrect calibration standards for a single batch of samples. The samples associated with this set of calibration standards all had no detectable amount of phosmet (17 environmental samples total) nor has phosmet been detected in any samples collected by the Coalition.

Laboratory precision assessed by the RPD of laboratory duplicates, met acceptability criteria in 96% of MSDs. The individual pesticides with less than 90% of samples within acceptable recoveries for MSDs include paraquat (87%), DDD (87%) and toxaphene

(89%). Two paraquat batches and two DDD batches had MSD RPDs above 25%, but in both batches the MS recoveries were within control limits and all environmental sample results were non-detect. One toxaphene MSD was above the RPD limit of 25%, but the MS/MSD and LCS were all within acceptable percent recovery range and all environmental samples were non-detect.

LCS were within acceptability criteria for 99% of total samples analyzed. The only constituents with less than 90% of LCS recoveries within acceptable range were HCH, delta and phosmet (82% and 83%, respectively were within range). Of the three batches with HCH, delta LCS recoveries out of range, one had high MS recoveries but was not re-injected and re-analyzed due to all the environmental sample results being non-detect. The other two batches contained MSs within acceptable limits and no detections of HCH, delta in the environmental samples. Three batches with low phosmet percent recoveries, ranging from no recovery up to 42% (PR 50-150), were due to problems with the laboratories vendor-supplied calibration standards. In both cases the MS and MSD were below recovery limits as well, but the samples were not re-analyzed since the problem was not recognized until after hold times had expired for the samples. Once the issue was identified, the laboratory contacted the vendor and a new standard was prepared and shipped.

The Coalition supplies the laboratory with enough sample water to perform a MS and MSD for every 20 samples. Therefore, the laboratory will only perform a laboratory duplicate in a batch when there is no MSD. Both laboratory and MSDs can be used to assess precision. Six batches this reporting season were run without MS. Five of these batches occurred in January 2009 when sample bottles from French Camp Slough broke in transit to the laboratory and the site had to be re-sampled and analyzed separately. The sixth LCSD was performed due to the samples being analyzed in two separate batch and therefore there was insufficient volume for a MS and MSD to be analyzed in this batch. All pesticides had 100% of LCSDs within precision criteria except atrazine which had 1 of 2 LCS RPDs above 25.

- ***Phosphate as P:*** One hundred percent of field blanks met acceptability criteria. Eighty-seven percent of field duplicates had RPDs less than 25%. Laboratory blanks were run with each batch and all were less than the RL. One hundred percent of LCSs met acceptability criteria. One hundred percent of MSs and MSDs were within acceptability criteria meeting requirements of accuracy and precision.

- ***Total Dissolved Solids (TDS):*** One hundred percent of field blanks and field duplicates met acceptance criteria. Lab blanks were run with every batch and were less than the reporting limit (RL) for 100% of the samples. One hundred percent of LCSs and lab duplicates met acceptance criteria. MS and MSDs cannot be performed for TDS.

- ***Total Organic Carbon (TOC):*** Ninety-three percent of field blanks met acceptability criteria, < RL or < 1/5 the environmental sample (14 of 15). Field duplicates had RPDs less than 25% for all of the samples analyzed. One hundred percent of laboratory blanks were less than the RL. One hundred percent of LCSs, MSs, and MSDs met acceptability criteria.

- ***Total Suspended Solids (TSS):*** One hundred percent of field blanks met acceptance criteria. Seventy-three percent of field duplicates had RPD values less than 25%. One hundred percent of lab blanks, LCSs and lab duplicates met acceptance criteria. MSs and MSDs cannot be performed for TSS.

- ***Turbidity:*** One hundred percent of field blanks were less than the RL. Ninety-three percent of field duplicates had RPDs less than 25%. LCSs were run with every batch and 100% met acceptance criteria. Lab blanks and laboratory duplicates were analyzed with each batch and 100% met acceptance criteria. MSs and MSDs cannot be performed for turbidity.

Toxicity

For aquatic toxicity tests, the acceptability of test results is determined primarily by performance-based criteria for test organisms, culture and test conditions, and the results of control bioassays. Control bioassays include monthly reference toxicant testing and negative and solvent controls (for TIEs). Test acceptability requirements are documented in the method documents for each bioassay method and are included in the QAPP. In addition to the quality assurance (QA) requirements for the toxicity testing methods, a field duplicate must be collected with each sampling event or every 20 samples, whichever is more frequent. Field duplicates were collected every sampling event. The overall percentage of field duplicates are as follows: *Ceriodaphnia* 20%, *Pimephales* 22%, *Selenastrum* 22% and *Hyalella* 33%.

- ***Water Column Toxicity:*** Field duplicates were collected during each monitoring event and were tested for toxicity to *Ceriodaphnia*, *Selenastrum* and *Pimephales*. All three species had 100% of field duplicates within the acceptability criteria (RPDs < 25%) except for *Selenastrum*, which had 93% of RPDs less than 25% (14 of 15). The *Selenastrum* field duplicate and environmental sample associated with the high RPD (61.8%) did not exhibit significant toxicity compared to the control. All tests met holding time criteria (< 36 hours), water quality requirements and control requirements (as listed in the EPA method guidelines).

- ***Sediment Toxicity:*** Sediment was collected on April 14, 2009 and August 19, 2009. Two field duplicates were collected and their RPDs were less than 25%. One hundred percent of the sediment samples had laboratory controls within acceptability criteria. All sediment samples met holding time criteria.

Table 14. SJCDWQC sample counts, field quality control counts and percentages.

Method	Analyte	Env. Samples (#)	Env. and Field QC Samples (#)	Field Blanks (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8321A CARB	Aldicarb	62	92	15	16.3%	15	16.3%		NA		NA
EPA 8321A CARB	Carbaryl	62	92	15	16.3%	15	16.3%		NA		NA
EPA 8321A CARB	Carbofuran	62	92	15	16.3%	15	16.3%		NA		NA
EPA 8321A CARB	Methiocarb	62	92	15	16.3%	15	16.3%		NA		NA
EPA 8321A CARB	Methomyl	62	92	15	16.3%	15	16.3%		NA		NA
EPA 8321A CARB	Oxamyl	62	92	15	16.3%	15	16.3%		NA		NA
EPA 8321A CARB	Diuron	51	81	15	18.5%	15	18.5%		NA		NA
EPA 8321A CARB	Linuron	51	81	15	18.5%	15	18.5%		NA		NA
EPA 619	Atrazine	48	78	15	19.2%	15	19.2%		NA		NA
EPA 619	Cyanazine	48	78	15	19.2%	15	19.2%		NA		NA
EPA 619	Simazine	48	78	15	19.2%	15	19.2%		NA		NA
EPA 547M	Glyphosate	47	77	15	19.5%	15	19.5%		NA		NA
EPA 549.2M	Paraquat dichloride	47	77	15	19.5%	15	19.5%		NA		NA
EPA 8081A	DDD(p,p')	100	130	15	11.5%	15	11.5%		NA		NA
EPA 8081A	DDE(p,p')	100	130	15	11.5%	15	11.5%		NA		NA
EPA 8081A	DDT(p,p')	100	130	15	11.5%	15	11.5%		NA		NA
EPA 8081A	Dicofol	100	130	15	11.5%	15	11.5%		NA		NA
EPA 8081A	Dieldrin	100	130	15	11.5%	15	11.5%		NA		NA
EPA 8081A	Endrin	100	130	15	11.5%	15	11.5%		NA		NA
EPA 8081A	Methoxychlor	100	130	15	11.5%	15	11.5%		NA		NA
EPA 8081A	Aldrin	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	Chlordane	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	Heptachlor	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	Heptachlor epoxide	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	HCH, alpha	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	HCH, beta	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	HCH, delta	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	HCH, gamma	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	Endosulfan I	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	Endosulfan II	84	114	15	13.2%	15	13.2%		NA		NA
EPA 8081A	Toxaphene	54	114	15	13.2%	15	13.2%		NA		NA
EPA 8141A OP	Azinphos methyl	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Chlorpyrifos	81	111	15	13.5%	15	13.5%		NA		NA
EPA 8141A OP	Diazinon	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Dichlorvos	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Dimethoate	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Demeton-s	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Disulfoton	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Malathion	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Methidathion	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Parathion, Methyl	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Phorate	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Phosmet	69	99	15	15.2%	15	15.2%		NA		NA
EPA 8141A OP	Trifluralin	48	78	15	19.2%	15	19.2%		NA		NA
EPA 8141A OP	Methamidophos	69	99	15	15.2%	15	15.2%		NA		NA

Method	Analyte	Env. Samples (#)	Env. and Field QC Samples (#)	Field Blanks (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
SM 2340 C	Hardness as CaCO3 (Dissolved)	21	36	7	19.4%	7	19.4%		NA		NA
SM 2340 C	Hardness as CaCO3	34	52	8	15.4%	8	15.4%		NA	2	3.8%
EPA 160.1	Total Dissolved Solids	107	137	15	10.9%	15	10.9%		NA		NA
EPA 160.2	Total Suspended Solids	107	137	15	10.9%	15	10.9%		NA		NA
EPA 180.1	Turbidity	107	137	15	10.9%	15	10.9%		NA		NA
EPA 350.2	Ammonia as N	107	137	15	10.9%	15	10.9%		NA		NA
EPA 351.3	Nitrogen, Total Kjeldahl	107	137	15	10.9%	15	10.9%		NA		NA
EPA 353.2	Nitrate + Nitrite as N	107	137	15	10.9%	15	10.9%		NA		NA
EPA 365.2	OrthoPhosphate as P	107	137	15	10.9%	15	10.9%		NA		NA
EPA 365.2	Phosphate as P	107	137	15	10.9%	15	10.9%		NA		NA
EPA 415.1	Total Organic Carbon	107	137	15	10.9%	15	10.9%		NA		NA
Walkley-Black	Total Organic Carbon (sediment)	4	6		NA	2	33.3%		NA		NA
SM 9223	E. coli	107	137	15	10.9%	15	10.9%		NA		NA
EPA 200.8	Arsenic	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Boron	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Cadmium	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Copper	55	100	15	15.0%	15	15.0%		NA	15	15.0%
EPA 200.8	Lead	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Molybdenum	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Nickel	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Selenium	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Zinc	47	92	15	16.3%	15	16.3%		NA	15	16.3%
EPA 200.8	Cadmium (Dissolved)	47	91	15	16.5%	15	16.5%	14	15.4%		NA
EPA 200.8	Copper (Dissolved)	55	99	15	15.2%	15	15.2%	14	14.1%		NA
EPA 200.8	Lead (Dissolved)	57	91	15	16.5%	15	16.5%	14	15.4%		NA
EPA 200.8	Nickel (Dissolved)	47	91	15	16.5%	15	16.5%	14	15.4%		NA
EPA 200.8	Zinc (Dissolved)	47	91	15	16.5%	15	16.5%	14	15.4%		NA

Table 15. SJCDWQC summary of field blank quality control sample evaluations.
Samples collected from October 2008 through December 2009, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	<RL or < (env sample/5)	15	15	100.00
EPA 8321A CARB	Carbaryl	<RL or < (env sample/5)	15	15	100.00
EPA 8321A CARB	Carbofuran	<RL or < (env sample/5)	15	15	100.00
EPA 8321A CARB	Methiocarb	<RL or < (env sample/5)	15	15	100.00
EPA 8321A CARB	Methomyl	<RL or < (env sample/5)	15	15	100.00
EPA 8321A CARB	Oxamyl	<RL or < (env sample/5)	15	15	100.00
EPA 8321A CARB	Diuron	<RL or < (env sample/5)	15	15	100.00
EPA 8321A CARB	Linuron	<RL or < (env sample/5)	15	15	100.00
EPA 619	Atrazine	<RL or < (env sample/5)	15	15	100.00
EPA 619	Cyanazine	<RL or < (env sample/5)	15	15	100.00
EPA 619	Simazine	<RL or < (env sample/5)	15	15	100.00
EPA 547M	Glyphosate	<RL or < (env sample/5)	15	15	100.00
EPA 549.2M	Paraquat dichloride	<RL or < (env sample/5)	15	14	93.33
EPA 8081A	DDD(p,p')	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	DDE(p,p')	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	DDT(p,p')	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Dicofol	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Dieldrin	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Endrin	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Methoxychlor	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Aldrin	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Chlordane	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Heptachlor	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Heptachlor epoxide	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	HCH, alpha	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	HCH, beta	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	HCH, delta	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	HCH, gamma	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Endosulfan I	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Endosulfan II	<RL or < (env sample/5)	15	15	100.00
EPA 8081A	Toxaphene	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Azinphos methyl	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Chlorpyrifos	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Diazinon	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Dichlorvos	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Dimethoate	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Demeton-s	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Disulfoton	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Malathion	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Methidathion	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Parathion, Methyl	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Phorate	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Phosmet	<RL or < (env sample/5)	15	15	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Trifluralin	<RL or < (env sample/5)	15	15	100.00
EPA 8141A OP	Methamidophos	<RL or < (env sample/5)	15	15	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL or < (env sample/5)	7	7	100.00
SM 2340 C	Hardness as CaCO3	<RL or < (env sample/5)	8	8	100.00
EPA 160.1	Total Dissolved Solids	<RL or < (env sample/5)	15	15	100.00
EPA 160.2	Total Suspended Solids	<RL or < (env sample/5)	15	15	100.00
EPA 180.1	Turbidity	<RL or < (env sample/5)	15	15	100.00
EPA 350.2	Ammonia as N	<RL or < (env sample/5)	15	15	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL or < (env sample/5)	15	15	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL or < (env sample/5)	15	14	93.33
EPA 365.2	OrthoPhosphate as P	<RL or < (env sample/5)	15	15	100.00
EPA 365.2	Phosphate as P	<RL or < (env sample/5)	15	15	100.00
EPA 415.1	Total Organic Carbon	<RL or < (env sample/5)	15	14	93.33
Walkley-Black	Total Organic Carbon (sediment)	NA			NA
SM 9223	E. coli	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Arsenic	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	15	14	93.33
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Copper (Dissolved)	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Lead (Dissolved)	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	15	15	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	15	13	86.67
		TOTAL	**975**	**971**	**99.59**

Table 16. SJCDWQC summary of equipment blank (dissolved metals) and travel blank (total metals) quality control sample evaluations.

Samples collected from October 2008 through December 2009, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 200.8	Arsenic	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Boron	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Cadmium	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Copper	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Lead	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Molybdenum	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Nickel	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Selenium	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Zinc	<RL or < (env sample/5)	15	15	NA
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	14	14	100.00
EPA 200.8	Copper (Dissolved)	<RL or < (env sample/5)	14	14	100.00
EPA 200.8	Lead (Dissolved)	<RL or < (env sample/5)	14	14	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	14	14	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	14	13	92.86
		TOTAL	**207**	**206**	**99.52**

Table 17. SJCDWQC summary of field duplicate quality control sample evaluations.
Samples collected from October 2008 through December 2009, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	15	15	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	15	15	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	15	15	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	15	15	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	15	15	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	15	15	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	15	15	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	15	15	100.00
EPA 619	Atrazine	RPD ≤ 25	15	15	100.00
EPA 619	Cyanazine	RPD ≤ 25	15	15	100.00
EPA 619	Simazine	RPD ≤ 25	15	15	100.00
EPA 547M	Glyphosate	RPD ≤ 25	15	15	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	15	15	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	15	15	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	15	15	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	15	15	100.00
EPA 8081A	Dicofol	RPD ≤ 25	15	15	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	15	15	100.00
EPA 8081A	Endrin	RPD ≤ 25	15	15	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	15	15	100.00
EPA 8081A	Aldrin	RPD ≤ 25	15	15	100.00
EPA 8081A	Chlordane	RPD ≤ 25	15	15	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	15	15	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	15	15	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	15	15	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	15	15	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	15	15	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	15	15	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	15	15	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	15	15	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	15	15	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Methamidophos	RPD ≤ 25	15	15	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	7	6	85.71
SM 2340 C	Hardness as CaCO3	RPD ≤ 25	8	8	100.00
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	15	15	100.00
EPA 160.2	Total Suspended Solids	RPD ≤ 25	15	11	73.33
EPA 180.1	Turbidity	RPD ≤ 25	15	14	93.33
EPA 350.2	Ammonia as N	RPD ≤ 25	15	11	73.33
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	15	11	73.33
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	15	12	80.00
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	15	12	80.00
EPA 365.2	Phosphate as P	RPD ≤ 25	15	13	86.67
EPA 415.1	Total Organic Carbon	RPD ≤ 25	15	15	100.00
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	2	2	100.00
SM 9223	E. coli	RPD ≤ 25			NA
EPA 200.8	Arsenic	RPD ≤ 25	15	14	93.33
EPA 200.8	Boron	RPD ≤ 25	15	14	93.33
EPA 200.8	Cadmium	RPD ≤ 25	15	14	93.33
EPA 200.8	Copper	RPD ≤ 25	15	14	93.33
EPA 200.8	Lead	RPD ≤ 25	15	10	66.67
EPA 200.8	Molybdenum	RPD ≤ 25	15	12	80.00
EPA 200.8	Nickel	RPD ≤ 25	15	14	93.33
EPA 200.8	Selenium	RPD ≤ 25	15	14	93.33
EPA 200.8	Zinc	RPD ≤ 25	15	7	46.67
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	15	14	93.33
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	15	15	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	15	15	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	15	14	93.33
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	15	13	86.67
		TOTAL	**962**	**918**	**95.43**

Table 18. SJCDWQC summary of method blank quality control sample evaluations. Samples analyzed in batches with samples collected during from October 2008 through December 2009, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	<RL	16	16	100.00
EPA 8321A CARB	Carbaryl	<RL	16	16	100.00
EPA 8321A CARB	Carbofuran	<RL	16	16	100.00
EPA 8321A CARB	Methiocarb	<RL	16	16	100.00
EPA 8321A CARB	Methomyl	<RL	16	16	100.00
EPA 8321A CARB	Oxamyl	<RL	16	16	100.00
EPA 8321A CARB	Diuron	<RL	16	16	100.00
EPA 8321A CARB	Linuron	<RL	16	16	100.00
EPA 619	Atrazine	<RL	16	16	100.00
EPA 619	Cyanazine	<RL	16	16	100.00
EPA 619	Simazine	<RL	16	16	100.00
EPA 547M	Glyphosate	<RL	15	15	100.00
EPA 549.2M	Paraquat dichloride	<RL	15	15	100.00
EPA 8081A	DDD(p,p')	<RL	16	16	100.00
EPA 8081A	DDE(p,p')	<RL	16	16	100.00
EPA 8081A	DDT(p,p')	<RL	16	16	100.00
EPA 8081A	Dicofol	<RL	16	16	100.00
EPA 8081A	Dieldrin	<RL	16	16	100.00
EPA 8081A	Endrin	<RL	16	16	100.00
EPA 8081A	Methoxychlor	<RL	16	16	100.00
EPA 8081A	Aldrin	<RL	16	16	100.00
EPA 8081A	Chlordane	<RL	16	16	100.00
EPA 8081A	Heptachlor	<RL	16	16	100.00
EPA 8081A	Heptachlor epoxide	<RL	16	16	100.00
EPA 8081A	HCH, alpha	<RL	16	16	100.00
EPA 8081A	HCH, beta	<RL	16	16	100.00
EPA 8081A	HCH, delta	<RL	16	16	100.00
EPA 8081A	HCH, gamma	<RL	16	16	100.00
EPA 8081A	Endosulfan I	<RL	16	16	100.00
EPA 8081A	Endosulfan II	<RL	16	16	100.00
EPA 8081A	Toxaphene	<RL	16	16	100.00
EPA 8141A OP	Azinphos methyl	<RL	16	16	100.00
EPA 8141A OP	Chlorpyrifos	<RL	16	16	100.00
EPA 8141A OP	Diazinon	<RL	16	16	100.00
EPA 8141A OP	Dichlorvos	<RL	16	16	100.00
EPA 8141A OP	Dimethoate	<RL	16	16	100.00
EPA 8141A OP	Demeton-s	<RL	16	16	100.00
EPA 8141A OP	Disulfoton	<RL	16	16	100.00
EPA 8141A OP	Malathion	<RL	16	16	100.00
EPA 8141A OP	Methidathion	<RL	16	16	100.00
EPA 8141A OP	Parathion, Methyl	<RL	16	16	100.00
EPA 8141A OP	Phorate	<RL	16	16	100.00
EPA 8141A OP	Phosmet	<RL	16	16	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Trifluralin	<RL	16	16	100.00
EPA 8141A OP	Methamidophos	<RL	17	17	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL	9	9	100.00
SM 2340 C	Hardness as CaCO3	<RL	15	15	100.00
EPA 160.1	Total Dissolved Solids	<RL	16	16	100.00
EPA 160.2	Total Suspended Solids	<RL	20	20	100.00
EPA 180.1	Turbidity	<RL	16	16	100.00
EPA 350.2	Ammonia as N	<RL	26	26	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL	25	24	96.00
EPA 353.2	Nitrate + Nitrite as N	<RL	15	15	100.00
EPA 365.2	OrthoPhosphate as P	<RL	16	16	100.00
EPA 365.2	Phosphate as P	<RL	15	15	100.00
EPA 415.1	Total Organic Carbon	<RL	20	20	100.00
Walkley-Black	Total Organic Carbon (sediment)	<RL	2	2	100.00
SM 9223	E. coli	<RL	16	16	100.00
EPA 200.8	Arsenic	<RL	17	17	100.00
EPA 200.8	Boron	<RL	17	17	100.00
EPA 200.8	Cadmium	<RL	17	17	100.00
EPA 200.8	Copper	<RL	17	17	100.00
EPA 200.8	Lead	<RL	17	17	100.00
EPA 200.8	Molybdenum	<RL	17	17	100.00
EPA 200.8	Nickel	<RL	17	17	100.00
EPA 200.8	Selenium	<RL	18	18	100.00
EPA 200.8	Zinc	<RL	18	18	100.00
EPA 200.8	Cadmium (Dissolved)	<RL	18	18	100.00
EPA 200.8	Copper (Dissolved)	<RL	18	18	100.00
EPA 200.8	Lead (Dissolved)	<RL	18	18	100.00
EPA 200.8	Nickel (Dissolved)	<RL	18	18	100.00
EPA 200.8	Zinc (Dissolved)	<RL	21	21	100.00
		TOTAL	**1178**	**1177**	**99.92**

Table 19. SJCDWQC summary of lab control spike quality control sample evaluations. Laboratory control spikes and laboratory control spike duplicates analyzed in batches with samples collected from October 2008 through December 2009, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	PR 31-133	17	17	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	17	17	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	17	17	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	17	17	100.00
EPA 8321A CARB	Methomyl	PR 23-152	17	17	100.00
EPA 8321A CARB	Oxamyl	PR 10-117	17	17	100.00
EPA 8321A CARB	Diuron	PR 52-136	17	17	100.00
EPA 8321A CARB	Linuron	PR 49-144	17	17	100.00
EPA 619	Atrazine	PR 39-156	18	18	100.00
EPA 619	Cyanazine	PR 22-172	18	17	94.44
EPA 619	Simazine	PR 21-179	18	18	100.00
EPA 547M	Glyphosate	PR 72-131	30	30	100.00
EPA 549.2M	Paraquat dichloride	PR 50-141	15	15	100.00
EPA 8081A	DDD(p,p')	PR 38-135	17	17	100.00
EPA 8081A	DDE(p,p')	PR 21-134	17	17	100.00
EPA 8081A	DDT(p,p')	PR 18-145	17	17	100.00
EPA 8081A	Dicofol	PR 40-135	17	17	100.00
EPA 8081A	Dieldrin	PR 48-121	17	17	100.00
EPA 8081A	Endrin	PR 24-143	17	17	100.00
EPA 8081A	Methoxychlor	PR 30-163	17	17	100.00
EPA 8081A	Aldrin	PR 11-138	17	17	100.00
EPA 8081A	Chlordane	PR 44-152	17	17	100.00
EPA 8081A	Heptachlor	PR 24-124	17	17	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	17	17	100.00
EPA 8081A	HCH, alpha	PR 33-111	17	17	100.00
EPA 8081A	HCH, beta	PR 49-119	17	17	100.00
EPA 8081A	HCH, delta	PR 12-97	17	14	82.35
EPA 8081A	HCH, gamma	PR 40-114	17	17	100.00
EPA 8081A	Endosulfan I	PR 50-131	17	17	100.00
EPA 8081A	Endosulfan II	PR 55-128	17	17	100.00
EPA 8081A	Toxaphene	PR 23-140	9	9	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	18	18	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	18	18	100.00
EPA 8141A OP	Diazinon	PR 57-130	18	18	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	18	18	100.00
EPA 8141A OP	Dimethoate	PR 68-202	18	18	100.00
EPA 8141A OP	Demeton-s	PR 40-125	18	18	100.00
EPA 8141A OP	Disulfoton	PR 47-117	18	18	100.00
EPA 8141A OP	Malathion	PR 47-125	18	18	100.00
EPA 8141A OP	Methidathion	PR 50-150	18	18	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	18	18	100.00
EPA 8141A OP	Phorate	PR 44-117	18	18	100.00
EPA 8141A OP	Phosmet	PR 50-150	18	15	83.33
EPA 8141A OP	Trifluralin	PR 40-148	18	18	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Methamidophos	PR 25-136	19	19	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	9	9	100.00
SM 2340 C	Hardness as CaCO3	PR 80-120	15	15	100.00
EPA 160.1	Total Dissolved Solids	PR 80-120	16	16	100.00
EPA 160.2	Total Suspended Solids	PR 80-120	20	20	100.00
EPA 180.1	Turbidity	PR 90-110	16	16	100.00
EPA 350.2	Ammonia as N	PR 80-120	26	26	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	PR 80-120	25	25	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 80-120	15	15	100.00
EPA 365.2	OrthoPhosphate as P	PR 80-120	16	16	100.00
EPA 365.2	Phosphate as P	PR 80-120	15	15	100.00
EPA 415.1	Total Organic Carbon	PR 75-125	20	20	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 21-199	2	2	100.00
SM 9223	E. coli	NA			NA
EPA 200.8	Arsenic	PR 75-125	17	17	100.00
EPA 200.8	Boron	PR 75-125	17	17	100.00
EPA 200.8	Cadmium	PR 75-125	17	17	100.00
EPA 200.8	Copper	PR 75-125	17	17	100.00
EPA 200.8	Lead	PR 75-125	17	17	100.00
EPA 200.8	Molybdenum	PR 75-125	17	17	100.00
EPA 200.8	Nickel	PR 75-125	17	17	100.00
EPA 200.8	Selenium	PR 75-125	18	18	100.00
EPA 200.8	Zinc	PR 75-125	18	18	100.00
EPA 200.8	Cadmium (Dissolved)	PR 75-125	18	18	100.00
EPA 200.8	Copper (Dissolved)	PR 75-125	18	18	100.00
EPA 200.8	Lead (Dissolved)	PR 75-125	18	18	100.00
EPA 200.8	Nickel (Dissolved)	PR 75-125	18	18	100.00
EPA 200.8	Zinc (Dissolved)	PR 75-125	21	21	100.00
		TOTAL	**1229**	**1222**	**99.43**

Table 20. SJCDWQC summary of lab control spike duplicate quality control sample evaluations.

Laboratory control spikes and laboratory control spike duplicates analyzed in batches with samples collected from October 2008 through December 2009, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	1	1	100.00
EPA 619	Atrazine	RPD ≤ 25	2	1	50.00
EPA 619	Cyanazine	RPD ≤ 25	2	2	100.00
EPA 619	Simazine	RPD ≤ 25	2	2	100.00
EPA 547M	Glyphosate	RPD ≤ 25	15	15	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25			NA
EPA 8081A	DDD(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	Dicofol	RPD ≤ 25	1	1	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Endrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	1	1	100.00
EPA 8081A	Aldrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Chlordane	RPD ≤ 25	1	1	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	1	1	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	1	1	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	1	1	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	1	1	100.00
EPA 8081A	Toxaphene	RPD ≤ 25			NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	2	2	100.00

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Disulfoton	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Methamidophos	RPD ≤ 25	2	2	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25			NA
SM 2340 C	Hardness as CaCO3	RPD ≤ 25			NA
EPA 160.1	Total Dissolved Solids	RPD ≤ 25			NA
EPA 160.2	Total Suspended Solids	RPD ≤ 25			NA
EPA 180.1	Turbidity	RPD ≤ 25			NA
EPA 350.2	Ammonia as N	RPD ≤ 25			NA
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25			NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25			NA
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25			NA
EPA 365.2	Phosphate as P	RPD ≤ 25			NA
EPA 415.1	Total Organic Carbon	RPD ≤ 25			NA
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20			NA
SM 9223	E. coli	RPD ≤ 25			NA
EPA 200.8	Arsenic	RPD ≤ 25			NA
EPA 200.8	Boron	RPD ≤ 25			NA
EPA 200.8	Cadmium	RPD ≤ 25			NA
EPA 200.8	Copper	RPD ≤ 25			NA
EPA 200.8	Lead	RPD ≤ 25			NA
EPA 200.8	Molybdenum	RPD ≤ 25			NA
EPA 200.8	Nickel	RPD ≤ 25			NA
EPA 200.8	Selenium	RPD ≤ 25			NA
EPA 200.8	Zinc	RPD ≤ 25			NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25			NA
		TOTAL	**74**	**73**	**98.65**

Table 21. SJCDWQC summary of matrix spike quality control sample evaluations. Matrix spikes and matrix spike duplicates collected from October 2008 through December 2009. Included in the following table are non project matrix spikes included for batch quality assurance purposes. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	PR 31-133	32	32	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	32	32	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	32	32	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	32	32	100.00
EPA 8321A CARB	Methomyl	PR 23-152	32	30	93.75
EPA 8321A CARB	Oxamyl	PR 10-117	32	30	93.75
EPA 8321A CARB	Diuron	PR 52-136	32	32	100.00
EPA 8321A CARB	Linuron	PR 49-144	32	32	100.00
EPA 619	Atrazine	PR 39-156	30	30	100.00
EPA 619	Cyanazine	PR 22-172	30	25	83.33
EPA 619	Simazine	PR 21-179	30	30	100.00
EPA 547M	Glyphosate	PR 72-131	30	30	100.00
EPA 549.2M	Paraquat dichloride	PR 50-141	30	28	93.33
EPA 8081A	DDD(p,p')	PR 38-135	30	30	100.00
EPA 8081A	DDE(p,p')	PR 21-134	30	30	100.00
EPA 8081A	DDT(p,p')	PR 18-145	30	30	100.00
EPA 8081A	Dicofol	PR 40-135	30	30	100.00
EPA 8081A	Dieldrin	PR 48-121	30	30	100.00
EPA 8081A	Endrin	PR 24-143	30	30	100.00
EPA 8081A	Methoxychlor	PR 30-163	30	30	100.00
EPA 8081A	Aldin	PR 11-138	30	30	100.00
EPA 8081A	Chlordane	PR 44-152	30	30	100.00
EPA 8081A	Heptachlor	PR 24-124	30	30	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	30	30	100.00
EPA 8081A	HCH, alpha	PR 33-111	30	30	100.00
EPA 8081A	HCH, beta	PR 49-119	30	30	100.00
EPA 8081A	HCH, delta	PR 12-97	30	22	73.33
EPA 8081A	HCH, gamma	PR 40-114	30	30	100.00
EPA 8081A	Endosulfan I	PR 50-131	30	30	100.00
EPA 8081A	Endosulfan II	PR 55-128	30	30	100.00
EPA 8081A	Toxaphene	PR 23-140	18	18	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	30	30	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	30	30	100.00
EPA 8141A OP	Diazinon	PR 57-130	30	30	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	30	30	100.00
EPA 8141A OP	Dimethoate	PR 68-202	30	30	100.00
EPA 8141A OP	Demeton-s	PR 40-125	30	30	100.00
EPA 8141A OP	Disulfoton	PR 47-117	30	30	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Malathion	PR 47-125	30	30	100.00
EPA 8141A OP	Methidathion	PR 50-150	30	30	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	30	30	100.00
EPA 8141A OP	Phorate	PR 44-117	30	30	100.00
EPA 8141A OP	Phosmet	PR 50-150	30	23	76.67
EPA 8141A OP	Trifluralin	PR 40-148	30	30	100.00
EPA 8141A OP	Methamidophos	PR 25-136	30	30	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	18	12	66.67
SM 2340 C	Hardness as CaCO3	PR 80-120	44	38	86.36
EPA 160.1	Total Dissolved Solids	PR 80-120			NA
EPA 160.2	Total Suspended Solids	PR 80-120			NA
EPA 180.1	Turbidity	PR 90-110			NA
EPA 350.2	Ammonia as N	PR 80-120	52	52	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	PR 80-120	48	43	89.58
EPA 353.2	Nitrate + Nitrite as N	PR 80-120	30	29	96.67
EPA 365.2	OrthoPhosphate as P	PR 80-120	32	28	87.50
EPA 365.2	Phosphate as P	PR 80-120	30	30	100.00
EPA 415.1	Total Organic Carbon	PR 75-125	40	40	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 21-199			NA
SM 9223	E. coli	NA			NA
EPA 200.8	Arsenic	PR 75-125	34	34	100.00
EPA 200.8	Boron	PR 75-125	34	25	73.53
EPA 200.8	Cadmium	PR 75-125	34	34	100.00
EPA 200.8	Copper	PR 75-125	34	34	100.00
EPA 200.8	Lead	PR 75-125	34	34	100.00
EPA 200.8	Molybdenum	PR 75-125	34	34	100.00
EPA 200.8	Nickel	PR 75-125	34	34	100.00
EPA 200.8	Selenium	PR 75-125	36	36	100.00
EPA 200.8	Zinc	PR 75-125	36	36	100.00
EPA 200.8	Cadmium (Dissolved)	PR 75-125	36	36	100.00
EPA 200.8	Copper (Dissolved)	PR 75-125	36	36	100.00
EPA 200.8	Lead (Dissolved)	PR 75-125	36	36	100.00
EPA 200.8	Nickel (Dissolved)	PR 75-125	36	36	100.00
EPA 200.8	Zinc (Dissolved)	PR 75-125	42	42	100.00
		TOTAL	**2144**	**2087**	**97.34**

Table 22. SJCDWQC summary of matrix spike duplicate quality control sample evaluations.

Matrix spikes and matrix spike duplicates were collected from October 2008 through December 2009. Included in the following table are non project matrix spikes included for batch quality assurance purposes. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	16	16	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	16	15	93.75
EPA 8321A CARB	Carbofuran	RPD ≤ 25	16	15	93.75
EPA 8321A CARB	Methiocarb	RPD ≤ 25	16	16	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	16	16	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	16	16	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	16	16	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	16	16	100.00
EPA 619	Atrazine	RPD ≤ 25	15	15	100.00
EPA 619	Cyanazine	RPD ≤ 25	15	15	100.00
EPA 619	Simazine	RPD ≤ 25	15	15	100.00
EPA 547M	Glyphosate	RPD ≤ 25	15	15	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	15	13	86.67
EPA 8081A	DDD(p,p')	RPD ≤ 25	15	13	86.67
EPA 8081A	DDE(p,p')	RPD ≤ 25	15	14	93.33
EPA 8081A	DDT(p,p')	RPD ≤ 25	15	14	93.33
EPA 8081A	Dicofol	RPD ≤ 25	15	14	93.33
EPA 8081A	Dieldrin	RPD ≤ 25	15	14	93.33
EPA 8081A	Endrin	RPD ≤ 25	15	14	93.33
EPA 8081A	Methoxychlor	RPD ≤ 25	15	14	93.33
EPA 8081A	Aldrin	RPD ≤ 25	15	14	93.33
EPA 8081A	Chlordane	RPD ≤ 25	15	14	93.33
EPA 8081A	Heptachlor	RPD ≤ 25	15	14	93.33
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	15	14	93.33
EPA 8081A	HCH, alpha	RPD ≤ 25	15	14	93.33
EPA 8081A	HCH, beta	RPD ≤ 25	15	14	93.33
EPA 8081A	HCH, delta	RPD ≤ 25	15	14	93.33
EPA 8081A	HCH, gamma	RPD ≤ 25	15	14	93.33
EPA 8081A	Endosulfan I	RPD ≤ 25	15	14	93.33
EPA 8081A	Endosulfan II	RPD ≤ 25	15	14	93.33
EPA 8081A	Toxaphene	RPD ≤ 25	9	8	88.89
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	15	14	93.33
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	15	15	100.00

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Dichlorvos	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	15	14	93.33
EPA 8141A OP	Disulfoton	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	15	15	100.00
EPA 8141A OP	Methamidophos	RPD ≤ 25	15	14	93.33
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	9	9	100.00
SM 2340 C	Hardness as CaCO3	RPD ≤ 25	15	15	100.00
EPA 160.1	Total Dissolved Solids	RPD ≤ 25			NA
EPA 160.2	Total Suspended Solids	RPD ≤ 25			NA
EPA 180.1	Turbidity	RPD ≤ 25			NA
EPA 350.2	Ammonia as N	RPD ≤ 25	26	26	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	24	23	95.83
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	15	15	100.00
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	16	16	100.00
EPA 365.2	Phosphate as P	RPD ≤ 25	15	15	100.00
EPA 415.1	Total Organic Carbon	RPD ≤ 25	20	20	100.00
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20			NA
SM 9223	E. coli	RPD ≤ 25			NA
EPA 200.8	Arsenic	RPD ≤ 25	17	17	100.00
EPA 200.8	Boron	RPD ≤ 25	17	17	100.00
EPA 200.8	Cadmium	RPD ≤ 25	17	17	100.00
EPA 200.8	Copper	RPD ≤ 25	17	17	100.00
EPA 200.8	Lead	RPD ≤ 25	17	17	100.00
EPA 200.8	Molybdenum	RPD ≤ 25	17	17	100.00
EPA 200.8	Nickel	RPD ≤ 25	17	17	100.00
EPA 200.8	Selenium	RPD ≤ 25	18	18	100.00
EPA 200.8	Zinc	RPD ≤ 25	18	18	100.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	18	18	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	18	18	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	18	18	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	18	18	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	21	21	100.00
		TOTAL	**1065**	**1038**	**97.46**

Table 23. SJCDWQC summary of lab duplicate quality control sample evaluations. Samples were analyzed in batches with samples collected from October 2008 through December 2009 and also include non project samples included for batch quality assurance purposes; sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25			NA
EPA 8321A CARB	Carbaryl	RPD ≤ 25			NA
EPA 8321A CARB	Carbofuran	RPD ≤ 25			NA
EPA 8321A CARB	Methiocarb	RPD ≤ 25			NA
EPA 8321A CARB	Methomyl	RPD ≤ 25			NA
EPA 8321A CARB	Oxamyl	RPD ≤ 25			NA
EPA 8321A CARB	Diuron	RPD ≤ 25			NA
EPA 8321A CARB	Linuron	RPD ≤ 25			NA
EPA 619	Atrazine	RPD ≤ 25			NA
EPA 619	Cyanazine	RPD ≤ 25			NA
EPA 619	Simazine	RPD ≤ 25			NA
EPA 547M	Glyphosate	RPD ≤ 25			NA
EPA 549.2M	Paraquat dichloride	RPD ≤ 25			NA
EPA 8081A	DDD(p,p')	RPD ≤ 25			NA
EPA 8081A	DDE(p,p')	RPD ≤ 25			NA
EPA 8081A	DDT(p,p')	RPD ≤ 25			NA
EPA 8081A	Dicofol	RPD ≤ 25			NA
EPA 8081A	Dieldrin	RPD ≤ 25			NA
EPA 8081A	Endrin	RPD ≤ 25			NA
EPA 8081A	Methoxychlor	RPD ≤ 25			NA
EPA 8081A	Aldrin	RPD ≤ 25			NA
EPA 8081A	Chlordane	RPD ≤ 25			NA
EPA 8081A	Heptachlor	RPD ≤ 25			NA
EPA 8081A	Heptachlor epoxide	RPD ≤ 25			NA
EPA 8081A	HCH, alpha	RPD ≤ 25			NA
EPA 8081A	HCH, beta	RPD ≤ 25			NA
EPA 8081A	HCH, delta	RPD ≤ 25			NA
EPA 8081A	HCH, gamma	RPD ≤ 25			NA
EPA 8081A	Endosulfan I	RPD ≤ 25			NA
EPA 8081A	Endosulfan II	RPD ≤ 25			NA
EPA 8081A	Toxaphene	RPD ≤ 25			NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25			NA
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25			NA
EPA 8141A OP	Diazinon	RPD ≤ 25			NA
EPA 8141A OP	Dichlorvos	RPD ≤ 25			NA
EPA 8141A OP	Dimethoate	RPD ≤ 25			NA

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Demeton-s	RPD ≤ 25			NA
EPA 8141A OP	Disulfoton	RPD ≤ 25			NA
EPA 8141A OP	Malathion	RPD ≤ 25			NA
EPA 8141A OP	Methidathion	RPD ≤ 25			NA
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25			NA
EPA 8141A OP	Phorate	RPD ≤ 25			NA
EPA 8141A OP	Phosmet	RPD ≤ 25			NA
EPA 8141A OP	Trifluralin	RPD ≤ 25			NA
EPA 8141A OP	Methamidophos	RPD ≤ 25			NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25			NA
SM 2340 C	Hardness as CaCO3	RPD ≤ 25			NA
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	16	16	100.00
EPA 160.2	Total Suspended Solids	RPD ≤ 25	20	20	100.00
EPA 180.1	Turbidity	RPD ≤ 25	16	16	100.00
EPA 350.2	Ammonia as N	RPD ≤ 25			NA
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25			NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25			NA
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25			NA
EPA 365.2	Phosphate as P	RPD ≤ 25			NA
EPA 415.1	Total Organic Carbon	RPD ≤ 25			NA
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	2	2	100.00
SM 9223	E. coli	Rlog 1.3	15	15	100.00
EPA 200.8	Arsenic	RPD ≤ 25			NA
EPA 200.8	Boron	RPD ≤ 25			NA
EPA 200.8	Cadmium	RPD ≤ 25			NA
EPA 200.8	Copper	RPD ≤ 25			NA
EPA 200.8	Lead	RPD ≤ 25			NA
EPA 200.8	Molybdenum	RPD ≤ 25			NA
EPA 200.8	Nickel	RPD ≤ 25			NA
EPA 200.8	Selenium	RPD ≤ 25			NA
EPA 200.8	Zinc	RPD ≤ 25			NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25			NA
		TOTAL	**69**	**69**	**100.00**

Table 24. SJCDWQC summary of surrogate recovery quality control sample evaluations. Surrogates were run with water samples collected and LABQAs analyzed from October 2008 through December 2009 for all organics except paraquat and glyphosate. Included are NONAG samples. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 36-140	158	157	99.37
EPA 8321A CARB	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 56-129			NA
EPA 619	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 62-145	142	141	99.30
EPA 619	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 54-144	142	141	99.30
EPA 8081A	Decachlorobiphenyl(Surrogate)	RPD ≤ 25; PR 16-146	192	192	100.00
EPA 8081A	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	192	192	100.00
EPA 8141A OP	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 60-150	340	335	98.53
EPA 8141A OP	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 56-129	340	324	95.29
		TOTAL	**1506**	**1482**	**98.41**

Table 25. SJCDWQC summary of holding time evaluations for environmental, field blank, field duplicate and matrix spike samples.
Samples collected from October 2008 through December 2009; sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	7 days	107	107	100.00
EPA 8321A CARB	Carbaryl	7 days	107	107	100.00
EPA 8321A CARB	Carbofuran	7 days	107	107	100.00
EPA 8321A CARB	Methiocarb	7 days	107	107	100.00
EPA 8321A CARB	Methomyl	7 days	107	107	100.00
EPA 8321A CARB	Oxamyl	7 days	107	107	100.00
EPA 8321A CARB	Diuron	7 days	96	96	100.00
EPA 8321A CARB	Linuron	7 days	96	96	100.00
EPA 619	Atrazine	7 days	93	93	100.00
EPA 619	Cyanazine	7 days	93	93	100.00
EPA 619	Simazine	7 days	93	93	100.00
EPA 547M	Glyphosate	14 days	92	92	100.00
EPA 549.2M	Paraquat dichloride	7 days	92	92	100.00
EPA 8081A	DDD(p,p')	7 days	145	145	100.00
EPA 8081A	DDE(p,p')	7 days	145	145	100.00
EPA 8081A	DDT(p,p')	7 days	145	145	100.00
EPA 8081A	Dicofol	7 days	145	145	100.00
EPA 8081A	Dieldrin	7 days	145	145	100.00
EPA 8081A	Endrin	7 days	145	145	100.00
EPA 8081A	Methoxychlor	7 days	145	145	100.00
EPA 8081A	Aldrin	7 days	129	129	100.00
EPA 8081A	Chlordane	7 days	129	129	100.00
EPA 8081A	Heptachlor	7 days	129	129	100.00
EPA 8081A	Heptachlor epoxide	7 days	129	129	100.00
EPA 8081A	HCH, alpha	7 days	129	129	100.00
EPA 8081A	HCH, beta	7 days	129	129	100.00
EPA 8081A	HCH, delta	7 days	129	129	100.00
EPA 8081A	HCH, gamma	7 days	129	129	100.00
EPA 8081A	Endosulfan I	7 days	129	129	100.00
EPA 8081A	Endosulfan II	7 days	129	129	100.00
EPA 8081A	Toxaphene	7 days	123	123	100.00
EPA 8141A OP	Azinphos methyl	7 days	114	114	100.00
EPA 8141A OP	Chlorpyrifos	7 days	126	126	100.00
EPA 8141A OP	Diazinon	7 days	114	114	100.00
EPA 8141A OP	Dichlorvos	7 days	114	114	100.00
EPA 8141A OP	Dimethoate	7 days	114	114	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Demeton-s	7 days	114	114	100.00
EPA 8141A OP	Disulfoton	7 days	114	114	100.00
EPA 8141A OP	Malathion	7 days	114	114	100.00
EPA 8141A OP	Methidathion	7 days	114	114	100.00
EPA 8141A OP	Parathion, Methyl	7 days	114	114	100.00
EPA 8141A OP	Phorate	7 days	114	114	100.00
EPA 8141A OP	Phosmet	7 days	114	114	100.00
EPA 8141A OP	Trifluralin	7 days	93	93	100.00
EPA 8141A OP	Methamidophos	7 days	114	114	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	6 months	42	42	100.00
SM 2340 C	Hardness as CaCO3	6 months	60	60	100.00
EPA 160.1	Total Dissolved Solids	7 days	137	137	100.00
EPA 160.2	Total Suspended Solids	7 days	137	137	100.00
EPA 180.1	Turbidity	48 hours	137	137	100.00
EPA 350.2	Ammonia as N	Field acidify, 28 days	152	152	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	Field acidify, 28 days	152	152	100.00
EPA 353.2	Nitrate + Nitrite as N	Field acidify, 28 days	152	152	100.00
EPA 365.2	OrthoPhosphate as P	48 hours	151	151	100.00
EPA 365.2	Phosphate as P	Field acidify, 28 days	152	152	100.00
EPA 415.1	Total Organic Carbon	28 days	155	155	100.00
Walkley-Black	Total Organic Carbon (sediment)	2 days	6	6	100.00
SM 9223	E. coli	24 hours	137	137	100.00
EPA 200.8	Arsenic	Field acidify, 6 months	108	108	100.00
EPA 200.8	Boron	Field acidify, 6 months	108	108	100.00
EPA 200.8	Cadmium	Field acidify, 6 months	108	108	100.00
EPA 200.8	Copper	Field acidify, 6 months	116	116	100.00
EPA 200.8	Lead	Field acidify, 6 months	108	108	100.00
EPA 200.8	Molybdenum	Field acidify, 6 months	108	108	100.00
EPA 200.8	Nickel	Field acidify, 6 months	108	108	100.00
EPA 200.8	Selenium	Field acidify, 6 months	108	108	100.00
EPA 200.8	Zinc	Field acidify, 6 months	108	108	100.00
EPA 200.8	Cadmium (Dissolved)	Field acidify, 6 months	108	108	100.00
EPA 200.8	Copper (Dissolved)	Field acidify, 6 months	116	116	100.00
EPA 200.8	Lead (Dissolved)	Field acidify, 6 months	108	108	100.00
EPA 200.8	Nickel (Dissolved)	Field acidify, 6 months	108	108	100.00
EPA 200.8	Zinc (Dissolved)	Field acidify, 6 months	108	108	100.00
		TOTAL	**7862**	**7862**	**100.00**

Table 26. SJCDWQC summary of toxicity field duplicate sample evaluations.
Samples collected from October 2008 through December 2009; sorted by method and species.

Method	Toxicity Species	Total Field Duplicate Samples	Data Quality Objective (DQO)	Total Field Duplicate Samples Within DQO	Percent Samples Within Acceptable Criteria
EPA 821/R-02-012	*Ceriodaphnia dubia*	15	RPD ≤ 25	15	100.00
EPA 821/R-02-012	*Pimephales promelas*	15	RPD ≤ 25	15	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	15	RPD ≤ 25	14	93.33
EPA 600/R-99-064	*Hyalella azteca*	2	RPD ≤ 25	2	100.00

Table 27. SJCDWQC summary of calculated sediment grain size RPD results.
Batch calculations based on the relative percent difference (RPD_{SD}) between the standard deviation (SD) of the environmental samples and the standard deviation of their duplicate samples.

Sample Type	Analysis Month	Φ_5	Φ_{16}	Φ_{84}	Φ_{95}	SD	RPD_{SD}
Environmental Sample	April 2009	1.08	2.76	7.25	8.86	2.30	-
Lab Duplicate	April 2009	0.70	2.69	7.32	8.90	2.40	4.20
Field Duplicate	April 2009	0.78	2.75	7.43	8.94	2.41	4.46
Environmental Sample	August 2009	0.81	2.53	7.11	9.09	2.40	-
Lab Duplicate	August 2009	0.62	2.43	7.06	9.02	2.43	1.27
Field Duplicate	August 2009	0.25	2.02	7.09	8.96	2.59	7.53

Discussion of Results

The Coalition monitored all constituents as required in the MRP and outlined in the MRPP submitted on August 25, 2008 (amended on March 12, 2009). All data met 90 percent completeness, precision and accuracy. A discussion of all quality control is included in the Precision and Accuracy section of this report.

All exceedances of water quality trigger limits (WQTLs) were reported within five business days upon receipt of lab results except for one arsenic and one HCH WQTL exceedance that occurred in samples collected on January 13, 2009. An amended exceedance report was submitted to the CVRWQCB on June 19, 2009.

TIEs were performed for all samples when survival or growth was 50 percent or less compared to the control. A TIE report is included in Appendix VI.

Evaluation of WQTL exceedances of applied pesticides were reviewed in the context of the PUR data relevant to exceedances. PUR data for San Joaquin and Stanislaus Counties were available from October 2008 through November 2009, and PUR data for Contra Costa were available from October 2008 through December 2009 (Table 28). Any outstanding PUR data that become available after this report is submitted will be included in an addendum to the AMR to be submitted on June 30, 2010.

Table 28. Obtained PUR data information October 2008-December 2009.

County	PUR Data Obtained	PUR Data Outstanding
Contra Costa	October 2008- December 2009	None
San Joaquin	October 2008-November 2009	December 2009
Stanislaus	October 2008-November 2009	December 2009

Table 29. Exceedance Discrepancies.

Exceedance Report Date Submitted	Site Name	Sample Date	Parameter	Reported Value	Correct Value	Units
8/21/2009	South Webb Tract Drain	8/19/2009	DO	4.00	3.96	mg/L

One discrepancy occurred in the reported dissolved oxygen concentration for South Webb Tract Drain during a sediment monitoring event on August 11, 2009 that was not reported in an amended exceedance report (Table 29). The result was incorrectly reported in the exceedance report for field parameters as a concentration of 4.0 instead of 3.96 mg/L.

Appropriate WQTLs are provided in Table 30. Coalition monitoring between October 1, 2008 and December 31, 2009 resulted in exceedances of WQTLs for DO, pH, SC, *E. coli*, TDS, ammonia, arsenic, boron, molybdenum, chlorpyrifos, DDT, HCH, and paraquat dichloride (Tables 31 – 33). Water column toxicity to *Ceriodaphnia dubia, Pimephales promelas, Selenastrum capricornutum,* and sediment toxicity to *Hyalella azteca* also occurred (Table 34). Exceedances are tallied by the number of environmental exceedances, the number of exceedances that occurred in non contiguous water bodies, the number of Management Plan Monitoring exceedances and a total count for all WQTL exceedances (Tables 31 – 34). If a WQTL exceedance occurred in the environmental sample and the field duplicate sample, the result is only counted once.

Table 30. Water Quality Trigger Limits (WQTLs).

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
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 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Carbaryl	2.53 ug/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 ug/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 ug/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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Oxamyl	50 ug/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
Pesticides - Organochlorines					
DDD(p,p')	0.00083 ug/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 ug/L				
DDT(p,p')	0.00059 ug/L				
Dicofol	NA				
Dieldrin	0.00014 ug/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 ug/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-Day Average	1
	0.76 ug/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 ug/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 ug/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 ug/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - instantaneous maximum	3
Chlorpyrifos	0.015 ug/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 ug/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan: San Joaquin River & Delta numeric standard. Sacramento & Feather Rivers numeric standard	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Dichlorvos	0.085 ug/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 ug/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
Demeton-s	NA				
Disulfoton	0.05 ug/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 ug/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 ug/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 ug/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 ug/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 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Instantaneous maximum	

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Chlordane	0.00057 ug/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)	I
	0.0043 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor	0.00021ug/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)	I
	0.0038 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor Epoxide	0.0001 ug/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)	I
	0.0038 ug/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 ug/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)	I
	0.95 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Maximum Concentration (1-hour Average)	
Endosulfan	110 ug/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)	I
	0.056 ug/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR (USEPA) - Continuous Concentration 4-day average (total)	
Toxaphene	0.00073 ug/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)	I
	0.0002 ug/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 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	I

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Cyanazine	1.0 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Health Advisory (human health)	3
Diuron	2 ug/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 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Linuron	1.4 ug/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 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3
Simazine	4.0 ug/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 ug/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 ug/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Boron	700 ug/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 ug/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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
	1,300 ug/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 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Molybdenum	15 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan - San Joaquin River, Mouth of the Merced River to Vernalis	1
	50 ug/L			Sacramento/San Joaquin Basin Plan - Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River	
	10 ug/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
	35 ug/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 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Selenium	50 ug/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
	5 ug/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 ug/L as NO3 10,000 ug/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 ug/L as N	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
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)*,

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.

MUN-Municipal and Domestic Supply

NA-Not Available.

ND-Non Detect

(*)-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 July 16, 2008.

Summary of Exceedance Reports

All Exceedance Reports are included in Appendix V. If any errors occurred in the original communication, an updated report was emailed to the CVRWQCB; all communications are documented in Appendix V. A report was submitted to the Regional Board on June 19, 2009 containing amendments to past exceedance reports. A copy of this report is also provided in Appendix V. A tally of all exceedances that occurred between October 2008 and December 2010 are listed by constituent group in Tables 31 - 34. All exceedances are tabulated by zone in Tables 36 – 40 followed by an assessment of agricultural applications of pesticides that are potential sources to the listed exceedances.

Table 31. Exceedances of WQTLs for parameters measured in the field including dissolved oxygen, specific conductivity and pH.
Field parameters under a management plan are all classified as Priority E constituents and are monitored only as a part of normal monitoring (see Management Plan submitted September 20, 2008, Prioritization of Exceedances section).

Station Name	Season	Sample Date	DO, mg/L	pH, none	SC, µS/cm
Bear Creek @ North Alpine Rd	Fall1	10/14/2008	3.89		
Bear Creek @ North Alpine Rd	Storm2	11/4/2008	6.82		
Bear Creek @ North Alpine Rd	Fall2, Non Contiguous	12/9/2008	4.14		
Bear Creek @ North Alpine Rd	Winter1, Non Contiguous	1/13/2009	6.26		
Drain @ Woodbridge Rd	Fall1	10/14/2008	5.44		1115
Drain @ Woodbridge Rd	Storm2	11/4/2008	4.03		716
Drain @ Woodbridge Rd	Winter1	1/13/2009	5.12		1211
Drain @ Woodbridge Rd	Winter2	2/10/2009			1358
Drain @ Woodbridge Rd	Winter3	3/10/2009	5.38		1910
Duck Creek @ Hwy 4	Storm2, Non Contiguous	11/4/2008	5.38		
Duck Creek @ Hwy 4	Winter3	3/10/2009	5.4		
Duck Creek @ Hwy 4	Irrigation2, MPM	5/12/2009	6.43		
Duck Creek @ Hwy 4	Irrigation3, MPM	6/9/2009	6.74		
Duck Creek @ Hwy 4	Irrigation4, MPM	7/14/2009	4.5		
Duck Creek @ Hwy 4	Irrigation5, MPM	8/11/2009	4.6		
Duck Creek @ Hwy 4	Irrigation6, MPM	9/15/2009	5.62		
French Camp Slough @ Airport Way	Fall1	10/14/2008		4.01	
French Camp Slough @ Airport Way	Storm2	11/4/2008	5.05		
French Camp Slough @ Airport Way	Winter1, Non Contiguous	1/13/2009	6.42		
French Camp Slough @ Airport Way	Irrigation5	8/11/2009	5.66		
Lone Tree Creek @ Jack Tone Rd	Irrigation4, MPM	7/14/2009	6.61		
Lone Tree Creek @ Jack Tone Rd	Irrigation5, MPM	8/11/2009	5.95		
Mokelumne River @ Bruella Rd	Irrigation6	9/15/2009	6.95	5.09	
Mokelumne River @ Bruella Rd	Fall2	11/10/2009		6.06	
Roberts Island Drain @ Holt Rd	Fall1	10/14/2008			896
Roberts Island Drain @ Holt Rd	Storm2	11/4/2008			764
Roberts Island Drain @ Holt Rd	Fall2	12/9/2008			894
Roberts Island Drain @ Holt Rd	Winter2	2/10/2009			1019
Roberts Island Drain @ Holt Rd	Winter3	3/10/2009			1385
Roberts Island Drain @ Holt Rd	Irrigation1	4/14/2009			1008
Roberts Island Drain @ Holt Rd	Irrigation2	5/12/2009			1059
Roberts Island Drain @ Holt Rd	Irrigation3	6/9/2009	5.07		782
Roberts Island Drain @ Holt Rd	Irrigation4	7/14/2009	5.85		1282

Station Name	Season	Sample Date	DO, mg/L	pH, none	SC, µS/cm
Roberts Island Drain @ Holt Rd	Irrigation5	8/11/2009	5.7		904
Roberts Island Drain @ Holt Rd	Irrigation6	9/15/2009	3.58		
Roberts Island Drain @ Holt Rd	Fall1	10/6/2009			948
Roberts Island Drain @ Holt Rd	Fall2	11/10/2009			1091
Roberts Island Drain @ Holt Rd	Fall3	12/8/2009			1099
South Webb Tract Drain	Fall1	10/14/2008	0.2		
South Webb Tract Drain	Storm2	11/4/2008	1.99		
South Webb Tract Drain	Fall2	12/9/2008	1.08		
South Webb Tract Drain	Winter1	1/14/2009	1.85		712
South Webb Tract Drain	Winter2	2/10/2009	3.38		737
South Webb Tract Drain	Winter3	3/10/2009	3.43		1020
South Webb Tract Drain	Irrigation1	4/14/2009	3.01	6.39	1095
South Webb Tract Drain	Irrigation2	5/12/2009	5.4		810
South Webb Tract Drain	Irrigation3	6/9/2009	4.71		
South Webb Tract Drain	Irrigation4	7/14/2009	5.97		
South Webb Tract Drain	Irrigation5	8/11/2009	2.48		
South Webb Tract Drain	Irrigation5, Sed	8/19/2009	3.96		
South Webb Tract Drain	Irrigation6	9/15/2009	4.51		
South Webb Tract Drain	Fall1	10/6/2009	3.48		
South Webb Tract Drain	Fall2	11/10/2009	0.36		
South Webb Tract Drain	Fall3	12/8/2009	0.4		
Stanislaus River Drain @ South Airport Way	Fall1	10/14/2008	1.94		922
Stanislaus River Drain @ South Airport Way	Storm2	11/4/2008	0.9		1758
Stanislaus River Drain @ South Airport Way	Fall2	12/9/2008	1.44		
Terminous Tract Drain @ Hwy 12	Fall1	10/14/2008			1047
Terminous Tract Drain @ Hwy 12	Storm2	11/4/2008			1103
Terminous Tract Drain @ Hwy 12	Winter1	1/13/2009			1010
Terminous Tract Drain @ Hwy 12	Winter2	2/10/2009			1701
Terminous Tract Drain @ Hwy 12	Winter3	3/10/2009		6.31	1898
Terminous Tract Drain @ Hwy 12	Irrigation1	4/14/2009	6.16		878
Terminous Tract Drain @ Hwy 12	Irrigation2	5/12/2009	6.55		
Terminous Tract Drain @ Hwy 12	Irrigation3	6/9/2009	6.34		
Terminous Tract Drain @ Hwy 12	Irrigation4	7/14/2009	4.49		
Terminous Tract Drain @ Hwy 12	Irrigation5	8/11/2009	4.49		
Terminous Tract Drain @ Hwy 12	Fall1	10/6/2009	6.94		
Terminous Tract Drain @ Hwy 12	Fall2	11/10/2009			753
Terminous Tract Drain @ Hwy 12	Fall3	12/8/2009			1378
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation5, MPM	8/11/2009	6.28		
Walthall Slough @ Woodward Ave	Winter1	1/13/2009	5.58		912
Walthall Slough @ Woodward Ave	Winter2	2/10/2009	1.42		993
Walthall Slough @ Woodward Ave	Winter3	3/10/2009	3.72		

Station Name	Season	Sample Date	DO, mg/L	pH, none	SC, µS/cm
Walthall Slough @ Woodward Ave	Irrigation1	4/14/2009	3.96		
Walthall Slough @ Woodward Ave	Irrigation2	5/12/2009	3.96		
Walthall Slough @ Woodward Ave	Irrigation3	6/9/2009	4.2		
Walthall Slough @ Woodward Ave	Irrigation4	7/14/2009	2.92		
Walthall Slough @ Woodward Ave	Irrigation5	8/11/2009	2.56		
Walthall Slough @ Woodward Ave	Irrigation5, Sed	8/19/2009	3.75		
Walthall Slough @ Woodward Ave	Irrigation6	9/15/2009	2.39		
Walthall Slough @ Woodward Ave	Fall1	10/6/2009	4.84		
Walthall Slough @ Woodward Ave	Fall3	12/8/2009			732
Environmental Exceedances			**58**	**5**	**36**
Non Contiguous Water Body Exceedances			**4**	**0**	**0**
TOTAL Exceedances			**62**	**5**	**36**

MPM – Management Plan Monitoring   Sed – Sediment

Table 32. Exceedances of WQTLs for E. coli, nutrients, metals and physical parameters. If a field duplicate and an environmental sample both have an exceedance, only the environmental sample exceedance is included in this table. If there is an exceedance in the field duplicate sample and not the environmental sample, this field duplicate result is included and is noted by (FD) at the end of the station name. Physical parameters under a management plan that are classified as Priority E constituents are monitored only as a part of normal monitoring and not counted toward MPM exceedances (see Management Plan submitted September 30, 2008, Prioritization of Exceedances section).

Station Name	Season	Sample Date	*E. coli*, MPN/100 mL	Total Dissolved Solids, mg/L	Ammonia, mg/L	Arsenic, µg/L	Boron, µg/L	Molybdenum, µg/L
Bear Creek @ North Alpine Rd	Fall2, Non Contiguous	12/9/2008	650					
Drain @ Woodbridge Rd	Fall1	10/14/2008		690		12		
Drain @ Woodbridge Rd	Storm2	11/4/2008	250	510		13		
Drain @ Woodbridge Rd	Winter1	1/13/2009		660		12		
Drain @ Woodbridge Rd	Winter2	2/10/2009		780		14		
Drain @ Woodbridge Rd	Winter3	3/10/2009		1100		15		
Drain @ Woodbridge Rd	Fall2, Non Contiguous	11/4/2008		550		12		
French Camp Slough @ Airport Way	Irrigation4	7/14/2009	240					
Mokelumne River @ Bruella Rd	Fall1	10/6/2009	1100					
Roberts Island Drain @ Holt Rd	Fall1	10/14/2008		550				
Roberts Island Drain @ Holt Rd	Storm2	11/4/2008	300					
Roberts Island Drain @ Holt Rd	Fall2	12/9/2008		530				
Roberts Island Drain @ Holt Rd	Winter1	1/13/2009		490				
Roberts Island Drain @ Holt Rd	Winter2	2/10/2009		670				
Roberts Island Drain @ Holt Rd	Winter3	3/10/2009		880				
Roberts Island Drain @ Holt Rd	Irrigation1	4/14/2009		610				
Roberts Island Drain @ Holt Rd	Irrigation2	5/12/2009		650				
Roberts Island Drain @ Holt Rd	Irrigation3	6/9/2009		480				
Roberts Island Drain @ Holt Rd	Irrigation4	7/14/2009		790				
Roberts Island Drain @ Holt Rd	Irrigation5	8/11/2009		550				
Roberts Island Drain @ Holt Rd	Fall1	10/6/2009	280	600				
Roberts Island Drain @ Holt Rd	Fall2	11/10/2009		640				
Roberts Island Drain @ Holt Rd	Fall3	12/8/2009		620				
South Webb Tract Drain	Fall1	10/14/2008				23		
South Webb Tract Drain	Storm2	11/4/2008	370					
South Webb Tract Drain	Fall2	12/9/2008	580	470		15	1000	11
South Webb Tract Drain	Winter1	1/14/2009		490				
South Webb Tract Drain	Winter2	2/10/2009		480				
South Webb Tract Drain	Winter3	3/10/2009		730		11		

Station Name	Season	Sample Date	*E. coli*, MPN/100 mL	Total Dissolved Solids, mg/L	Ammonia, mg/L	Arsenic, µg/L	Boron, µg/L	Molybdenum, µg/L
South Webb Tract Drain	Irrigation1	4/14/2009		1600	1.6	18		
South Webb Tract Drain	Irrigation2	5/12/2009		530		24		
South Webb Tract Drain	Irrigation3	6/9/2009	390			30		
South Webb Tract Drain	Irrigation4	7/14/2009				30		
South Webb Tract Drain	Irrigation5	8/11/2009	460			33		
South Webb Tract Drain	Irrigation6	9/15/2009	610			29		
South Webb Tract Drain	Fall1	10/6/2009				16		
South Webb Tract Drain	Fall2	11/10/2009				19		
South Webb Tract Drain	Fall3	12/8/2009				13		
Stanislaus River Drain @ South Airport Way	Fall1	10/14/2008	870	610				
Stanislaus River Drain @ South Airport Way	Storm2	11/4/2008	0	1300	35			
Stanislaus River Drain @ South Airport Way	Fall2	12/9/2008	460					
Terminous Tract Drain @ Hwy 12	Fall1	10/14/2008		620				
Terminous Tract Drain @ Hwy 12	Storm2	11/4/2008		700				
Terminous Tract Drain @ Hwy 12	Winter1	1/13/2009		600				
Terminous Tract Drain @ Hwy 12	Winter2	2/10/2009		990				
Terminous Tract Drain @ Hwy 12	Winter3	3/10/2009		1200				
Terminous Tract Drain @ Hwy 12	Irrigation1	4/14/2009		510				
Terminous Tract Drain @ Hwy 12	Irrigation2	5/12/2009	250					
Terminous Tract Drain @ Hwy 12	Irrigation5	8/11/2009	290					
Terminous Tract Drain @ Hwy 12	Fall3	12/8/2009		770				
Walthall Slough @ Woodward Ave	Winter1	1/13/2009		550				
Walthall Slough @ Woodward Ave	Winter2	2/10/2009		570				
Walthall Slough @ Woodward Ave	Winter3	3/10/2009	650	570	2.4			
Walthall Slough @ Woodward Ave	Fall2	11/10/2009	340					
Environmental Exceedances			**17**	**36**	**3**	**17**	**1**	**1**
Non Contiguous Water Body Exceedances			**1**	**1**	**0**	**1**	**0**	**0**
Management Plan Monitoring Exceedances[1]			**0**	**0**	**0**	**0**	**0**	**0**
TOTAL Exceedances			**18**	**37**	**3**	**18**	**1**	**1**

MPM – Management Plan Monitoring FD – Field Duplicate

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

Table 33. Exceedances of WQTLs for pesticides.
If a field duplicate and an environmental sample both have an exceedance, only the environmental sample exceedance is included in this table. If there is an exceedance in the field duplicate sample and not the environmental sample, this field duplicate result is included and is noted by (FD) at the end of the station name.

Station Name	Season	Sample Date	Chlorpyrifos, µg/L	DDT[1], µg/L	HCH[2], delta , µg/L	Paraquat Dichloride, µg/L
Duck Creek @ Hwy 4	Irrigation3, MPM	6/9/2009	0.070			
Duck Creek @ Hwy 4	Irrigation4, MPM	7/14/2009	0.150			
Duck Creek @ Hwy 4	Irrigation5, MPM	8/11/2009	0.031			
French Camp Slough @ Airport Way	Fall1	10/6/2009	0.029			
Lone Tree Creek @ Jack Tone Rd	Irrigation5, MPM	8/11/2009	0.100			
Mokelumne River @ Bruella Rd	Irrigation5	8/11/2009		0.015		
South Webb Tract Drain	Irrigation 3	6/9/2009				3.6
Stanislaus River Drain @ South Airport Way	Fall1	10/14/2008	0.027			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation2, MPM	5/12/2009	0.032			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation4, MPM	7/14/2009	0.660			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation6, MPM	9/15/2009	0.086			
Walthall Slough @ Woodward Ave	Winter1	1/13/2009			0.01	
Walthall Slough @ Woodward Ave	Fall3	12/8/2009			0.02	
Walthall Slough @ Woodward Ave	Fall2	11/10/2009			0.01	
Environmental Exceedances			**2**	**1**	**3**	**1**
Non Contiguous Water Body Exceedances			**0**	**0**	**0**	**0**
Management Plan Monitoring Exceedances[3]			**7**	**0**	**0**	**0**
TOTAL Exceedances			**9**	**1**	**3**	**1**

MPM – Management Plan Monitoring
[1]DDT-Dichlorodiphenyldichloroethane
[2]HCH – Hexachlorocyclohexane; exceedance based on WQTL for total HCH.
[3] Refers to Management Plan Monitoring for specific constituents at Assessment, Core, and/or MPM locations.

Table 34. Water column and sediment toxicity exceedances.

If a field duplicate and an environmental sample both have an exceedance, only the environmental sample exceedance is included in this table. If there is an exceedance in the field duplicate sample and not the environmental sample, this field duplicate result is included and is noted by (FD) at the end of the station name.

Station Name	Season	Sample Date	Species	Toxicity End Point	Mean	Percent Control	Toxicity Significance	Summary Comments
Duck Creek @ Hwy 4	Irrigation4, MPM	7/14/2009	*C. dubia*	Survival (%)	0	0	SL	Complete mortality on Day 2. TIE initiated on 7/17/09 and it was concluded that organophosphate insecticide(s) were the cause of toxicity.
South Webb Tract Drain	Irrigation4	7/14/2009	*C. dubia*	Survival (%)	0	0	SL	Complete mortality on Day 3. TIE initiated on 7/18/09 and it was concluded that pyrethroid insecticide(s) were the cause of toxicity.
Stanislaus River Drain @ South Airport Way	Storm2	11/4/2008	*C. dubia*	Survival (%)	0	0	SL	TIE not initiated due to low and unstable DO, and high ammonia levels.
Stanislaus River Drain @ South Airport Way	Storm2	11/4/2008	*P. promelas*	Survival (%)	0	0	SL	Sample aerated due to low and unstable DO values. TIE not initiated due to low and unstable DO, and high ammonia levels.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation6, MPM	9/15/2009	*C. dubia*	Survival (%)	30	30	SL	TIE initiated on 9/22/09 and no toxicity was detected in the TIE.
Walthall Slough @ Woodward Ave	Winter3	3/10/2009	*S. capricornutum*	Total Cell Count	136538	38	SL	TIE initiated on 3/18/09 and no toxicity was detected in the TIE.
Walthall Slough @ Woodward Ave (FD)	Irrigation1, Sediment	4/14/2009	*H. azteca*	Survival (%)	71	81	SG	FD RPD 23

Monitoring Type	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Environmental Exceedances	**2**	**1**	**1**	**1**
Non Contiguous Water Body Environmental Exceedances	**0**	**0**	**0**	**0**
Management Plan Monitoring Exceedances[1]	**2**	**0**	**0**	**0**
Total	**4**	**1**	**1**	**1**

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

MPM – Management Plan Monitoring

FD – Field Duplicate

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

Discussion of Exceedances

Pesticide Use Report Data

Pesticide Use Report (PUR) data are provided to the Coalition from each of the county Agricultural Commissioner's offices and are evaluated for applications relevant to WQTL exceedances. To assess toxicity sources, applications of pesticides known to be toxic to the test species are identified based on a variety of factors including the organic carbon partition coefficient (K_{oc}), chemical type, mode of action and solubility. If sediment toxicity occurs then pesticides with a relatively high K_{oc} (1600 or greater) are considered relevant. If water toxicity occurs then pesticides with a relatively low K_{oc} (below 1900) are evaluated. Most pesticides are queried for applications within 30 days prior to water sampling. The PUR database is queried for applications of pyrethroid pesticides 180 days prior to the exceedance and queries for metals are for 90 days prior to exceedances (Table 35). If there were no applications within the specified time period, the PUR database was queried for applications an additional 30 days prior to the standard query period. Appendix IV includes tables and maps of all pesticide applications that are relevant to WQTL exceedances or toxicity. If the PUR data for any county were unattainable at the time of this report, a note was made in Appendix IV. Information regarding obtained and outstanding PUR is included in Table 28 in the Discussion of Results section of this report. Any outstanding PUR will be submitted in an addendum to the Annual Monitoring Report (AMR) on June 30, 2010.

Aldrin, dieldrin, endrin, HCH, DDT and DDE exceedances were not queried since there are no registered products that contain these chemicals.

Table 35. Pesticide use data collected for exceedances reported.

Exceedance Type	Pesticides Use Data Collected
Pesticides	1 month
Metals	3 months
Sediment Toxicity	3 months with 6 months for pyrethroids
Water Column Toxicity	1 months with 6 months for pyrethroids 3 months for metals

Tables 36 - 40 provide details on all exceedances in each Coalition Zone that occurred between October 2008 and December 2009. Zone 6 was not monitored during this period. The following section discusses possible sources of WQTL exceedances that are due to pesticide applications. All exceedances are included in the Tables 36 - 40 as reference when discussing possible sources and contributing factors. PUR data relevant to pesticide exceedances and toxicity are discussed based on the pounds of active ingredient applied upstream of the sampling site. Measures taken to address these exceedances are described in the section Actions Taken to Address Water Quality Exceedances.

Table 36. Zone 1 (Bear Creek @ North Alpine Rd, Mokelumne River @ Bruella Rd) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	*E. coli*, MPN/100 mL	DDT (p,p'), µg/L
Zone 1	Bear Creek @ North Alpine Rd	NM	10/14/2008	3.89			
Zone 1	Bear Creek @ North Alpine Rd	NM	11/4/2008	6.82			
Zone 1	Bear Creek @ North Alpine Rd	NM	12/9/2008	4.14		650	
Zone 1	Bear Creek @ North Alpine Rd	NM	1/13/2009	6.26			
Zone 1	Mokelumne River @ Bruella Rd	NM	8/11/2009				0.015
Zone 1	Mokelumne River @ Bruella Rd	NM	9/15/2009	6.95	5.09		
Zone 1	Mokelumne River @ Bruella Rd	NM	10/6/2009			1100	
Zone 1	Mokelumne River @ Bruella Rd	NM	11/10/2009		6.06		

DDT-Dichlorodiphenyldichloroethane
NM-Normal Monitoring
DO-Dissolved Oxygen

Dichlorodiphenyldichloroethane

Exceedances of DDT and its breakdown products, DDE and DDD, are a result of applications in the past. DDT, aldrin, and dieldrin are no longer registered or applied within the United States but persist because of their exceptionally high K_{oc} and long half life. It is estimated that the K_{oc} for DDT is between 100,000 and 1,000,000 years depending on the source, and the half life in aquatic systems is probably over 150 years (http://www.speclab.com/compound/c50293.htm). DDT was banned in 1972, and the USEPA prohibited application of aldrin and dieldrin in 1974 except for uses on termites and banned all uses in 1987. These pesticides may be bound to sediment in the channels and mobilized periodically by several mechanisms. Zone 1 (Table 36) had a detection of DDT at Mokelumne River @ Bruella Rd on August 11, 2009. This exceedance is a result of legacy pesticide use and cannot be attributed to current agricultural practices.

Table 37. Zone 2 (Duck Creek @ Hwy 4, French Camp Slough @ Airport Way, Lone Tree Creek @ Jack Tone Rd, Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	*E. coli*, MPN/100 mL	Chlorpyrifos, µg/L	*C. dubia*, % Control
Zone 2	Duck Creek @ Hwy 4	MPM	3/10/2009	5.4				
Zone 2	Duck Creek @ Hwy 4	MPM	5/12/2009	6.43				
Zone 2	Duck Creek @ Hwy 4	MPM	6/9/2009	6.74			0.07	
Zone 2	Duck Creek @ Hwy 4	MPM	7/14/2009	4.5			0.15	0
Zone 2	Duck Creek @ Hwy 4	MPM	8/11/2009	4.6			0.031	
Zone 2	Duck Creek @ Hwy 4	MPM	9/15/2009	5.62				
Zone 2	French Camp Slough @ Airport Way	NM	10/14/2008		4.01			
Zone 2	French Camp Slough @ Airport Way	NM	11/4/2008	5.05				
Zone 2	French Camp Slough @ Airport Way	NM	1/13/2009	6.42				
Zone 2	French Camp Slough @ Airport Way	NM	7/14/2009			240		
Zone 2	French Camp Slough @ Airport Way	NM	8/11/2009	5.66				
Zone 2	French Camp Slough @ Airport Way	NM	10/6/2009				0.029	
Zone 2	Lone Tree Creek @ Jack Tone Rd	MPM	7/14/2009	6.61				
Zone 2	Lone Tree Creek @ Jack Tone Rd	MPM	8/11/2009	5.95			0.1	
Zone 2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	5/12/2009				0.032	
Zone 2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	7/14/2009				0.66	
Zone 2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	8/11/2009	6.28				
Zone 2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	9/15/2009				0.086	30

MPM-Management Plan Monitoring
NM-Normal Monitoring
DO-Dissolved Oxygen

Chlorpyrifos

Chlorpyrifos is an organophosphate pesticide applied for pest control on alfalfa, grapes, and orchards, among other crops in California. In a water body, chlorpyrifos can both bind to sediment and remain in the water column (K_{oc} of 6070). The LC_{50} for chlorpyrifos to *Ceriodaphnia* is 0.055 µg/L. There were eight chlorpyrifos exceedances experienced in Zone 2 (Table 37).

Duck Slough @ Hwy 4 was sampled for chlorpyrifos every month from April to September as specified in the Coalition's Management Plan Monitoring schedule. In April, July, and September samples were also collected to test for *Ceriodaphnia* toxicity. Of the samples collected, three months had exceedance levels of chlorpyrifos and one of those samples resulted in *Ceriodaphnia* toxicity. Samples collected for MPM for chlorpyrifos from Duck Creek @ Hwy 4 exceeded the chlorpyrifos WQTL during irrigation 3 (0.070 µg/L) June 9, 2009. PUR data (Appendix IV) indicate there were 14 applications of Lorsban (chlorpyrifos) totaling 254 gallons between May 12 and June 5, 2009 across 975 acres of walnuts. Toxicity samples were not collected during this event for *Ceriodaphnia.* MPM conducted at Duck Creek @ Hwy 4 one month later (July 14, 2009) again resulted in an exceedance of the chlorpyrifos WQTL with 0.150 µg/L of chlorpyrifos detected in the water column. PUR data (Appendix IV) indicate there were a total of 163 gallons of Lorsban (chlorpyrifos) applied on 326 acres of walnuts between July 2 and July 8, 2009. Samples from the July sampling event were also toxic to *Ceriodaphnia* and the Phase I TIE concluded that organophosphate pesticide(s) were responsible for the toxicity and the Phase III TIE confirmed that the chlorpyrifos detected in the water column accounted for all of the toxicity (TIE Report, Appendix VI). MPM for chlorpyrifos on August 11, 2009 at Duck Creek resulted in a chlorpyrifos exceedance of 0.031 µg/L. PUR data indicate there were a total of 10 gallons of Lorsban applied on 20 acres of walnuts between July 17 and July 23, 2009. Toxicity samples were not collected for *Ceriodaphnia* in August.

French Camp Slough @ Airport Way had one exceedance of the chlorpyrifos WQTL (0.029 µg/L) in fall 1 samples collected on October 6, 2009. There was no toxicity associated with this exceedance. PUR data (Appendix IV) indicate on August 29, 2009 2.80 gallons of Warhawk (chlorpyrifos) was applied to 22.50 acres of corn and on October 5, 2009 an application of 48.7 gallons of Lorsban (chlorpyrifos) was applied across 97.4 acres of wine grapes. This sample did not result in water column toxicity.

Lone Tree Creek @ Jack Tone Rd was sampled for chlorpyrifos in July and August as specified in the Coalition's Management Plan Monitoring schedule. MPM samples collected on August 11, 2009 (irrigation 5) from Lone Tree Creek @ Jack Tone Rd resulted in an exceedance of the chlorpyrifos WQTL with 0.100 µg/L detected in the water column. Samples were not collected for toxicity analysis. PUR data (Appendix IV) indicate six Lorsban (chlorpyrifos) applications totaling 119.5 gallons occurred on 255 acres of almonds between July 16 and August 4, 2009.

Lone Tree Creek @ Jack Tone Rd was sampled for chlorpyrifos in May, June, July and September per the Coalition's Management Plan Monitoring schedule. Three of the four samples collected had concentrations of chlorpyrifos above the WQTL. In September, MPM samples were also collected to test for *Ceriodaphnia* toxicity and resulted in 30% survival compared to the control (Table 2). Samples collected from Unnamed Drain to Lone Tree Creek on May 12, 2009 resulted in a chlorpyrifos exceedance of 0.032 µg/L. PUR data (Appendix IV) indicate that 4 applications of Lorsban totaling 28.75 gallons occurred between March 17 and March 20, 2009 on 227 acres. Samples collected in July had 0.660 µg/L of chlorpyrifos. PUR data indicate there were two applications of Lorsban, one application on June 23, 2009 of 15 gallons on 40 acres, and on July 7, 2009 there were 18.8 gallons applied on 37.5 acres. September samples contained 0.086 µg/L of chlorpyrifos which may have accounted for the toxicity to *Ceriodaphnia* in samples collected at the same time. Toxicity in the samples could not be recovered during the TIE and therefore a Phase III analysis could not be conducted (Appendix VI). PUR data indicate there were 4 applications of Lorsban totaling 103.6 gallons across 207 acres of walnuts between August 18 and August 25, 2009. Refer to Appendix IV to review PUR data.

Toxicity

There were two samples that were toxic to *Ceriodaphnia* in Zone 2; both were collected as part of the Coalition's Management Plan Monitoring schedule. During the irrigation 4 monitoring event of July 14, 2009; Duck Creek @ Hwy 4 tested toxic to *Ceriodaphnia* and a Phase III analysis verified chlorpyrifos was responsible for the toxicity experienced in the samples. PUR data (Appendix IV) indicate there were a total of 163 gallons of Lorsban (chlorpyrifos) applied across 326 acres of walnuts between July 2 and July 8, 2009. There were no other applications that could have contributed to the July toxicity.

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd tested toxic to *Ceriodaphnia* during the September 15, 2009 irrigation 6 monitoring event. A high concentration of chlorpyrifos was detected in the July 14, 2009 samples (0.660 µg/L) and was also detected in the September samples with a concentration of 0.086 µg/L. The high concentrations of chlorpyrifos are most likely responsible for the toxicity experienced in these samples. No toxicity was detected in the TIE (Appendix VI); consequently, the source of toxicity was unable to be determined. PUR data (Appendix IV) indicates there were 4 applications of Lorsban (chlorpyrifos) totaling 103.6 gallons across 207 acres of walnuts between August 18 and August 25, 2009. There were no other applications that could have contributed to the September toxicity.

Table 38. Zone 3 (Drain @ Woodbridge Rd, Terminous Tract Drain @ Hwy 12) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	SC, µS/cm	Total Dissolved Solids, mg/L	E. coli, MPN/100 mL	Arsenic, µg/L
Zone 3	Drain @ Woodbridge Rd	NM	10/14/2008	5.44		1115	690		12
Zone 3	Drain @ Woodbridge Rd	FD	11/4/2008				550	370	12
Zone 3	Drain @ Woodbridge Rd	NM	11/4/2008	4.03		716	1053	250	13
Zone 3	Drain @ Woodbridge Rd	NM	1/13/2009	5.12		1211	660		12
Zone 3	Drain @ Woodbridge Rd	NM	2/10/2009			1358	780		14
Zone 3	Drain @ Woodbridge Rd	FD	3/10/2009				1100		15
Zone 3	Drain @ Woodbridge Rd	NM	3/10/2009	5.38		1910	1100		15
Zone 3	Terminous Tract Drain @ Hwy 12	NM	10/14/2008			1047	620		
Zone 3	Terminous Tract Drain @ Hwy 12	NM	11/4/2008			1103	700		
Zone 3	Terminous Tract Drain @ Hwy 12	NM	1/13/2009			1010	600		
Zone 3	Terminous Tract Drain @ Hwy 12	NM	2/10/2009			1701	990		
Zone 3	Terminous Tract Drain @ Hwy 12	NM	3/10/2009		6.31	1898	1200		
Zone 3	Terminous Tract Drain @ Hwy 12	NM	4/14/2009	6.16		878	510		
Zone 3	Terminous Tract Drain @ Hwy 12	NM	5/12/2009	6.55				250	
Zone 3	Terminous Tract Drain @ Hwy 12	NM	6/9/2009	6.34					
Zone 3	Terminous Tract Drain @ Hwy 12	NM	7/14/2009	4.49					
Zone 3	Terminous Tract Drain @ Hwy 12	NM	8/11/2009	4.49				290	
Zone 3	Terminous Tract Drain @ Hwy 12	NM	10/6/2009	6.94					
Zone 3	Terminous Tract Drain @ Hwy 12	NM	11/10/2009			753			
Zone 3	Terminous Tract Drain @ Hwy 12	NM	12/8/2009			1378	770		

FD-Field Duplicate
NM-Normal Monitoring
DO-Dissolved Oxygen
SC-Specific Conductance

Arsenic

The registrations on many products with this active ingredient have been cancelled. However, there are four products currently registered for use on citrus, for weed control around ditches, for use on ornamental plants, for nonagricultural weed control, and for weed control around buildings, driveways, sidewalks, rights-of-way, and fencerows. Several products are available for use by homeowners and nonagricultural users (e.g. county road maintenance) (http://www.pesticideinfo.org/List_Products.jsp?Rec_Id=PC34358&Chem_Name=Sodium%20cacodylate&PC_Code=012502) and products may have been purchased for use by local homeowners for use on their property. Arsenic is found in sodium cacodylate which is applied by agriculture for broadleaf weed control and as a cotton defoliant. California Department of Pesticide Regulation records indicate no agricultural use of sodium cacodylate across the Coalition region between 1998 and 2009. There were seven exceedances of arsenic in Zone 3 (Table 38); all were from water samples collected at Drain @ Woodbridge Rd and occurred in October - November 2008 and January, February, and March 2009.

Table 39. Zone 4 (Roberts Island Drain @ Holt Rd, South Webb Tract Drain) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	SC, µS/cm	*E. coli*, MPN/100 mL	Total Dissolved Solids, mg/L	Ammonia as N, mg/L	Arsenic, µg/L	Boron, µg/L	Molybdenum, µg/L	Paraquat dichloride, µg/L	*C. dubia*, % Control
Zone 4	Roberts Island Drain @ Holt Rd	NM	10/14/2008			896		550						
Zone 4	Roberts Island Drain @ Holt Rd	NM	11/4/2008			764	300							
Zone 4	Roberts Island Drain @ Holt Rd	NM	12/9/2008			894		1055						
Zone 4	Roberts Island Drain @ Holt Rd	NM	1/13/2009					490						
Zone 4	Roberts Island Drain @ Holt Rd	NM	2/10/2009			1019		670						
Zone 4	Roberts Island Drain @ Holt Rd	NM	3/10/2009			1385		880						
Zone 4	Roberts Island Drain @ Holt Rd	NM	4/14/2009			1008		610						
Zone 4	Roberts Island Drain @ Holt Rd	NM	5/12/2009			1059		650						
Zone 4	Roberts Island Drain @ Holt Rd	NM	6/9/2009	5.07		782		480						
Zone 4	Roberts Island Drain @ Holt Rd	NM	7/14/2009	5.85		1282		790						
Zone 4	Roberts Island Drain @ Holt Rd	NM	8/11/2009	5.7		904		550						
Zone 4	Roberts Island Drain @ Holt Rd	NM	9/15/2009	3.58										
Zone 4	Roberts Island Drain @ Holt Rd	NM	10/6/2009			948	280	600						
Zone 4	Roberts Island Drain @ Holt Rd	NM	11/10/2009			1091		640						
Zone 4	Roberts Island Drain @ Holt Rd	NM	12/8/2009			1099		620						
Zone 4	South Webb Tract Drain	NM	10/14/2008	0.2						23				
Zone 4	South Webb Tract Drain	NM	11/4/2008	1.99			370							
Zone 4	South Webb Tract Drain	FD	12/9/2008				1100	490			1000	11		
Zone 4	South Webb Tract Drain	NM	12/9/2008	1.08			580	470		15				
Zone 4	South Webb Tract Drain	NM	1/14/2009	1.85		712		490						
Zone 4	South Webb Tract Drain	NM	2/10/2009	3.38		737		480						
Zone 4	South Webb Tract Drain	NM	3/10/2009	3.43		1020		730		11				

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	SC, µS/cm	*E. coli*, MPN/100 mL	Total Dissolved Solids, mg/L	Ammonia as N, mg/L	Arsenic, µg/L	Boron, µg/L	Molybdenum, µg/L	Paraquat dichloride, µg/L	*C. dubia*, % Control
Zone 4	South Webb Tract Drain	NM, Sediment	4/14/2009	3.01	6.39	1095		1600	1.6	18				
Zone 4	South Webb Tract Drain	NM	5/12/2009	5.4		810		530		24				
Zone 4	South Webb Tract Drain	NM	6/9/2009	4.71			390			30			3.6	
Zone 4	South Webb Tract Drain	NM	7/14/2009	5.97						30				0
Zone 4	South Webb Tract Drain	NM	8/11/2009	2.48			460			33				
Zone 4	South Webb Tract Drain	NM, Sediment	8/19/2009	3.96										
Zone 4	South Webb Tract Drain	NM	9/15/2009	4.51			610			29				
Zone 4	South Webb Tract Drain	NM	10/6/2009	3.48						16				
Zone 4	South Webb Tract Drain	NM	11/10/2009	0.36						19				
Zone 4	South Webb Tract Drain	NM	12/8/2009	0.4						13				

FD-Field Duplicate
NM-Normal Monitoring
DO-Dissolved Oxygen
SC-Specific Conductance

Ammonia

Ammonia can enter a water body through two sources; direct discharge from agricultural fertilizers or animal waste, or from discharges from waste water treatment plants. Ammonia in fertilizer is typically converted to nitrite and then nitrate in soils over a short period of time and discharge of fertilizer would have to be immediate to detect ammonia in the receiving water body. Ammonia can also result from the conversion of organic nitrogen to inorganic nitrogen in the process of mineralization. Previous exceedances of the ammonia WQTL have been attributed to discharge from dairies. There was one exceedance of ammonia in Zone 4 (Table 39). South Webb Tract Drain had an ammonia exceedance of 1.6 mg/L from samples collected on April 14, 2009. Because no farming occurred on South Webb Tract during 2009, and there are no dairy operations present, it is most likely that the exceedance was due to the mineralization of organic nitrogen from aquatic vegetation present in the drain channel.

Arsenic / Boron / Molybdenum

There were a total of 12 arsenic, 1 boron and 1 molybdenum exceedance of WQTLs in Zone 4 (Table 39); all exceedances were in samples collected from South Webb Tract Drain. Although it is possible for arsenic, boron and molybdenum to be applied through agricultural practices, products containing any of these constituents are rarely if ever used within the Coalition area. In addition, Webb Tract was not actively farmed in 2009 and therefore no applications of fertilizers or amendments were applied to the island. PUR indicate that no pesticides containing arsenic were applied (Appendix IV).

Paraquat dichloride

Paraquat is a quaternary nitrogen herbicide widely used for broadleaf weed control. It is a quick-acting, nonselective compound, which destroys green plant tissue on contact and is absorbed by the foliage. Paraquat is used for broad-spectrum control of broad-leaved weeds and grasses in fruit orchards (including citrus), plantation crops, vines, olives, tea, alfalfa, onions, leeks, sugar beet, asparagus, ornamental trees and shrubs, and in forestry (http://www.sinoharvest.com/products/Paraquat.shtml). South Webb Tract Drain samples collected on June 9, 2009 contained paraquat dichloride (3.60 µg/L, Table 39). Webb Tract was not actively farmed in 2009 and paraquat is rarely found in the water column due to its high binding coefficient. Therefore the Coalition has the laboratory review their results and re-ran the samples. The samples returned as non-detect however they were run outside of hold time. PUR data (Appendix IV) indicate that there were no applications associated with this exceedance were made between October 2008 and December 2009.

Toxicity

South Webb Tract @ South Airport Way tested toxic to *Ceriodaphnia* during the July 14, 2009 irrigation 4 monitoring event (Table 39). TIE results (Appendix VI) indicate pyrethroid insecticides were the cause of the toxicity. The Coalition does not analyze for pyrethroids in the water column and therefore, the source of toxicity in the sample was not confirmed. Webb Tract was not actively farmed in 2009 and there were no pesticide applications between October 2008 and December 2009. It is possible that during sampling pyrethroids bound to sediment were re-suspended in the water column; however, this explanation is unlikely due to the half life of various pyrethroids and length of time since Webb Tract had applications.

Table 40. Zone 5 (Stanislaus River Drain @ South Airport Way, Walthall Slough @ Woodward Ave) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	SC, µS/cm	Ammonia as N, mg/L	*E. coli*, MPN/100 mL	Total Dissolved Solids, mg/L	Chlorpyrifos, µg/L	HCH, delta, µg/L	*C. dubia*, % Control	*P. promelas*, % Control	*S. capricornutum*, % Control	*H. azteca*, % Control
Zone 5	Stanislaus River Drain @ South Airport Way	NM	10/14/2008	1.94	922		870	610	0.027					
Zone 5	Stanislaus River Drain @ South Airport Way	NM	11/4/2008	0.9	1758	35	2400	1300			0	0		
Zone 5	Stanislaus River Drain @ South Airport Way	NM	12/9/2008	1.44			460							
Zone 5	Walthall Slough @ Woodward Ave	NM	1/13/2009	5.58	912			550		0.0055				
Zone 5	Walthall Slough @ Woodward Ave	NM	2/10/2009	1.42	993			570						
Zone 5	Walthall Slough @ Woodward Ave	NM	3/10/2009	3.72		2.4	650	570					38	
Zone 5	Walthall Slough @ Woodward Ave	FD, Sediment	4/14/2009											81
Zone 5	Walthall Slough @ Woodward Ave	NM, Sediment	4/14/2009	3.96										
Zone 5	Walthall Slough @ Woodward Ave	NM	5/12/2009	3.96										
Zone 5	Walthall Slough @ Woodward Ave	NM	6/9/2009	4.2										
Zone 5	Walthall Slough @ Woodward Ave	NM	7/14/2009	2.92										
Zone 5	Walthall Slough @ Woodward Ave	NM	8/11/2009	2.56										
Zone 5	Walthall Slough @ Woodward Ave	NM, Sediment	8/19/2009	3.75										
Zone 5	Walthall Slough @ Woodward Ave	NM	9/15/2009	2.39										
Zone 5	Walthall Slough @ Woodward Ave	NM	10/6/2009	4.84										
Zone 5	Walthall Slough @ Woodward Ave	FD	11/10/2009				390			0.0061				
Zone 5	Walthall Slough @ Woodward Ave	NM	11/10/2009				340							
Zone 5	Walthall Slough @ Woodward Ave	FD	12/8/2009							0.016				
Zone 5	Walthall Slough @ Woodward Ave	NM	12/8/2009							0.019				

FD-Field Duplicate
NM-Normal Monitoring
DO-Dissolved Oxygen
SC-Specific Conductance
HCH – Hexachlorocyclohexane, compared to WQTL for total HCH.

Ammonia

There were two exceedances of ammonia for Zone 5 (Table 40); Stanislaus River Drain @ South Airport Way on November 4, 2008 (35 mg/L), and Walthall Slough @ Woodward Ave on March 10, 2009 (2.4 mg/L). The former was associated with discharge from a dairy, and the latter is from an unknown source.

Chlorpyrifos

One exceedance of the WQTL for chlorpyrifos occurred in Zone 5 (Table 40) in samples collected on October 14, 2008 during the first fall monitoring event at the Stanislaus River Drain @ South Airport Way site (0.027 µg/L). This sample did not cause toxicity in the water column. PUR data (Appendix IV) for the Stanislaus Drain site subwatershed includes 642 pounds of chlorpyrifos applied on September 20, 2008 on 322 acres of grapes.

Hexachlorocyclohexane

Lindane, one of the hexachlorocyclohexane isomers, is an organochlorine insecticide that is not currently registered for agricultural use. Lindane was used in the past as a pesticide and a pharmaceutical treatment for lice and scabies. Isomers of lindane include alpha-HCH, beta-HCH and delta-HCH. Lindane is not produced in the US (since 1970), but has been imported from other nations. In 2006 the United States Environmental Protection Agency (US EPA) called for a voluntary withdraw of all agricultural uses of lindane. Lindane is still used for its pharmaceutical application but has been banned for use on agriculture in the US. All products containing Lindane are currently banned in California. The detection of the Lindane isomers delta-HCH at Walthall Slough @ Woodward Ave in the winter and fall monitoring seasons is a result of past use and cannot be attributed to current agricultural practices. There were four HCH exceedances experienced in Zone 5 (Table 40 from samples collected from Walthall Slough @ Woodward Ave; 0.0055 µg/L on January 13, 2009, 0.0061 µg/L on November 10, 2009, 0.019 µg/L (field duplicate = 0.016 µg/L) on December 8, 2009 due to legacy pesticide use.

Toxicity

Samples collected from the Stanislaus River Drain site were toxic to both *Ceriodaphnia* and *Pimephales* during the November 4, 2008 monitoring event (Table 40). The toxicity laboratory reported a strong odor of manure in the sample water and a low DO (0.8 mg/L). After sparging the sample water with pure oxygen prior to the fathead minnow test, DO remained below the protocol requirement, therefore samples were aerated throughout the test (refer to laboratory report within Appendix VI for details on protocol). A high concentration of ammonia was detected (34.5 mg/L), and it is likely that the ammonia was responsible for the water toxicity. Due to persistently low DO, a TIE could not be conducted (Appendix VI). It is likely that the source of the toxicity was due to a dairy discharge upstream. Based on the amount of dairy acreage upstream of this sampling location, the Coalition petitioned to remove this location from its MRPP; the Coalition received approval on December 17, 2008.

Walthall Slough @ Woodward Ave tested toxic to *Selenastrum* during the third winter monitoring event in March. A TIE (Appendix VI) was conducted due to less than 50 percent growth relative to the control, however toxicity did not persist through the TIE and therefore the tests were inconclusive. There were no exceedances of any WQTLs that would be associated with algae toxicity. PUR data (Appendix IV) indicate on March 6, 2009 4.88 gallons of MCPA, dimethylamine salt was applied on 52 acres of oats, and on March 7, 2009 3.13 gallons of bromoxynil octanoate was applied on 50 acres of alfalfa.

Hyalella toxicity also occurred at this site from samples collected during sediment monitoring on April 14, 2009. Survival of *Hyalella* in these samples was 81 percent relative to the control. Because survival was greater than 50 percent, these samples were not analyzed for pesticides and therefore the cause of sediment toxicity is unknown (Appendix VI). PUR data (Appendix IV) for Walthall Slough site subwatershed include applications of Rhomene MCPA amine herbicide on 52 acres of oats on March 6, 2009 (4.88 gallons) and on March 7, 2009 400 ounces of Buctril 4EC herbicide on 50 acres of alfalfa.

Actions Taken to Address Water Quality Exceedances

Monitoring of ambient surface waters is conducted by the Coalition for the purpose of characterizing discharges from agriculture. Over the long term, monitoring data provide insight on the general trends in water quality at each of the sample sites. Results from each event within a monitoring season can identify constituents, agricultural lands, crops and/or particular pesticides that need to be managed to reduce or eliminate input from agriculture. A series of actions taken to determine the potential sources of exceedances include: 1) the use of PURs to identify relevant applications that occurred upstream of the sample site and within a specified time period prior to the sampling event, 2) an analysis of monitoring data to determine the potential mechanism associated with exceedances of physical and field parameters such as DO, pH, and TDS, and 3) special studies where appropriate and cost effective to determine the sources of constituents such as *E. coli* or the potential causes of exceedances such as low DO (see Discussion of Results section).

The Coalition notified the Regional Board of all exceedances in Exceedance Reports (Appendix V). Any discrepancies or omissions have been described in the Discussion of Results section. Results are also disseminated via grower mailings, at grower outreach meetings, and, in some cases, by personal communication when evidence such as PURs indicates the likely contributor to a detection or exceedance.

Grower notifications, management practice outreach and education, and management practice tracking and implementation are additional actions taken by the Coalition to ensure that growers are aware of downstream water and sediment quality issues as well as the importance of implementing various management practices within their farm operations. Grower notifications of upcoming meetings, water quality results, grower meetings to conduct outreach and education and encourage growers to implement additional management practices and management practice tracking and implementation actions (prioritized according to the SJCDWQC Management Plan) are documented in Table 41.

Coalition members received results of the monitoring through Coalition mailings, at grower outreach meetings, and, in some cases, by personal communication. The Coalition also provided growers with information on management practices to reduce irrigation and storm runoff into receiving water bodies. Additional relevant management practices were presented in a handbook of management practices developed by CURES and mailed to all members in October, 2008 (Table 41).
The Coalition also provided growers with information on management practices to reduce storm water runoff and discharge of irrigation water and sediments into receiving water bodies.

Additional relevant management practices are presented at meetings, such as alternative products, structural changes to manage drain water or pesticide application practices for minimizing spray drift. Appendix VII includes meeting agendas and handouts.

Management Practices

The Coalition provides growers with information on management practices to reduce storm water runoff, discharge of irrigation water, and mobilization of sediments into receiving water bodies. Relevant management practices were detailed in a handbook developed by CURES and mailed to all members in October, 2008 (Table 41). Additional applicable management practices were presented at meetings, such as alternative products, structural changes to manage drain water, and pesticide application practices for minimizing spray drift. Appendix VII includes meeting agendas and handouts from October 2008 through December 2009.

To evaluate and establish a baseline of current management practices, the Coalition requests that all members complete a general survey and return it to the Coalition. The general survey documents irrigation and storm water management practices, pest management strategies and drift management activities. The SJCDWQC submitted a General Survey Summary Report to the Regional Board on December 30, 2008.

The Coalition has developed a strategy to prioritize subwatersheds in order to conduct focused outreach with individual members to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices. From 2008 to 2010 the Coalition has conducted focused outreach in the following site subwatersheds: Duck Creek @ Hwy 4, Lone Tree Creek @ Jack Tone Road, and Unnamed Drain to Lone Tree Creek @ Jack Tone Road (also known as Temple Creek). Growers were contacted during the fall of 2008, and winter and fall of 2009. Growers were asked to complete surveys documenting current practices and indicate which recommended practices they anticipated implementing in the upcoming year. Follow up with growers will be conducted in spring of 2010 to document implementation of new practices. This process is further detailed below (Management Plan Status, Table 41), and the Coalition Management Plan Update Report to be submitted on April 1, 2010 will summarize information obtained from these individual contacts.

The Coalition is preparing to contact growers in the next priority subwatersheds which include Littlejohn's Creek @ Jack Tone Road, Grant Line Canal @ Clifton Court and Grant Line Canal near Calpack Road. The Coalition's Management Plan includes a schedule of prioritized subwatersheds and details regarding the prioritization strategy.

The Coalition continues to be committed to collaboration with outside sponsors to secure unique opportunities that will enhance the Coalition's ability to achieve its goal of reducing the impact of agricultural discharge on water quality (Table 41). As part of the Prop 50 project, Coalition and University of California (UC) Cooperative Extension representatives conducted an East County Codling Moth Pheromone Mating Disruption Study in Contra Costa County which compared using pheromone mating disruption of codling moths to the standard practice of using organophosphate and pyrethroid insecticides. The results of the management practice evaluation were presented by Terry Prichard and Mike Devenchenzi the Pesticide Control Advisor (PCA) to participating growers at a meeting held December 11, 2008 (Table 41).

The Coalition has recently been awarded a $175,000 grant through the California Department of Pesticide Regulation (DPR) with a goal of reducing pesticide runoff (up to 10 percent) by 2011 from tomato, alfalfa, walnut, and wine grape crops. With the funds, the Coalition is developing a crop specific management practice workbook that will enable individual farmers to easily make management practice decisions specific to their operations. The Coalition anticipates the completion of the handbook by spring of 2010 to allow for grower practice changes during the irrigation season of 2010.

The Coalition website serves as a clearing house for Coalition activities and outreach on management practices (http://www.sjdeltawatershed.org/). Information provided on the website is a useful supplement to regular grower contacts and meetings. Interested parties can find information on site subwatershed land uses, past exceedances, management plans (in development), links to management practices websites, and grower meeting dates.

Outreach and Education

Outreach and education activities are an important component of the Coalition monitoring program. The Coalition continues to make a strong effort to provide information to growers at regular meetings, as well as at meetings conducted by the County Agricultural Commissioner, and by personal contact. Coalition presentations from October 2008 through December 2009 provided members with information regarding the Coalition's intentions, progress, and site subwatershed specific monitoring results, as well as management practices that have proven to be effective to reduce the discharge of pesticides to water bodies. All outreach and education activities are documented in Table 41.

Overall, Coalition representatives conducted or participated in 22 meetings from October 2008 through December 2009. Of those meetings, 19 addressed storm water quality issues, 19 addressed irrigation water quality issues, 18 meetings addressed sediment runoff issues, 22 meetings reviewed management practices and 18 addressed specific site subwatershed management plans.

On November 21, individual grower outreach meetings were held to discuss chlorpyrifos exceedances linked with grower use in the Lone Tree Creek area. Rachelle Antinetti, Terry Prichard, and Joe Gasper (PCA) met with various large growers on their respective properties to assess runoff conditions and discuss potential management practices. During the fall of 2008, additional individual grower meetings were conducted. A team consisting of Mike Wackman, Terry Prichard, Rachelle Antinetti, Parry Klassen, and a UC Farm Advisor discussed the importance of understanding current irrigation and pesticide application practices and implementing management practices to achieve water quality objectives specific to the individual grower. Five growers, representing 28,000 acres in the Central Delta, were initially contacted with the focus to work with growers farming larger acreage. A steering committee comprising of these five growers and their PCAs was then formed to coordinate further outreach in the Central Delta area.

Additionally, Coalition representatives attended and participated in several grower group meetings that also were used to conduct individual interviews. Coalition representatives coordinated an outreach meeting for growers within the Duck Creek subwatershed held on November 24, 2008. The meeting was split into a morning and an afternoon session with surface irrigation growers attending the session in the morning and growers utilizing pressurized irrigation attending in the afternoon. Agronomic practices and product options as well as irrigation practices and strategies specific to pressurized or surface irrigation were discussed. Management practices were also reviewed and Coalition representatives collected management practice survey information. Forty-four percent of Coalition members that were invited attended the meeting, 39% of growers representing an invited entity were in attendance, and 23% of non-coalition members invited attended; 19 surveys were completed.

Mike Wackman attended the Asparagus Grower Association Annual Meeting on December 3, 2008 to discuss, among other things, constituents relevant to asparagus farming.

A total of eleven 2008 Agricultural Commissioner’s Meetings were held to update and review pesticide laws and regulations from November 18 to December 18, 2008 in the Lodi, Ripon, Manteca, Escalon, Linden, Stockton, and Tracy areas. Meeting attendance included 1,258 growers and 87 licensees.

The Coalition also teamed with local pesticide suppliers during the 2009 irrigation season increase their grower audience. On March 5, 2009, Terry Prichard and Mike Wackman attended a grower meeting hosted by Mid Valley Agricultural Services at the Escalon Sportsman Club. Approximately 50 growers were in attendance, including some growers not in Coalition, to discuss the Irrigated Land and Regulatory Program (ILRP) and complete surveys. Terry Prichard discussed with 310 growers the importance of identifying and protecting sensitive sites during the spray application process and also reviewed associated best management practices during the July 15, 2009 grower meeting hosted by Spray Safe (Table 41). Members, growers and PCA's attended the meetings.

Mike Wackman attended and presented at all ten of the 2009 Agricultural Commissioner's Meetings held from November 17 to December 15, 2009. He reviewed past exceedances, explained the purpose and strategy of the Coalition's Management Plan, and reiterated the necessity for all growers to participate in and comply with the ILRP. A total of 1,252 growers attended the meetings, 71 of whom were licensed.

Pest Control Advisors, Agricultural Commissioners, and Registrants

In order for the Coalition to be most effective in providing recommendations on management practices that reduce or eliminate discharge, collaboration with County Agricultural Commissioners, Pest Control Advisors , and pesticide registrants is important. Throughout the October 2008 to December 2009 timeframe, and specifically during the 2009 irrigation season, the Coalition worked with each of these entities on a number of occasions. The Coalition participated in the March 5, 2009 meeting hosted by Mid Valley Ag and in the July 15, 2009 meeting hosted by Spray Safe.

Table 41. Table of SJCDWQC actions and deliverables dealing with grower notification of exceedances and management practices relevant to the monitoring conducted between October 2008 and December 2009 (sorted by date).

Area	Date	Category	Details	Constituents Addressed	Who
All Members	24-Oct-08	Grower Notification	Mailing to announce Agricultural Commissioner Office's 2008 Annual Grower Meetings.	All Constituents	Ag Commissioner
Central Delta	Fall, 2008	BMP Outreach and Education / Management Practice Tracking	Individual grower meetings to tour grower's farm and to discuss the importance of understanding current irrigation and pesticide application practices and of implementing management practices in achieving water quality objectives specific to individual grower.	All Constituents	Mike Wackman, Terry Prichard, Rachelle Antinetti, Parry Klassen, UC Farm Advisor specific to crop(s) grown
Lodi Area	18-Nov-08	BMP Outreach and Education	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	MLJ-LLC, Mike Wackman
Lone Tree Creek Subwatershed	21-Nov-08	BMP Outreach and Education / Management Practice Tracking	Individual grower meetings to discuss chlorpyrifos exceedances linked with individual grower use. Meetings included a visit to growers' fields to view runoff conditions and suggest/discuss potential management practices.	Chlorpyrifos	Rachelle Antinetti, Terry Prichard, and Joe Gasper (PCA)
Duck Creek Subwatershed	24-Nov-08	BMP Outreach and Education / Management Practice Tracking	Grower meeting to address measured water quality standard exceedances and to discuss BMPs and pesticide product options. 19 BMP surveys were completed.	All Constituents	Mike Wackman, Terry Prichard
Linden Area	24-Nov-08	BMP Outreach and Education	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Rachelle Antinetti
Escalon Area	25-Nov-08	BMP Outreach and Education	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	MLJ-LLC, Mike Wackman
Stockton Area	2-Dec-08	BMP Outreach and Education	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	MLJ-LLC, Mike Wackman
Delta Area	3-Dec-08	BMP Outreach and Education	Asparagus Grower Association Annual Meeting.	All Constituents	Mike Wackman
Tracey Area	4-Dec-08	BMP Outreach and Education	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	MLJ-LLC, Mike Wackman
Lodi Area	9-Dec-08	BMP Outreach and Education	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Rachelle Antinetti

Area	Date	Category	Details	Constituents Addressed	Who
Duck Creek Subwatershed	10-Dec-08	Grower Notification	Mailing to announce Duck Creek subwatershed grower meeting in Farmington; followed up with reminder postcard sent seven days after initial mailing.	All Constituents	Terry Prichard
East San Joaquin County	11-Dec-08	Water Quality Collaborations	Final meeting to discuss results for walnut growers (6 growers representing 300 acres) participating in codling moth management practice evaluation study (compared the use of pheromone mating disruption of codling moth in contrast to standard practice of using OP and pyrethroid insecticides).	Organo-phosphates, pyrethroid insecticides	Terry Prichard (Prop50)
Stockton Area	18-Dec-08	BMP Outreach and Education	Agricultural Commissioner's meetings to update and review pesticide laws and regulations.	All Constituents	Terry Prichard
Lone Tree Creek, Temple Creek, Duck Creek, Littlejohn's Creek Subwatersheds	18-Feb-09	Grower Notification	Mailing to announce Mid Valley Ag Services is hosting a grower meeting at Escalon Sportsman Club (sent to all members Mid Valley Ag); followed up with phone call after initial mailing.	All Constituents	Terry Prichard
Escalon Area	5-Mar-09	BMP Outreach and Education / Management Practice Tracking	Grower Meeting hosted by Mid Valley Agricultural Services at Escalon Sportsman Club. Invited all Mid Valley Ag's PCAs to discuss the program and distribute surveys. Approximately 50 growers attended, including some growers not in Coalition (Prichard continues to work with other groups/pesticide sellers).	All Constituents	Terry Prichard, Mike Wackman
Stockton Area	15-Jul-09	BMP Outreach and Education	Large grower meeting with 310 in attendance hosted in part by Spray Safe; meeting held in San Joaquin Agricultural Center. Discussion on the importance of identifying and protecting sensitive sites in the spray application and review of BMPs.	All Constituents	Terry Prichard
Simms Area	17-Nov-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 213 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman

Area	Date	Category	Details	Constituents Addressed	Who
Lodi Area	17-Nov-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 173 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman
Stockton Area	17-Nov-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 74 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman
Unnamed Drain to Lone Tree Creek Subwatershed	30-Nov-09	Grower Notification / Management Practice Tracking	Growers with outstanding surveys contacted and surveys mailed to all growers.	All Constituents	Terry Prichard
Stockton Area	1-Dec-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 139 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman
Lodi Area	8-Dec-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 159 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman
Lodi Area	8-Dec-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 37 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman

Area	Date	Category	Details	Constituents Addressed	Who
Simms Area	10-Dec-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 172 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman
Stockton Area	10-Dec-09	BMP Outreach and Education	Grower meeting hosted by local Agriculture Commissioners with 83 in attendance. A Coalition representative discussed past exceedances, the purpose and function of Management Plans, and the need to comply with the ILRP including how completing grower surveys works to aid compliance.	All Constituents	Mike Wackman

BMP – Best Management Practice

Management Plan Status and Special Projects

The SJCDWQC has established monitoring and management activities as required in the Regional Board's Basin Plan for the Sacramento and San Joaquin River basins as well as the ILRP MRP for Coalition Groups (Order No. R5-2008-0005). The Basin Plan sets forth Total Maximum Daily Load (or TMDL) requirements for dischargers and requires that dischargers comply with the monitoring and management criteria defined in the Basin Plan. In addition, the ILRP MRP requires that a management plan be developed if more than one exceedance of the same parameter at the same location occurs within a three-year period. If an exceedance occurs for a TMDL constituent (i.e. chlorpyrifos, diazinon, salt and boron) a management plan will be required for that constituent and site subwatershed regardless of whether there was a second exceedance.

A management plan resulting from a single exceedance of a TMDL constituent, or from more than one exceedance of a constituent without a TMDL, triggers additional focused efforts that take place within subwatersheds. Coalition efforts in all zones include but are not limited to: (1) continued monitoring during periods when peak pesticide application use occurs, (2) analysis of Pesticide Use Report (PUR) data, (3) Management Plan Monitoring, (4) implementation of site subwatershed grower meetings, (5) encouraging and evaluating implementation of management practices, and (6) addressing the seven compliance components described in the Basin Plan in conjunction with dairy operators with irrigated lands and other entities identified as potential sources of discharges. The Coalition addresses toxicity, pesticides, and sediment bound analytes with specific management practices whether or not there is a TMDL. A narrative concerning each special monitoring constituent was provided in the Coalition's Management Plan (submitted on September 30, 2008) to describe how it is meeting the TMDL requirements for Coalition members. This narrative will be updated in the Management Plan Update Report to be submitted on April 1, 2010 to account for activities that have occurred during 2009. TMDL constituents currently include chlorpyrifos, diazinon, dissolved oxygen, salinity/boron and mercury.

The Coalition's Management Plan was approved on January 23, 2009 and describes the Coalitions strategy for evaluating the implementation of new management practices to reduce the effects of agricultural practices on water quality. As described in the Action Taken section, intensive outreach and documentation of management practices occur throughout the Coalition, but greater efforts to acquire these details are made at the site subwatersheds that the Coalition has designated as High Priority areas. The Coalition actively informs growers with irrigated crop land about water sampling results and the status of evolving water quality objectives, and obtains information on management practices.

The 2010 Management Plan Update Report will include an update on the following items:

1. Status of high priority subwatershed performance goals
2. Evaluation of current Management Plan strategy
3. Evaluation of management practices and water quality improvements
4. Status of TMDL constituents and Basin Plan requirements

Conclusions and Recommendations

The following conclusions and recommendations answer the five key Program questions (ILRP MRP Order No. R5-2008-0005) based on water quality information obtained under the Coalition's MRPP for October 2008 through December 2009.

QUESTION No.1: Are conditions in waters of the State that receive discharges of wastes from irrigated lands within Coalition Group boundaries, as a result of activities within those boundaries, protective of beneficial uses?

The results of the monitoring program from October 2008 through December 2009 indicate that although there has been substantial improvement in water quality in many areas, water quality is still not protective of beneficial uses across most of the Coalition region (Table 42). The most common exceedances of WQTLs involve physical parameters such as DO and SC which resulted in impaired Agricultural and Aquatic Life Beneficial Uses. Other parameters such as *E. coli* and TDS also experienced numerous exceedances which resulted in impaired Recreational and Aquatic Life Beneficial Uses. The most common causes of impairment of the Municipal Beneficial Use were elevated concentrations of arsenic. Wastes from irrigated lands is but one of many possible sources of impairments to beneficial uses.

Table 42. Monitoring sites in 2009, beneficial uses associated with the downstream water body, and whether the sites met the WQTLs for the assigned beneficial uses.
X indicates no sampling occurred during the years specified. NA indicates that the beneficial use (BU) is not applicable for that water body.

Monitoring Site	Immediate Downstream Water Body	Beneficial Use Immediate Downstream Water Body	Status 2004 –2007 Meets BUs?	Status 2008 Meets BUs?	Status 2009 Meets BUs?
Duck Creek @ Hwy 4	Sacramento San Joaquin Delta	MUN	No	Yes	Yes
		AG	Yes	Yes	Yes
		REC I	No	Yes	Yes
		AQ Life	No	No	No
French Camp Slough @ Airport Way	Sacramento San Joaquin Delta	MUN	No	No	Yes
		AG	Yes	Yes	No
		REC I	No	No	No
		AQ Life	No	No	No
Drain @ Woodbridge Rd	Sacramento San Joaquin Delta	MUN	X	No	No
		AG	X	No	No
		REC I	X	No	Yes
		AQ Life	X	No	No
Lone Tree Creek @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No	No	Yes
		AG	Yes	No	Yes
		REC I	No	No	Yes
		AQ Life	No	No	No
Mokelumne River @ Bruella Rd	Mokelumne River (Camanche Res to Delta Reach)	MUN	NA	Yes	No
		AG	Yes	Yes	Yes
		REC I	Yes	Yes	No
		AQ Life	No	No	No
Roberts Island Drain @ Holt Rd	Sacramento San Joaquin Delta	MUN	No	Yes	No
		AG	No	No	No
		REC I	No	No	No
		AQ Life	No	No	No
Unnamed Drain to Lone Tree Cr @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No	No	Yes
		AG	No	No	Yes
		REC I	No	No	Yes
		AQ Life	No	No	No
Walthall Slough @ Woodward Ave	Sacramento San Joaquin Delta	MUN	X	X	No
		AG	X	X	No
		REC I	X	X	No
		AQ Life	X	X	No
Terminous Tract Drain @ Hwy 12	Sacramento San Joaquin Delta	MUN	No	No	Yes
		AG	No	No	No

Monitoring Site	Immediate Downstream Water Body	Beneficial Use Immediate Downstream Water Body	Status 2004 –2007 Meets BUs?	Status 2008 Meets BUs?	Status 2009 Meets BUs?
		REC I	No	No	No
		AQ Life	Yes	No	No
South Webb Tract Drain	Sacramento San Joaquin Delta	MUN	X	No	No
		AG	X	No	No
		REC I	No	No	No
		AQ Life	Yes	No	No
Stanislaus River Drain @ South Airport Way	Sacramento San Joaquin Delta	MUN	X	No	No
		AG	X	No	No
		REC I	X	No	No
		AQ Life	X	No	No

QUESTION No.2: What is the magnitude and extent of water quality problems in waters of the State that receive agricultural drainage or are affected by other irrigated agriculture activities within Coalition Group boundaries, as determined using monitoring information?

Appendix II includes all tabulated results from October 2008 through December 2009. Exceedances occurred in every zone during 2009 (Table 43).

Exceedances of physical parameters (141 of 488 samples, 28.9%) and *E. coli* (18 of 107 samples, 16.8%) were more common than exceedances of pesticides (13 of 3124 samples, 0.4%) or metals (19 of 674 samples, 2.8%). And, as described in the Discussion of Results section, the zones differed substantially in the types of exceedances. For example, in Zones 3 and 4 (Terminous Tract @ Highway 12 Zone and Roberts Island @ Holt Rd Zone) there were a large number of exceedances of SC and TDS (SC - 13 of 20 and 18 of 31 in Zones 3 and 4 respectively; TDS – 13 of 20 and 20 of 30 samples respectively). Zones 3 and 4 are located in the Delta portion of the Coalition region where irrigation water is brought in directly from the Delta. Both Zones 3 and 4 experienced frequent arsenic exceedances (Zone 3 – 5 of 5 samples, Zone 4 - 5 of 6 samples) for reasons that are unknown. Exceedances of nutrient criteria were very low across the entire Coalition region with only 1 exceedance in Zone 4 and 2 exceedances in Zone 5; Zone 5 exceedances were from ammonia rather than nitrate (the sampling location with ammonia exceedances was dropped from the SJCDWQC MRPP due to high densities of dairies within the area).

The amount of toxicity was lower in 2009 compared to previous years with 4 samples being toxic to *Ceriodaphnia*, one sample being toxic to *Pimephales*, and only one sediment sample being toxic to *Hyalella*. A single sample was toxic to both *Ceriodaphnia* and *Pimephales* and was attributed to ammonia from a dairy discharge (this sampling location was dropped from the SJCDWQC MRPP due to high densities of dairies within the area).

Some exceedances were more common seasonally. Warm water with little or no flow occurred during summer as did consistent exceedances of the DO WQTL. South Webb Tract was sampled although there was no farming in the summer of 2009. Water in the drain channel did not move, and as a result, there were exceedances of the DO WQTL in every month.

Table 43. Number of exceedances by constituent group and zone.

Analyte Name	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total Exceed.	Total Samples	Pct Exceed.
	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples			
Physical Parameters	7	84	14	138	37	80	59	123	24	63	141	488	**28.9%**
E. coli	2	21	1	21	3	20	7	30	5	15	18	107	**16.8%**
Carbamates	0	36	0	126	0	30	0	90	0	90	0	372	**0.0%**
Organochlorines	1	126	0	126	0	78	0	180	0	90	1	600	**0.2%**
Organophosphates	0	72	8	264	0	60	0	264	1	180	9	840	**1.1%**
Group A Pesticides	0	231	0	154	0	143	0	231	3	165	3	924	**0.3%**
Herbicides	0	48	0	60	0	40	0	120	0	120	0	388	**0.0%**
Metals	0	84	0	100	5	70	14	210	0	210	19	674	**2.8%**
Nutrients	0	42	0	42	0	40	1	60	2	30	3	214	**1.4%**
Water Column Toxicity	0	18	2	17	0	15	1	60	3	45	6	155	**3.9%**
Sediment Toxicity	0	0	0	0	0	0	0	2	1	2	0	4	**25.0%**
Count per Zone	**10**	**762**	**25**	**1048**	**45**	**576**	**82**	**1370**	**39**	**1010**	**200**	**4766**	
Pct Exceed. per Zone	**1.3%**		**2.4%**		**7.8%**		**6.0%**		**3.9%**		**4.2%**		

QUESTION No.3: What are the contributing source(s) from irrigated agriculture to the water quality problems in waters of the State that receive agricultural drainage or are affected by other irrigated agriculture activities within Coalition Group boundaries?

For many parameters, it is not clear to what extent WQTL exceedances are a result of current agricultural activities. Source identification is difficult especially for non-conserved constituents. There are numerous non-conserved constituents that cannot be traced upstream, e.g. specific conductance or bacteria. For example, locations within the Delta (Zones 3 and 4) experienced numerous exceedances of SC and TDS which are a function of the hydrostatic pressure moving Delta water to the interior of Delta islands or the use of Delta water for irrigation. Also, as discussed several times in semi-annual reports, *E. coli* source tracking analysis identified the coliform bacteria in the system as originating predominantly from human sources.

Many pesticides are the result of agricultural applications and enter surface waters as a result of drift or runoff in either storm water or irrigation return flows. In the reporting period, the largest number of exceedances was for chlorpyrifos, a pesticide that is registered for use by agriculture only. The Coalition is continuing to identify sources of WQTL exceedances through PUR, assessment of water quality data and evaluation of current management practices. The Coalition's sourcing strategy is further described in the Coalition's Management Plan.

QUESTION No.4: What are the management practices that are being implemented to reduce the impacts of irrigated agriculture on waters of the State within the Coalition Group boundaries and where are they being applied?

The Coalition conducts outreach and education regarding management practices effective in reducing impact of irrigated agriculture on waters of the State through grower meetings, management practice handouts and booklets and through high priority subwatershed visits. The section Actions Taken to Address Water Quality Exceedances includes documentation of outreach activities. The Coalition has obtained management practice information from members through General Surveys which were mailed to members in the Coalition region in 2007. The Coalition submitted a General Survey Summary Report in December 2008 tabulating management practices documented through those surveys on a subwatershed level and is used by the Coalition as an overall baseline of management practices.

The Coalition has prioritized Management Plan sites and constituents and is focusing on obtaining management practice information from priority subwatersheds. A schedule of subwatershed prioritization is included in the Coalition's Management Plan. Details on specific management practices will be provided in the Management Plan Update Report.

Growers in the first three priority watersheds were involved in meetings last spring and summer. These growers are being contacted now by mail to determine if practices recommended to the growers are being implemented. That assessment will be provided in the Management Plan Update Report.

QUESTION No.5: Are water quality conditions in waters of the State within Coalition Group boundaries getting better or worse through implementation of management practices?

On an annual basis, monitoring data indicate that the number of exceedances of pesticides and metals decreased in 2009 relative to 2008 and previous years although the number of sites also decreased in 2009 relative to 2008. Contacting growers took place throughout the spring and summer of 2009 and many growers may not have had sufficient time to implement management practices to prevent discharges to surface waters. Overall, it appears that water quality is slightly improving. Water quality in 2009 was not worse than previous years. The Coalition anticipates improvements in water quality at high priority management plan locations in the few couple of years due to increased education, outreach and implementation of management practices.