San Joaquin County and Delta Water Quality Coalition

Lead Agency:
San Joaquin County Resource Conservation District

March 1, 2011

Pamela Creedon
Chris Jimmerson
Irrigated Lands Regulatory 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 2011 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 January 1, 2010 through December 31, 2010 and covers monitoring, reporting, outreach and education activities that occurred during this time. Accompanying this letter are the following:

1. 2011 Annual Monitoring Report (electronic and hard copy)
2. Appendices I – IX (electronic and hard copy)
3. 2010 Level III Laboratory Reports (electronic)
4. 2010 Field Sheets (electronic)
5. 2010 Site Pictures (electronic)
6. SWAMP Comparable Database (Microsoft Access) with ESJWQC results through 2010 (electronic)
7. Pesticide Use Report Database (Microsoft Access) (electronic)

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 twelve 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 January 2010 through December 2010. 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

Cc:
Chris Jimmerson, CVRWQCB
Susan Fregien, CVRWQCB
Michael Wackman, SJCDWQC
John Brodie, SJCDWQC
Michael Johnson, MLJ-LLC
Melissa Turner, MLJ-LLC

Annual Monitoring Report

San Joaquin County & Delta Water Quality Coalition

January – December 2010

March 1, 2011

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LIST OF ACRONYMS

A	Assessment
AG	Agriculture
AI	Active Ingredient
AMR	Annual Monitoring Report
AQ	Aquatic
BMP	Best Management Practice
BU	Beneficial Use
C	Core
CCA	Certified Crop Adviser
CEDEN	California Environmental Data Exchange Network
COC	Chain of Custody
CRM	Certified Reference Materials
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
DPR	(California) Department of Pesticide Regulation
DQO	Data Quality Objective
DWR	(California) Department of Water Resources
EC	Electrical Conductivity
EDD	Electronic Data Deliverables
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	Minimum Detection Limit
MLJ-LLC	Michael L. Johnson, LLC
MPM	Management Plan Monitoring
MPN	Most Probable Number
MPUR	Management Plan Update Report

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
REC 1	Water Contact Recreation
RfD	Reference Dose
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SC	Specific Conductance
SD	Standard Deviation
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
TSS	Total Suspended Solids
UCANR	University of California Agricultural and Natural Resources
UCCE	University of California County Extension
USEPA	Unites States Environmental Protection Agency
VOA	Volatile Organic Analyte
WQTL	Water Quality Trigger Limit
YSI	Yellow Springs Instruments

LIST OF UNITS

°C	degrees Celsius
cfs	cubic feet per second
cm	centimeter
dw	dry weight
kg	kilogram
L	Liter
lbs	pounds
mg	milligram
mL	milliliter
mm	millimeter
NTU	Nephelometric Turbidity Units
sec	second
µg	microgram
µm	micrometer
µmhos	microsiemens
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 total maximum daily load (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)

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 2010 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 and Electronic Data Deliverables (EDDs) (attached CDs)
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
17. Specify the method used to obtain flow at each monitoring site during each monitoring event;	Sampling and Analytical Methods

REQUIRED SECTION - MRP	SECTION NAME/LOCATION - AMR
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 2010 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

MONITORING AND REPORTING PROGRAM PLAN (MRPP) AND QUALITY ASSURANCE PROGRAM PLAN (QAPP) AMENDMENTS

Table 1. SJCDWQC MRPP and QAPP amendments summary.

ITEM NUMBER	AMENDMENTS DESCRIPTIONS	DATE SUBMITTED	MRP PLAN PAGE NUMBER	DATE APPROVED
Original SJCDWQC MRP Plan		**August 25, 2008**		**September 15, 2008**
1	Removed sampling sites Stanislaus River Drain @ East Division Ave and Walthall Slough Drain @ Airport Way. Request to exchange sites: Stanislaus River Drain @ South Airport Rd for Walthall Slough @ Woodward Ave.	December 4, 2008	Table 3, page 28 Figure 12, page 31 Table 4, page 36 Figure 13, page 41 Verbiage, pages 47-49 Table 6, page 50 Table 9, page 55 Verbiage, page 56 Table 10, page 58 Table 12, page 64 Attachment 1	December 17, 2008
2	Request to update Five Mile Slough zone number from 5 to 4; site is represented by Roberts Island Drain @ Holt Rd for TMDL constituent diazinon.	December 4, 2008	Verbiage, page 56 Table 10, page 58	December 17, 2008
3	Request to reduce monitoring; Assessment Monitoring modified to include only one Assessment Monitoring location which rotates annually. Corrected Table 12, pg 64 typo indicating organochlorine monitoring at Mokelumne River @ Bruella Rd and Roberts Island Drain @ Holt Rd for 2009.	March 12, 2009	Verbiage, pages 32-33, 35 Table 9, page 55 Table 10, page 58 Table 12, page 64 Table 20, page 86	March 30, 2009
4	Request to change monitoring schedule at French Camp Slough @ Airport Way, South Webb Tract to be exchanged for Drain @ Woodbridge.	October 20, 2009	Table 13, page 71	November 16, 2009
5	Request to submit quarterly monitoring results in electronic format	May 6, 2010	Table 16, page 85[1]	May 17, 2010
6	Updated California Department of Pesticide Regulation (DPR) and Department of Water Resources reference links.	October 20, 2010	Verbiage, page 8	January 18, 2011
7	Updated spelling of “demeton-s.”	October 20, 2010	Table 11, page 61 Table 13, page 69	January 18, 2011

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
Original SJCDWQC MRP Plan		**August 25, 2008**		**September 15, 2008**
8	Added deltamethrin:tralomethrin to sediment pyrethroids analysis list. Deltamethrin is listed in the MRP but was not previously added to the MRPP or QAPP tables	October 20, 2010	Table 11, page 61	January 18, 2011
9	Updated sediment toxicity method to EPA 600/R-99-064 from EPA 100.1.	October 20, 2010	Table 13, page 39	January 18, 2011
10	Updated methamidophos method to EPA 8321 from EPA 8141A due to lab analysis change in July 2010.	October 20, 2010	Table 13, page 69	January 18, 2011
11	Updated sediment pyrethroid analytical method from EPA 8270 to a modified 8270 method, GCMS-NCI-SIM, due to lab analysis change for sediment pyrethroids in April 2010.	October 20, 2010	Table 13, page 69	January 18, 2011
12	Updated trifluralin RL to 0.05 µg/L from 0.01 µg/L.	October 20, 2010	Table 13, page 69	January 18, 2011
13	Updated sediment pyrethroid MDL and RL values to match those recommended by lab.	October 20, 2010	Table 13, page 69	January 18, 2011
14	Updated glyphosate, cadmium, lead, molybdenum, TKN and ammonia MDL values to match those achieved by lab.	October 20, 2010	Table 13, page 69	January 18, 2011
15	Updated turbidity, hardness, molybdenum and TKN RL values to match those achievable by the lab.	October 20, 2010	Table 13, page 69	January 18, 2011
16	Updated dichlorvos and demeton-s RL values from 0.2 µg/L to 0.1 µg/L.	October 20, 2010	Table 13, page 69	January 18, 2011
17	QAPP: Updated MRP reference to the current number, R5-2008-0005.	October 20, 2010	QAPP List of Acronyms Page 6	January 18, 2011
18	QAPP: Updated Caltest QA Officer. Sonya Babcock replaced Carmelita Oliveros as the Caltest QA Officer and assumed all the responsibilities.	October 20, 2010	QAPP Verbiage, page 2 Figure 1, page 11 Table 17, page 53 Table 18, page 55	January 18, 2011
19	QAPP: Updated MLJ Sampling Coordinator. Frank Wulff replaced Jonathon Katz as MLJ Sampling Coordinator and assumed all the associated responsibilities	October 20, 2010	QAPP Table 8, page 26 Table 17, page 53 Table 18, page 55 Table 19, page 57	January 18, 2011
20	QAPP: Updated Regional Board ILRP Monitoring Assessment Supervisor. Susan Fregien replaced Margie Read as the ILRP Monitoring Assessment Supervisor and assumed all associated responsibilities.	October 20, 2010	QAPP Verbiage, page 2 Verbiage, page 8 Figure 1, page 11	January 18, 2011

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
Original SJCDWQC MRP Plan		**August 25, 2008**		**September 15, 2008**
21	QAPP: Separated Matrix Spike/Lab Control Spike Frequency into two columns. Updated sediment TOC MS/LCS frequency to MS=N/A, LCS=1 per batch; grain size updated to N/A for both LCS and MS.	October 20, 2010	QAPP Table 5, page 22	January 18, 2011
22	QAPP: Updated sediment grain size Accuracy/Recovery from 90-110% to N/A (recoveries are not possible for grain size).	October 20, 2010	QAPP Table 5, page 22	January 18, 2011
23	QAPP: Updated glyphosate Accuracy/Recovery acceptability range from 72-131% to 85.7-121% to match the range recommended by the lab.	October 20, 2010	QAPP Table 5, page 22	January 18, 2011
24	QAPP: Updated metals Accuracy/Recovery acceptability range from 75-125% to 85-115% and nutrients Accuracy/Recovery range from 80-120% to 90-110% to match the range recommended by the lab; updated lab precision RPDs from 25 to 20 for nutrients, metals and physical parameters to match the acceptability criteria used by the lab.	October 20, 2010	QAPP Table 5, page 22	January 18, 2011
25	QAPP: Removed requirement for Lab Control Spike/CRM/SRM from sediment grain size section of the Analytical QC table. This QC level is not required by SWAMP.	October 20, 2010	QAPP Table 16, page 47	January 18, 2011
26	QAPP: Removed requirements for internal standards performed for Organic Parameters: OPs, OCHs, carbamates, and additional herbicides.	October 20, 2010	QAPP Table 16, page 47	January 18, 2011
27	QAPP: Updated organic and inorganic Field Blank Acceptable Limits from "<MDL" to "<RL or <sample/5" to agree with Table 7, Element 7, page 24.	October 20, 2010	QAPP: Table 15, page 46	January 18, 2011
28	QAPP: Added precision calculation for sediment grain size.	October 20, 2010	QAPP: Verbiage, page 51	January 18, 2011
29	QAPP: Updated location of Regional Data Center from UCD-AEAL to Central Valley RDC.	October 20, 2010	QAPP: Verbiage, page 58 Figure 4, page 61	January 18, 2011
30	QAPP: Updated chemistry and toxicity data verification, validation and loading SOPs; updated sample detail excel file creation SOP.	October 20, 2010	QAPP: Appendices XXXV-XXXVII	January 18, 2011
31	QAPP: Updated laboratory organic chemistry SOPs; updated laboratory toxicity SOPs for Acute *Ceriodaphnia*, Acute *Pimephales*, and Chronic *Selenastrum* toxicity tests; updated inorganic chemistry method SOPs as needed.	October 20, 2010	QAPP: Appendices XI-XXXII	January 18, 2011

[1] -All deliverables are submitted electronically (quarterly monitoring data reports, Annual Monitoring Report, Annual Management Plan Update Report)

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 eastern boundary 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 January through December 2010 as described in the SJCDWQC Monitoring and Reporting Program Plan (MRPP). The MRPP was originally submitted on August 25, 2008 and approved on September 15, 2008. Additional modifications were approved on December 17, 2008 (site exchange), and March 30, 2009 (modification to overall sampling schedule). On October 20, 2010 an amended MRPP was submitted to the Regional Board which includes documentation of all previous modifications and updates, this amended report was approved on January 18, 2011. The primary objectives of the monitoring program are to characterize discharge from agriculture and to determine if the implementation of management practices are effective in reducing or eliminating discharge. The Coalition monitored 12 sites from January 2010 through December 2010; six sites were part of the Normal Monitoring schedule in the SJCDWQC MRPP (pages 59-64). Additional samples were collected for chlorpyrifos, diazinon and sediment toxicity as part of a California Department of Pesticide Regulation (DPR) grant to reduce the impact of agricultural discharge on water quality. The DPR grant monitoring began in June 2010 and will continue through February 2011. Six sites were Management Plan Monitoring (MPM) sites as outlined in the SJCDWQC Management Plan (submitted September 30, 2008), two of those six (Grant Line Canal @ Clifton Court and Grant Line Canal near Calpack Rd) were Management Plan Monitoring (MPM) only and the other four sites (Duck Creek @ Hwy 4, Littlejohns Creek @ Jack Tone Road, Lone Tree Cree @ Jack Tone Road and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) were monitored for MPM and DPR grant monitoring. 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) (Table 11, pages 68-71).

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 in the MRPP (pages 53-55).

MONITORING PROGRAM COMPLIANCE

For the period of January through December 2010, 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 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 January 1, 2010 and December 31, 2010 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), nitrate, arsenic, copper, chlorpyrifos and dichlorodiphenyldichloroethylene (DDE). Water column toxicity to *Ceriodaphnia dubia, Selenastrum capricornutum* and sediment toxicity to *Hyalella azteca* occurred between January and December 2010.

The most common exceedances were for dissolved oxygen (52), specific conductance (40), total dissolved solids (28), and *E. coli* (13). Exceedances of the arsenic (11) WQTL were common and copper (2) was the only other metal to exceed the WQTLs. All arsenic exceedances occurred within the Drain @ Woodbridge Rd subwatershed except for two which were at Terminous Tract Drain @ Hwy 12. There were 13 pesticide exceedances of chlorpyrifos WQTL and one exceedance of DDE at Walthall Slough @ Woodward Ave. Seven of the 13 chlorpyrifos exceedances occurred in samples collected for Management Plan Monitoring and four of the 13 were additional samples collected as part of a DPR grant monitoring program to reduce the impact of agricultural discharge on water quality. Exceedances of physical parameters and *E. coli* were more common than exceedances of pesticides or metals.

Of the samples collected, water column toxicity was detected in one of 71 *Selenastrum capricornutum* tests, in one of 66 *Ceriodaphnia dubia* tests and in none of 48 *Pimephales promelas* tests. In the toxic *Ceriodaphnia dubia* sample, survival was greater than 50% compared to the control, therefore no Toxicity Identification Evaluation (TIE) was conducted. The toxic MPM sample collected for *Selenastrum capricornutum* resulted in growth less than 50% compared to the control. The TIE initiated on this sample to determine the cause of toxicity indicated that non-polar organic chemicals played a key role in the toxicity, however; Phase III Tie could not be conducted due to a lack of relevant data.

There were a total of eight toxic sediment samples to *Hyalella azteca* in the fall of 2010. Of the eight toxic sediment samples, six had survival less than 80% compared to the control and considered

ecologically significant, therefore additional chemistry analysis was conducted for chlorpyrifos and pyrethroids. Additional chemical analysis resulted in detections of pyrethroids in all six toxic samples.

The series of actions taken to determine the potential sources of exceedances include: 1) the use of Pesticide Use Reports (PUR) 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 dissolved oxygen.

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 irrigation and 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 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 through 2010 the Coalition has conducted focused outreach in the following first priority 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 was conducted in early 2010 to document implementation of new practices. The Coalition anticipates that it will take more than one year of focused outreach to observe improvements in water quality and the Coalition continues to work with growers in these priority subwatersheds during the irrigation season of 2010 to track changes in management practices.

Beginning in early 2010 focused outreach was initiated in the following second priority site subwatersheds: Grant Line Canal @ Clifton Court Rd, Grant Line Canal near Calpack Rd and Littlejohns Creek @ Jack Tone Rd. Growers were contacted and asked to complete surveys documenting current practices and indicate which recommended practices they anticipated implementing in the upcoming year. In early 2011 follow up mailings were sent to growers from the second priority site subwatersheds to document implementation of new practices. Results from follow up with growers from both the first and second sets of priority watersheds will be included in an analysis in the Management Plan Update Report to be submitted on April 1, 2011.

The Coalition continues to be committed to collaboration with outside sponsors to secure unique opportunities that enhance the Coalition's ability to achieve its goal of reducing the impact of agricultural discharge on water quality. The Coalition was 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 grapes. With the funds, the Coalition has developed a series of crop specific management practice workbooks that enable individual farmers to easily make management practice decisions specific to their operations. The Coalition completed the handbook in the spring of 2010 to allow for grower practice changes during the irrigation season of 2010.

CONCLUSIONS

The results of the monitoring program from January 2010 through December 2010 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 dissolved oxygen, total dissolved solids, and specific conductance 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 results of current agricultural activities. Source identification is difficult 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 specific conductance and total dissolved solids 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. There were numerous exceedances of *E. coli* experienced which resulted in impaired Recreational and Aquatic Life Beneficial Uses.

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. 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 flow from 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. Water is either exported from the Coalition region to San Francisco Bay through the Delta or conveyed southward via the State Water Project and Federal Water Project the California Aquaduct and the Delta Mendota Canal respectively.

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 2). To obtain irrigated acreages, the Coalition uses information from two California Department of Water Resources (DWR) data sources: 1) DWR Agricultural Land and Water Use data and 2) DWR Land Use Survey.

Agricultural Land and Water Use data (DWR, http://www.water.ca.gov/landwateruse/anaglwu.cfm) estimates the acreage of irrigated crops for each county on an entire county basis. Land Use Survey data (DWR, http://www.water.ca.gov/landwateruse/lusrvymain.cfm) includes more detailed information regarding specific crop uses (both irrigated and nonirrigated) than the Agricultural Land and Water Use data but is updated less often. Because Land Use Survey data are available in GIS shape files, the information can be mapped to the Coalition area and used for estimates of irrigated crop acreage. The data source used depends on: 1) which data was developed more recently and 2) whether or not the entire county is within the Coalition region. If the entire county is not within the Coalition, the DWR Land Use Survey data must be utilized even if it is older.

For Alameda, Calaveras, Contra Costa, San Joaquin, and Stanislaus counties, the Coalition utilized the DWR data for Agricultural Land and Water Use to determine irrigated land area (see footnote 1 in Table 2 for source information). Utilizing Land Use Survey data estimates was necessary since the Coalition boundary does not correspond to the county boundary; the exception being San Joaquin County acreage which was obtained from DWR Agricultural Land and Water Use data (Table 2). In Table 2, the column for Data Source Year (Agricultural Land and Water Use) represents county acreage only, and the column for Data Source Year (Land Use Survey) represents zone acreage information. For specific zone acreage details see Table 3.

Table 2. Acreage of irrigated land in SJCDWQC counties and available DWR data.

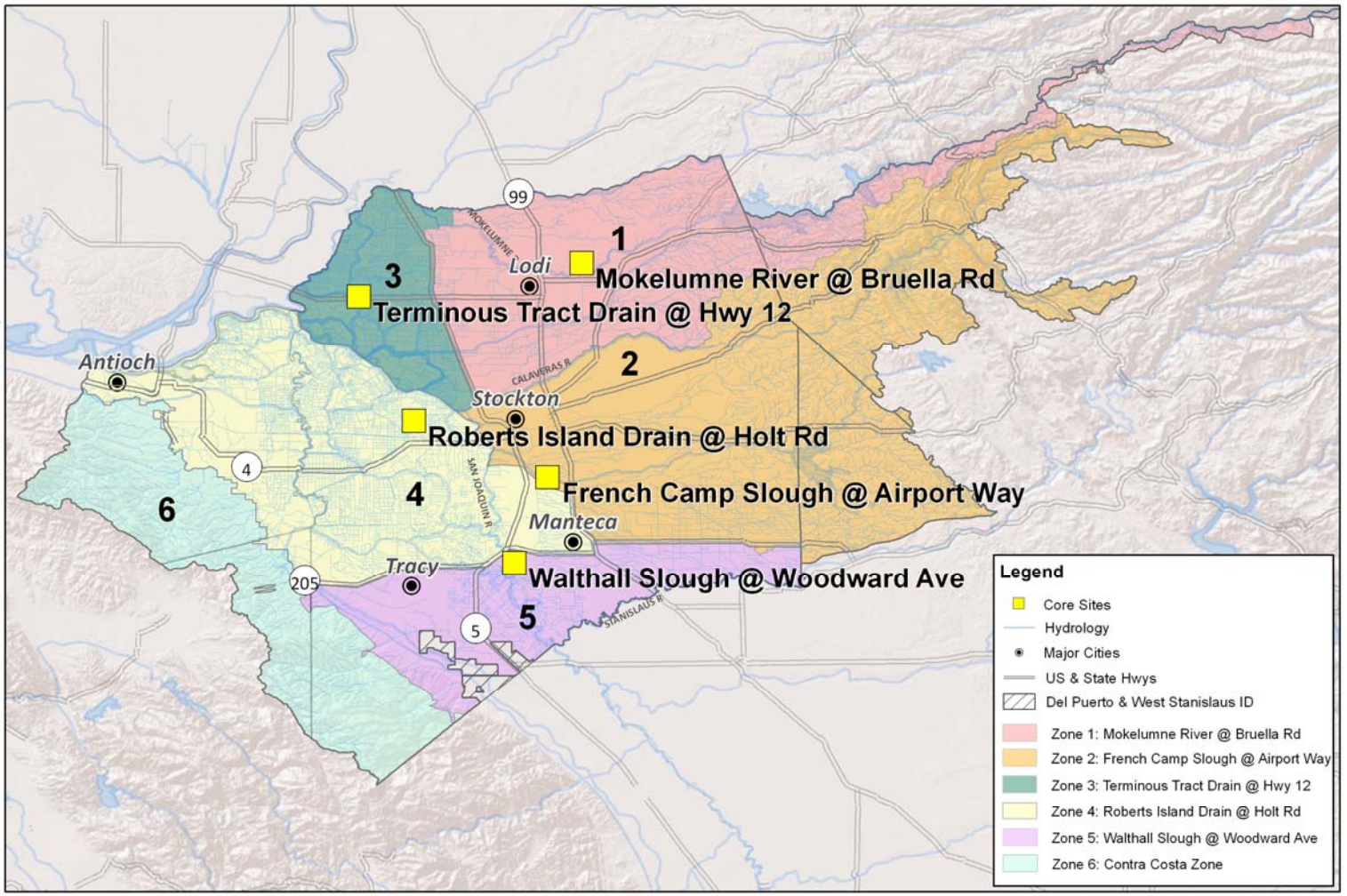
County*	Irrigated Land Area (acres)	Data Source Year (Agricultural Land and Water Use)[1]	Data Source Year (Land Use Survey)[2]
San Joaquin*	539,000	2001	1996 (Not Used)
Contra Costa	48,920	1995	1995
Alameda	937	2006	2006
Calaveras	1,077	2000	2000
Stanislaus	19,200	2004	2004
Total	**609,134**		

[1]DWR Agricultural Land Use: http://www.water.ca.gov/landwateruse/anaglwu.cfm
[2]DWR Land Use Survey: http://www.water.ca.gov/landwateruse/lusrvymain.cfm
*Land Use Survey data is estimated because Coalition boundaries are not completely represented by County boundary acreage. San Joaquin County acreage is obtained from DWR Agricultural Land and Water Use estimates.

GEOGRAPHICAL CHARACTERISTICS AND LAND USE

The Coalition area has been divided into six zones to create a comprehensive monitoring program (Figure 1). These zones were designated based on hydrology, crop types, land use, soil types, and rainfall (Table 3). 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 only recently began monitoring this area in October 2008. Zone 6 does not have a Core Monitoring location due to the increase of urbanization within Contra Costa County and a paucity 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 MRPP (pages 10-25). Land use maps for each zone are included in Figures 2-7.

Figure 1. SJCDWQC Zone Boundaries and Core Sites.



Source of Layers:
Hydrology - NHD hydrodata, http://nhd.usgs.gov/
Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library.
World Shaded Relief, ESRI 2009
NAD 1927

Date Prepared: 09/15/10
SJCDWQC

SJCDWQC Zone Boundaries

N

0 4.5 9 18
Miles

Table 3. 2010 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

DWR land use survey geo-coded data was used to obtain zone irrigated acreage information
*only one contour/area data point exists

Figure 2. Land use for Mokelumne River @ Bruella Rd Zone (Zone 1).

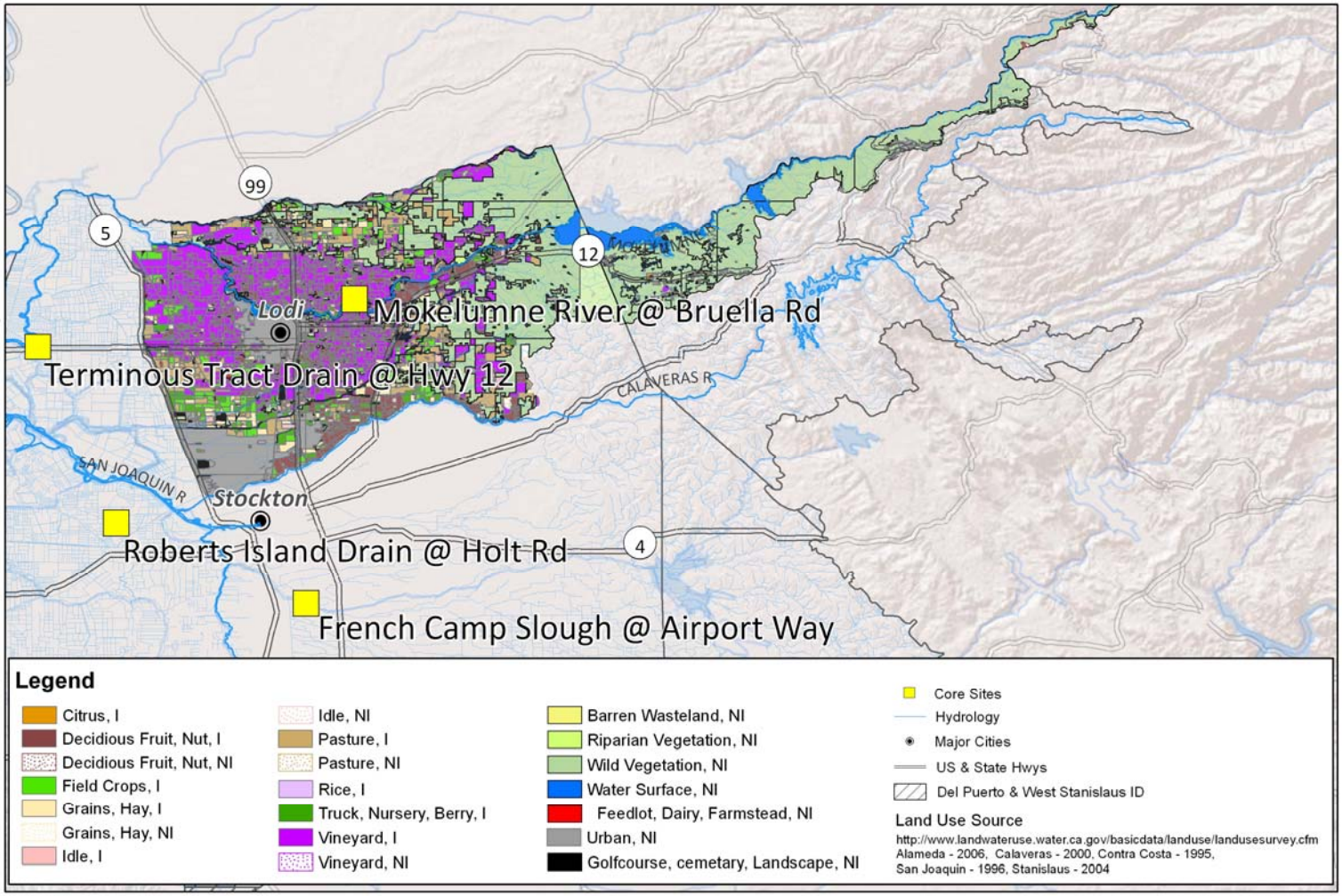


Figure 3. Land use for French Camp Slough @ Airport Way Zone (Zone 2).

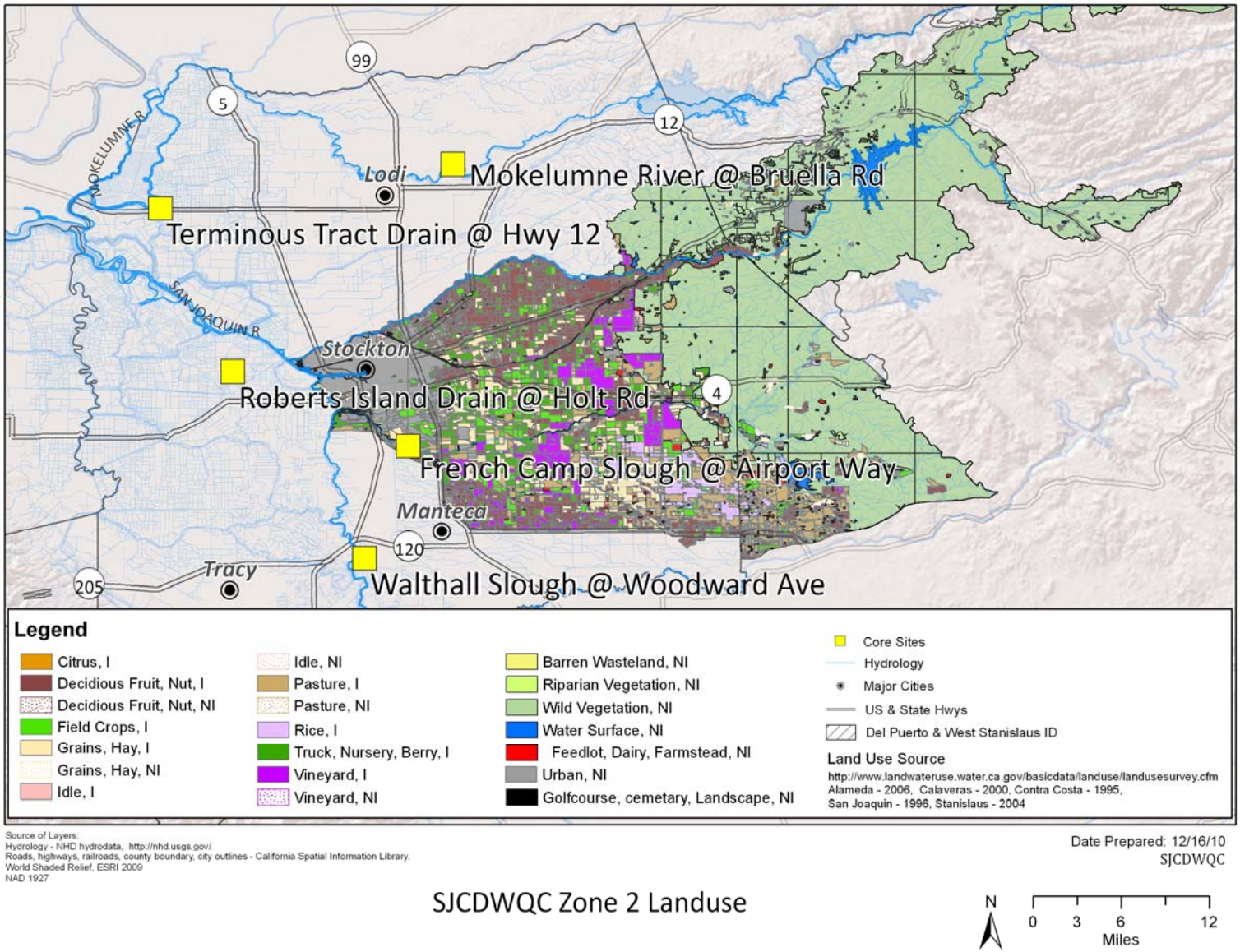


Figure 4. Land use for Terminous Tract @ Hwy 12 Zone (Zone 3).

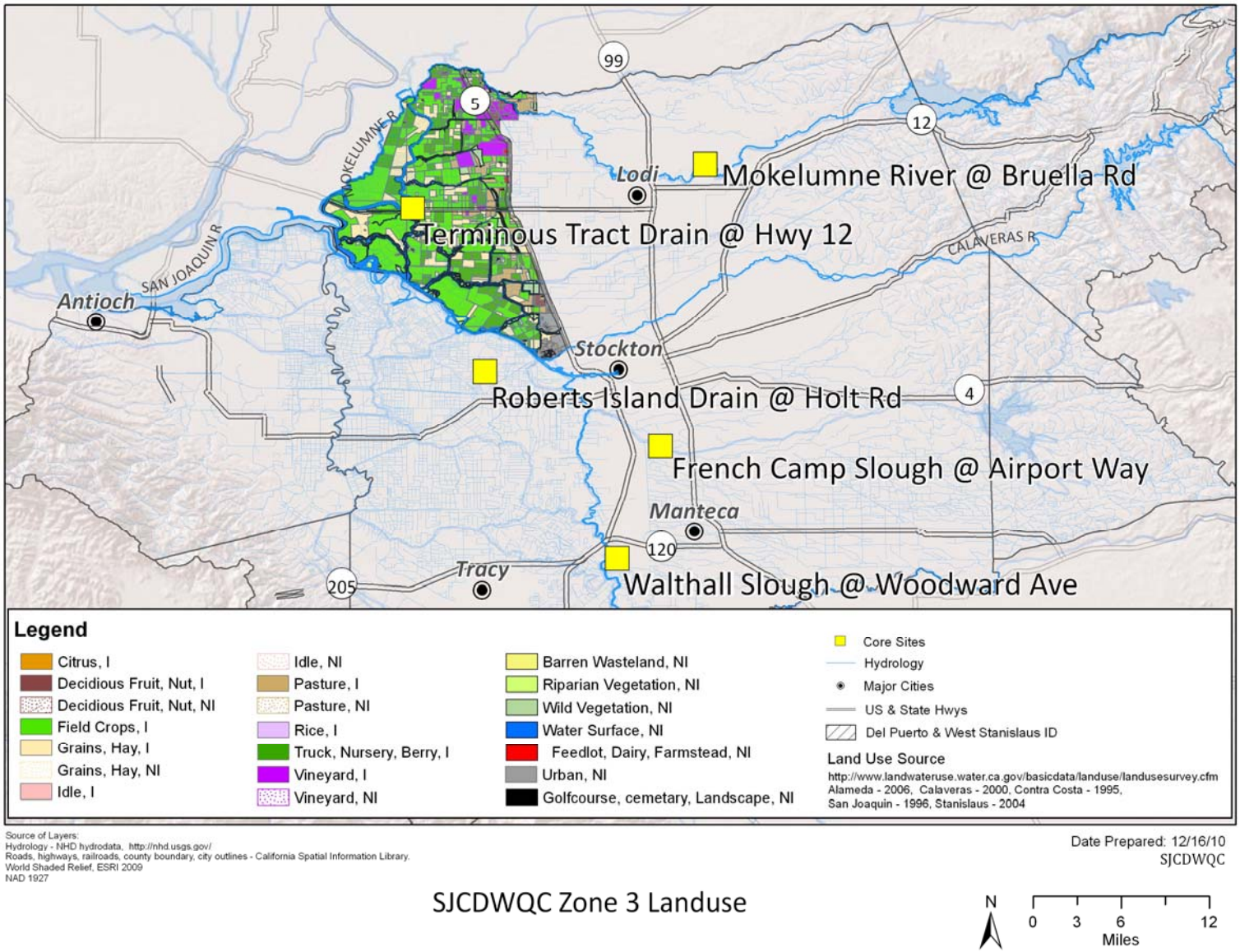


Figure 5. Land use for Roberts Island Drain @ Holt Rd Zone (Zone 4).

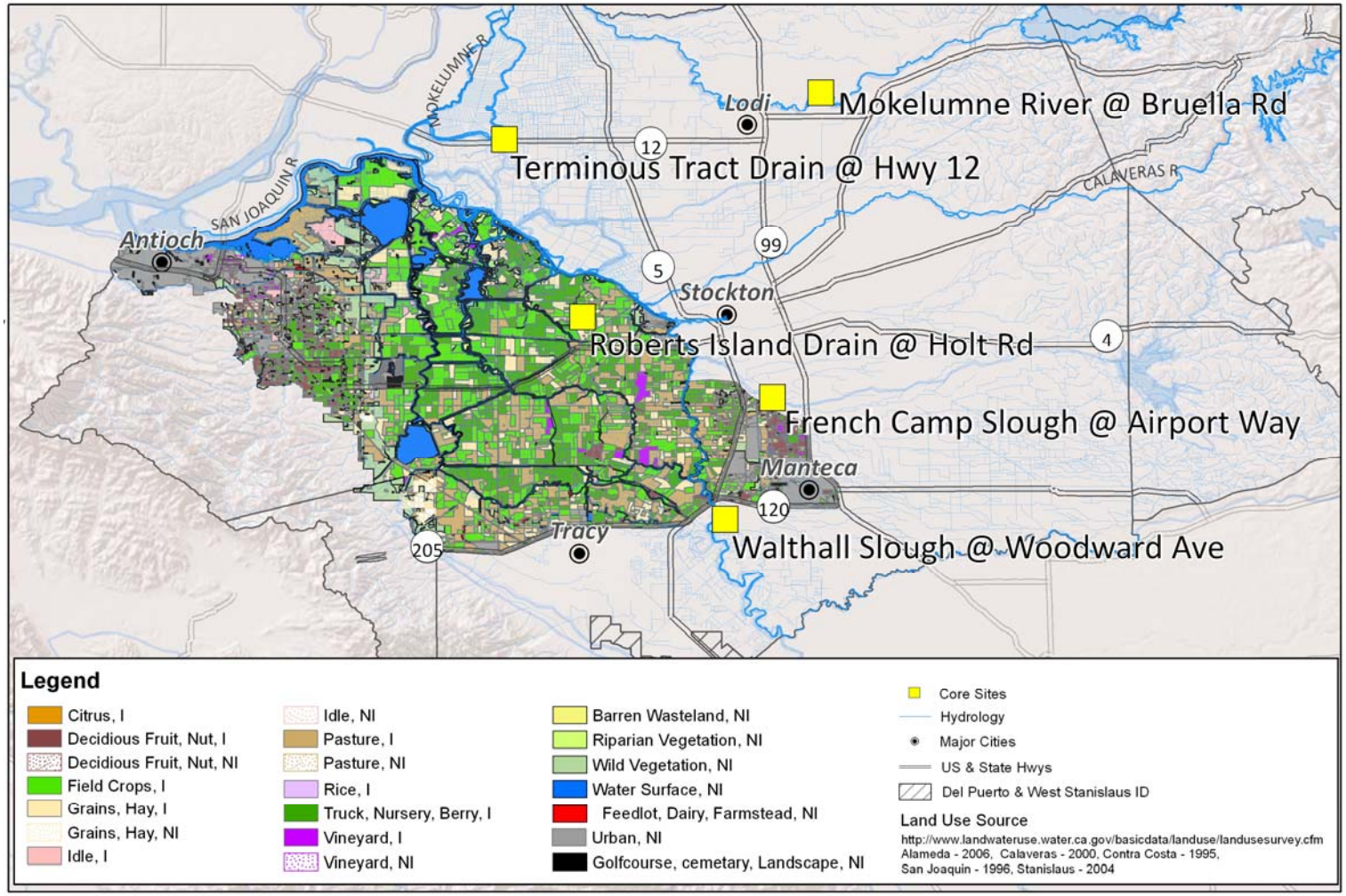


Figure 6. Land use for Lower San Joaquin Zone (Zone 5).

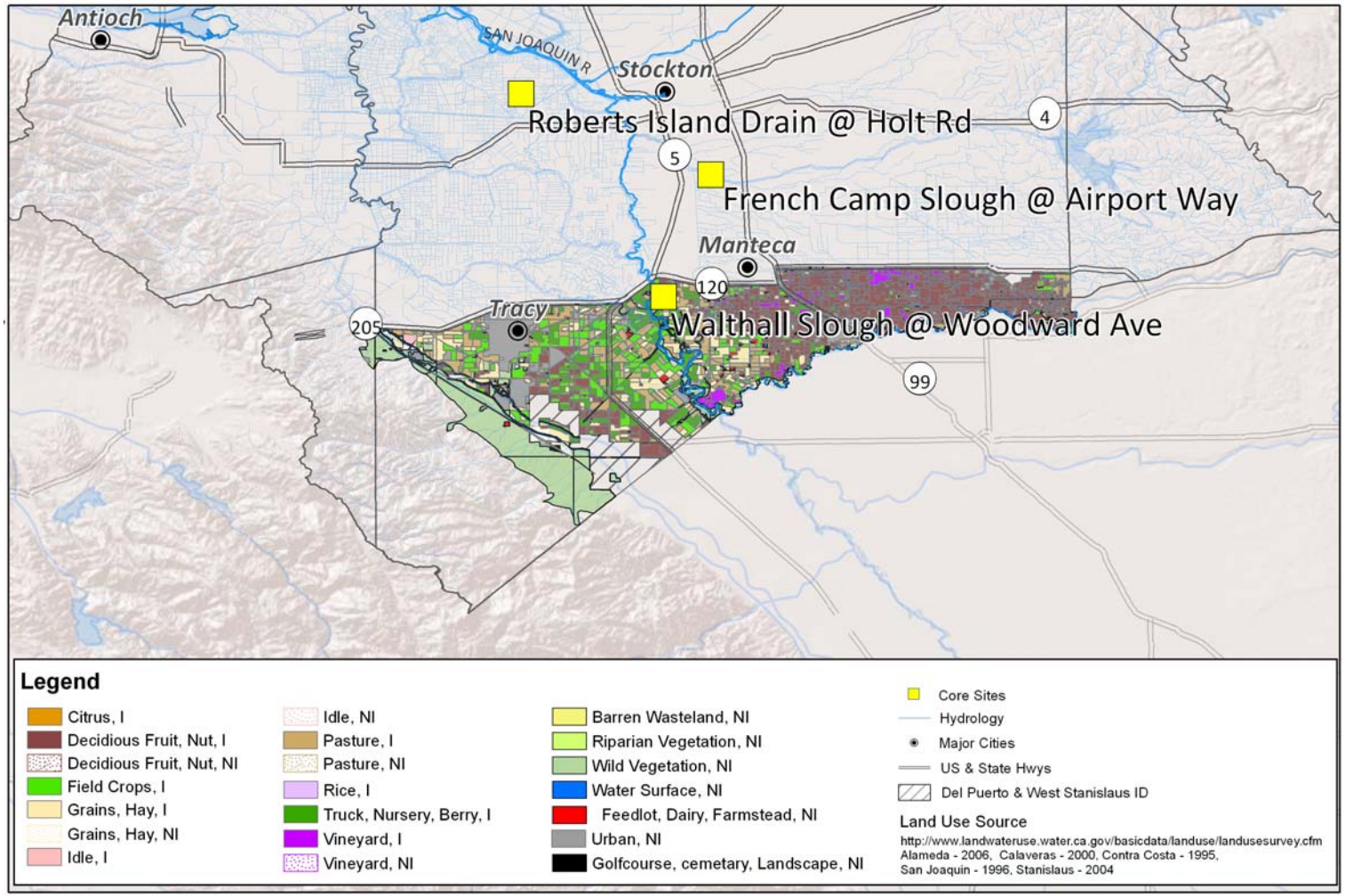
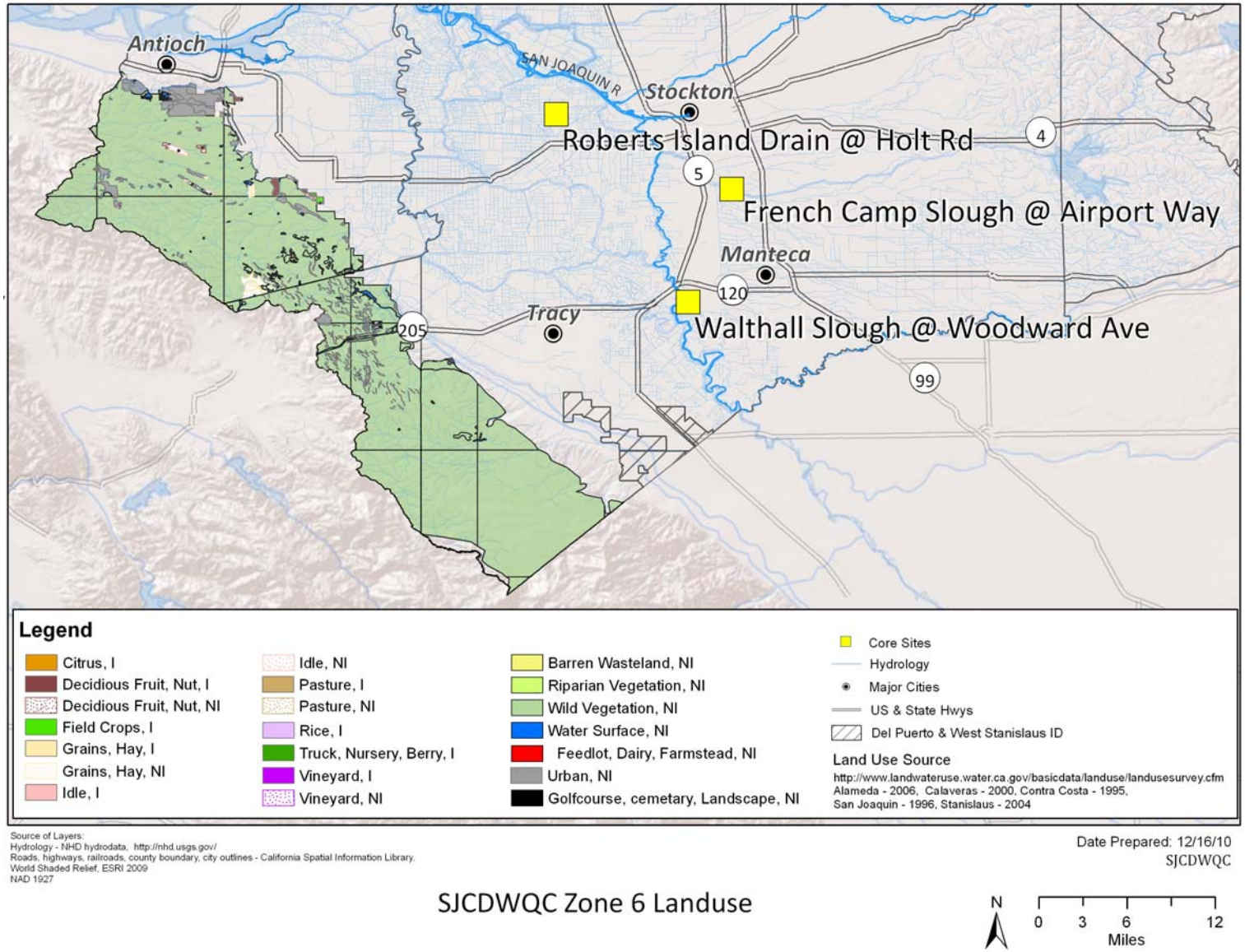


Figure 7. Land use for Contra Costa Zone (Zone 6).



MONITORING OBJECTIVES AND DESIGN

MONITORING JANUARY 2010 THROUGH DECEMBER 2010

From January 2010 through December 2010 the Coalition conducted both normal monitoring and Management Plan Monitoring based on an approved MRPP (pages 32-34) and Management Plan submitted on September 30, 2008 (annual updates are submitted on April 1 of each year).

As part of Normal Monitoring during the 2010 monitoring year, the Coalition sampled both Core and Assessment Monitoring locations once a month including at least one storm event and two sediment events. The following section briefly describes the objectives of Normal Monitoring (Core (C), Assessment (A) and Sediment Monitoring), Management Plan Monitoring (MPM), the DPR grant monitoring, 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 12 sites from January through December 2010; six sites were part of the Normal Monitoring schedule found in the MRPP (Table 9, page 55). Additional samples were collected for chlorpyrifos and diazinon as part of DPR grant activities to evaluate the effectiveness of management practices, outreach and education within selected subwatersheds. The DPR grant monitoring began in June 2010 and will continue through February 2011. Nine sites were sampled for Management Plan Monitoring (MPM) as outlined in the SJCDWQC Management Plan Update Report (MPUR); two sites (Grant Line Canal @ Clifton Court and Grant Line Canal near Calpack Rd) were monitored as MPM only and four sites (Duck Creek @ Hwy 4, Littlejohns Creek @ Jack Tone Road, Lone Tree Creek @ Jack Tone Road and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) were monitored for MPM and/or to meet DPR grant monitoring requirements.

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 4 and 5). Monitoring constituents are established by the Monitoring and Reporting Program (MRP) (Order No. R5-2008-0005) (Table II.D, pages 12-14) and are discussed in more detail at the end of this section.

Table 4. Monitoring Parameters.

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
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	
Aldicarb	Assessment
Carbaryl	Assessment
Carbofuran	Assessment
Methiocarb	Assessment
Methomyl	Assessment
Oxamyl	Assessment
Organochlorines	
Dichlorodiphenyldichloroethane (DDD)	Assessment
Dichlorodiphenyldichloroethylene (DDE)	Assessment
Dichlorodiphenyltrichloroethane (DDT)	Assessment
Dicofol	Assessment
Dieldrin	Assessment
Endrin	Assessment
Methoxychlor	Assessment

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
Additional Group A*	
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
Organophosphates	
Azinphos-methyl	Assessment
Chlorpyrifos	Assessment
Diazinon	Assessment
Dichlorvos	Assessment
Dimethoate	Assessment
Demeton-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
Copper (total and dissolved)	Assessment
Lead (total and dissolved)	Assessment
Nickel (total and dissolved)	Assessment
Molybdenum (total)	Assessment
Selenium (total)	Assessment

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
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
Deltamethrin: Tralomethrin	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

*Monitored at a single location due to past exceedances.

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

Table 5. SJCDWQC January through December 2010 Monitoring Schedule including site name, identification (ID), zone and constituent groups.

SJCDWQC January through December 2010 Monitoring Schedule-part 1		Nutrients					Pathogen	Field Parameters				Physical Parameters				Metals										Pesticides																
																										Organophosphates																
Zone	Site Name	Total Ammonia	Nitrate + Nitrite (as N)	Soluble Orthophosphate	Total Kjeldahl Nitrogen	Total Phosphorous	*E. coli*	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity	TOC	Total Dissolved Solids	Total Suspended Solids	Arsenic (Total)	Boron (Total)	Cadmium (Dissolved/Total)	Copper (Dissolved/Total)	Lead (Dissolved/Total)	Molybdenum (Total)	Nickel (Dissolved/Total)	Selenium (Total)	Zinc (Dissolved/Total)	Hardness (Dissolved)	Azinphos-methyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Demeton-s	Disulfoton	Malathion	Methamidophos	Methidathion	Parathion, methyl	Phorate	Phosmet
1	Mokelumne River @ Bruella Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M																				
2	Duck Creek @ Hwy 4							F	F	F	F																M[3]	M[3]											
	French Camp Slough @ Airport Way	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M								M												
	Littlejohns Creek @ Jack Tone Rd							F	F	F	F								M								M[3]	M[2]											
	Lone Tree Creek @ Jack Tone Rd							F	F	F	F								M								M[3]	M[3]											
	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd							F	F	F	F								M								M[3]	M[2]											
3	Drain @ Woodbridge Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Terminous Tract Drain @ Hwy 12	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A,M	A,M	A	A	A	A	A	A	A	A	A	A
4	Grant Line Canal @ Clifton Court Rd							F	F	F	F								M								M											
	Grant Line Canal near Calpack Rd							F	F	F	F																M											
	Roberts Island Drain @ Holt Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C											C	C	C	C	C	C	C	C		C	C	C	C
5	Walthall Slough @ Woodward Ave	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

A - Assessment monitoring constituent
C - Core monitoring constituent
DPR-Constituent monitored as part of DPR grant monitoring
F-Sites with M collect field parameters but this does not indicate that sites with (F) are under a management plan.
M - Management Plan Monitoring for Priority A-D constituents during months of past exceedances
[2]DPR Monitoring Only
[3]MPM and DPR Monitoring

SJCDWQC January through December 2010 Monitoring Schedule-part 2		Pesticides																																		Water Column Toxicity			Sediment		
		Organochlorines							Carbamates						Herbicides								Group A																	Toxi-city	Physical Para-meters	
Zone	Site Name	DDD	DDE	DDT	Dicofol	Dieldrin	Endrin	Methoxychlor	Aldicarb	Carbaryl	Carbofuran	Methiocarb	Methomyl	Oxamyl	Atrazine	Cyanazine	Diuron[4]	Linuron[4]	Simazine	Trifluralin	Paraquat	Glyphosate	Aldrin	Chlordane	Heptachlor	Heptachlor epoxide	HCH, alpha	HCH, beta	HCH, delta	HCH, gamma	Endosulfan I	Endosulfan II	Toxaphene	*Ceriodaphnia dubia*	*Pimephales promales*	*Selenastrum capricornutum*	*Hyalella azteca*[1]	TOC	Grain size
1	Mokelumne River @ Bruella Rd																																		M					
2	Duck Creek @ Hwy 4																																M		M	M[2]	M[2]	M[2]
	French Camp Slough @ Airport Way					M			C	C	C	C	C	C			C	C																	M	M	M	M
	Littlejohns Creek @ Jack Tone Rd																																		M	M[2]	M[2]	M[2]
	Lone Tree Creek @ Jack Tone Rd																M																		M	M[2]	M[2]	M[2]
	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd																M		M															M		M	M[3]	M[3]	M[3]
3	Drain @ Woodbridge Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A	A	A	A
	Terminous Tract Drain @ Hwy 12	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A,M	A	A	A
4	Grant Line Canal @ Clifton Court Rd																																			M	M	M	M
	Grant Line Canal near Calpack Rd																																			M	M	M	M
	Roberts Island Drain @ Holt Rd																																C						
5	Walthall Slough @ Woodward Ave	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

A - Assessment monitoring constituent
C - Core monitoring constituent
M - Management Plan Monitoring for Priority A-D constituents during months of past exceedances
[1]If *Hyalella* survival is less than 80% compared to the control, the following pesticides will be analyzed for: bifenthrin, cyfluthrin, cypermethrin, deltamethrin/tralomethrin, esfenvalerate, lambda-cyhalothrin, permethrin, fenpropathrin and chlorpyrifos
[2]DPR Monitoring Only, [3]MPM and DPR Monitoring
[3]Diuron and linuron analyzed as carbamates.

MONITORING DESIGN

Normal Monitoring

Starting October 2008 the Coalition began monitoring under a new MRPP (Table 9, page 55) 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 6 illustrates the locations and seasons that the Coalition has monitored from 2004 through 2010.

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 dictates the rotation to a new Assessment Monitoring location in a different zone. During that year the associated Core Monitoring location in the same zone is monitored for all assessment constituents, as outlined in the SJCDWQC MRPP monitoring schedule (Table 9, page 55).

In order to monitor following a storm event, the Coalition attempts to sample within three days following a rainfall event that exceeds 0.50 inches within 24 hours. Storm samples were collected on January 13, 2010.

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, and includes a diversity of water body size and flows. Data generated from the Core Monitoring sites is used to establish trend information about water quality and to assess 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.

Sediment Monitoring

Sediment samples are collected twice a year. Storm season sediment samples are collected after the winter rainfall events and before the height of the irrigation season (between March 1 and April 30). Irrigation season sediment samples are collected at the end of the irrigation season (between August 15 and October 15). Storm sediment samples were collected on March 16, 2010 and irrigation sediment samples were collected on September 7, 2010 and sediment samples for DPR grant monitoring samples were collected on September 14, 2010.

Table 6. Sample sites and years monitored.

Station Name	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm*	Winter	Irrigation	Fall	Winter	Storm	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			x	x	x	x
Duck Creek @ Drais Rd[1]									x									
Duck Creek @ Hwy 4	x				x	x	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	x	x	x	x
Grant Line Canal @ Clifton Court Rd		x	x	x	x	x	x	x	x								x	
Grant Line Canal near Calpack Rd		x	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								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		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	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	x	x	x	x

Station Name	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm*	Winter	Irrigation	Fall	Winter	Storm	Irrigation	Fall
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				
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	x	x	x	x
Unnamed Drain to Lone Tree Creek @ Jack Tone					x	x	x	x	x				x		x	x	x	x
Unnamed Drain to Lone Tree Creek @ Wagner Rd[1]									x									
Walthall Slough @ Woodward Ave												x	x	x	x	x	x	x

[1]Upstream sampling of normal monitoring locations conducted for source identification.
[2]Monitored April through 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 2010 Management Plan Monitoring occurred at nine sites: Duck Creek @ Hwy 4, French Camp Slough @ Airport Way, Grant Line Canal near Calpack Rd, Grant Line Canal @ Clifton Court, Littlejohns Creek @ Jack Tone Rd, Lone Tree Creek @ Jack Tone Rd, Mokelumne River @ Bruella Rd, Terminous Tract Drain @ Hwy 12 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. Additional monitoring included toxicity analysis for *Ceriodaphnia, Hyalella* and *Selenastrum,* a well as chemistry analyses for copper, chlorpyrifos, diazinon, dieldrin, diuron, and simazine (Table 7). Details on the process and the schedule of 2010 Management Plan Monitoring are found in the SJCDWQC Management Plan Update submitted April 1, 2010 to the Regional Board.

Department of Pesticide Regulation Grant Monitoring

Supplemental sampling was conducted for chlorpyrifos, diazinon and *Hyalella* toxicity as part of DPR grant monitoring to assess the effectiveness of additional outreach and education (crop specific management practice workbooks) on water and sediment quality. The DPR grant monitoring occurred from June 2010 through December in 2010 and will continue through February 2011.

Table 7. 2010 Management Plan Monitoring sites and constituents

Grey columns indicate additional DPR grant monitoring.

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Diazinon	Dieldrin	Diuron	Simazine	*Hyalella azteca*	Chlorpyrifos for DPR	Diazinon for DPR	*Hyalella Azteca* for DPR
Lone Tree Creek @ Jack Tone Rd	2010	January		X	X	X	X		X					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	January	X			X			X	X				
Duck Creek @ Hwy 4	2010	February		X			X							
Lone Tree Creek @ Jack Tone Rd	2010	February		X	X	X	X		X					
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	February	X	X		X			X	X				
Lone Tree Creek @ Jack Tone Rd	2010	March		X										
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	March		X										
Duck Creek @ Hwy 4	2010	April	X	X		X								
Lone Tree Creek @ Jack Tone Rd	2010	April		X										
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	April			X									
Grant Line Canal near Calpack Rd	2010	April		X										
Littlejohns Creek @ Jack Tone Rd	2010	April		X		X								

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Diazinon	Dieldrin	Diuron	Simazine	*Hyalella azteca*	Chlorpyrifos for DPR	Diazinon for DPR	*Hyalella Azteca* for DPR
Terminous Tract Drain @ Hwy 12	2010	April		X										
French Camp Slough @ Airport Way	2010	April		X										
Mokelumne River @ Bruella Rd	2010	April		X										
Duck Creek @ Hwy 4	2010	May		X		X								
Lone Tree Creek @ Jack Tone Rd	2010	May		X										
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	May		X	X	X								
Grant Line Canal @ Clifton Court Rd	2010	May		X	X									
Grant Line Canal near Calpack Rd	2010	May		X		X								
Littlejohns Creek @ Jack Tone Rd	2010	May			X									
Terminous Tract Drain @ Hwy 12	2010	May		X										
French Camp Slough @ Airport Way	2010	May			X	X								
Mokelumne River @ Bruella Rd	2010	May		X										
Duck Creek @ Hwy 4	2010	June				X						X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	June				X						X	X	
Grant Line Canal @ Clifton Court Rd	2010	June			X									
Littlejohns Creek @ Jack Tone Rd	2010	June			X	X						X	X	
French Camp Slough @ Airport Way	2010	June			X									
Lone Tree Creek @ Jack Tone Rd	2010	June										X	X	
Mokelumne River @ Bruella Rd	2010	June			X									
Duck Creek @ Hwy 4	2010	July	X			X						X	X	
Lone Tree Creek @ Jack Tone Rd	2010	July			X	X						X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	July			X	X						X	X	
Grant Line Canal @ Clifton Court Rd	2010	July			X									
Grant Line Canal near Calpack Rd	2010	July		X		X								
Littlejohns Creek @ Jack Tone Rd	2010	July		X		X						X	X	
French Camp Slough @ Airport Way	2010	July			X	X		X						
Mokelumne River @ Bruella Rd	2010	July		X	X									
Duck Creek @ Hwy 4	2010	August				X						X	X	
Lone Tree Creek @ Jack Tone Rd	2010	August			X	X						X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	August			X							X	X	
Grant Line Canal @ Clifton Court Rd	2010	August			X									
Grant Line Canal near Calpack Rd	2010	August				X								
Littlejohns Creek @ Jack Tone Rd	2010	August		X								X	X	
Terminous Tract Drain @ Hwy 12	2010	August				X								

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Diazinon	Dieldrin	Diuron	Simazine	*Hyalella azteca*	Chlorpyrifos for DPR	Diazinon for DPR	*Hyalella Azteca* for DPR
French Camp Slough @ Airport Way	2010	August			X	X								
Mokelumne River @ Bruella Rd	2010	August		X	X									
Duck Creek @ Hwy 4	2010	September	X			X						X	X	X
Lone Tree Creek @ Jack Tone Rd	2010	September			X							X	X	X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	September	X		X	X					X	X	X	X
Grant Line Canal @ Clifton Court Rd	2010	September			X	X					X			
Littlejohns Creek @ Jack Tone Rd	2010	September			X							X	X	X
Terminous Tract Drain @ Hwy 12	2010	September				X								
French Camp Slough @ Airport Way	2010	September				X					X			
Grant line Canal near Calpack Rd	2010	September									X			
French Camp Slough @ Airport Way	2010	October				X								
Duck Creek @ Hwy 4	2010	October										X	X	
Lone Tree Creek @ Jack Tone Rd	2010	October										X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	October										X	X	
Littlejohns Creek @ Jack Tone Rd	2010	October										X	X	
Duck Creek @ Hwy 4	2010	November										X	X	
Lone Tree Creek @ Jack Tone Rd	2010	November										X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	November										X	X	
Littlejohns Creek @ Jack Tone Rd	2010	November										X	X	
Duck Creek @ Hwy 4	2010	December										X	X	
Lone Tree Creek @ Jack Tone Rd	2010	December										X	X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2010	December										X	X	
Littlejohns Creek @ Jack Tone Rd	2010	December										X	X	

MONITORING SEASONS

The Coalition categorizes monitoring by "seasons"; fall, winter, irrigation, and storm. Fall monitoring (October – December) occurs during a time period after irrigation has finished and generally before dormant sprays. Winter monitoring (January and March) occurs when dormant sprays are expected as well as significant rainfall. Irrigation season (April – September) sampling is scheduled to characterize the discharge from irrigated agriculture and irrigation return flows (Table 8). 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 8. Description of Monitoring Seasons.

SEASON	MONTH RANGE	DESCRIPTION
Fall	October through December	No irrigation.
Winter	January through 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 through September	Summer months with possible irrigation.

MONITORING CONSTITUENTS

All monitoring constituents are listed in Table 5. 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, or from drift to surface waters during spraying. Irrigation return flows from fields or storm water runoff can move sediment and chemicals to surface waters. 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 healthy aquatic communities. The Coalition's objective is to determine if exceedances of nutrient trigger limits are occurring and to determine if potential sources can be identified through analysis of monitoring data. However, sources of nutrients and physical parameters such as organic carbon 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 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, dissolved oxygen, and specific conductance 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. In the case of specific conductance, the tidal flux plays a role in determining Delta salinity. 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 if 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 proliferation 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.

Metals

Nine metals are analyzed during 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 Environmental Protection Agency (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.

Of the nine metals there are four general classes: 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 nickel 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 uses monitoring data to determine if exceedances are occurring.

SAMPLING SITE DESCRIPTIONS AND RAINFALL RECORDS

The site names, zones, sample types, station codes, locations, and land use acreage of all sites monitored between January 2010 and December 2010 are provided in Tables 9 and 10.

A narrative description of each site subwatershed with respect to hydrology and agricultural production follows below. Location maps of sampling sites, crops and land uses are provided in the Land Use Maps and 2010 Annual Site Photos Appendix VIII.

SJCDWQC region rainfall data for the months January 2010 through December 2010 are described in the section “Record of Rainfall”.

Table 9. SJCDWQC sampling locations – January through December 2010.

ZONE	SITE TYPE[1]	2010 MONITORING	SITE NAME	STATION CODE	LATITUDE	LONGITUDE
1	Core	C,MPM	Mokelumne River @ Bruella Rd	531XMRABR	38.160100	-121.205100
2	Assessment	MPM,DPR	Duck Creek @ Highway 4	531XDCAHF	37.949100	-121.181000
2	Core	C,MPM	French Camp Slough @ Airport Way	531SJC504	37.881700	-121.249300
2	Assessment	MPM,DPR	Littlejohns Creek @ Jack Tone Rd	531XLCAJR	37.889600	-121.146100
2	Assessment	MPM,DPR	Lone Tree Creek @ Jack Tone Rd	531XLTCJR	37.837600	-121.143800
2	Assessment	MPM,DPR	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.853580	-121.145700
3	Assessment	A	Drain @ Woodbridge Rd	544DAWRXX	38.152560	-121.500950
3	Assessment	A,MPM	Terminous Tract Drain @ Hwy 12	544XTTHWT	38.116600	-121.493600
4	Assessment	MPM	Grant Line Canal @ Clifton Court Rd	544XGLCAA	37.841400	-121.528800
4	Assessment	MPM	Grant Line Canal near Calpack Rd	544XGLCCR	37.820500	-121.499900
4	Core	C	Roberts Island Drain @ Holt Rd	544RIDAHT	37.955600	-121.422300
5	Assessment	A	Walthall Slough @ Woodward Ave	544WSAWAV	37.770460	-121.292270

A-Assessment Monitoring
C-Core Monitoring
DPR-Department of Pesticide Regulation grant monitoring
MPM-Management Plan Monitoring
[1] Site types are either Assessment or Core based on the SJCDWQC MRPP (pages 32-34). The yearly monitoring conducted at each sample site depends on the rotation schedule outlined in the SJCDWQC MRPP (Table 9, page 55) where Core site locations rotate into Assessment Monitoring locations every third year.

Table 10. SJCDWQC Land Use Acreage of Site Subwatersheds January through December 2010. The land uses are designated as irrigated/non-irrigated (I/NI). Sites are listed alphabetically from Drain @ Woodbridge Rd to Walthall Slough @ Woodward Ave.

Land Use*	I/NI	Drain @ Woodbridge Rd	Duck Creek @ Hwy 4	French Camp Slough @ Airport Way	Grant Line Canal near Calpack Rd	Grant Line Canal @ Clifton Ct	Littlejohns Creek @ Jack Tone Rd	Lone Tree Creek @ Jack Tone Rd	Mokelumne River @ Bruella Rd	Roberts Is Drain @ Holt Rd	Terminous Tract @ Hwy 12	Unnamed Drain to Lone Creek @ Jack Tone Rd	Walthall Slough @ Woodward Ave
Citrus	I			11.368				11.368	5.050	5.616			
Deciduous Nut And Fruit	I	5.468	2828.764	14154.524			2895.972	7420.070	2617.025			1616.054	768.378
Deciduous Nut And Fruit	NI								4.264				
Field Crop	I	2308.509	2415.043	7903.712	316.832		1932.860	2221.058	593.837	378.667	5100.904	3358.491	1287.111
Grain And Hay	I	760.992	3983.131	15665.411	49.061	259.166	3848.697	5655.197	98.271	312.165	2056.802	6721.814	2238.737
Grain And Hay	NI		31.274	349.427			282.858	22.673				87.666	
Idle	I		64.560	737.513			109.026	270.571	492.512		37.114	246.630	27.184
Idle	NI			42.443								42.443	
Barren Wasteland	NI								11.381				
Raparian Vegetation	NI			16.280				6.464	336.610		50.770	9.816	28.435
Wild Vegetation	NI	229.172	15569.318	31712.059			15370.328	122.394	45983.202		310.521	16033.835	252.415
Water Surface	NI		24.177	81.193			23.906	4.153	2154.243			60.067	85.941
Pasture	I	649.357	1613.706	15922.050	672.123		1866.911	8014.194	1027.185	354.654	1067.392	6393.799	2376.194
Pasture	NI												
Rice	I			5973.533				3146.382				4929.080	
Feedlot, Dairy, Farmstead	NI	9.654	165.138	2442.479			265.579	1102.752	177.875	16.743	19.470	936.976	349.316
Truck, Nursery, Berry	I	306.121	2252.369	6533.473	32.066		2549.644	809.452	337.757	119.921	1275.641	1787.058	903.993
Urban	NI	6.553	126.136	3571.831			502.754	1381.576	556.470		143.712	402.925	62.996
Golfcourse, Cemetery, Landscape	NI		18.047	168.352			8.704	51.695	14.460				
Vineyard	I	508.068	1888.029	8792.216			4393.171	1684.111	6464.766			4839.070	30.911
Vineyard	NI												
Total Acres		**4783.894**	**30979.692**	**114077.864**	**1070.082**	**259.166**	**34050.410**	**31924.110**	**60874.908**	**1187.766**	**10413.003**	**47465.724**	**8411.611**
Irrigated Acres		**4538.515**	**15045.602**	**75693.800**	**1070.082**	**259.166**	**17596.281**	**29232.403**	**11636.403**	**1171.023**	**9888.530**	**29891.996**	**7632.508**

* Land use information was obtained from data provided by California Department of Water Resources, http://www.landwateruse.water.ca.gov/annualdata/landuse/2001/landuselevels.cfm. Data was compiled in 2001 and land use in some parts of the SJCDWQC area may have changed since that time.

SITE SUBWATERSHED DESCRIPTIONS

The Coalition sampled a total of 12 site subwatersheds as part of Normal Monitoring and Management Plan Monitoring between January and December 2010. Descriptions of the site subwatersheds for all sample sites are provided below alphabetically. Land use maps of each site subwatershed can be found in Appendix VIII (Land Use Maps and 2010 Annual Site Photos).

- 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 just downstream 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 (15,046 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 (75,694 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.

- Grant Line Canal near Calpack Road (1,070 irrigated acres) – This site is located on the south west section of Union Island. The site is adjacent to Grant Line Canal and drains fields immediately north and east. The crops grown are primarily alfalfa, field crops, tomatoes and grain.

- Grant Line @ Clifton Court Road (259 irrigated acres) – This site is located on the southwest section of Union Island. The site is west of the Grant line Canal @ Calpack Rd. site immediately south of Clifton Court and drains fields east and south. The crops are primarily alfalfa, field crops, tomatoes and grain.

- Littlejohns Creek @ Jack Tone Road (17,596 irrigated acres) – This site is upstream from the French Camp Slough @ Airport Way site. The crops grown in the site subwatershed represent all of the major types of agriculture present in the Coalition region including field crops, orchards, grains, and vineyards as well as irrigated pasture.

- Lone Tree Creek @ Jack Tone Road (29,232 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 (11,636 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.

- 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.

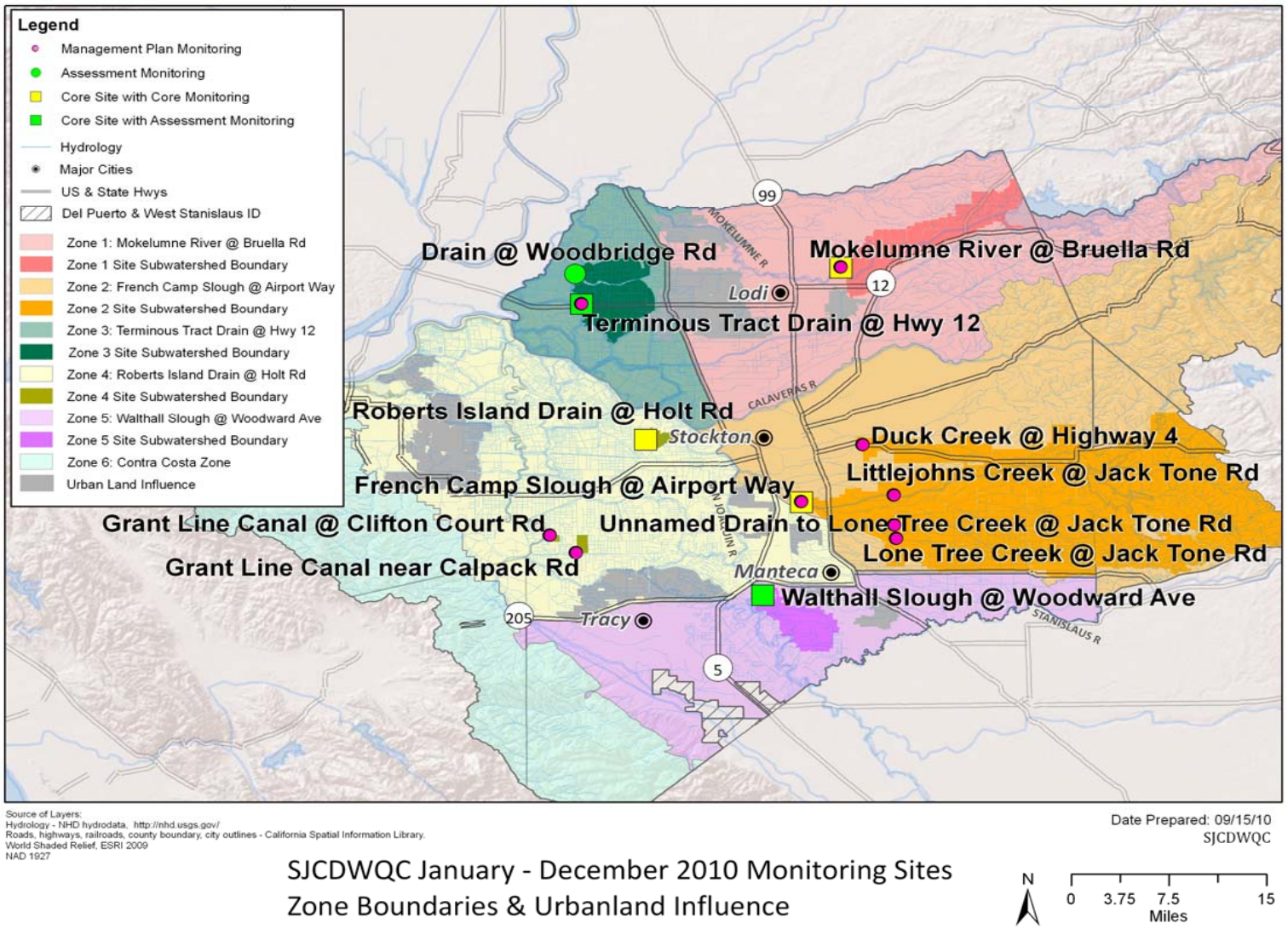
- Unnamed Drain to Lone Tree Creek @ Jack Tone Road (29,892 irrigated acres) – This site subwatershed is located to the north of the Lone Tree Creek site subwatershed and south of Littlejohns Creek. The drain forms in the eastern portion of San Joaquin County and flows west and eventually confluences 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 8 maps all site subwatersheds sampled from January through December 2010. Zone boundaries are also mapped for reference.

Figure 8. SJCDWQC January through December 2010 Monitoring Sites relative to Zone Boundaries.



RAINFALL RECORDS

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 January 2010 and December 2010. 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. These graphs can be found below in Figure 9 (January 2010 – March 2010), Figure 10 (April 2010 – June 2010), and Figure 11 (October 2010 – December 2010).

January 2010 through March 2010

The first substantial storm system occurred on January 12-13, 2010 resulting in 0.67 inches of precipitation in Stockton and 0.57 inches in Modesto over the two day period (Figure 9). The first sampling event of the year had been scheduled for January 12, 2010, but since weather predictions suggested the majority of the precipitation would occur on January 13, 2010, sampling was conducted a day later in anticipation of more precipitation. As predicted, the majority of the storm's precipitation fell in the early morning of January 13 before sample collection started. By holding off a day to sample, the trigger limit of 0.5 inches in 24 hours was met and the storm runoff event was captured.

The largest storm system of the month lasted a little over a week from January 16-23, 2010, and resulted in considerable amounts of precipitation in the region. Over those eight days Stockton received 2.09 inches of precipitation and Modesto received 2.25 inches (Figure 9). Since the Coalition had already sampled the week prior, a second sampling event to catch storm runoff was not conducted.

February had several small storms but none of them resulted in precipitation greater than 0.50 inches in 24 hours. February's first storm came through the region on February 5-6, 2010. Stockton received 0.38 inches of precipitation and Modesto reported 0.27 inches (Figure 9). The next system occurred on February 8-9, 2010 and during this storm Stockton received 0.48 inches of precipitation and Modesto reported 0.38 inches (Figure 9). The precipitation was too low to reach the trigger limit of 0.50 inches in 24 hours so it was not considered a storm event when Winter 1 sampling took place on February 9, 2010.

Following the first two storms, the remaining days in February reported less than 0.36 inches of precipitation per day in the Stockton and Modesto areas. The next storm on February 23-24, 2010 resulted in 0.37 inches of precipitation in Stockton and 0.5 inches in Modesto (Figure 9). The final storm in February occurred on February 26-27, 2010 with 0.37 inches of precipitation being deposited in Stockton and 0.11 inches in Modesto (Figure 9). None of these remaining storms met the trigger limit of 0.5 inches in 24 hours.

The first storm event in March occurred on March 2-4, 2010 resulting in 0.82 inches of precipitation in Stockton and 0.48 inches in Modesto (Figure 9). This storm met the storm trigger limit in Stockton but not in Modesto and therefore storm monitoring was not conducted. Smaller rain shower events occurred on March 8, 10, 12, 24, 30, and 31, 2010, none of which resulted in precipitation above the 0.5 inch trigger limit in 24 hours (Figure 9).

April 2010 through June 2010

There were no storm events monitored between April and June 2010.

An April storm started two days before the scheduled sampling date of April 13, 2010 (Figure 10). Over the two day period, April 11-12, 2010, Stockton recorded 0.36 inches of precipitation and Modesto recorded 0.52 inches (Figure 10). The amount of precipitation did not meet the trigger limit for Stockton and therefore the April 13, 2010 sampling event was not considered a storm event. It should still be noted that the region received a significant amount of precipitation prior to sampling on April 13, 2010.

The heaviest precipitation for the month occurred on April 20-22, 2010 with 1.03 inches of precipitation in Stockton and 0.95 inches in Modesto (Figure 10). Since the Coalition had already sampled the week prior, a second sampling event was not conducted during the month of April to capture this storm runoff.

May was dry as is common in the San Joaquin region, with only four days experiencing precipitation (May 10, 18, 25 and 27, 2010). Total accumulation for the month of May was 0.31 inches in Stockton and 0.25 inches in Modesto (Figure 10).

June was a dry month, as is typical for the San Joaquin region, with only one day of measurable precipitation. Modesto recorded 0.02 inches of precipitation on June 25, 2010 (Figure 10). Stockton recorded no measurable precipitation in the month of June.

July 2010 through September 2010

There were no storm events monitored between July and September 2010.

The first of July through the last day of September only had one day with any measurable precipitation. On September 22, 2010, 0.01 inches of precipitation was reported in Stockton, and was the only precipitation the San Joaquin region received for the last three months of summer. No graph is included for July through September due to the lack of measurable precipitation.

October 2010 through December 2010

There were no storm events monitored between October and December 2010.

The first part of October was dry with little measurable precipitation (Figure 11). The only substantial storm in October lasted three days, from October 22, 2010 through October 24, 2010. Stockton received 1.2 inches of precipitation and Modesto received 0.52 inches during the length of the storm (Figure 11).

November had one day with heavy precipitation that almost met the trigger limit. On November 7, 2010 Stockton received 0.76 inches of precipitation; however, Modesto only received 0.41 inches. The

remaining storm systems in November did not make the trigger limit, with the highest daily precipitation equaling 0.33 inches for Modesto and 0.28 inches for Stockton (Figure 11).

December had many small storms that never resulted in sufficient precipitation in 24 hours to reach the trigger limit. The first half of the month had seven days with precipitation totaling less than a quarter of an inch. The last 15 days of December had 10 days with precipitation, only one of which exceeded the trigger limit in Stockton with 0.69 inches; however, the trigger limit was not met in Modesto (0.30 inches, Figure 11).

Figure 9. Precipitation history for Stockton and Modesto, January 1 – March 31, 2010.

The shaded gray area represents the trigger to initiate sampling: 0.5" rain in 24 hours. The SJCDWQC storm1 sampling event on took place on 1/13/10. No second event took place. All data reported on weatherunderground.com.

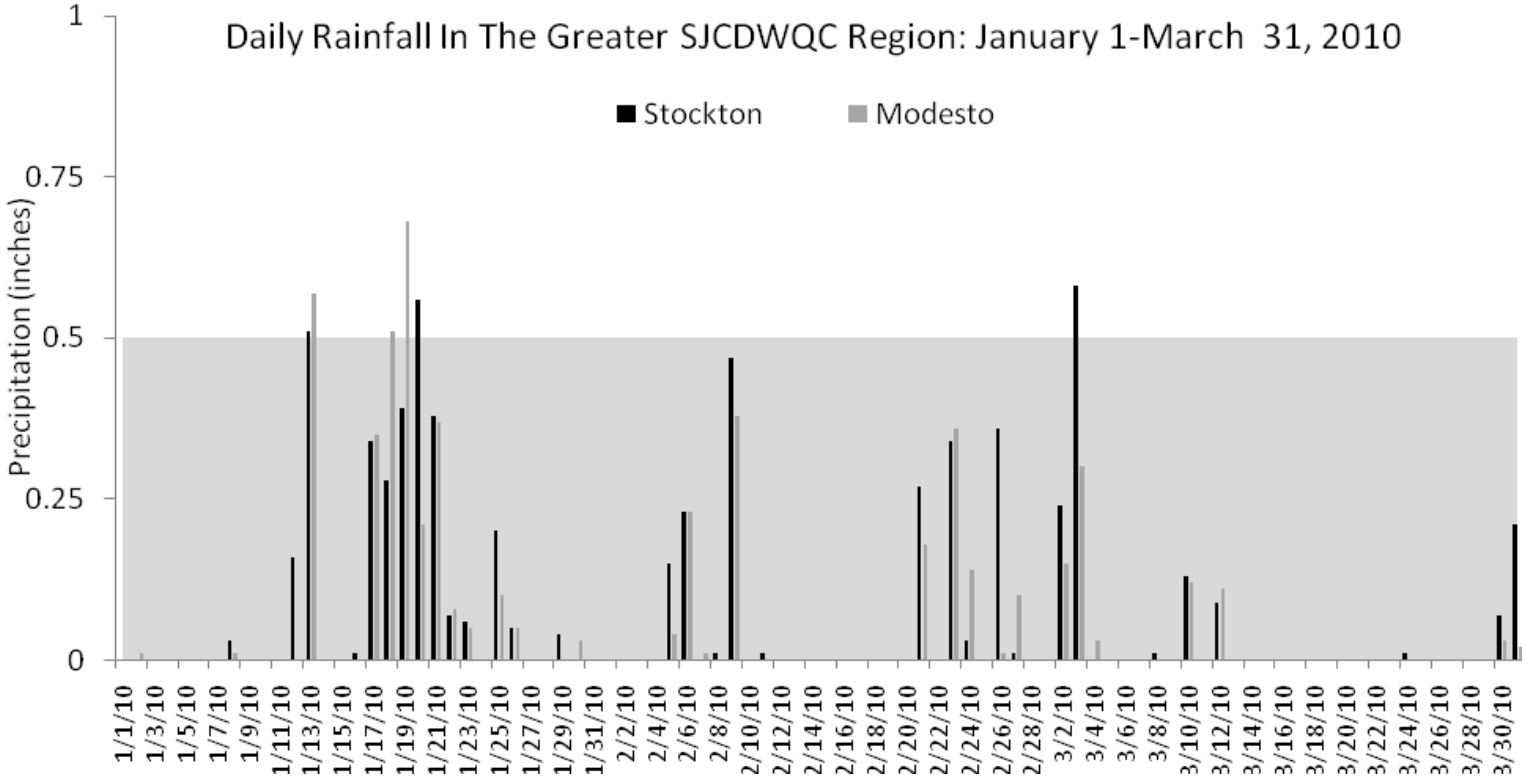


Figure 10. Precipitation history for Stockton and Modesto, April 1 – June 30, 2010.

The shaded gray area represents the trigger to initiate sampling: 0.5" rain in 24 hours. All data reported on weatherunderground.com.

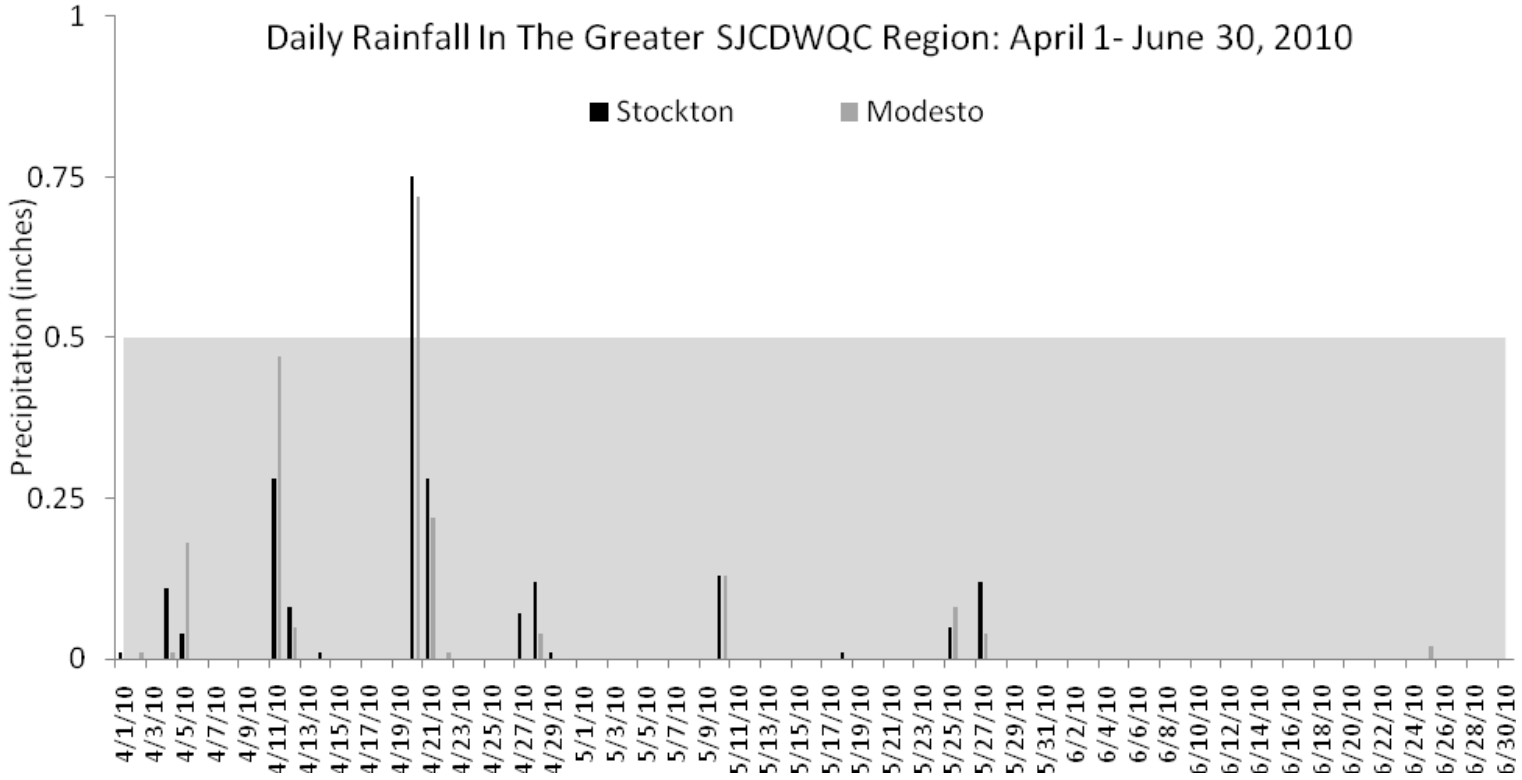
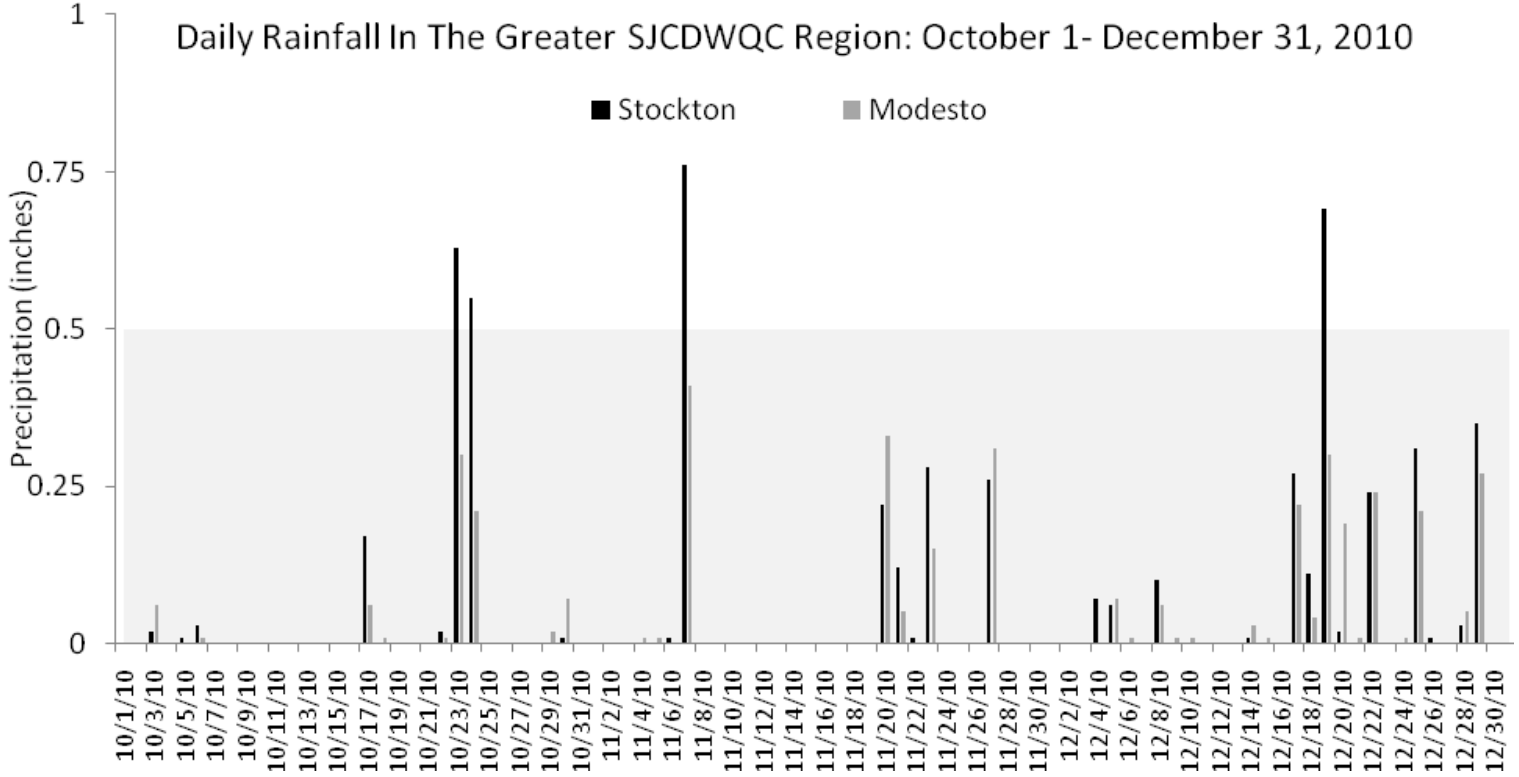


Figure 11. Precipitation history for Stockton and Modesto, October 1, 2010 - December 31, 2010.
All data recorded in Merced, CA and reported on weatherunderground.com.



MONITORING RESULTS

SAMPLE DETAILS

Original Chain of Custody (COC) forms were scanned and converted to pdf files for submission with this report (Appendix I). Chain of Custody forms 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) (page 35) approved on January 18, 2011. 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 on page 2 of Appendix I.

Full monitoring results from sampling that occurred from January 2010 through December 2010 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.

Instantaneous loads are calculated for all detections (Appendix II, Table II-7) 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 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.

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 11.

All field data sheets can be found in Appendix IX. All laboratory reports and Level III data packages for 2010 will be submitted along with this report on March 1, 2011. Instantaneous load calculation for TMDL compliance will be included in the Management Plan Update Report (MPUR) to be submitted on April 1, 2011.

Table 11. Sample details for January through December 2010 (sorted by station name, sample date and monitoring event). Non contiguous water bodies are noted in the Season/Group column.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Drain @ Woodbridge Rd	544DAWRXX	NM	Storm1	01/13/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Winter1	02/09/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Winter2	03/16/10	08:10	None	Discharge recorded as zero due to no measurable flow.
Drain @ Woodbridge Rd	544DAWRXX	Sediment	Winter2	03/16/10	08:10	None	Pesticides analyzed in toxic sediment only; Discharge recorded as zero due to no measurable flow.
Drain @ Woodbridge Rd	544DAWRXX	NM	Irrigation1	04/13/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Irrigation2	05/11/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Irrigation3	06/08/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Irrigation4	07/13/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Irrigation5	08/10/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Irrigation6	09/07/10	08:20	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	Sediment	Irrigation6	09/07/10	08:20	None	Pesticides analyzed in toxic sediment only.
Drain @ Woodbridge Rd	544DAWRXX	NM	Fall1	10/12/10	08:00	None	Too deep to measure discharge.
Drain @ Woodbridge Rd	544DAWRXX	NM	Fall2	11/09/10	08:00	None	Discharge recorded as zero due to no measurable flow.
Drain @ Woodbridge Rd	544DAWRXX	NM	Fall3	12/07/10	08:00	None	Discharge recorded as zero due to no measurable flow.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Winter1, Management Plan Monitoring	02/09/10	09:10	None	February MPM for *Selenastrum* toxicity and diazinon.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation1, Management Plan Monitoring	04/13/10	09:20	None	April MPM for *Ceriodaphnia* and *Selenastrum* toxicity and chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation2, Management Plan Monitoring	05/11/10	09:00	None	May MPM for *Selenastrum* toxicity and chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation3, Management Plan Monitoring	06/08/10	09:10	None	June MPM for chlorpyrifos, and DPR grant monitoring for diazinon; Discharge recorded as zero due to no measurable flow..
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation4, Management Plan Monitoring	07/13/10	09:10	None	July MPM for *Ceriodaphnia* toxicity and chlorpyrifos, and DPR grant monitoring for diazinon.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation5, Management Plan Monitoring	08/10/10	09:00	None	August MPM for chlorpyrifos, and DPR grant monitoring for diazinon; Too deep to measure discharge.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation6, Management Plan Monitoring	09/07/10	09:00	None	September MPM for *Ceriodaphnia* toxicity and chlorpyrifos, and DPR grant monitoring for diazinon.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Duck Creek @ Hwy 4	531XDCAHF	DPR	Irrigation6	09/14/10	20:30	None	September DPR grant monitoring for *Hyalella* toxicity; Pesticides analyzed in toxic sediment only; Discharge not measured due to toxicity monitoring only.
Duck Creek @ Hwy 4	531XDCAHF	DPR	Fall1	10/12/10	11:10	None	October DPR grant monitoring for diazinon and chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	DPR	Fall2	11/09/10	08:50	None	November DPR grant monitoring for diazinon and chlorpyrifos; Discharge recorded as zero due to no measureable flow.
Duck Creek @ Hwy 4	531XDCAHF	DPR	Fall3	12/07/10	08:40	None	December DPR grant monitoring for diazinon and chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	NM	Storm1, Non Contiguous	01/13/10	11:10	None	Non contiguous water body, discharge recorded as zero.
French Camp Slough @ Airport Way	531SJC504	NM	Winter1	02/09/10	12:30	None	Too deep to measure discharge.
French Camp Slough @ Airport Way	531SJC504	NM	Winter2	03/16/10	12:30	None	
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation1, Management Plan Monitoring	04/13/10	12:30	None	
French Camp Slough @ Airport Way	531SJC504	MPM	Irrigation1, Management Plan Monitoring	04/13/10	12:30	None	April MPM for *Selenastrum* toxicity.
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation2, Management Plan Monitoring	05/11/10	13:20	None	
French Camp Slough @ Airport Way	531SJC504	MPM	Irrigation2, Management Plan Monitoring	05/11/10	13:20	None	May MPM for chlorpyrifos and copper.
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation3, Management Plan Monitoring	06/08/10	12:00	None	
French Camp Slough @ Airport Way	531SJC504	MPM	Irrigation3, Management Plan Monitoring	06/08/10	12:00	None	June MPM for copper.
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation4, Management Plan Monitoring	07/13/10	13:20	None	
French Camp Slough @ Airport Way	531SJC504	MPM	Irrigation4, Management Plan Monitoring	07/13/10	13:20	None	July MPM for copper, chlorpyrifos and dieldrin.
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation5, Management Plan Monitoring	08/10/10	12:40	None	

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
French Camp Slough @ Airport Way	531SJC504	MPM	Irrigation5, Management Plan Monitoring	08/10/10	12:40	None	August MPM for copper and chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation6, Management Plan Monitoring	09/07/10	15:50	None	
French Camp Slough @ Airport Way	531SJC504	MPM	Irrigation6, Management Plan Monitoring	09/07/10	15:50	None	September MPM for chlorpyrifos and *Hyalella* toxicity; Pesticides analyzed in toxic sediment only.
French Camp Slough @ Airport Way	531SJC504	NM	Fall1, Management Plan Monitoring	10/12/10	13:50	None	
French Camp Slough @ Airport Way	531SJC504	MPM	Fall1, Management Plan Monitoring	10/12/10	13:50	None	October MPM for chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	NM	Fall2, Non Contiguous	11/09/10	11:30	None	Non contiguous water body, discharge recorded as zero.
French Camp Slough @ Airport Way	531SJC504	NM	Fall3	12/07/10	11:30	None	
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation2, Management Plan Monitoring	05/11/10	11:10	None	May MPM for *Selenastrum* toxicity and copper.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation3, Management Plan Monitoring	06/08/10	11:10	None	June MPM for copper; Discharge recorded as zero due to no measurable flow.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation4, Management Plan Monitoring	07/13/10	11:20	None	July MPM for copper; Discharge recorded as zero due to no measurable flow.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation5, Management Plan Monitoring	08/10/10	11:00	None	August MPM for copper.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation6, Management Plan Monitoring	09/07/10	13:50	None	September MPM for copper, chlorpyrifos, and *Hyalella* toxicity; Pesticides analyzed in toxic sediment only.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation1, Management Plan Monitoring	04/13/10	11:30	None	April MPM for *Selenastrum* toxicity; Discharge not measured due to toxicity monitoring only.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation2, Management Plan Monitoring	05/11/10	12:20	None	May MPM for *Selenastrum* toxicity and chlorpyrifos; Pump station not running, discharge recorded as zero.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation4, Management Plan Monitoring	07/13/10	12:00	None	July MPM for chlorpyrifos, and *Selenastrum* toxicity.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation5, Management Plan Monitoring	08/10/10	11:40	None	August MPM for chlorpyrifos; Pump station not running, discharge recorded as zero.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation6, Management Plan Monitoring	09/07/10	14:50	None	September MPM for *Hyalella* toxicity; Discharge not measured due to toxicity monitoring only; Pesticides analyzed in toxic sediment only.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation1, Management Plan Monitoring	04/13/10	10:20	None	April MPM for *Selenastrum* toxicity and chlorpyrifos; Dams have been placed both upstream and downstream of sample location and have obstructed the water flow; Discharge recorded as zero due to no measurable flow.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation2, Management Plan Monitoring	05/11/10	09:40	None	May MPM for copper only; Too deep to measure discharge..
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation3, Management Plan Monitoring	06/08/10	09:40	None	June MPM for chlorpyrifos and copper, and DPR grant monitoring for diazinon; Too deep to measure discharge..
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation4, Management Plan Monitoring	07/13/10	09:50	None	July MPM for chlorpyrifos and *Selenastrum* toxicity, and DPR grant monitoring for diazinon; Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation5, Management Plan Monitoring	08/10/10	09:20	None	August MPM for *Selenastrum* toxicity, and DPR grant monitoring for diazinon and chlorpyrifos; Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation6, Management Plan Monitoring	09/07/10	10:40	None	September MPM for copper, and DPR grant monitoring for diazinon and chlorpyrifos; Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	DPR	Irrigation6	09/14/10	19:50	None	September DPR grant monitoring for *Hyalella* toxicity; Discharge not measured due to toxicity monitoring only; Pesticides analyzed in toxic sediment only.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	DPR	Fall1	10/12/10	11:30	None	October DPR grant monitoring for diazinon and chlorpyrifos; Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	DPR	Fall2	11/09/10	09:20	None	November DPR grant monitoring for diazinon and chlorpyrifos; Discharge recorded as zero due to no measurable flow.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	DPR	Fall3	12/07/10	09:20	None	December DPR grant monitoring for diazinon and chlorpyrifos; Discharge recorded as zero due to no measurable flow.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Storm1, Management Plan Monitoring	01/13/10	10:00	None	January MPM for *Selenastrum* toxicity, chlorpyrifos, diazinon, diuron and copper.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Winter1, Management Plan Monitoring	02/09/10	10:30	None	February MPM for *Selenastrum* toxicity, chlorpyrifos, diazinon, diuron and copper.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Winter2, Management Plan Monitoring	03/16/10	09:50	None	March MPM for *Selenastrum* toxicity; Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation1, Management Plan Monitoring	04/13/10	11:40	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	05/11/10	11:00	None	May MPM for *Selenastrum* toxicity; Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	DPR	Irrigation3	06/08/10	10:30	None	June DPR grant monitoring for chlorpyrifos and diazinon.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation4, Management Plan Monitoring	07/13/10	11:00	None	July MPM for chlorpyrifos and copper, and DPR grant monitoring for diazinon.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation5, Management Plan Monitoring	08/10/10	10:40	None	August MPM for chlorpyrifos and copper, and DPR grant monitoring for diazinon.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation6, Management Plan Monitoring	09/07/10	12:20	None	September MPM for copper and DPR grant monitoring for diazinon and chlorpyrifos.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	DPR	Irrigation6	09/14/10	19:30	None	September DPR grant monitoring for *Hyalella* toxicity; Discharge not measured due to toxicity monitoring only. Pesticides analyzed in toxic sediment only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	DPR	Fall1	10/12/10	12:00	None	October DPR grant monitoring for diazinon and chlorpyrifos.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	DPR	Fall2	11/09/10	10:50	None	November DPR grant monitoring for diazinon and chlorpyrifos.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	DPR	Fall3	12/07/10	10:00	None	December DPR grant monitoring for diazinon and chlorpyrifos.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Storm1	01/13/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter1	02/09/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter2	03/16/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation1, Management Plan Monitoring	04/13/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	MPM	Irrigation1, Management Plan Monitoring	04/13/10	08:00	None	April MPM for *Selenastrum* toxicity; Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation2, Management Plan Monitoring	05/11/10	08:00	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	MPM	Irrigation2, Management Plan Monitoring	05/11/10	08:00	None	May MPM for *Selenastrum* toxicity; Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation3, Management Plan Monitoring	06/08/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	MPM	Irrigation3, Management Plan Monitoring	06/08/10	08:00	None	June MPM for copper; Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation4, Management Plan Monitoring	07/13/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	MPM	Irrigation4, Management Plan Monitoring	07/13/10	08:00	None	July MPM for copper and *Selenastrum* toxicity, Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation5, Management Plan Monitoring	08/10/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	MPM	Irrigation5, Management Plan Monitoring	08/10/10	08:00	None	August MPM for copper and *Selenastrum* toxicity; Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation6	09/07/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall1	10/12/10	10:20	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall2	11/09/10	08:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall3	12/07/10	08:00	None	Too deep to measure discharge.
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Storm1	01/13/10	11:00	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Winter1	02/09/10	11:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Winter2	03/16/10	11:30	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation1	04/13/10	10:30	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation2	05/11/10	10:10	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation3	06/08/10	10:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation4	07/13/10	10:30	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation5	08/10/10	10:10	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Irrigation6	09/07/10	13:20	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall1	10/12/10	12:40	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall2	11/09/10	10:30	None	
Roberts Island Drain @ Holt Rd	544RIDAHT	NM	Fall3	12/07/10	10:40	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Storm1	01/13/10	09:10	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Winter1	02/09/10	09:20	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Winter2	03/16/10	09:30	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	Sediment	Winter2	03/16/10	09:30	None	Pesticides analyzed in toxic sediment only.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation1, Management Plan Monitoring	04/13/10	09:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM	Irrigation1, Management Plan Monitoring	04/13/10	09:00	None	April MPM for *Selenastrum* toxicity.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation2, Management Plan Monitoring	05/11/10	09:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM	Irrigation2, Management Plan Monitoring	05/11/10	09:00	None	May MPM for *Selenastrum* toxicity.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation3	06/08/10	08:50	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation4	07/13/10	09:00	None	Too deep to measure discharge.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation5, Management Plan Monitoring	08/10/10	09:00	None	Too deep to measure discharge.
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM	Irrigation5, Management Plan Monitoring	08/10/10	09:00	None	August MPM for chlorpyrifos; Too deep to measure discharge.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation6, Management Plan Monitoring	09/07/10	11:30	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM	Irrigation6, Management Plan Monitoring	09/07/10	11:30	None	September MPM for chlorpyrifos.
Terminous Tract Drain @ Hwy 12	544XTTHWT	Sediment	Irrigation6, Management Plan Monitoring	09/07/10	11:30	None	Pesticides analyzed in toxic sediment only.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall1	10/12/10	11:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall2	11/09/10	09:10	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall3	12/07/10	09:10	None	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Storm1, Management Plan Monitoring	01/13/10	09:10	None	January MPM for *Ceriodaphnia* toxicity, chlorpyrifos, diuron and simazine.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Winter1, Management Plan Monitoring	02/09/10	10:00	None	February MPM for *Ceriodaphnia* and *Selenastrum* toxicity, chlorpyrifos, diuron and simazine.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Winter2, Management Plan Monitoring	03/16/10	09:20	None	March MPM for *Selenastrum* toxicity; Discharge not measured due to toxicity monitoring only.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation1, Management Plan Monitoring	04/13/10	11:00	None	April MPM for copper.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation2, Management Plan Monitoring	05/11/10	10:20	None	May MPM for *Selenastrum* toxicity, copper, and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation3, Management Plan Monitoring	06/08/10	10:10	None	June MPM for chlorpyrifos and DPR grant monitoring for diazinon.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation4, Management Plan Monitoring	07/13/10	10:10	None	June MPM for chlorpyrifos, copper, and DPR grant monitoring for diazinon.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation5, Management Plan Monitoring	08/10/10	09:50	None	August MPM for copper and DPR grant monitoring for diazinon and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation6, Management Plan Monitoring	09/07/10	11:10	None	September MPM for copper, chlorpyrifos, *Ceriodaphnia* and *Hyalella* toxicity and DPR grant monitoring for diazinon; Pesticides analyzed in toxic sediment only.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	DPR	Fall1	10/12/10	11:40	None	October DPR grant monitoring for diazinon and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	DPR	Fall2	11/09/10	09:30	None	November DPR grant monitoring for diazinon and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	DPR	Fall3	12/07/10	09:40	None	December DPR grant monitoring for diazinon and chlorpyrifos.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Storm1	01/13/10	13:00	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter1	02/09/10	12:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter2	03/16/10	13:00	None	
Walthall Slough @ Woodward Ave	544WSAWAV	Sediment	Winter2	03/16/10	13:00	None	Pesticides analyzed in toxic sediment only.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation1	04/13/10	13:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation2	05/11/10	13:00	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation3	06/08/10	13:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation4	07/13/10	13:00	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation5	08/10/10	13:00	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation6	09/07/10	14:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	Sediment	Irrigation6	09/07/10	14:30	None	Pesticides analyzed in toxic sediment only.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Fall1	10/12/10	13:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Fall2	11/09/10	12:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Fall3	12/07/10	11:50	None	

MPM-Management Plan Monitoring
NM-Normal Monitoring
SED-Sediment Monitoring

SAMPLING AND ANALYTICAL METHODS

On October 20, 2010 the SJCDWQC submitted an amended copy of its Monitoring Reporting and Program Plan (MRPP) to the Regional Board which included changes and updates that had occurred over the two year period since the original MRPP approval in September 2008. Revisions to the MRPP consisted of updates to sample sites and zone numbers, monitoring strategy and constituents, laboratory methods, quality control limits, standard operating procedures (SOPs), and corrections of previous typos. The revisions do not change the overall monitoring monitoring strategy of the SJCDWQC MRPP and therefore the amended MRPP maintains compliance with MRP Order No. R5-2008-0005.

Sample collection criteria and field instruments are provided in Tables 12 and 13, respectively. Site specific discharge methods are included in Table 14. Analytical methods and reporting limits (RLs) are provided in Table 15.

All field sampling and analytical methods were performed as outlined in the SOPs provided in the QAPP (Appendix I-XXXVII). No deviations from these procedures occurred during the monitoring.

Table 12. 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

Analytical Parameter	Sample Volume[1]	Sample Container	Initial Preservation/Holding Requirements	Holding Time[2]
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.
[5] Samples for bacteria analyses should be set up as soon as possible.

Table 13. 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 14. Site specific discharge methods.

SITE	DISCHARGE METHOD	METER/ GAUGE
Duck Creek @ Highway 4	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Drain @ Woodbridge Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
French Camp Slough @ Airport Way	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Grant Line Canal @ Clifton Court	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Grant Line Canal near Calpack Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Littlejohns Creek @ Jack Tone Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Lone Tree Creek @ Jack Tone Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Mokelumne River @ Bruella Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Roberts Island Drain @ Holt Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Terminous Tract Drain @ Hwy 12	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Walthall Slough @ Woodward Ave	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 15. 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	0.05 NTU	0.030 NTU	EPA 180.1
Total Dissolved Solids	Fresh Water	Caltest	10 mg/L	4.0 mg/L	SM 2540C
Total Suspended Solids	Fresh Water	Caltest	3 mg/L	2.0 mg/L	SM 2540D
Hardness	Fresh Water	Caltest	5 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
Oxamyl	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Organochlorines					
DDD[1]	Fresh Water	APPL Inc	0.01 µg/L	0.003 µg/L	EPA 8081A
DDE[1]	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
DDT[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Dicofol[1]	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8081A
Dieldrin[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endrin[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Methoxychlor[1]	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Group A Pesticides					
Aldrin[1]	Fresh Water	APPL Inc	0.01 µg/L	0.009 µg/L	EPA 8081A
Chlordane[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Heptachlor[1]	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Heptachlor epoxide[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Hexachlorocyclohexane (alpha-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (beta-BHC)[1]	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Hexachlorocyclohexane (gamma-BHC; Lindane)[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (delta-BHC)[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan I[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan II[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A

CONSTITUENT	MATRIX	ANALYZING LAB	RL	MDL	ANALYTICAL METHOD
Toxaphene[1]	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
Demeton-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[4]	Fresh Water	APPL Inc	0.2 µg/L	0.08 µg/L	EPA 8321A
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[1]	Fresh Water	NCL Ltd	5 µg/L	2.77 µg/L	EPA 547M
Linuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Paraquat dichloride[1]	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
Trifluralin	Fresh Water	APPL Inc	0.05 µg/L	0.036 µg/L	EPA 8141A
Metals					
Arsenic[1]	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[1]	Fresh Water	Caltest	0.1 µg/L	0.011 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[1]	Fresh Water	Caltest	0.25 µg/L	0.071 µg/L	EPA 200.8 (ICPMS Collision Cell)
Molybdenum[1]	Fresh Water	Caltest	0.25 µg/L	0.016 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[1]	Fresh Water	Caltest	0.1mg/L	0.07 mg/L	EPA 351.3
Nitrate + 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[1]	Fresh Water	Caltest	0.01 mg/L	0.006 mg/L	EPA 365.2
Sediment					
Bifenthrin	Sediment	Caltest	0.33 µg/kg	0.1 µg/kg dw	GCIS/NCI/SIM[3]
Cyfluthrin	Sediment	Caltest	0.33 µg/kg	0.11 µg/kg dw	GCIS/NCI/SIM[3]
Cypermethrin	Sediment	Caltest	0.33 µg/kg	0.1 µg/kg dw	GCIS/NCI/SIM[3]
Deltamethrin: Tralomethrin	Sediment	Caltest	0.33 µg/kg	0.12 µg/kg dw	GCIS/NCI/SIM[3]
Esfenvalerate	Sediment	Caltest	0.33 µg/kg	0.13 µg/kg dw	GCIS/NCI/SIM[3]
Lambda-Cyhalothrin	Sediment	Caltest	0.33 µg/kg	0.06 µg/kg dw	GCIS/NCI/SIM[3]
Permethrin	Sediment	Caltest	0.33 µg/kg	0.11 µg/kg dw	GCIS/NCI/SIM[3]

CONSTITUENT	MATRIX	ANALYZING LAB	RL	MDL	ANALYTICAL METHOD
Fenpropathrin	Sediment	Caltest	0.33 µg/kg	0.07 µg/kg dw	GCIS/NCI/SIM[3]
Chlorpyrifos	Sediment	Caltest	0.33 µg/kg	0.12 µg/kg dw	GCIS/NCI/SIM[3]
Total Solids	Sediment	Caltest	0.10%	0.10%	SM2540B
Total Organic Carbon	Sediment	Caltest[2]	200 mg/kg	100 mg/kg dw	Walkley Black
Grain Size	Sediment	Caltest[2]	1% sand, silt, clay, gravel	0.4 µm	ASTM D-422-63, ASTM D4464M-85

[1] Constituents dropped May 2009 were added back in starting July 2010.
[2] Subcontracted to PTS Laboratories.
[3] Method updated from EPA 8270 GCMS/SIM to a modified EPA 8270 method, GCIS/NCI/SIM, starting April 2010.
[4] Method updated from 8141A to 8321A starting July 2010.
cfs-cubic feet per second
MPN- Most Probable Number
NA- Not applicable

PRECISION, ACCURACY AND COMPLETENESS

Normal surface water monitoring occurred monthly for six sites from January 2010 through December 2010 (SJCDWQC MRPP). Six Management Plan Monitoring (MPM) sites were sampled in addition to the normal monitoring (NM) sites throughout the year. Starting in June 2010, four of the additional MPM sites were also sampled for DPR grant monitoring. See Table 7 in the Monitoring Objectives and Design section for a list of all MPM and DPR locations and constituents sampled. None of the normal monitoring, MPM, or DPR monitoring sites were dry.

Sediment sampling occurred twice during the year, once during the month of March and again during the month of September. Sediment was collected from all scheduled sites.

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 with the understanding that the water was not connected to a downstream water body.

From January 2010 through December 2010 the following sites were sampled when water was non contiguous:

- French Camp Slough @ Airport Way (1/13/10, and 11/9/10)

An assessment of precision, accuracy and completeness is tabulated in Tables 16 – 29. The following is a narrative explanation for chemistry and toxicity precision, accuracy and completeness.

CHEMISTRY

All results are reported in the Monitoring Results and Lab and Field Quality Control Results sections of this report (Appendix II and III). 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, except sediment pesticide analysis, which is included in Electronic Data Deliverables (EDD). The Coalition works with the Central Valley Regional Data Center (CVRDC) 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.

For sediment chemistry constituents, varying Minimum Detection Limits (MDLs) and RLs can be due to differing initial weights of the samples or varying dry weight (dw) results of the samples based on a calculated percent solids value.

Chemistry Completeness

The constituents sampled from January 2010 through December 2010 are listed by site in Table 5. For normal monitoring, MPM, and DPR monitoring, not including laboratory or field quality control (QC) samples, 48 carbamate, 36-37 organochlorine, 36-40 herbicide, 36-93 organophosphate, 12 Group A pesticides, 72 *E. coli* and physical parameters, 72 nutrients, 36-61 dissolved and total metal, 10 sediment total organic carbon (TOC) samples, 10 sets of sediment grain size samples, and 6 sediment pesticide samples were collected and analyzed in 2010 (Table 16).

There was 100% completeness for water chemistry and both water and sediment toxicity samples collected for normal monitoring, MPM and additional DPR monitoring. Though not required, there was incomplete analysis of sediment chemistry for MPM and DPR monitoring samples for grain size and TOC. Management Plan Monitoring and DPR monitoring sites were not originally scheduled for sediment TOC, grain size and sediment pesticide analysis. Four of the seven MPM and DPR sites scheduled for *Hyalella* testing in September exhibited sediment toxicity and extra sediment was shipped from the toxicity laboratory to the chemistry laboratory to be analyzed for TOC, grain size and pesticides. Since the remaining three sites had no sediment toxicity, additional sediment was not shipped to the chemistry laboratory for analysis. 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, for each sampling event. Overall, field blanks and field duplicates comprised more than 5% of samples collected for each analyte. Field blanks and field duplicates each comprised 10.3-33.3% of organic samples, 12.5% of *E. coli* samples and nutrient samples, 12.5% of physical parameter samples, 12.4 - 16.7% of dissolved metal samples and 12.4-16.7% of total metal samples (Table 16). Equipment blanks comprised 12.4-16.7% of dissolved metal samples (Table 16). Travel blanks comprised 12.4-16.7% of total metal samples (Table 16).

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

One turbidity batch from February 2010 was run without a lab duplicate due to laboratory error. Three sediment grain size batches, one from March 2010 and two from September 2010 were run without lab duplicates due to laboratory error. One sediment TOC batch from September 2010 was also run without a lab duplicate sample due to laboratory error.

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 6 in Appendix II and Table 9 in Appendix III.

One hundred percent of field blanks met acceptance criteria. Ammonia field duplicates had a relative percent difference (RPD) value of less than 25% for 66.6% of samples. Three of the four ammonia field duplicate and environmental sample pairs with RPDs greater than 25 had at least one sample with an ammonia concentration below the reporting limit (RL). Results below the RL are estimates and therefore RPDs calculated on those numbers are likely to be outside of criteria. This is also true for results that are close to the RL as were the detections of the fourth pair of samples with an RPD greater than 25. One hundred percent of laboratory blanks were less than the RL. Laboratory control spikes (LCS) were analyzed with each batch and 100% met acceptance criteria. Matrix spikes (MS) and Matrix spike duplicates (MSD) 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 field and laboratory duplicates had R_{log} values below the criteria acceptance level.

Hardness: One hundred percent of hardness field blanks and 91.6% of field duplicates met acceptability criteria. One hundred percent of hardness lab blanks and laboratory control spikes met the acceptance criteria. Fifty percent of hardness MS samples met the acceptability criteria (13 of 26). Twelve of the 13 matrix spikes that recovered low were matrix spike pairs (six MS and MSD pairs) and most likely recovered low due to the spike level being much lower than the amount detected in the environmental result. The one MS that recovered low and the MSD did not recover low, had a recovery of 79% (lower acceptability criteria is 80%). Batch quality control (QC) data were accepted based on LCS, MS/MSD RPD, and non-Coalition acceptable MS results. One hundred percent of hardness MSDs met the acceptability criteria for precision (RPD < 25%).

Inorganic sediment (grain size and TOC): Sediment grain size and total organic carbon (TOC) were analyzed for sediment samples collected during the January 2010 – December 2010 sampling period (March 16, September 7 and September 14, 2010) excluding the three MPM/DPR sites in September which did not exhibit sediment toxicity.

Management Plan Monitoring and DPR monitoring sites were not originally scheduled for sediment TOC or grain size analysis. In September 2010, four of the seven MPM/DPR sites sampled for sediment exhibited toxicity. Since sediment was not originally sent to the laboratory for chemistry analysis for these four sites, the extra sediment left over from the toxicity analysis was shipped to the chemistry laboratory for TOC and grain size analysis. The extra un-frozen sediment was extracted past the 14 day hold time, but was considered representative of the original September sampling conditions. In order to assess any differences in results, extra un-frozen sediment from Walthall Slough was shipped to the chemistry laboratory and analyzed along with previously frozen sediment from the Walthall Slough site. The un-frozen sediment yielded similar grain size and TOC results to the frozen sediment.

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 $RPD_{SD} \leq 20\%$. Of the four grain size batches analyzed, only one had a calculated grain size RPD result and it was within the acceptability criteria for precision. The other three batches were run without lab duplicates so the RPD based on logarithmic standard deviation could not be calculated. Grain size field duplicate relative percent differences were calculated for two of the four batches, with one batch FD RPD meeting acceptability criteria. The two batches without a lab or field duplicate consisted of the September 2010 MPM and DPR toxic samples which originally were not scheduled to be analyzed for grain size, and the additional Walthall Slough site replicate analyzed for data quality purposes.

One hundred percent of the sediment TOC lab blank samples had results less than the RL. Fifty percent (1 of 2) of the field duplicate and 100% of the lab duplicate samples were within acceptability criteria ($RPD_{SD} \leq 20$). Two of the three TOC certified reference material (CRM) samples were within the ILRP MRP acceptability criteria (PR 75-125). The laboratory CRM acceptability criteria varied in each of their reports; therefore the data are assessed based on the ILRP MRP acceptability requirement of 75-125%. Only 30.7% (4 of 13) sediment TOC samples were analyzed within hold time. None of the sediment samples collected in September were frozen in the lab, and all were analyzed past the 14 day hold time for un-frozen samples.

Metals (dissolved): One hundred percent of dissolved metal field blanks met field contamination criteria except for dissolved zinc. One dissolved zinc field blank sample was equal to the reporting limit (1 µg/L) and was greater than one fifth of the environmental sample which was non-detect. 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. Only one of 12 dissolved zinc equipment blanks did not meet the criteria (< RL or < 1/5 environmental sample). The equipment blank result was 1 µg/L, the environmental and field blank results were both non-detect. Laboratory blanks were run with each metals batch and 100% met acceptability criteria. One hundred percent of dissolved metal field duplicates met the acceptability criteria (RPD < 25%). Laboratory control spikes were within acceptable recovery limits for 100% of dissolved metals run. One hundred percent of dissolved metals MSs met acceptance criteria and all MSDs met acceptability criteria for precision (RPD < 25%).

Metals (total): One hundred percent of total metal field blanks met acceptability criteria. Due to past detections in field blanks, travel blanks were sent from the lab and traveled with the sampling crew from beginning to end. Ninety-seven percent of travel blanks met acceptability criteria. The three travel blank detections came from the same January 2010 batch. Total nickel was detected at 1.3 µg/L (environmental sample, 1.9 µg/L), copper at 2.7 µg/L (environmental sample, 1.2 µg/L) and zinc at 3.7 µg/L (environmental sample, 1.7 µg/L). There was no contamination of the associated field blanks. The results were re-analyzed in triplicateand the original results were confirmed. All appropriate SOPs were followed regarding the handling of travel blanks and both the laboratory and sampling crews were made aware of the situation. Laboratory blanks were run with each metals batch and 100% met acceptability criteria. All field duplicates, except for nickel and zinc met acceptability criteria (RPDs < 25%) for at least 90% of samples. The RPDs outside the acceptance limits for nickel were 31.1% and 28.6%, and for zinc were 61.2%, 26.1%, 25.02%. All nickel and zinc results with RPDs above 25 were above the RL. A review of the field sheets describe the sample sites as having cloudy, brown colored water with low turbidity (1.2-5.3 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 resulting in heterogeneity of the water column. All field SOPs were followed by the field crew including collecting the environmental and field duplicate samples at the same time. Laboratory control spikes were within acceptable recovery limits for 100% of samples analyzed for total metals. Matrix spike recoveries were within control limits for 96.7% of all total metals samples analyzed. Matrix spikes had recoveries within acceptable criteria for more than 90% of the samples except for boron. Seventy-five percent of boron MSs were within control limits (PR 75-125). Eight of 32 boron MSs were outside of the control limits with five recovering low. For the three MSs that recovered above control limits all were spiked with an amount less than half of what was detected in the environmental sample. Non-project MS samples were within acceptability criteria in two of the batches with low project MS/MSD recoveries. 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-two percent of field blanks and field duplicates met acceptance criteria. The single field blank detection was re-analyzed in triplicate and the original result was confirmed. Lab blanks met the acceptability criteria (< RL) in 100% of samples. Matrix spikes met acceptance criteria for 81% of samples (21 of 26). All five MSs that did not meet the acceptance criteria were recovered below control limits due to possible matrix interference. Batches were accepted based on LCS recoveries and RPD results. One hundred percent of MSDs met the acceptability criteria for precision (RPD < 25%) and 100% of LCSs were within acceptability criteria.

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 58% of the samples analyzed. The field duplicate RPDs that were greater than 25 were 35.11%, 90.6%, 43.4%, 30.7%, and 28.5%; all associated field duplicate and environmental results were above the RL of 0.1 mg/L. Field duplicate and environmental samples may vary in concentrations due to the heterogeneity of the water column from which the samples were collected. One hundred

percent of laboratory blanks were less than the RL of 0.1 mg/L. Matrix spikes and LCSs met acceptance criteria in 100% of the samples; all MSDs had RPDs < 25.

Orthophosphate as P: Field blanks met acceptability criteria for 92% of samples analyzed. A single field blank detection occurred in April 2010. The field blank bottle was mistakenly filled with lab water instead of the appropriate blank water. One hundred percent of field duplicates had RPDs less than 25%. Laboratory blanks and LCSs were run with every batch and 100% met acceptability criteria. Matrix spikes met acceptability criteria in 84.6% of the samples (22 of 26). Four MSs recovered below control limits (two MS/MSD pairs); one MS/MSD pair was on non-project samples. The low recoveries were due to possible matrix interference. The LCSs analyzed in the same batch as the MSs that recovered low were all within control limits. One hundred percent of MSDs had RPDs less than 25%.

Pesticides: For the January – December 2010 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 January – June, EPA 8321A July-December), paraquat (EPA 549.2), glyphosate (EPA 547M) and triazines (EPA 619). One hundred percent of pesticide field blanks met acceptability criteria. All field duplicates met acceptability criteria for at least 90% of samples analyzed (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 99.7% 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.

Matrix spikes and LCSs were performed for each batch to assess accuracy as well as possible matrix interference. Either a MSD and/or a laboratory control spike duplicate (LCSD) was performed per batch to assess precision. Ninety-nine percent of matrix spike samples run were within acceptability criteria. The individual pesticide with less than 90% of samples within acceptable recoveries for matrix spikes was paraquat at 76.9% (20 of 26). Three paraquat batches had MS and MSDs below acceptance limits (PR 50-141) ranging from 0.9 to 28.6. The MS/MSDs for two of the batches were re-extracted and re-analyzed (one within hold time and one outside hold time) with acceptable results. All of the associated LCSs were within control limits. Recently the laboratory has been having coelluting peak issues related to their paraquat analyses which may be a result of their SPE cartridges and/or analytical columns. They are working on replacing the columns and lines on the instrument as well as finding a new vendor for the SPE cartridges. Results submitted to date have been verified and validated as accurate based on calibration data and any additional conformational analysis conducted by the laboratory.

Laboratory precision met acceptability criteria in 98.7% of MSDs. Paraquat was the only pesticide with less than 90% of samples within acceptable recoveries for MSDs (85%). Two

paraquat batches had MSD RPDs above 25%, and in both batches the MS recoveries were below control limits. Laboratory control spikes were all within acceptable percent recovery (PR) range and all environmental samples were non-detect. One pair of MS/MSDs were re-extracted and re-analyzed with acceptable results.

Laboratory control spikes were within acceptability criteria for 99.5% of total samples analyzed. The only constituent with less than 90% of LCS recoveries within acceptable range was methamidophos analyzed with the EPA 8321A method. A single methamidophos LCS recovered below control limits and the associated MS/MSD were within acceptability range.

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. Eighteen batches analyzed in 2010 were run with an LCSD either in lieu of an MSD or along with an MSD. All LCSDs were within precision criteria.

Phosphate as P: One hundred percent of field blanks met acceptability criteria. One hundred 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.

Sediment Pesticides: Sediment pesticides were analyzed for any sediment sample that exhibited significant *Hyalella azteca* toxicity. Six samples in September 2010 were tested for sediment pesticides and four of those samples were from MPM and DPR monitoring sites not originally scheduled for sediment pyrethroid analysis due to an internal miscommunication. Since sediment was not originally sent to the laboratory for chemistry analysis for these four sites, the extra sediment left over from the toxicity analysis was shipped to the chemistry laboratory for sediment chemistry testing. The extra un-frozen sediment was extracted past the 14 day hold time, but was considered more representative of the original September sampling conditions than newly collected samples from those water bodies. Un-frozen sediment from Walthall Slough was sent from the toxicity laboratory for chemistry analysis to be compared to the chemistry results of the frozen sample (both an environmental and field duplicate sample). In most cases the pesticides detected in the unfrozen sample ran outside of hold time were greater than those in either the environmental or field duplicate samples that were frozen and run within hold time. It was concluded that analyzing the un frozen samples past hold time did not affect the detection of pyrethroids and chlorpyrifos within the sediment samples.

Field duplicates were analyzed and all but one met the acceptance criteria (RPD < 25%). The single bifenthrin field duplicate sample was detected at 3.8 µg/Kg dw (environmental sample was 1.6 µg/Kg dw). Lab blanks were run with every batch and were less than the RL for 100% of the samples.

Matrix spikes and LCSs were performed for each batch to assess accuracy. Eighty-six percent of MS met acceptance criteria. The individual pesticides with less than 90% of acceptable samples were bifenthrin, 50% (2 of 4), cyhalothrin, 50% (2 of 4) and permethrin, 75% (3 of 4). The bifenthrin MS/MSD pair was above control limits, along with the LCS and MS RPD in the batch, but the LCSD analyzed in the batch was within range. The single permethrin MSD was also

above control limits, and the associated MS, LCS and LCSD were within range. Both cyhalothrin MS and MSD were from a different project and recovered below acceptability criteria due to possible matrix effects and non-homogeneity of the sample. A single bifenthrin LCS recovered above control limits, but the associated LCSD was within range.

Laboratory precision assessed by the RPD of laboratory duplicates, met acceptability criteria in 88% of MSDs and 94% of LCSDs. One bifenthrin MS RPD and one permethrin MS RPD were above the acceptance criteria (RPD < 25%). Surrogates were run for each sediment pesticide analysis. The laboratory is continuing to refine its extraction and analytical procedures regarding sediment organic analysis. Due to these refinements the lab has only recently had sufficient sample matrix data to generate control charts for their surrogate recoveries. The surrogate recoveries from the September sediment analyses have been evaluated using the laboratories internal recovery range of 30-180% which is a fairly common range for pesticides in sediment. Surrogate recoveries were within specific acceptance criteria for 100% of all samples analyzed.

Total Dissolved Solids (TDS): Eighty-three percent of field blanks met acceptance criteria (10 of 12). A detection occurred in April 2010 when the field blank bottle was filled with lab water instead of the appropriate blank water. The other field blank detection occurred in September 2010 and the result was verified by reviewing electrical conductivity measurements conducted on the same sample. The sample was not re-analyzed due to expired hold time. One hundred percent of field duplicates met acceptance criteria. Lab blanks were run with every batch and were less than the RL for 100% of the samples. One hundred percent of LCSs and lab duplicates met acceptance criteria. Matrix spikes are not performed for total dissolved solids.

Total Organic Carbon (TOC): One hundred percent of field blanks met acceptability criteria (< RL or < 1/5 the environmental sample). Field duplicates had RPDs less than 25% for all of the samples analyzed. One hundred percent of laboratory blanks were less than the RL. At least 90% of all LCS, MS, and MSD samples met acceptability criteria.

Total Suspended Solids (TSS): One hundred percent of field blanks met acceptance criteria. Ninety-two percent of field duplicates had RPD values less than 25%. One hundred percent of lab blanks, and LCSs met acceptance criteria. Ninety-two (12 of 13) lab duplicates met acceptance criteria. Matrix spikes are not performed for total suspended solids.

Turbidity: One hundred percent of field blanks were less than the RL. Ninety-two percent of field duplicates had RPDs less than 25%. The 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. Matrix spikes are not 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* 18%, *Pimephales* 25%, *Selenastrum* 16.9% and *Hyalella* 12.5%.

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 (RPD < 25%). 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 March 16, 2010, September 7, 2010 and September 14, 2010. 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. A single sediment sample was re-analyzed three days outside hold time due to high variability in the replicate results. The sample was originally tested and found to have statistically reduced survival compared to the control however some replicates exhibited very high survival and others exhibited very low survival. The sample has been reported as toxic although the retest resulted in a mean survival of 90%.

Table 16. SJCDWQC sample counts, field quality control (QC) 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	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8321A CARB	Carbaryl	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8321A CARB	Carbofuran	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8321A CARB	Methiocarb	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8321A CARB	Methomyl	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8321A CARB	Oxamyl	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8321A CARB	Diuron	40	64	12	18.8%	12	18.8%		NA		NA
EPA 8321A CARB	Linuron	36	60	12	20%	12	20.0%		NA		NA
EPA 619	Atrazine	36	60	12	20%	12	20%		NA		NA
EPA 619	Cyanazine	36	60	12	20%	12	20%		NA		NA
EPA 619	Simazine	38	62	12	19.40%	12	19.40%		NA		NA
EPA 547M	Glyphosate	36	60	12	20%	12	20%		NA		NA
EPA 549.2M	Paraquat dichloride	36	60	12	20%	12	20%		NA		NA
EPA 8081A	DDD(p,p')	36	60	12	20%	12	20%		NA		NA
EPA 8081A	DDE(p,p')	36	60	12	20%	12	20%		NA		NA
EPA 8081A	DDT(p,p')	36	60	12	20%	12	20%		NA		NA
EPA 8081A	Dicofol	36	60	12	20%	12	20%		NA		NA
EPA 8081A	Dieldrin	37	61	12	19.7%	12	19.7%		NA		NA
EPA 8081A	Endrin	36	60	12	20%	12	20%		NA		NA
EPA 8081A	Methoxychlor	36	60	12	20%	12	20%		NA		NA
EPA 8081A	Aldrin	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Chlordane	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Heptachlor	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Heptachlor epoxide	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	HCH, alpha	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	HCH, beta	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	HCH, delta	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	HCH, gamma	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Endosulfan I	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Endosulfan II	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Toxaphene	12	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Azinphos methyl	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Chlorpyrifos	93	117	12	10.3%	12	10.3%		NA		NA
EPA 8141A OP	Diazinon	79	103	12	11.7%	12	11.7%		NA		NA
EPA 8141A OP	Dichlorvos	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Dimethoate	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Demeton-s	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Disulfoton	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Malathion	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Methidathion	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Parathion, Methyl	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Phorate	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Phosmet	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Trifluralin	48	72	12	16.7%	12	16.7%		NA		NA
EPA 8141A OP	Methamidophos	18	30	6	20%	6	20%		NA		NA
EPA 8321A	Methamidophos	18	30	6	20%	6	20%		NA		NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	61	85	12	14.1%	12	14.1%		NA		NA
EPA 160.1	Total Dissolved Solids	72	96	12	12.5%	12	12.5%		NA		NA
EPA 160.2	Total Suspended Solids	72	96	12	12.5%	12	12.5%		NA		NA
EPA 180.1	Turbidity	72	96	12	12.5%	12	12.5%		NA		NA
EPA 350.2	Ammonia as N	72	96	12	12.5%	12	12.5%		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 (%)
EPA 351.3	Nitrogen, Total Kjeldahl	72	96	12	12.5%	12	12.5%		NA		NA
EPA 353.2	Nitrate + Nitrite as N	72	96	12	12.5%	12	12.5%		NA		NA
EPA 365.2	OrthoPhosphate as P	72	96	12	12.5%	12	12.5%		NA		NA
EPA 365.2	Phosphate as P	72	96	12	12.5%	12	12.5%		NA		NA
EPA 415.1	Total Organic Carbon	72	96	12	12.5%	12	12.5%		NA		NA
SM 9223	*E. coli*	72	96	12	12.5%	12	12.5%		NA		NA
EPA 200.8	Arsenic	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Boron	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Cadmium	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Copper	61	97	12	12.4%	12	12.4%		NA	12	12.4%
EPA 200.8	Lead	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Molybdenum	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Nickel	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Selenium	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Zinc	36	72	12	16.7%	12	16.7%		NA	12	16.7%
EPA 200.8	Cadmium (Dissolved)	36	72	12	16.7%	12	16.7%	12	16.7%		NA
EPA 200.8	Copper (Dissolved)	36	72	12	16.7%	12	16.7%	12	16.7%		NA
EPA 200.8	Lead (Dissolved)	36	72	12	16.7%	12	16.7%	12	16.7%		NA
EPA 200.8	Nickel (Dissolved)	36	72	12	16.7%	12	16.7%	12	16.7%		NA
EPA 200.8	Zinc (Dissolved)	36	72	12	16.7%	12	16.7%	12	16.7%		NA
Walkley-Black	Total Organic Carbon (sediment)	10	12	3	23.1%	2	16.7%		NA		NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Deltamethrin: Tralomethrin (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Esfenvalerate/ Fenvalerate (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	6	7		NA	1	14.3%		NA		NA
EPA 8270M_NCI_SIM	Permethrin (sediment)	6	7		NA	1	14.3%		NA		NA

Table 17. SJCDWQC summary of field blank quality control sample evaluations.

Samples collected from January 2010 through December 2010, 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)	12	12	100.00
EPA 8321A CARB	Carbaryl	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Carbofuran	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Methiocarb	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Methomyl	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Oxamyl	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Diuron	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Linuron	<RL or < (env sample/5)	12	12	100.00
EPA 619	Atrazine	<RL or < (env sample/5)	12	12	100.00
EPA 619	Cyanazine	<RL or < (env sample/5)	12	12	100.00
EPA 619	Simazine	<RL or < (env sample/5)	12	12	100.00
EPA 547M	Glyphosate	<RL or < (env sample/5)	12	12	100.00
EPA 549.2M	Paraquat dichloride	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	DDD(p,p')	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	DDE(p,p')	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	DDT(p,p')	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Dicofol	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Dieldrin	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Endrin	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Methoxychlor	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Aldrin	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Chlordane	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Heptachlor	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Heptachlor epoxide	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	HCH, alpha	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	HCH, beta	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	HCH, delta	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	HCH, gamma	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Endosulfan I	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Endosulfan II	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	Toxaphene	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Azinphos methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Diazinon	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dichlorvos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dimethoate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Demeton-s	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Disulfoton	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Malathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Methidathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phorate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phosmet	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Trifluralin	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Methamidophos	<RL or < (env sample/5)	6	6	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A	Methamidophos	<RL or < (env sample/5)	6	6	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 160.1	Total Dissolved Solids	<RL or < (env sample/5)	12	10	83.33
EPA 160.2	Total Suspended Solids	<RL or < (env sample/5)	12	12	100.00
EPA 180.1	Turbidity	<RL or < (env sample/5)	12	12	100.00
EPA 350.2	Ammonia as N	<RL or < (env sample/5)	12	12	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL or < (env sample/5)	12	12	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL or < (env sample/5)	12	11	91.67
EPA 365.2	OrthoPhosphate as P	<RL or < (env sample/5)	12	11	91.67
EPA 365.2	Phosphate as P	<RL or < (env sample/5)	12	12	100.00
EPA 415.1	Total Organic Carbon	<RL or < (env sample/5)	12	12	100.00
SM 9223	*E. coli*	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Arsenic	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Copper (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Lead (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	12	11	91.67
Walkley-Black	Total Organic Carbon (sediment)	NA			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	NA			NA
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	NA			NA
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	NA			NA
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Permethrin (sediment)	NA			NA
		TOTAL	**840**	**835**	**99.40**

Table 18. SJCDWQC summary of equipment blank (dissolved metals) and travel blank (total metals) quality control sample evaluations.

Samples collected from January 2010 through December 2010, 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)	12	12	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	12	11	91.67
EPA 200.8	Lead	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	12	11	91.67
EPA 200.8	Selenium	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	12	11	91.67
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Copper (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Lead (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	12	11	91.67
		TOTAL	**60**	**59**	**98.33**

Table 19. SJCDWQC summary of field duplicate quality control sample evaluations.

Samples collected from January 2010 through December 2010, 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	12	12	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	12	12	100.00
EPA 619	Atrazine	RPD ≤ 25	12	12	100.00
EPA 619	Cyanazine	RPD ≤ 25	12	12	100.00
EPA 619	Simazine	RPD ≤ 25	12	12	100.00
EPA 547M	Glyphosate	RPD ≤ 25	12	12	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	12	12	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	12	12	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	12	12	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	12	12	100.00
EPA 8081A	Dicofol	RPD ≤ 25	12	12	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	12	12	100.00
EPA 8081A	Endrin	RPD ≤ 25	12	12	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	12	12	100.00
EPA 8081A	Aldrin	RPD ≤ 25	12	12	100.00
EPA 8081A	Chlordane	RPD ≤ 25	12	12	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	12	12	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	12	12	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	12	12	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	12	12	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	12	11	91.67
EPA 8141A OP	Diazinon	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Methamidophos	RPD ≤ 25	6	6	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	6	6	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	12	11	91.67
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	12	12	100.00
EPA 160.2	Total Suspended Solids	RPD ≤ 25	12	11	91.67
EPA 180.1	Turbidity	RPD ≤ 25	12	11	91.67
EPA 350.2	Ammonia as N	RPD ≤ 25	12	8	66.67
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	12	7	58.33
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	12	11	91.67
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	12	12	100.00
EPA 365.2	Phosphate as P	RPD ≤ 25	12	12	100.00
EPA 415.1	Total Organic Carbon	RPD ≤ 25	12	12	100.00
SM 9223	*E. coli*	RPD ≤ 25			NA
EPA 200.8	Arsenic	RPD ≤ 25	12	12	100.00
EPA 200.8	Boron	RPD ≤ 25	12	12	100.00
EPA 200.8	Cadmium	RPD ≤ 25	12	12	100.00
EPA 200.8	Copper	RPD ≤ 25	12	11	91.67
EPA 200.8	Lead	RPD ≤ 25	12	11	91.67
EPA 200.8	Molybdenum	RPD ≤ 25	12	12	100.00
EPA 200.8	Nickel	RPD ≤ 25	12	10	83.33
EPA 200.8	Selenium	RPD ≤ 25	12	11	91.67
EPA 200.8	Zinc	RPD ≤ 25	12	9	75.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	12	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	2	1	50.00
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD <25	1	0	0.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD <25	1	1	100.00
		TOTAL	**839**	**815**	**97.14**

Table 20. SJCDWQC summary of method blank quality control sample evaluations.

Samples analyzed in batches with samples collected during from January 2010 through December 2010, 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	12	12	100.00
EPA 8321A CARB	Carbaryl	<RL	12	12	100.00
EPA 8321A CARB	Carbofuran	<RL	12	12	100.00
EPA 8321A CARB	Methiocarb	<RL	12	12	100.00
EPA 8321A CARB	Methomyl	<RL	12	12	100.00
EPA 8321A CARB	Oxamyl	<RL	12	12	100.00
EPA 8321A CARB	Diuron	<RL	12	12	100.00
EPA 8321A CARB	Linuron	<RL	12	12	100.00
EPA 619	Atrazine	<RL	12	12	100.00
EPA 619	Cyanazine	<RL	12	12	100.00
EPA 619	Simazine	<RL	12	12	100.00
EPA 547M	Glyphosate	<RL	12	12	100.00
EPA 549.2M	Paraquat dichloride	<RL	12	12	100.00
EPA 8081A	DDD(p,p')	<RL	12	12	100.00
EPA 8081A	DDE(p,p')	<RL	12	12	100.00
EPA 8081A	DDT(p,p')	<RL	12	12	100.00
EPA 8081A	Dicofol	<RL	12	12	100.00
EPA 8081A	Dieldrin	<RL	12	12	100.00
EPA 8081A	Endrin	<RL	12	12	100.00
EPA 8081A	Methoxychlor	<RL	12	12	100.00
EPA 8081A	Aldrin	<RL	12	12	100.00
EPA 8081A	Chlordane	<RL	12	12	100.00
EPA 8081A	Heptachlor	<RL	12	12	100.00
EPA 8081A	Heptachlor epoxide	<RL	12	12	100.00
EPA 8081A	HCH, alpha	<RL	12	12	100.00
EPA 8081A	HCH, beta	<RL	12	12	100.00
EPA 8081A	HCH, delta	<RL	12	12	100.00
EPA 8081A	HCH, gamma	<RL	12	12	100.00
EPA 8081A	Endosulfan I	<RL	12	12	100.00
EPA 8081A	Endosulfan II	<RL	12	12	100.00
EPA 8081A	Toxaphene	<RL	12	12	100.00
EPA 8141A OP	Azinphos methyl	<RL	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL	12	12	100.00
EPA 8141A OP	Diazinon	<RL	12	12	100.00
EPA 8141A OP	Dichlorvos	<RL	12	12	100.00
EPA 8141A OP	Dimethoate	<RL	12	12	100.00
EPA 8141A OP	Demeton-s	<RL	12	12	100.00
EPA 8141A OP	Disulfoton	<RL	12	12	100.00
EPA 8141A OP	Malathion	<RL	12	12	100.00
EPA 8141A OP	Methidathion	<RL	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL	12	12	100.00
EPA 8141A OP	Phorate	<RL	12	12	100.00
EPA 8141A OP	Phosmet	<RL	12	12	100.00
EPA 8141A OP	Trifluralin	<RL	12	12	100.00
EPA 8141A OP	Methamidophos	<RL	6	6	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A	Methamidophos	<RL	6	6	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL	13	13	100.00
EPA 160.1	Total Dissolved Solids	<RL	13	13	100.00
EPA 160.2	Total Suspended Solids	<RL	13	13	100.00
EPA 180.1	Turbidity	<RL	14	14	100.00
EPA 350.2	Ammonia as N	<RL	14	14	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL	16	16	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL	13	13	100.00
EPA 365.2	OrthoPhosphate as P	<RL	13	13	100.00
EPA 365.2	Phosphate as P	<RL	12	12	100.00
EPA 415.1	Total Organic Carbon	<RL	14	14	100.00
SM 9223	*E. coli*	<RL	12	12	100.00
EPA 200.8	Arsenic	<RL	13	13	100.00
EPA 200.8	Boron	<RL	13	13	100.00
EPA 200.8	Cadmium	<RL	13	13	100.00
EPA 200.8	Copper	<RL	13	13	100.00
EPA 200.8	Lead	<RL	13	13	100.00
EPA 200.8	Molybdenum	<RL	13	13	100.00
EPA 200.8	Nickel	<RL	13	13	100.00
EPA 200.8	Selenium	<RL	13	13	100.00
EPA 200.8	Zinc	<RL	14	14	100.00
EPA 200.8	Cadmium (Dissolved)	<RL	13	13	100.00
EPA 200.8	Copper (Dissolved)	<RL	13	13	100.00
EPA 200.8	Lead (Dissolved)	<RL	13	13	100.00
EPA 200.8	Nickel (Dissolved)	<RL	13	13	100.00
EPA 200.8	Zinc (Dissolved)	<RL	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	<RL	3	3	100.00
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	<RL	2	2	100.00
		TOTAL	**891**	**891**	**100.00**

Table 21. 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 January 2010 through December 2010, 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	12	12	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	12	12	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	12	12	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	12	12	100.00
EPA 8321A CARB	Methomyl	PR 23-152	12	12	100.00
EPA 8321A CARB	Oxamyl	PR 10-117	12	12	100.00
EPA 8321A CARB	Diuron	PR 52-136	12	12	100.00
EPA 8321A CARB	Linuron	PR 49-144	12	12	100.00
EPA 619	Atrazine	PR 39-156	13	13	100.00
EPA 619	Cyanazine	PR 22-172	13	13	100.00
EPA 619	Simazine	PR 21-179	13	13	100.00
EPA 547M	Glyphosate	PR 72-131	24	24	100.00
EPA 549.2M	Paraquat dichloride	PR 50-141	14	14	100.00
EPA 8081A	DDD(p,p')	PR 38-135	13	13	100.00
EPA 8081A	DDE(p,p')	PR 21-134	13	13	100.00
EPA 8081A	DDT(p,p')	PR 18-145	13	13	100.00
EPA 8081A	Dicofol	PR 40-135	13	13	100.00
EPA 8081A	Dieldrin	PR 48-121	13	13	100.00
EPA 8081A	Endrin	PR 24-143	13	13	100.00
EPA 8081A	Methoxychlor	PR 30-163	13	13	100.00
EPA 8081A	Aldrin	PR 11-138	13	13	100.00
EPA 8081A	Chlordane	PR 44-152	13	13	100.00
EPA 8081A	Heptachlor	PR 24-124	13	13	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	13	13	100.00
EPA 8081A	HCH, alpha	PR 33-111	13	13	100.00
EPA 8081A	HCH, beta	PR 49-119	13	13	100.00
EPA 8081A	HCH, delta	PR 12-97	13	12	92.31
EPA 8081A	HCH, gamma	PR 40-114	13	13	100.00
EPA 8081A	Endosulfan I	PR 50-131	13	13	100.00
EPA 8081A	Endosulfan II	PR 55-128	13	13	100.00
EPA 8081A	Toxaphene	PR 23-140	13	13	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	13	13	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	13	13	100.00
EPA 8141A OP	Diazinon	PR 57-130	13	13	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	13	13	100.00
EPA 8141A OP	Dimethoate	PR 68-202	13	13	100.00
EPA 8141A OP	Demeton-s	PR 40-125	13	13	100.00
EPA 8141A OP	Disulfoton	PR 47-117	13	13	100.00
EPA 8141A OP	Malathion	PR 47-125	13	13	100.00
EPA 8141A OP	Methidathion	PR 50-150	13	13	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	13	13	100.00
EPA 8141A OP	Phorate	PR 44-117	13	13	100.00
EPA 8141A OP	Phosmet	PR 50-150	13	12	92.31
EPA 8141A OP	Trifluralin	PR 40-148	13	13	100.00
EPA 8141A OP	Methamidophos	PR 25-136	6	6	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A	Methamidophos	PR 25-136	6	5	83.33
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	13	13	100.00
EPA 160.1	Total Dissolved Solids	PR 80-120	13	13	100.00
EPA 160.2	Total Suspended Solids	PR 80-120	13	13	100.00
EPA 180.1	Turbidity	PR 90-110	14	14	100.00
EPA 350.2	Ammonia as N	PR 80-120	14	14	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	PR 80-120	16	16	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 80-120	13	13	100.00
EPA 365.2	OrthoPhosphate as P	PR 80-120	13	13	100.00
EPA 365.2	Phosphate as P	PR 80-120	12	12	100.00
EPA 415.1	Total Organic Carbon	PR 75-125	14	14	100.00
SM 9223	*E. coli*	NA			NA
EPA 200.8	Arsenic	PR 75-125	13	13	100.00
EPA 200.8	Boron	PR 75-125	13	13	100.00
EPA 200.8	Cadmium	PR 75-125	13	13	100.00
EPA 200.8	Copper	PR 75-125	13	13	100.00
EPA 200.8	Lead	PR 75-125	13	13	100.00
EPA 200.8	Molybdenum	PR 75-125	13	13	100.00
EPA 200.8	Nickel	PR 75-125	13	13	100.00
EPA 200.8	Selenium	PR 75-125	13	13	100.00
EPA 200.8	Zinc	PR 75-125	14	14	100.00
EPA 200.8	Cadmium (Dissolved)	PR 75-125	13	13	100.00
EPA 200.8	Copper (Dissolved)	PR 75-125	13	13	100.00
EPA 200.8	Lead (Dissolved)	PR 75-125	13	13	100.00
EPA 200.8	Nickel (Dissolved)	PR 75-125	13	13	100.00
EPA 200.8	Zinc (Dissolved)	PR 75-125	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125	3	2	66.67
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	PR 10-160	4	3	75.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	PR 10-160	4	4	100.00
		TOTAL	**945**	**940**	**99.47**

Table 22. 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 January 2010 through December 2010, 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			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	1	1	100.00
EPA 619	Cyanazine	RPD ≤ 25	1	1	100.00
EPA 619	Simazine	RPD ≤ 25	1	1	100.00
EPA 547M	Glyphosate	RPD ≤ 25	12	12	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	2	2	100.00
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	1	1	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Methamidophos	RPD ≤ 25			NA

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A	Methamidophos	RPD ≤ 25			NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	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
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
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD ≤ 25	2	1	50.00
		TOTAL	**66**	**65**	**98.48**

Table 23. SJCDWQC summary of matrix spike quality control sample evaluations.

Matrix spikes and matrix spike duplicates collected from January 2010 through December 2010. 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	24	24	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	24	24	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	24	24	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	24	24	100.00
EPA 8321A CARB	Methomyl	PR 23-152	24	24	100.00
EPA 8321A CARB	Oxamyl	PR 10-117	24	23	95.83
EPA 8321A CARB	Diuron	PR 52-136	24	24	100.00
EPA 8321A CARB	Linuron	PR 49-144	24	24	100.00
EPA 619	Atrazine	PR 39-156	24	24	100.00
EPA 619	Cyanazine	PR 22-172	24	24	100.00
EPA 619	Simazine	PR 21-179	24	24	100.00
EPA 547M	Glyphosate	PR 72-131	24	24	100.00
EPA 549.2M	Paraquat dichloride	PR 50-141	26	20	76.92
EPA 8081A	DDD(p,p')	PR 38-135	24	24	100.00
EPA 8081A	DDE(p,p')	PR 21-134	24	24	100.00
EPA 8081A	DDT(p,p')	PR 18-145	24	24	100.00
EPA 8081A	Dicofol	PR 40-135	24	24	100.00
EPA 8081A	Dieldrin	PR 48-121	24	24	100.00
EPA 8081A	Endrin	PR 24-143	24	24	100.00
EPA 8081A	Methoxychlor	PR 30-163	24	24	100.00
EPA 8081A	Aldin	PR 11-138	24	24	100.00
EPA 8081A	Chlordane	PR 44-152	24	24	100.00
EPA 8081A	Heptachlor	PR 24-124	24	24	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	24	24	100.00
EPA 8081A	HCH, alpha	PR 33-111	24	24	100.00
EPA 8081A	HCH, beta	PR 49-119	24	24	100.00
EPA 8081A	HCH, delta	PR 12-97	24	22	91.67
EPA 8081A	HCH, gamma	PR 40-114	24	24	100.00
EPA 8081A	Endosulfan I	PR 50-131	24	24	100.00
EPA 8081A	Endosulfan II	PR 55-128	24	24	100.00
EPA 8081A	Toxaphene	PR 23-140	24	24	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	24	24	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	24	24	100.00
EPA 8141A OP	Diazinon	PR 57-130	24	24	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	24	24	100.00
EPA 8141A OP	Dimethoate	PR 68-202	24	24	100.00
EPA 8141A OP	Demeton-s	PR 40-125	24	22	91.67
EPA 8141A OP	Disulfoton	PR 47-117	24	24	100.00
EPA 8141A OP	Malathion	PR 47-125	24	22	91.67
EPA 8141A OP	Methidathion	PR 50-150	24	24	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	24	24	100.00
EPA 8141A OP	Phorate	PR 44-117	24	24	100.00
EPA 8141A OP	Phosmet	PR 50-150	24	24	100.00
EPA 8141A OP	Trifluralin	PR 40-148	24	24	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Methamidophos	PR 25-136	12	12	100.00
EPA 8321A	Methamidophos	PR 25-136	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	26	13	50.00
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	28	28	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	PR 80-120	32	32	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 80-120	26	21	80.77
EPA 365.2	OrthoPhosphate as P	PR 80-120	26	22	84.62
EPA 365.2	Phosphate as P	PR 80-120	24	24	100.00
EPA 415.1	Total Organic Carbon	PR 75-125	28	26	92.86
SM 9223	*E. coli*	NA			NA
EPA 200.8	Arsenic	PR 75-125	26	26	100.00
EPA 200.8	Boron	PR 75-125	32	24	75.00
EPA 200.8	Cadmium	PR 75-125	26	26	100.00
EPA 200.8	Copper	PR 75-125	26	26	100.00
EPA 200.8	Lead	PR 75-125	26	26	100.00
EPA 200.8	Molybdenum	PR 75-125	26	26	100.00
EPA 200.8	Nickel	PR 75-125	26	26	100.00
EPA 200.8	Selenium	PR 75-125	26	26	100.00
EPA 200.8	Zinc	PR 75-125	28	28	100.00
EPA 200.8	Cadmium (Dissolved)	PR 75-125	26	26	100.00
EPA 200.8	Copper (Dissolved)	PR 75-125	26	26	100.00
EPA 200.8	Lead (Dissolved)	PR 75-125	26	26	100.00
EPA 200.8	Nickel (Dissolved)	PR 75-125	26	26	100.00
EPA 200.8	Zinc (Dissolved)	PR 75-125	26	26	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	PR 10-160	4	2	50.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	PR 10-160	4	2	50.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	PR 10-160	4	4	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	PR 10-160	4	3	75.00
		TOTAL	**1680**	**1630**	**97.02**

Table 24. SJCDWQC summary of matrix spike duplicate quality control sample evaluations.

Matrix spikes and matrix spike duplicates were collected from January 2010 through December 2010. 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	12	12	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	12	12	100.00
EPA 619	Atrazine	RPD ≤ 25	12	12	100.00
EPA 619	Cyanazine	RPD ≤ 25	12	12	100.00
EPA 619	Simazine	RPD ≤ 25	12	12	100.00
EPA 547M	Glyphosate	RPD ≤ 25	12	12	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	13	11	84.62
EPA 8081A	DDD(p,p')	RPD ≤ 25	12	12	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	12	12	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	12	12	100.00
EPA 8081A	Dicofol	RPD ≤ 25	12	12	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	12	12	100.00
EPA 8081A	Endrin	RPD ≤ 25	12	12	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	12	12	100.00
EPA 8081A	Aldrin	RPD ≤ 25	12	11	91.67
EPA 8081A	Chlordane	RPD ≤ 25	12	12	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	12	11	91.67
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	12	11	91.67
EPA 8081A	HCH, beta	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	12	11	91.67
EPA 8081A	Endosulfan I	RPD ≤ 25	12	12	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	12	12	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	11	91.67

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Methamidophos	RPD ≤ 25	6	6	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	6	6	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	14	14	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	14	14	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	16	16	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	13	13	100.00
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	13	13	100.00
EPA 365.2	Phosphate as P	RPD ≤ 25	12	12	100.00
EPA 415.1	Total Organic Carbon	RPD ≤ 25	14	14	100.00
SM 9223	*E. coli*	RPD ≤ 25			NA
EPA 200.8	Arsenic	RPD ≤ 25	13	13	100.00
EPA 200.8	Boron	RPD ≤ 25	16	16	100.00
EPA 200.8	Cadmium	RPD ≤ 25	13	13	100.00
EPA 200.8	Copper	RPD ≤ 25	13	13	100.00
EPA 200.8	Lead	RPD ≤ 25	13	13	100.00
EPA 200.8	Molybdenum	RPD ≤ 25	13	13	100.00
EPA 200.8	Nickel	RPD ≤ 25	13	13	100.00
EPA 200.8	Selenium	RPD ≤ 25	13	13	100.00
EPA 200.8	Zinc	RPD ≤ 25	14	14	100.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	13	13	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	13	13	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	13	13	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	13	13	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD <25	2	1	50.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD <25	2	1	50.00
		TOTAL	**841**	**832**	**98.93**

Table 25. SJCDWQC summary of lab duplicate quality control sample evaluations.

Samples were analyzed in batches with samples collected from January 2010 through December 2010 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
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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A	Methamidophos	RPD ≤ 25			NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25			NA
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	13	13	100.00
EPA 160.2	Total Suspended Solids	RPD ≤ 25	13	12	92.31
EPA 180.1	Turbidity	RPD ≤ 25	13	13	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
SM 9223	*E. coli*	Rlog 1.3	12	12	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
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	3	3	100.00
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD ≤ 25			NA
		TOTAL	**54**	**53**	**98.15**

Table 26. SJCDWQC summary of surrogate recovery quality control sample evaluations.

Surrogates were run with water samples collected and Laboratory Quality Assurance (LABQA) analyzed from January 2010 through December 2010 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	124	124	100.00
EPA 8321A	Diphenamid(Surrogate)	RPD ≤ 25; PR 70-130 (Jan-Nov 2010); PR 52-122 (Dec 2010)	54	52	96.30
EPA 619	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 62-145	111	111	100.00
EPA 619	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 54-144	111	111	100.00
EPA 8081A	Decachlorobiphenyl(Surrogate)	RPD ≤ 25; PR 16-146	110	110	100.00
EPA 8081A	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	110	110	100.00
EPA 8141A OP	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 60-150	221	221	100.00
EPA 8141A OP	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 56-129	221	220	99.55
EPA 8270M_NCI_SIM	Decachlorobiphenyl(Surrogate) sediment	RPD ≤ 25; PR 30-180	19	19	100.00
		TOTAL	**1081**	**1078**	**99.72**

Table 27. SJCDWQC summary of holding time evaluations for environmental, field blank, field duplicate and matrix spike samples.

Samples collected from January 2010 through December 2010; 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	84	84	100.00
EPA 8321A CARB	Carbaryl	7 days	84	84	100.00
EPA 8321A CARB	Carbofuran	7 days	84	84	100.00
EPA 8321A CARB	Methiocarb	7 days	84	84	100.00
EPA 8321A CARB	Methomyl	7 days	84	84	100.00
EPA 8321A CARB	Oxamyl	7 days	84	84	100.00
EPA 8321A CARB	Diuron	7 days	76	76	100.00
EPA 8321A CARB	Linuron	7 days	72	72	100.00
EPA 619	Atrazine	7 days	72	72	100.00
EPA 619	Cyanazine	7 days	72	72	100.00
EPA 619	Simazine	7 days	74	74	100.00
EPA 547M	Glyphosate	14 days	72	72	100.00
EPA 549.2M	Paraquat dichloride	7 days	73	73	100.00
EPA 8081A	DDD(p,p')	7 days	72	72	100.00
EPA 8081A	DDE(p,p')	7 days	72	72	100.00
EPA 8081A	DDT(p,p')	7 days	72	72	100.00
EPA 8081A	Dicofol	7 days	72	72	100.00
EPA 8081A	Dieldrin	7 days	73	73	100.00
EPA 8081A	Endrin	7 days	72	72	100.00
EPA 8081A	Methoxychlor	7 days	72	72	100.00
EPA 8081A	Aldrin	7 days	48	48	100.00
EPA 8081A	Chlordane	7 days	48	48	100.00
EPA 8081A	Heptachlor	7 days	48	48	100.00
EPA 8081A	Heptachlor epoxide	7 days	48	48	100.00
EPA 8081A	HCH, alpha	7 days	48	48	100.00
EPA 8081A	HCH, beta	7 days	48	48	100.00
EPA 8081A	HCH, delta	7 days	48	48	100.00
EPA 8081A	HCH, gamma	7 days	48	48	100.00
EPA 8081A	Endosulfan I	7 days	48	48	100.00
EPA 8081A	Endosulfan II	7 days	48	48	100.00
EPA 8081A	Toxaphene	7 days	48	48	100.00
EPA 8141A OP	Azinphos methyl	7 days	84	84	100.00
EPA 8141A OP	Chlorpyrifos	7 days	129	129	100.00
EPA 8141A OP	Diazinon	7 days	115	115	100.00
EPA 8141A OP	Dichlorvos	7 days	84	84	100.00
EPA 8141A OP	Dimethoate	7 days	84	84	100.00
EPA 8141A OP	Demeton-s	7 days	84	84	100.00
EPA 8141A OP	Disulfoton	7 days	84	84	100.00
EPA 8141A OP	Malathion	7 days	84	84	100.00
EPA 8141A OP	Methidathion	7 days	84	84	100.00
EPA 8141A OP	Parathion, Methyl	7 days	84	84	100.00
EPA 8141A OP	Phorate	7 days	84	84	100.00
EPA 8141A OP	Phosmet	7 days	84	84	100.00
EPA 8141A OP	Trifluralin	7 days	72	72	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8141A OP	Methamidophos	7 days	36	36	100.00
EPA 8321A	Methamidophos	7 days	36	36	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	6 months	97	97	100.00
EPA 160.1	Total Dissolved Solids	7 days	96	96	100.00
EPA 160.2	Total Suspended Solids	7 days	96	96	100.00
EPA 180.1	Turbidity	48 hours	96	96	100.00
EPA 350.2	Ammonia as N	Field acidify, 28 days	108	108	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	Field acidify, 28 days	108	108	100.00
EPA 353.2	Nitrate + Nitrite as N	Field acidify, 28 days	108	108	100.00
EPA 365.2	OrthoPhosphate as P	48 hours	108	108	100.00
EPA 365.2	Phosphate as P	Field acidify, 28 days	108	108	100.00
EPA 415.1	Total Organic Carbon	28 days	110	110	100.00
SM 9223	*E. coli*	24 hours	96	96	100.00
EPA 200.8	Arsenic	Field acidify, 6 months	84	84	100.00
EPA 200.8	Boron	Field acidify, 6 months	84	84	100.00
EPA 200.8	Cadmium	Field acidify, 6 months	84	84	100.00
EPA 200.8	Copper	Field acidify, 6 months	109	109	100.00
EPA 200.8	Lead	Field acidify, 6 months	84	84	100.00
EPA 200.8	Molybdenum	Field acidify, 6 months	84	84	100.00
EPA 200.8	Nickel	Field acidify, 6 months	84	84	100.00
EPA 200.8	Selenium	Field acidify, 6 months	84	84	100.00
EPA 200.8	Zinc	Field acidify, 6 months	85	85	100.00
EPA 200.8	Cadmium (Dissolved)	Field acidify, 6 months	84	84	100.00
EPA 200.8	Copper (Dissolved)	Field acidify, 6 months	109	109	100.00
EPA 200.8	Lead (Dissolved)	Field acidify, 6 months	84	84	100.00
EPA 200.8	Nickel (Dissolved)	Field acidify, 6 months	84	84	100.00
EPA 200.8	Zinc (Dissolved)	Field acidify, 6 months	84	84	100.00
Walkley-Black	Total Organic Carbon (sediment)	Unfrozen, 2 days	13	4	30.77
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	Unfrozen, 2 days	9	4	44.44
EPA 8270M_NCI_SIM	Permethrin (sediment)	Unfrozen, 2 days	9	4	44.44
		TOTAL	**5728**	**5674**	**99.06**

Table 28. SJCDWQC summary of toxicity field duplicate sample evaluations.

Samples collected from January 2010 through December 2010; 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*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-012	*Pimephales promelas*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	12	RPD ≤ 25	12	100.00
EPA 600/R-99-064	*Hyalella azteca*	2	RPD ≤ 25	2	100.00

Table 29. 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. Two of three batches in September did not have duplicates analyzed and therefore RPDs are not calculated.

Sample Type	Analysis Month	Φ_5	Φ_{16}	Φ_{84}	Φ_{95}	SD	RPD_{SD}
Environmental Sample	March 2010	2.24	3.37	7.56	9.19	2.10	-
Lab Duplicate	March 2010	NA	NA	NA	NA	NA	NA
Field Duplicate	March 2010	0.55	1.88	7.37	9.16	2.67	24.13
Environmental Sample	September 2010	1.22	2.55	6.72	8.53	2.15	-
Lab Duplicate	September 2010	1.75	2.66	6.45	8.28	1.94	9.92
Field Duplicate	September 2010	1.2	2.59	6.71	8.52	2.14	0.51

NA – Not applicable; duplicate analysis was not performed.
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_5 = phi value of the 5th percentile sediment grain size category
Φ_{95} = phi value of the 95th percentile sediment grain size category

The Coalition monitored all constituents as required in the MRP and outlined in the MRPP (Table 11, pages 69-71). Ninety percent of samples met data quality objectives for completeness, precision and accuracy. A discussion of all quality assurance/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 a pH exceedance that occurred in samples collected on February 9, 2010 (revised report sent on June 18, 2010).

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

Evaluations of WQTL exceedances for applied pesticides were reviewed in the context of the PUR data relevant to exceedances. Pesticide use report data from January through May 2010 (San Joaquin County), January through November (Stanislaus County) and from January through August 2010 (Contra Costa County) were available for review (Table 30). 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 1, 2011.

Table 30. Obtained PUR data information January through December 2010.

COUNTY	2010 PUR DATA OBTAINED	2010 PUR DATA OUTSTANDING
Contra Costa	January through August	September through December
San Joaquin	January through May	June through December
Stanislaus	January through November	December

Coalition monitoring between January 1, 2010 and December 31, 2010 resulted in exceedances of WQTLs (Table 31) for dissolved oxygen, pH, specific conductance, *E. coli*, total dissolved solids, nitrate, arsenic, copper, chlorpyrifos and DDE. Water column toxicity to *Ceriodaphnia dubia* and *Selenastrum capricornutum,* and sediment toxicity to *Hyalella azteca* also occurred. The next section summarizes all exceedance data.

Table 31. 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 µmhos/cm	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcott)	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 & Westcott)	3
Total Suspended Solids	NA				
Temperature	variable	Numeric		Basin Plan Objective (see objectives for COLD, WARM, and Enclosed Bays and Estuaries)	1
E. coli	235 MPN/100 ml	Narrative	Water Contact Recreation	EPA ambient water quality criteria, single-sample maximum	3
Fecal coliform	200 MPN/100 ml 400 MPN/100 ml	Numeric	Water Contact Recreation	Sacramento/San Joaquin Rivers Basin Plan (page III.3.00) Geometric mean of not less than five samples for any 30- day period, nor shall more than 10% of the total number of samples taken during a 30 -day period.	1
TOC	NA				
Pesticides - Carbamates					
Aldicarb	3 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: United States Environmental Protection Agency (USEPA) Primary MCL (MUN, human health)	1
Carbaryl	2.53 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average	3
Carbofuran	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methiocarb	0.5 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates	3
Methomyl	0.52 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average (California Department of Fish and Game) (aquatic life)	3
Oxamyl	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Drinking Water Standards - Maximum Contaminant Levels (MCLs). California Dept of Health Services. Primary MCL	3
Pesticides - Organochlorines					
DDD(p,p')	0.00083 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR, Human Health Protection, 30-Day Average -	1
DDE(p,p')	0.00059 µg/L				

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
DDT(p,p')	0.00059 µg/L			Sources of Drinking Water (water & fish consumption)	
Dicofol	NA				
Dieldrin	0.00014 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) / Continuous Concentration 4-day average (total)	1
Endrin	0.036 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-Day Average	1
	0.76 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
Methoxychlor	0.03 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - Freshwater Aquatic Life Protection - instantaneous maximum	3
	30 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Pesticides - Organophosphates					
Azinphos methyl	0.01 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - instantaneous maximum	3
Chlorpyrifos	0.015 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Rivers Basin Plan: page III-6.01; San Joaquin River & Delta, Sacramento & Feather Rivers; more stringent 4-day average.	1
Diazinon	0.1 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan: San Joaquin River & Delta numeric standard. Sacramento & Feather Rivers numeric standard	1
Dichlorvos	0.085 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water. Cal/EPA Cancer Potency Factor as a drinking water level	3
Dimethoate	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Notification Level – DHS (MUN, human health). California Notification Levels. (Department of Health Services)	3
Demeton-s	NA				
Disulfoton	0.05 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA National Ambient Water Quality Criteria - Freshwater Aquatic Life Protection - instantaneous maximum	3
Malathion	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methamidophos	0.35 µg/L	Narrative	Municipal and Domestic Supply	Basin Plan Toxicity Objective, Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Methidathion	0.7 µg/L	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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Phorate	0.7 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Phosmet	140 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose (RfD) as a drinking water level.	3
Group A Pesticides					
Aldrin	0.00013 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	3 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Instantaneous maximum	
Chlordane	0.00057 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0043 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor	0.00021µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor Epoxide	0.0001 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Total Hexachlorocyclohexane (including lindane)	0.0039 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.95 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Maximum Concentration (1-hour Average)	
Endosulfan	110 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR (USEPA) - Continuous Concentration 4-day average (total)	
Toxaphene	0.00073 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Toxaphene	0.0002 µg/L		Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	1
Pesticides - Herbicides					
Atrazine	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Cyanazine	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Health Advisory (human health)	3
Diuron	2 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water. USEPA Health Advisory. Likely to be carcinogenic to humans (U.S. Environmental Protection Agency, 2005 Guidelines for Carcinogen Risk Assessment).	3
Glyphosate	700 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Linuron	1.4 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3
Molinate	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Paraquat dichloride	3.2 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3
Simazine	4.0 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Thiobencarb	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Trifluralin	5 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Cancer Risk Level. One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water	3
Metals (c)					
Arsenic	10 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Boron	700 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Cadmium	For aquatic life; variable (see cadmium worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness	1
	5 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Copper	For aquatic life; variable (see copper worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness/	1
	1,300 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Lead	For aquatic life; variable (see lead worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Molybdenum	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan - San Joaquin River, Mouth of the Merced River to Vernalis	1
	50 µg/L			Sacramento/San Joaquin Basin Plan - Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River	
	10 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
	35 µg/L		Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level.	
Nickel	For aquatic life variable (see Nickel worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	100 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Selenium	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
	5 µg/L (4-day average)	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR Freshwater Aquatic Life Protection - Continuous Concentration - 4-Day Average	
Zinc	For aquatic life variable (see Zinc worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness/	1
Nutrients					
Nitrate as NO_3 Nitrate as N	45,000 µg/L as NO_3 10,000 µg/L as N	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Nitrite as Nitrogen	1,000 µg/L as N	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Ammonia	For aquatic life variable (see ammonia worksheet).	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Freshwater Aquatic Life Criteria, Continuous Concentration	3
	1.5 mg/L (regardless of pH and Temperature values)	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Taste and Odor Threshold (Ammore and Hautala)	3
Hardness	NA				

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
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.
MCL- Maximum Contaminant Level
MUN-Municipal and Domestic Supply
NA-Not Applicable
ND-Not Detected
(*)-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 Regional Board. All communications are documented in Appendix V. A tally of all exceedances that occurred between January 2010 and December 2010 are listed by constituent group in Tables 32-35. Sediment chemistry results associated with sediment toxicity can be found in Table 36. 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 (MPM) exceedances, and a total count for all WQTL exceedances (Tables 32-36). Non contiguous water body exceedances have been flagged and are indicated separately in tables 32-36 because the water was not connected to a downstream water body. If a WQTL exceedance occurred in the environmental sample and the field duplicate sample, the result is only counted once.

Table 32. Exceedances of WQTLs for parameters measured in the field including dissolved oxygen, pH, and specific conductivity.

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).

Site Name	Sample Date	Season	DO, mg/L	pH, None	SC, µS/cm
Drain @ Woodbridge Rd	1/13/2010	Storm1	4.78		956
French Camp Slough @ Airport Way	1/13/2010	Storm1	2.11		
Lone Tree Creek @ Jack Tone Rd	1/13/2010	Storm1, MPM	3.61		
Roberts Island Drain @ Holt Rd	1/13/2010	Storm1			1199
Terminous Tract Drain @ Hwy 12	1/13/2010	Storm1	6.69		1242
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1/13/2010	Storm1, MPM	2.36		
Walthall Slough @ Woodward Ave	1/13/2010	Storm1	2.94		784
Drain @ Woodbridge Rd	2/9/2010	Winter1	5.12		1049
French Camp Slough @ Airport Way	2/9/2010	Winter1			
Mokelumne River @ Bruella Rd	2/9/2010	Winter1		6.08	
Roberts Island Drain @ Holt Rd	2/9/2010	Winter1			1602
Terminous Tract Drain @ Hwy 12	2/9/2010	Winter1			1434
Walthall Slough @ Woodward Ave	2/9/2010	Winter1			719
Drain @ Woodbridge Rd	3/16/2010	Winter2	5.94		1294
Roberts Island Drain @ Holt Rd	3/16/2010	Winter2			1862
Terminous Tract Drain @ Hwy 12	3/16/2010	Winter2			1960
Drain @ Woodbridge Rd	4/13/2010	Irrigation1	6.04		1629
Duck Creek @ Hwy 4	4/13/2010	Irrigation1, MPM	6.60		
Grant Line Canal near Calpack Rd	4/13/2010	Irrigation1, MPM			1713
Roberts Island Drain @ Holt Rd	4/13/2010	Irrigation1			1429
Terminous Tract Drain @ Hwy 12	4/13/2010	Irrigation1	6.45		1590
Drain @ Woodbridge Rd	5/11/2010	Irrigation2	6.18		2002
Grant Line Canal @ Clifton Court Rd	5/11/2010	Irrigation2, MPM	6.23		
Grant Line Canal near Calpack Rd	5/11/2010	Irrigation2, MPM	4.75		1357
Roberts Island Drain @ Holt Rd	5/11/2010	Irrigation2			1426
Walthall Slough @ Woodward Ave	5/11/2010	Irrigation2	5.88		
Drain @ Woodbridge Rd	6/8/2010	Irrigation3	3.01		1358
Duck Creek @ Hwy 4	6/8/2010	Irrigation3, MPM	0.44		
Grant Line Canal @ Clifton Court Rd	6/8/2010	Irrigation3			1523
Roberts Island Drain @ Holt Rd	6/8/2010	Irrigation3	4.03		778
Terminous Tract Drain @ Hwy 12	6/8/2010	Irrigation3	6.70		
Walthall Slough @ Woodward Ave	6/8/2010	Irrigation3	4.55		
Drain @ Woodbridge Rd	7/13/2010	Irrigation4	3.71		783
Duck Creek @ Hwy 4	7/13/2010	Irrigation4, MPM	6.48		
Grant Line Canal @ Clifton Court Rd	7/13/2010	Irrigation4, MPM	6.71		
Grant Line Canal near Calpack Rd	7/13/2010	Irrigation4, MPM	6.55		934
Littlejohns Creek @ Jack Tone Rd	7/13/2010	Irrigation4, MPM	6.53		
Roberts Island Drain @ Holt Rd	7/13/2010	Irrigation4	4.89		745
Terminous Tract Drain @ Hwy 12	7/13/2010	Irrigation4	5.83		
Walthall Slough @ Woodward Ave	7/13/2010	Irrigation4	5.06		
Drain @ Woodbridge Rd	8/10/2010	Irrigation5	4.53		
Duck Creek @ Hwy 4	8/10/2010	Irrigation5, NM, MPM	5.07		
Grant Line Canal @ Clifton Court Rd	8/10/2010	Irrigation5, MPM	6.37		1172
Grant Line Canal near Calpack Rd	8/10/2010	Irrigation5, MPM	5.5		925
Littlejohns Creek @ Jack Tone Rd	8/10/2010	Irrigation5, MPM	6.25		

Site Name	Sample Date	Season	DO, mg/L	pH, None	SC, µS/cm
Roberts Island Drain @ Holt Rd	8/10/2010	Irrigation5	5.09		843
Terminous Tract Drain @ Hwy 12	8/10/2010	Irrigation5, NM, MPM	5.52		
Walthall Slough @ Woodward Ave	8/10/2010	Irrigation5	4.83		
Drain @ Woodbridge Rd	9/7/2010	Irrigation 6, Sed	2.16		1200
Duck Creek @ Hwy 4	9/7/2010	Irrigation 6, Sed, MPM	6.11		
Grant Line Canal @ Clifton Court Rd	9/7/2010	Irrigation 6, Sed, MPM	6.28		798
Grant Line Canal near Calpack Rd	9/7/2010	Irrigation 6, Sed, MPM			1017
Littlejohns Creek @ Jack Tone Rd	9/7/2010	Irrigation 6, Sed, MPM	5.50		
Roberts Island Drain @ Holt Rd	9/7/2010	Irrigation 6, Sed	3.66		824
Terminous Tract Drain @ Hwy 12	9/7/2010	Irrigation 6, Sed, MPM	5.55		
Walthall Slough @ Woodward Ave	9/7/2010	Irrigation 6, Sed	6.88		
Duck Creek @ Hwy 4	9/14/2010	Irrigation 6, Sed*	4.51		
Drain @ Woodbridge Rd	10/12/2010	Fall1	3.38		797
Duck Creek @ Hwy 4	10/12/2010	Fall1	5.60		
Littlejohns Creek @ Jack Tone Rd	10/12/2010	Fall1	6.00		
Roberts Island Drain @ Holt Rd	10/12/2010	Fall1			946
Drain @ Woodbridge Rd	11/9/2010	Fall2	4.10		984
Duck Creek @ Hwy 4	11/9/2010	Fall2	6.01		
French Camp Slough @ Airport Way	11/9/2010	Fall2, Non Contiguous	6.36		
Roberts Island Drain @ Holt Rd	11/9/2010	Fall2			1618
Terminous Tract Drain @ Hwy 12	11/9/2010	Fall2			991
Drain @ Woodbridge Rd	12/7/2010	Fall3	3.68		1262
Roberts Island Drain @ Holt Rd	12/7/2010	Fall3			1022
Terminous Tract Drain @ Hwy 12	12/7/2010	Fall3	6.21		1151
Walthall Slough @ Woodward Ave	12/7/2010	Fall3			733
		Environmental Exceedances	**32**	**1**	**33**
		Non Contiguous Water Body Exceedances	**1**	**0**	**0**
		Management Plan Monitoring Exceedances[1]	**19**	**0**	**7**
		TOTAL Exceedances	**52**	**1**	**40**

[1] Refers to Management Plan Monitoring for specific constituents at Assessment, Core, and/or MPM locations.
*Additional DPR Grant Monitoring
MPM – Management Plan Monitoring
NM-Normal monitoring
Sed – Sediment monitoring

Table 33. 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).

Site Name	Sample Date	Season	TDS, mg/L	*E. coli*, MPN/100 ml	Nitrate + Nitrite, mg/L	Arsenic, µg/L	Copper Dissolved[1], µg/L (hardness based trigger limit)
Drain @ Woodbridge Rd	1/13/2010	Storm1	490				
Roberts Island Drain @ Holt Rd	1/13/2010	Storm1	670				
Terminous Tract Drain @ Hwy 12	1/13/2010	Storm1	710				
Walthall Slough @ Woodward Ave (FD)	1/13/2010	Storm1		250			
Drain @ Woodbridge Rd	2/9/2010	Winter1	630			14	
French Camp Slough @ Airport Way	2/9/2010	Winter1		1300			
Roberts Island Drain @ Holt Rd	2/9/2010	Winter1	930				
Terminous Tract Drain @ Hwy 12	2/9/2010	Winter1	800				
Drain @ Woodbridge Rd	3/16/2010	Winter2	700			13	
Roberts Island Drain @ Holt Rd	3/16/2010	Winter2	1100				
Terminous Tract Drain @ Hwy 12	3/16/2010	Winter2	1100				
Drain @ Woodbridge Rd	4/13/2010	Irrigation1	840			14	
French Camp Slough @ Airport Way	4/13/2010	Irrigation1		>2400			
Roberts Island Drain @ Holt Rd	4/13/2010	Irrigation1	800				
Terminous Tract Drain @ Hwy 12	4/13/2010	Irrigation1	850			13	
Unnamed Drain To Lone Tree Creek @ Jack Tone Rd	4/13/2010	Irrigation1, MPM					5.5 (4.70)
Drain @ Woodbridge Rd	5/11/2010	Irrigation2	1300			18	
French Camp Slough @ Airport Way	5/11/2010	Irrigation2		360			
Littlejohns Creek @ Jack Tone Rd	5/11/2010	Irrigation2, MPM					1.7 (1.46)
Roberts Island Drain @ Holt Rd	5/11/2010	Irrigation2	890	280			
Walthall Slough @ Woodward Ave	5/11/2010	Irrigation2		310			
Drain @ Woodbridge Rd	6/8/2010	Irrigation3	730			13	
French Camp Slough @ Airport Way	6/8/2010	Irrigation3, NM, MPM		270			
Roberts Island Drain @ Holt Rd	6/8/2010	Irrigation3	460	550			
Drain @ Woodbridge Rd	7/13/2010	Irrigation4	460			11	
Roberts Island Drain @ Holt Rd	7/13/2010	Irrigation4		370			
Roberts Island Drain @ Holt Rd	8/10/2010	Irrigation5	520				
Drain @ Woodbridge Rd	9/7/2010	Irrigation 6, Sed	660			14	

Site Name	Sample Date	Season	TDS, mg/L	*E. coli*, MPN/100 ml	Nitrate + Nitrite, mg/L	Arsenic, µg/L	Copper Dissolved[1], µg/L (hardness based trigger limit)
French Camp Slough @ Airport Way	9/7/2010	Irrigation 6, NM, Sed, MPM		550			
Roberts Island Drain @ Holt Rd	9/7/2010	Irrigation 6, Sed	480				
Terminous Tract Drain @ Hwy 12	9/7/2010	Irrigation 6, Sed, MPM		2000		11	
Walthall Slough @ Woodward Ave	9/7/2010	Irrigation 6, Sed		250			
Drain @ Woodbridge Rd	10/12/2010	Fall1		820		17	
Roberts Island Drain @ Holt Rd	10/12/2010	Fall1	540				
Drain @ Woodbridge Rd	11/9/2010	Fall2	520				
Roberts Island Drain @ Holt Rd	11/9/2010	Fall2	960				
Terminous Tract Drain @ Hwy 12	11/9/2010	Fall2	540				
Drain @ Woodbridge Rd	12/7/2010	Fall3	740			14	
Roberts Island Drain @ Holt Rd	12/7/2010	Fall3	640				
Terminous Tract Drain @ Hwy 12	12/7/2010	Fall3	730				
Walthall Slough @ Woodward Ave	12/7/2010	Fall3	460		11		
Environmental Exceedances			**28**	**10**	**1**	**10**	**0**
Non Contiguous Water Body Exceedances			**0**	**0**	**0**	**0**	**0**
Management Plan Monitoring Exceedances[2]			**0**	**3**	**0**	**1**	**2**
TOTAL Exceedances			**28**	**13**	**1**	**11**	**2**

[1] If copper exceedance is the dissolved fraction of copper, the limit based on hardness is shown in parenthesis.
[2]Refers to Management Plan Monitoring for specific constituents at Assessment, Core, and/or MPM locations.
*Additional DPR Grant Monitoring
FD – Field Duplicate
MPM – Management Plan Monitoring
NM-Normal monitoring
Sed-Sediment monitoring

Table 34. 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.

Site Name	Sample Date	Season	Chlorpyrifos, µg/L	DDE[1] µg/L
Lone Tree Creek @ Jack Tone Rd	1/13/2010	Storm1	1.1	
Drain @ Woodbridge Rd	4/13/2010	Irrigation1	0.029	
Duck Creek @ Hwy 4	5/11/2010	Irrigation2, MPM	0.055	
Duck Creek @ Hwy 4	7/13/2010	Irrigation4, MPM	0.02	
Lone Tree Creek @ Jack Tone Rd	7/13/2010	Irrigation4, MPM	0.27	
Duck Creek @ Hwy 4	8/10/2010	Irrigation5, MPM	0.3	
French Camp Slough @ Airport Way	8/10/2010	Irrigation5, NM, MPM	0.022	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/10/2010	Irrigation5*	0.039	
Duck Creek @ Hwy 4	9/7/2010	Irrigation 6, Sed, MPM	0.023	
Grant Line Canal @ Clifton Court Rd	9/7/2010	Irrigation 6, Sed, MPM	0.044	
Littlejohns Creek @ Jack Tone Rd	11/9/2010	Fall2*	0.04	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	11/9/2010	Fall2*	0.052	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/7/2010	Fall3*	0.068	
Walthall Slough @ Woodward Ave (FD)	12/7/2010	Fall3		0.0049
		Environmental Exceedances	2	1
		Non Contiguous Water Body Exceedances	**0**	**0**
		Additional DPR Grant Monitoring*	**4**	**0**
		Management Plan Monitoring Exceedances[2]	**7**	**0**
		TOTAL Exceedances	**13**	**1**

[1]DDE- Dichlorodiphenyldichloroethylene

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

*Additional DPR Grant Monitoring

MPM – Management Plan Monitoring

NM-Normal monitoring

Sed-Sediment sampling

Table 35. 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.

Station Name	Season	Sample Date	Species	Toxicity End Point	Mean	Percent Control	Toxicity Significance	Summary Comments
Roberts Island Drain @ Holt Rd	Winter2	3/16/2010	*C. dubia*	Survival (%)	75	75	SL	
Grant Line Canal @ Clifton Court Rd	Irrigation2, MPM	5/11/2010	*S. capricornutum*	Total Cell Count (cells/ml)	34017	11	SL	A TIE was conducted on 5/19/10 and it was concluded that non-polar organic chemicals were the cause of toxicity.
Drain @ Woodbridge Rd	Irrigation6, Sediment	9/7/2010	*H. azteca*	Survival (%)	85	88	SG	
French Camp Slough @ Airport Way	Irrigation6, MPM	9/7/2010	*H. azteca*	Survival (%)	1	1	SL	
Grant Line Canal @ Clifton Court Rd	Irrigation6, Sediment, MPM	9/7/2010	*H. azteca*	Survival (%)	29	30	SL	Chlorpyrifos and pyrethroids detected.
Grant Line Canal near Calpack Rd	Irrigation6, Sediment, MPM	9/7/2010	*H. azteca*	Survival (%)	88	91	SG	
Terminous Tract Drain @ Hwy 12	Irrigation6, Sediment	9/7/2010	*H. azteca*	Survival (%)	44	45	SL	Pyrethroids detected.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	Irrigation6, Sediment, MPM	9/7/2010	*H. azteca*	Survival (%)	74	76	SL	Chlorpyrifos and pyrethroids detected.
Walthall Slough @ Woodward Ave	Irrigation6, Sediment	9/7/2010	*H. azteca*	Survival (%)	67	69	SL	Chlorpyrifos and pyrethroids detected.
Duck Creek @ Hwy 4	Irrigation6, Sediment*	9/14/2010	*H. azteca*	Survival (%)	15	17	SL	Sample retested due to highly variable replicate response (NAUT_SJ100110_S_TOX)

Monitoring Type	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Environmental Exceedances	1	0	1	8
Non Contiguous Water Body Environmental Exceedances	0	0	0	0
Management Plan Monitoring Exceedances[1]	0	0	1	4
Additional DPR Grant Monitoring*	NA	NA	NA	1
Total	1	0	1	8

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

MPM – Management Plan Monitoring

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

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

*Additional DPR Grant Monitoring

NA – Not applicable; this type of monitoring did not occur for this species

Table 36. Sediment toxicity chemistry results.

If a field duplicate and an environmental sample both have an exceedance, only the environmental sample exceedance is included in this table.

				Sediment Pesticides µg/kg dw												
Station Name	Sample Date	Sample Type Code	*Hyalella azteca* (Percent Control; % Survival)	Bifenthrin	Chlorpyrifos	Cyfluthrin, total	Cyhalothrin, lambda, total	Cypermethrin, total	Deltamethrin:Tralomethrin	Esfenvalerate/Fenvalerate, total	Fenpropathrin	Permethrin, Total	TOC (mg/kg dw)	Mean GS Description	Median GS (mm)	Lab Result Comment
French Camp Slough @ Airport Way	07/Sep/2010	IN	1	19.6	0.87	ND	0.11	0.14	ND	2.5	0.083	ND	2350	Fine sand[1]	0.051	MPM
Grant Line Canal @ Clifton Court Rd	07/Sep/2010	IN	30	2	0.25	ND	1.1	ND	ND	51.3	0.2	0.27	32700	Silt[2]	0.015	MPM
Terminous Tract Drain @ Hwy 12	07/Sep/2010	IN	45	10.5	4.6	ND	2.9	ND	ND	ND	ND	0.5	17900	Fine sand[1]	0.112	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	07/Sep/2010	IN	76	3.4	1.2	ND	ND	ND	ND	ND	ND	ND	7850	Silt[2]	0.033	MPM
Walthall Slough @ Woodward Ave	07/Sep/2010	IN	69	1.6	ND	ND	0.54	ND	ND	ND	ND	ND	9150	Fine sand[1]	0.7	
Walthall Slough @ Woodward Ave (FD)	07/Sep/2010	IN2	74	3.8	ND	ND	0.54	ND	ND	ND	ND	ND	7700	Silt[2]	0.066	
Walthall Slough @ Woodward Ave	07/Sep/2010	IN3	69	16	0.2	ND	0.67	ND	ND	0.15	ND	0.67	10800	Silt[2]	0.06	
Duck Creek @ Hwy 4	14/Sep/2010	IN	17	1.5	0.55	ND	ND	ND	ND	ND	ND	ND	4100	Silt[2]	0.016	DPR

[1]Fine Sand: 0.075 to <0.425 mm

[2]Silt: 0.005 to <0.075 mm

DPR-Department of Pesticide Regulation Monitoring

IN-Integrated sample

IN2-Integrated field duplicate sample

IN3-Integrated toxicity laboratory duplicate; this sample was analyzed for chemistry to compare analytical results of samples frozen verses samples that were not frozen.

MPM-Management Plan Monitoring

ND- Not Detected

FD- Field Duplicate

GS- Grain Size

DISCUSSION OF EXCEEDANCES

Pesticide Use Report Data

All PUR information is provided to the Coalition from each of the county Agricultural Commissioner's offices and evaluated for applications relevant to exceedances of WQTLs. 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 partitioning 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 made within 30 days prior to water sampling. The PUR database is queried for applications of pyrethroid pesticides within 180 days prior to the exceedance and queries for metals are for within 90 days prior to exceedances (Table 37). 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 unavailable at the time of this report, a note was made in Appendix IV. Information regarding available and outstanding PURs is included in Table 30 in the Discussion of Results section of this report. Any outstanding PUR information will be submitted on June 1, 2011 in an addendum to the Annual Monitoring Report (AMR).

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

Table 37. 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 month with 6 months for pyrethroids 3 months for metals

Exceedances that occurred from January 2010 through December 2010 are tabulated by zone in Tables 38 through 42. No monitoring was conducted in Zone 6 during 2010. The following section discusses possible sources of WQTL exceedances that are due to pesticide applications. An assessment of agricultural pesticide applications that are potential sources of the exceedances accompanies the Tables. All PUR data relevant to pesticide exceedances and toxicity are based on the pounds (lbs) of active ingredient (AI) 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 38. Zone 1 (Mokelumne River @ Bruella Rd) Exceedances.

ZONE	STATION NAME	SAMPLE TYPE CODE	SAMPLE DATE	PH, NONE
1	Mokelumne River @ Bruella Rd	NM	2/9/2010	6.08

NM-Normal Monitoring

Physical Parameters, Total Dissolved Solids and E. coli

Physical parameters (specific conductance, dissolved oxygen, pH), total dissolved solids, and *E. coli* can be influenced by agricultural inputs as well as other inputs outside of the control of agriculture (see Monitoring Objectives and Design section of this report). Zone 1 only had one exceedance during 2010 at Mokelumne River @ Bruella Rd which was an exceedance of the pH WQTL on February 9, 2010 (pH = 6.08, Table 38). Exceedances of water quality objectives for pH are difficult to track to sources because pH is a non-conserved constituent.

Table 39. Zone 2 (Duck Creek @ Hwy 4, French Camp Slough @ Airport Way, Littlejohns Creek @ Jack Tone Rd, 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	*E. coli*, MPN/100 mL	Copper Dissolved, µg/L (hardness based trigger limit)	Chlorpyrifos, µg/L	*H. azteca*, % control
2	Duck Creek @ Hwy 4	MPM	4/13/2010	6.60				
2	Duck Creek @ Hwy 4	MPM	5/11/2010				0.055	
2	Duck Creek @ Hwy 4	MPM	6/8/2010	0.44				
2	Duck Creek @ Hwy 4	MPM	7/13/2010	6.48			0.020	
2	Duck Creek @ Hwy 4	MPM	8/10/2010	5.07			0.300	
2	Duck Creek @ Hwy 4	MPM	9/7/2010	6.11			0.023	
2	Duck Creek @ Hwy 4	*Additional SED	9/14/2010	4.51				17
2	Duck Creek @ Hwy 4	*Additional	10/12/2010	5.60				
2	Duck Creek @ Hwy 4	*Additional	11/9/2010	6.01				
2	French Camp Slough @ Airport Way	NM	1/13/2010	2.11				
2	French Camp Slough @ Airport Way	NM	2/9/2010		1300			
2	French Camp Slough @ Airport Way	NM	4/13/2010		>2400			
2	French Camp Slough @ Airport Way	NM	5/11/2010		360			
2	French Camp Slough @ Airport Way	MPM, NM	6/8/2010		270			
2	French Camp Slough @ Airport Way	MPM, NM	8/10/2010				0.022	
2	French Camp Slough @ Airport Way	MPM, NM, SED	9/7/2010		550			1
2	French Camp Slough @ Airport Way	NM	11/9/2010	6.36				
2	Littlejohns Creek @ Jack Tone Rd	MPM	5/11/2010			1.7 (1.46)		
2	Littlejohns Creek @ Jack Tone Rd	MPM	7/13/2010	6.53				
2	Littlejohns Creek @ Jack Tone Rd	MPM	8/10/2010	6.25				
2	Littlejohns Creek @ Jack Tone Rd	MPM, SED	9/7/2010	5.50				
2	Littlejohns Creek @ Jack Tone Rd	*Additional	10/12/2010	6.00				
2	Littlejohns Creek @ Jack Tone Rd	*Additional	11/9/2010				0.04	
2	Lone Tree Creek @ Jack Tone Rd	MPM	1/13/2010	3.61			1.100	
2	Lone Tree Creek @ Jack Tone Rd	MPM	7/13/2010				0.270	
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	1/13/2010	2.36				
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	4/13/2010			5.5 (4.70)		
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	*Additional	8/10/2010				0.039	
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM, SED	9/7/2010					76
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	*Additional	11/9/2010				0.052	
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	*Additional	12/7/2010				0.068	

*Additional DPR Grant Monitoring
MPM-Management Plan Monitoring
SED-Sediment monitoring
NM-Normal Monitoring
DO-Dissolved Oxygen

Physical Parameters, Total Dissolved Solids and E. coli

There were 16 exceedances of the WQTL for dissolved oxygen in Zone 2 between January 2010 and December 2010 (Table 39). Dissolved oxygen is a non-conserved constituent and is impossible to track to a specific source.

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 to fully understand. Any species of vertebrate that voids feces can contribute *E. coli* to surface waters. Consequently, there may be a large amount of bacteria in any environmental sample that is collected. There were five exceedances of the WQTL for *E. coli* in Zone 2; all exceedances occurred in samples collected from French Camp Slough @ Airport Way (Table 39). French Camp Slough @ Airport Way drains multiple subwatersheds including Littlejohns Creek, Lone Tree Creek and Unnamed Drain to Lone Tree Creek (also called Temple Creek) and there are multiple dairies in the upstream watersheds.

Copper

There are a number of possible sources of copper in water bodies within the Coalition region. Copper is applied as a fungicide to a variety of vegetable crops, grains, and fruit and nut orchards in numerous forms such as copper hydroxide, copper sulfide and copper oxide. Copper can also enter a drainage system as a result of inputs other than agriculture. Copper is commonly used by dairies and can also enter surface water through the weathering of rocks and soils. Automobile components may also contain copper and wearing of brakes can add substantial amounts of copper to surface waters that pass through or near urban areas. Dissolved copper results are compared to the hardness of the water to determine if the bioavailable amount of copper will be toxic to aquatic life. Therefore, the WQTL for dissolved copper will be different for each sample. There were two dissolved copper exceedances experienced in Zone 2 between January 2010 and December 2010 (Table 39). Both exceedances occurred as part of MPM and will be discussed in additional detail in the Coalition's Management Plan Update Report (to be submitted on April 1, 2010).

Littlejohns creek @ Jack Tone Rd MPM samples were collected for copper (total and dissolved) in May, June and September 2010 as specified in the Coalition's Management Plan Monitoring schedule. Samples collected on May 11, 2010 during the second irrigation monitoring event exceeded the WQTL containing 1.7 µg/L dissolved copper (hardness based WQTL = 1.46 µg/L). The PUR data associated with the May exceedance indicate 70 applications ranging between 0.613 and 7.70 lbs AI per acre of copper (Kocide, Nordox and NU-COP) across 8212 acres of grapes, onions, walnuts, and tomatoes with the majority being applied to walnuts between March 25, 2010 and May 7, 2010 (Appendix IV).

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd MPM samples were collected for copper (total and dissolved) in April, May, July, August and September 2010 as specified in the Coalition's Management Plan Monitoring schedule. Samples collected during the first irrigation monitoring event on April 20, 2010 exceeded the WQTL containing 5.5 µg/L dissolved copper (hardness based WQTL = 4.70 µg/L). The PUR data associated with the April exceedance indicate 13 applications ranging between 0.538 and 6.16 lbs AI per acre of copper (Kocide and NU-COP) on 603 acres of almonds, wine grapes, and walnuts with the majority being applied to walnuts between February 4, 2010 and April 10, 2010 (Appendix IV).

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 lethal concentration at 50% mortality (LC_{50}) for chlorpyrifos to *Ceriodaphnia dubia* is 0.055 µg/L. There were 11 exceedances of the WQLT for chlorpyrifos experienced in Zone 2 between January 2010 and December 2010 ranging from 0.020 to 1.100 µg/L (Table 39). All chlorpyrifos exceedances occurred at MPM locations and will be discussed in further details in the 2011 MPUR.

Duck Creek @ Hwy 4 was sampled for MPM of chlorpyrifos every month from April to September as specified in the Coalition's Management Plan Monitoring schedule. Of the six MPM samples collected for chlorpyrifos, four exceeded the WQTL (May, July, August and September). Since samples were collected for MPM, samples for toxicity analysis were not collected during every event. Samples collected May 11, 2010 from Duck Creek @ Hwy 4 exceeded the WQTL containing 0.055 µg/L chlorpyrifos. The PUR data associated with the May exceedance indicate there were nine applications ranging between 0.813 and 0.938 lbs AI per acre of chlorpyrifos (Lorsban and Warhawk) across 907 acres of walnuts and wine grapes on April 30, 2010 (Appendix IV). Samples collected during the fourth irrigation monitoring event on July 13, 2010 exceeded the WQTL containing 0.020 µg/L chlorpyrifos but were not toxic to *Ceriodaphnia dubia*. The PUR data associated with the July exceedance were not available for review at the time of this report; all outstanding PUR will be submitted in an addendum to the AMR on June 1, 2011. Samples collected on August 10, 2010 for the fifth irrigation monitoring event exceeded the WQTL containing 0.30 µg/L chlorpyrifos. The PUR data associated with the August exceedance were not available for review at the time of this report; all outstanding PUR will be submitted on June 1, 2011 in an addendum to the AMR. Samples collected on September 7, 2010 for the last irrigation monitoring event exceeded the WQTL containing 0.023 µg/L chlorpyrifos. The PUR data associated with the September exceedance also were not available for review at the time of this report.

French Camp Slough @ Airport Way MPM samples for chlorpyrifos were collected in May and July-October as specified in the Coalition's Management Plan Monitoring schedule. There was one exceedance of the WQTL in MPM samples collected from this site. Samples collected on August 10, 2010 exceeded the WQTL containing 0.022 µg/L chlorpyrifos. The PUR data associated with the August exceedance were not available for review at the time of this report.

Littlejohns Creek @ Jack Tone Rd was sampled for chlorpyrifos in April, June and July as specified in the Coalition's Management Plan Monitoring schedule. During the months of August-December additional samples were analyzed for chlorpyrifos and diazinon as part of the DPR grant monitoring to reduce the impact of agricultural discharge on water quality. Samples collected on November 9, 2010 exceeded the WQTL with 0.04 µg/L chlorpyrifos. The PUR data associated with the November exceedance were not available for review at the time of this report.

Lone Tree Creek @ Jack Tone Rd was sampled for chlorpyrifos in January, February, July and August as specified in the Coalition's Management Plan Monitoring schedule. There were two exceedances of the WQTL in MPM samples collected from this site. The MPM samples collected on January 13, 2010 (Storm 1) from Lone Tree Creek @ Jack Tone Rd exceeded the WQTL containing 1.100 µg/L chlorpyrifos. The PUR data associated with the January exceedance indicate there were four applications ranging between 1.88 and 1.93 lbs AI per acre of chlorpyrifos (Lorsban) across 186 acres of wine grapes on

October 8, 2009 and on October 9, 2009 (Appendix IV). The MPM samples collected on July 13, 2010 (Irrigation 3) from Lone Tree Creek @ Jack Tone Rd exceeded the WQTL with 0.270 µg/L chlorpyrifos. The PUR data associated with the July exceedance were not available for review at the time of this report.

Unnamed Drain to Lone Tree Creek @ Jack Tone Rd was sampled for chlorpyrifos during the months of January, February, May-July and September as specified in the Coalition's Management Plan Monitoring schedule. Additional samples were analyzed for chlorpyrifos and diazinon as part of the DPR grant monitoring to reduce the impact of agricultural discharge on water quality from June-December 2010. There were three exceedances of the chlorpyrifos WQTL experienced at this location; all three were from additional samples collected for the DPR grant monitoring program. The samples collected on August 10, November 9 and December 7, 2010 exceeded the chlorpyrifos WQTL (0.039, 0.052 and 0.068 µg/L chlorpyrifos respectively). The PUR data associated with the August, November and December exceedances were not available for review at the time of this report.

Toxicity

Sediment toxicity occurred three times in Zone 2 between January and December 2010 to *Hyalella azteca.* There was no water column toxicity in Zone 2 (Table 39).

Duck Creek @ Hwy 4 samples collected as part of the DPR grant monitoring on September 14, 2010 were toxic to *Hyalella azteca*. Survival of *Hyalella azteca* was less than 80 percent in the September samples (17% survival compared to the control, Table 39). Therefore, additional chemistry analyses for pyrethroids and chlorpyrifos were performed. The following pyrethroids were detected in the Duck Creek sediment samples: bifenthrin (4.5 µg/kg dw) and chlorpyrifos (0.55 µg/kg dw). The PUR data associated with September sediment toxicity were not available for review at the time of this report; all outstanding PUR will be submitted in an addendum to the AMR on June 1, 2011.

French Camp Slough @ Airport Way and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd sediment samples collected as part of MPM on September 7, 2010 tested toxic to *Hyalella azteca* (1% and 76% survival compared to the control respectively, Table 39). Additional chemistry analyses for pyrethroids and chlorpyrifos were performed on the French Camp and Unnamed Drain to Lone Tree Creek samples. French Camp Slough samples contained the following pyrethroids: bifenthrin (19.6 µg/kg dw), chlorpyrifos (0.87 µg/kg dw), cypermethrin (J0.14 µg /kg dw), esfenvalerate: fenvalerate (2.5 µg /kg dw), fenpropathrin (J0.083 µg /kg dw) and lambda-cyhalothrin (J0.11 µg/kg dw) Unnamed Drain to Lone Tree Creek samples contained the following pyrethroids: bifenthrin (3.4 µg /kg dw) and chlorpyrifos (1.2 µg /kg dw). The PUR data associated with September sediment toxicity were not available for review at the time of this report; all outstanding PUR will be submitted in an addendum to the AMR on June 1, 2011.

Table 40. Zone 3 (Drain @ Woodbridge Rd, Terminous Tract Drain @ Hwy 12) exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	SC, µS/cm	*E. coli*, MPN/100 mL	Total Dissolved Solids, mg/L	Arsenic, µg/L	Chlorpyrifos, µg/L	*H. azteca*, % control
3	Drain @ Woodbridge Rd	NM	1/13/2010	4.78	956		490			
3	Drain @ Woodbridge Rd	NM	2/9/2010	5.12	1049		630	14		
3	Drain @ Woodbridge Rd	NM	3/16/2010	5.94	1294		700	13		
3	Drain @ Woodbridge Rd	NM	4/13/2010	6.04	1629		840	14	0.029	
3	Drain @ Woodbridge Rd	NM	5/11/2010	6.18	2002		1300	18		
3	Drain @ Woodbridge Rd	NM	6/8/2010	3.01	1358		730	13		
3	Drain @ Woodbridge Rd	NM	7/13/2010	3.71	783		460	11		
3	Drain @ Woodbridge Rd	NM	8/10/2010	4.53						
3	Drain @ Woodbridge Rd	NM, SED	9/7/2010	2.16	1200		660	14		88
3	Drain @ Woodbridge Rd	NM	10/12/2010	3.38	797	820		17		
3	Drain @ Woodbridge Rd	NM	11/9/2010	4.10	984		520			
3	Drain @ Woodbridge Rd	NM	12/7/2010	3.68	1262		740	14		
3	Terminous Tract Drain @ Hwy 12	NM	1/13/2010	6.69	1242		710			
3	Terminous Tract Drain @ Hwy 12	NM	2/9/2010		1434		800			
3	Terminous Tract Drain @ Hwy 12	NM	3/16/2010		1960		1100			
3	Terminous Tract Drain @ Hwy 12	NM	4/13/2010	6.45	1590		850	13		
3	Terminous Tract Drain @ Hwy 12	NM	6/8/2010	6.70						
3	Terminous Tract Drain @ Hwy 12	NM	7/13/2010	5.83						
3	Terminous Tract Drain @ Hwy 12	MPM, NM	8/10/2010	5.52						
3	Terminous Tract Drain @ Hwy 12	MPM,NM,SED	9/7/2010	5.55		2000		11		45
3	Terminous Tract Drain @ Hwy 12	NM	11/9/2010		991		540			
3	Terminous Tract Drain @ Hwy 12	NM	12/7/2010	6.21	1151		730			

NM-Normal Monitoring
MPM- Management Plan Monitoring
DO-Dissolved Oxygen
SED-Sediment monitoring
SC-Specific Conductance

Physical Parameters, Total Dissolved Solids and E. coli

In Zone 3 there were 19 exceedances of the WQTL for dissolved oxygen, 17 for specific conductance, 16 for total dissolved solids and two for *E. coli* between January and December 2010 (Table 40). Sites in Zone 3 are drains within Delta islands and require pumping to remove the water from the drains. In most cases flows do not occur in the drains unless they are being pumped. Therefore it is common in Zone 3 to have exceedances of the salt (specific conductance and total dissolved solids) WQTLs and low dissolved oxygen due to a lack of flow.

Arsenic

The registrations of many products with arsenic as an active ingredient have been cancelled. However, there are four products currently registered (arsenic acid, arsenic acid anhydride, arsenic trioxide and chromate copper arsenate) which are used for wood protection, as a household ant killer, 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. Exceedances of arsenic appear to be common in Zone 3 and may be due to naturally occurring levels of arsenic within the islands. There were 11 exceedances of the arsenic WQTL in Zone 3 between January and December 2010 (Table 40); nine were from water samples collected at Drain @ Woodbridge Rd and two were from samples collected at Terminous Tract Drain @ Hwy 12.

Chlorpyrifos

There was one chlorpyrifos exceedance of the WQTL experienced in Zone 3 between January and December 2010 (Table 40). Drain @ Woodbridge Rd samples collected on April 13, 2010 experienced an exceedance of the chlorpyrifos WQTL (0.029 µg/L). The PUR data associated with the April exceedance indicates that the last application of chlorpyrifos (Lorsban-4E) reported was March 31, 2009 to 100 acres of alfalfa at 0.25 lbs AI per acre. If more PUR data become available in relation to this exceedance they will be included in the addendum to the AMR on June 1, 2011.

Toxicity

Sediment toxicity occurred twice in Zone 3 between January and December 2010 (Table 40). There was no water column toxicity in this zone for 2010.

Drain @ Woodbridge Rd and Terminous Tract Drain @ Hwy 12 samples collected on September 7, 2010 tested toxic to *Hyalella azteca* (88 and 45% survival compared to the control, respectively, Table 40). Drain @ Woodbridge Rd samples had *Hyalella* survival above 80% and are not considered ecologically relevant even thought the sample organism survival was significantly different from the control organism survival. Additional sediment chemistry analysis was conducted on the Terminous Tract Drain samples and the following chemicals were detected: bifenthrin (10.5 µg/kg dw), chlorpyrifos (4.6 µg/kg dw), lambda-cyhalothrin (2.9 µg/kg dw) and permethrin (0.5 µg/kg dw) (Table 36). The PUR data associated with September sediment toxicity were not available for review at the time of this report.

Table 41. Zone 4 (Grant Line Canal @ Clifton Court Rd, Grant Line Canal near Calpack Rd, Roberts Island Drain @ Holt Rd) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	SC, µS/cm	*E. coli*, MPN/100 mL	Total Dissolved Solids, mg/L	Chlorpyrifos, µg/L	*C. dubia*, % Control	*S. capricornutum* % Control	*H. azteca*, % control
4	Grant Line Canal @ Clifton Court Rd	MPM	5/11/2010	6.23						11	
4	Grant Line Canal @ Clifton Court Rd	MPM	6/8/2010		1523						
4	Grant Line Canal @ Clifton Court Rd	MPM	7/13/2010	6.71							
4	Grant Line Canal @ Clifton Court Rd	MPM	8/10/2010	6.37	1172						
4	Grant Line Canal @ Clifton Court Rd	MPM	9/7/2010	6.28	798			0.044			30
4	Grant Line Canal near Calpack Rd	MPM	4/13/2010		1713						
4	Grant Line Canal near Calpack Rd	MPM	5/11/2010	4.75	1357						
4	Grant Line Canal near Calpack Rd	MPM	7/13/2010	6.55	934						
4	Grant Line Canal near Calpack Rd	MPM	8/10/2010	5.50	925						
4	Grant Line Canal near Calpack Rd	MPM	9/7/2010		1017						91
4	Roberts Island Drain @ Holt Rd	NM	1/13/2010		1199		670				
4	Roberts Island Drain @ Holt Rd	NM	2/9/2010		1602		930				
4	Roberts Island Drain @ Holt Rd	NM	3/16/2010		1862		1100		75		
4	Roberts Island Drain @ Holt Rd	NM	4/13/2010		1429		800				
4	Roberts Island Drain @ Holt Rd	NM	5/11/2010		1426	280	890				
4	Roberts Island Drain @ Holt Rd	NM	6/8/2010	4.03	778	550	460				
4	Roberts Island Drain @ Holt Rd	NM	7/13/2010	4.89	745	370					
4	Roberts Island Drain @ Holt Rd	NM	8/10/2010	5.09	843		520				
4	Roberts Island Drain @ Holt Rd	NM	9/7/2010	3.66	824		480				
4	Roberts Island Drain @ Holt Rd	NM	10/12/2010		946		540				
4	Roberts Island Drain @ Holt Rd	NM	11/9/2010		1618		960				
4	Roberts Island Drain @ Holt Rd	NM	12/7/2010		1022		640				

NM-Normal Monitoring
MPM-Management Plan Monitoring
DO-Dissolved Oxygen
SC-Specific Conductance

Physical Parameters, Total Dissolved Solids and E. coli

In Zone 4 there were 11 exceedances of the WQTL for dissolved oxygen, 20 for specific conductance, 11 for total dissolved solids and three for *E. coli* between January and December 2010 (Table 41). Similar to Zone 3, sites in Zone 4 are agricultural drains within Delta islands and require pumping to remove the water from the drains. In most cases flows do not occur in the drains unless they are being pumped. Therefore it is common in Zone 3 to have exceedances of the salt (specific conductance and total dissolved solids) WQTLs and low dissolved oxygen due to a lack of flow. All three *E. coli* exceedances (ranging from 280 to 550 MPM/100mL) occurred at Roberts Island Drain @ Holt Rd (Table 41).

Chlorpyrifos

There was one chlorpyrifos exceedance of the WQTL experienced in Zone 4 between January and December 2010 (Table 41).

Grant Line canal @ Clifton Court Rd was sampled for chlorpyrifos during the month of September as specified in the Coalition's Management Plan Monitoring schedule. The samples collected on September 7, 2010 for MPM at Grant Line Canal @ Clifton Court Rd exceeded the chlorpyrifos WQTL (0.044 µg/L). Any PUR data associated with September exceedance that becomes available will be submitted in an addendum to the AMR on June 1, 2011.

Toxicity

Toxicity occurred four times in Zone 4 between January and December 2010 (Table 41). Water column toxicity occurred to *Ceriodaphnia dubia* and *Selenastrum capricornutum*. Two MPM sediment samples were toxic to *Hyalella azteca.*

Roberts Island Drain @ Holt Rd was sampled for water column toxicity on March 16, 2010 and tested toxic to *Ceriodaphnia dubia* (75% survival compared to the control, Table 41). A TIE was not conducted since the survival was greater than 50% compared to the control. No pesticides were detected in water column samples collected at the same time. The last reported applications that could be associated with the *Ceriodaphnia* toxicity were four applications of paraquat dichloride (Firestorm) applied on 126.5 acres of alfalfa between December 20, 2009 and December 24, 2009; these applications were more than two months prior to the sampling date. Paraquat has a high K_{OC} and binds readily to suspended solids and sediment; it is highly unlikely that the paraquat applications were the source of the *Ceriodaphnia* toxicity. If more PUR data become available in relation to this water toxicity; they will be included in the addendum to the AMR on June 1, 2011.

Grant Line Canal @ Clifton Court Rd was sampled for *Selenastrum capricornutum* toxicity during the month of May as specified in the Coalition's Management Plan Monitoring schedule. Samples collected on May 11, 2010 from Grant Line Canal @ Clifton Court Rd tested toxic to *Selenastrum capricornutum* with only 11 percent growth compared to the control. The Phase 1 TIE indicated that non-polar organic chemicals were the cause of the toxicity. A Phase III TIE could not be conducted due to lack of relevant analytical data (there were no samples collected for either herbicides or metals). The PUR data indicate there were two associated applications (0.833 lbs AI per acre of dimethylamine salt and 1.088 lbs AI per acre of glyphosate) which were applied on 37acres of asparagus on May 7, 2010 (Appendix IV).

Grant Line Canal @ Clifton Court Rd sediment samples collected for MPM on September 7, 2010 resulted in toxicity to *Hyalella azteca* with only 30 percent survival compared to the control. Additional sediment chemistry analysis performed and the following pesticides were detected: bifenthrin (2 µg/kg

dw), chlorpyrifos (0.55 µg/kg dw), esfenvalerate: fenvalerate (51.3 µg/kg dw), fenpropathrin (0.20 µg/kg dw), lambda-cyhalothrin (1.1 µg/kg dw) and permethrin (J0.27 µg/kg dw) (Table 36). Any PUR data associated with September sediment toxicity that becomes available will be submitted in an addendum to the AMR on June 1, 2011.

Grant Line Canal near Calpack Rd sediment samples collected for MPM resulted in toxicity to *Hyalella azteca* with 90 percent survival compared to the control. The survival of *Hyalella* was greater than 80% when compared to the control indicating that the statistical difference in survival is not ecologically relevant. The PUR data associated with September sediment toxicity were not available for review at the time of this report; all outstanding PUR will be submitted in an addendum to the AMR on June 1, 2011.

Table 42. Zone 5 (Walthall Slough @ Woodward Ave) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	SC, µS/cm	Total Dissolved Solids, mg/L	*E. coli*, MPN/100 mL	Nitrate + Nitrite as N mg/L	DDE, µg/L	*H. azteca*, % control
5	Walthall Slough @ Woodward Ave	NM	1/13/2010	2.94	784					
5	Walthall Slough @ Woodward Ave (FD)	NM	1/13/2010				250			
5	Walthall Slough @ Woodward Ave	NM	2/9/2010		719					
5	Walthall Slough @ Woodward Ave	NM	5/11/2010	5.88			310			
5	Walthall Slough @ Woodward Ave	NM	6/8/2010	4.55						
5	Walthall Slough @ Woodward Ave	NM	7/13/2010	5.06						
5	Walthall Slough @ Woodward Ave	NM	8/10/2010	4.83						
5	Walthall Slough @ Woodward Ave	NM	9/7/2010	6.88			250			69
5	Walthall Slough @ Woodward Ave (FD)	NM	9/7/2010							74
5	Walthall Slough @ Woodward Ave	NM	12/7/2010		733	460		11		
5	Walthall Slough @ Woodward Ave (FD)	NM	12/7/2010			460			0.0049J	

J – Estimated value; between the reporting limit and the minimum detection limit
FD-Field Duplicate
NM-Normal Monitoring
DO-Dissolved Oxygen
SC-Specific Conductance

Physical Parameters, Total Dissolved Solids and E. coli

The only sample location suitable for Coalition monitoring in Zone 5 is Walthall Slough @ Woodward Ave. In Zone 5 there were six exceedances of the WQTL for dissolved oxygen, three for specific conductance, one for total dissolved solids (plus a similar exceedance in the field duplicate sample) and three for *E. coli* between January and December 2010 (Table 42).

Nitrates

Potential sources of nitrate in surface waters include runoff of fertilizers or organic matter from irrigated pasture, leaking septic systems, waste-treatment facility effluent, and inputs from animal waste. These sources can move to surface waters through above ground runoff or shallow subsurface flows. Animal waste that enters surface waters can be converted to nitrate by nitrifying bacteria. Possible sources of animal waste include dairies, poultry operations, pasture and/or wildlife. Because of its extreme solubility, the only way for nitrates in fertilizer to enter surface water is for them to move to surface waters immediately after application and it is unlikely that applications in the spring would result in exceedances of the WQTL throughout the irrigation season. In Zone 5 (Table 42), there was one exceedance of the nitrate WQTL between January and December 2010. In samples collected at Walthall Slough @ Woodward Ave on December 7, 2010 (nitrate +nitrite = 11 mg/L, Table 42). The area draining into Walthall Slough includes dairy operations along the water way and it is possible that the source of the nitrate in this exceedance is due to inputs from upstream dairies.

Dichlorodiphenyldichloroethane (DDE)

Exceedances of DDT and its breakdown products, DDE and DDD, are a result of applications in the past. Dichlorodiphenyltrichloroethane (DDT) was banned in 1972 and is no longer registered or applied within the United States but persist because of its 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 consulted, and half life in aquatic systems is probably over 150 years (http://www.speclab.com/compound/c50293.htm). DDT may be bound to sediment in the channels and mobilized periodically by several mechanisms. DDT breaks down to DDD and DDE over time. Zone 5 experienced one exceedance of the WQTL for DDE in the grab sample at Walthall Slough @ Woodward Ave on December 7, 2010; the amount detected is estimated since it is below the analytical reporting limit and is flagged with a "J" (0.0049J µg/L, Table 42). The Walthall Slough subwatershed has had exceedances of legacy pesticides in the past that may be due to the re-suspension of old sediment in the slough's bottom.

Toxicity

Sediment toxicity occurred in sediment samples collected from Walthall Slough @ Woodward Ave on September 7, 2010 in both the environmental and the field duplicate samples (69 and 74% survival compared to the control, respectively, Table 42). Additional chemistry analysis resulted in the following detections in the environmental sample: bifenthrin (1.6 µG/kg dw) and lambda-cyhalothrin (0.54 µG/kg dw). The field duplicate had similar detections: bifenthrin (3.8 µG/kg dw) and lambda-cyhalothrin (0.54 µG/kg dw). The chemistry results associated with sediment toxicity tend to be highly variable (as seen in sediment samples collected from Walthall Slough, Table 36). An additional sediment sample was sent from the toxicity laboratory to the chemistry laboratory to evaluate 1) differences in samples that were frozen versus unfrozen and 2) intersample variability between samples collected at the same time and location. This third sample replicate is recorded with a Sample Type Code of "IN3" in Tabel 36. Results from this sample were slightly different than the environmental and field duplicate samples that were

shipped directly to the chemistry laboratory and frozen prior to analysis. The Walthall Slough @ Woodward Ave (IN3) sample had the following detections: bifenthrin (16 μG/kg dw), chlorpyrifos (0.2 μG/kg dw), lambda-cyhalothrin (0.67 μG/kg dw), Esfenvalerate (0.15 μG/kg dw), and permethrin (0.67 μG/kg dw). Chlorpyrifos, esfenvalerate, and permethrin were not detected in the environmental or field duplicate samples indicating heterogeneity between samples collected at the same location at the same time despite procedures to homogenize samples in the field through an integrated sampling tecnnique. The variability in chemistry results in sediment samples can be influenced by many environmental factors such as differential settlement of sediment (which can be influenced by current and stream bed shape and substrate), differences in particle size and differences in organic carbon. The PUR data associated with September sediment toxicity were not available for review at the time of this report; all outstanding PUR will be submitted in an addendum to the AMR on June 1, 2011.

ACTIONS TAKEN TO ADDRESS WATER QUALITY EXCEEDANCES

The Coalition conducts monitoring of ambient surface waters to characterize discharges from irrigated 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 may be taken to determine the potential sources of exceedances including: 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 dissolved oxygen, pH, and total dissolved solids, and 3) special studies where appropriate and cost effective to help determine the potential sources of water quality trigger limit exceedances.

The Coalition notified the Regional Board of all exceedances with electronically submitted 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 with growers.

Grower notifications, management practice outreach and education, and management practice implementation and tracking are additional actions taken by the Coalition to ensure that growers are aware of downstream water and sediment quality issues. The information provided to growers emphasizes the importance of implementing various management practices within their farm operations. Grower notifications of upcoming meetings, water quality results, availability of funding for management practice implementation, and management practice tracking and implementation actions (prioritized according to the SJCDWQC Management Plan) are documented in Table 43. Appendix VII includes available meeting agendas and handouts.

MANAGEMENT PRACTICES

The Coalition provides growers with information through various meetings on management practices to reduce storm water runoff, discharge of irrigation tail water, and avoid the mobilization of sediments into receiving water bodies. Applicable management practices include alternative, low-risk products, structural changes to manage tail water and sediment runoff, and pesticide application practices for minimizing spray drift. Appendix VII includes available meeting agendas and handouts that occurred from January through December 2010.

The Coalition's Management Plan includes a schedule of prioritized subwatersheds and details regarding the prioritization strategy (last updated in the 2010 MPUR, Table 6, page 18). The purpose of Coalition outreach is to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices. This process is briefly discussed in the following section, Management Plan Status. The Coalition MPURs, submitted on April 1 of each year, summarize management practices for priority subwatersheds including current, recommended and additional practices implemented after Coalition outreach.

From 2008 to 2010, the Coalition conducted focused outreach in the first priority 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 in 2008 and 2009 to complete surveys documenting current practices and indicate which recommended practices they anticipated implementing in the upcoming year. Growers who anticipated implementating additional management practices were contacted in 2010 and a summary of new management practices implemented in the subwatersheds will be included in the MPUR to be submitted on April 1, 2011.

The Coalition has started the management plan tracking process with growers in the second set of high priority subwatersheds (2010 -2012): Littlejohn's Creek @ Jack Tone Road, Grant Line Canal @ Clifton Court and Grant Line Canal near Calpack Road. To efficiently document grower's current management practices in these subwatersheds, the Coalition hosted two crop-specific grower meetings at which Coalition representatives were able to discuss with growers their individual operations and recommended management practices. Meeting announcements were mailed on January 6, 2010 to orchard growers in the Littlejohn's Creek subwatershed and on January 8, 2010 to row crop growers in the Littlejohn's Creek and both Grant Line Canal subwatersheds to announce individual contact meetings to be held on January 25, 2010 and January 28, 2010, respectively. Of the 15 members invited, 10 members were represented at the Littlejohn's Creek Orchard Grower Meeting, while four of the six members invited to the Grant Line Canal and Littlejohns Creek Row Crop Grower Meeting attended. Coalition representatives discussed the Management Plan's purpose and process, subwatershed water quality impairments, various crop specific management practices and helped growers fill out management practice surveys. These mailings and meetings are listed below in Table 43. The Coalition began follow-up contacts in February 2011 with targeted growers who indicated that they would implement additional management practices.

Mokelumne River @ Bruella Rd, French Camp Slough @ Airport Way, and Terminous Tract Drain @ Hwy 12 are the third set of high priority subwatersheds scheduled for focused outreach from 2011 through 2013. This January (2011), the Coalition began the process of meeting with targeted growers in these subwatersheds and documenting current and recommended management practices. Information about these meetings and results of surveys received prior to February 28, 2011 will be detailed in the Coalition MPUR to be submitted on April 1, 2011.

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, County Agricultural Commissioner meetings, and through personal contact. Coalition presentations at various grower meetings during 2010 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 43.

Overall, Coalition representatives conducted or participated in 19 meetings from January 2010 through December 2010. Of those meetings, all addressed storm water quality issues, irrigation water quality issues, sediment runoff issues, and management practices; two meetings addressed specific site subwatershed management plans.

The Coalition continues to coordinate with other entities to reach broader grower audiences including growers who are not Coalition members. On February 10, 2010, the Coalition participated in the Stockton area Spray Safe Sponsored Grower Meeting to discuss grower responsibility and best management practices as well as new technologies used to promote safe pesticide use. Coalition representative Terry Prichard presented at the meeting. The meeting announcement ran in several San Joaquin Valley newspapers during January 2010 as well as appeared in the Farm Bureau News and the University of California County Extension (UCCE) San Joaquin newsletter. Coalition representative Terry Prichard also participated in the November 30, 2010 Irrigated Pest Management Alfalfa Workshop held in the town of Parlier and the December 1, 2010 California Alfalfa Symposium held in the city of Visalia. Topics discussed at these meetings included balancing pest management and environment concerns, preventing offsite movement of applied pesticides, and applicable management practices. Growers throughout California were invited and a combined 583 growers and pest control advisors (PCAs) attended these statewide meetings. The Coalition sponsored a December 6, 2010 meeting that focused on PCAs/ certified crop advisers' (CCAs) roles in water quality protection. The meeting discussed, among other things, the relationship between CCA programs and water quality issues, pesticide fate and pathways to surface waters, alfalfa pest management, and nitrate in groundwater. Local PCAs were notified of the meeting by the Coalition on November 23, 2010 via an email with an attached agenda. Copies of the meeting agenda were also sent to local agriculture chemical supply houses.

The Coalition is also dedicated to ensuring its members stay informed of emerging regulations that will impact their operations. On August 31, 2010 an email was sent to all Coalition members to inform them of the proposed Long Term ILRP that seeks to regulate irrigation water discharges to surface water (current program) and groundwater (new in long term program). Included in the email were proposed public workshop dates and several links to additional information. The Coalition will continue to keep its members informed of the Long Term ILRP status and consequent changes for growers.

As it has in the past, the Coalition participated in the 2010 San Joaquin County Agricultural Commissioner's Meetings. Coalition representatives Mike Wackman and/or Terry Prichard discussed pesticides in surface water at all nine of the 2010 Agricultural Commissioner's Meetings held from November 10, 2010 to December 8, 2010. Coalition representatives used this opportunity to explain the requirements of the ILRP, the Coalition's role in maintaining compliance with the ILRP for its members, and the strategy of the Coalition's Management Plan as well as review past exceedances and discuss applicable management practices. A total of 1,252 growers attended the meetings; 71 of the attendees were licensed PCA/CCAs.

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. Last year, the Coalition was awarded a $175,000 grant from DPR with a goal of reducing pesticide runoff (up to 10 percent) by 2011 from alfalfa, tomato, walnut, and wine grapes. With the funds, the Coalition has developed Management Practice Workbooks for all four crops that will enable individual farmers to more easily make management practice decisions specific to their operations. Final drafts of the four Management Practice Workbooks are in the final stages and will be published by the University of California Agriculture and Natural Resources (UCANR). The Coalition will submit the workbooks as 8000 series publications and will be available as free downloads from the UCANR website.

The Coalition has provided the workbooks to targeted growers within the Duck Creek, Lone Tree Creek, Littlejohn's Creek, and Unnamed Drain to Lone Tree Creek subwatersheds. These four subwatersheds

were selected because they were the first and second priority subwatershed under the Coalition's Management Plan, and had past histories of chlorpyrifos and diazinon exceedances. The Wine Grape Management Practice Workbook was sent to 15 wine grape growers and their eight associated PCAs in the four subwatersheds. An informative meeting was held on March 25, 2010 to discuss how to use the workbook and answer questions. Similar meetings were held on May 10, 2010 and July 6, 2010, to introduce the Walnut Management Practice Workbook and Alfalfa Management Practice Workbook, respectively, to targeted growers within the four subwatersheds. Of the 68 growers and associated PCAs sent the Walnut Management Practice Workbook, 21 attended the meeting whereas 14 of the 26 growers and associated PCAs whom received the Alfalfa Management Practice Workbook attended the associated meeting. The Tomato Management Practice Workbook was mailed to 12 growers and their associated PCAs and eight growers attended the September 29, 2010 meeting. Copies of the walnut, alfalfa, and tomato Management Practice Workbooks will be included as appendices to the 2011 MPUR; the Wine Grape Management Practice Workbook was submitted with the 2010 MPUR as Appendix II.

The DPR grant funding has also allowed the Coalition to better characterize chlorpyrifos and diazinon runoff and sediment toxicity in the Duck Creek, Lone Tree Creek, Littlejohn's Creek, and Unnamed Drain to Lone Tree Creek subwatersheds. As part of the DPR grant project to assess whether a reduction of pesticide runoff has occurred, the Coalition conducted monthly monitoring from June 2010 through December 2010 for chlorpyrifos and diazinon from the four site subwatersheds. Samples were also collected from the four site subwatersheds to assess sediment toxicity to *Hyalella azteca* in September 2010 and toxic samples were analyzed for sediment chemistry (chlorpyrifos and pyrethroids). Results from DPR grant monitoring are included in Appendix II and any exceedances are discussed in the Discussion of Results section of this report as well. The DPR grant will be completed in April 2011 and a final report summarizing the grant project and associated results will be submitted to DPR for review.

The Coalition also hosts a website which 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.

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, PCAs, and pesticide registrants is important. As mentioned above, the Coalition participated in the February 10, 2010 meeting hosted by Spray Safe in the Stockton area and hosted its own PCA/CCA meeting on December 8, 2010 to which PCAs throughout the Coalition region were invited. Coalition representatives also participated at the nine San Joaquin County Agricultural Commissioner Meetings held near the end of 2010.

Table 43. Table of SJCDWQC actions and deliverables dealing with grower notification of exceedances, management practice tracking, and best management practice (BMP) outreach and education, relevant to the monitoring conducted during 2010 (sorted by date).

Area	Date	Category	Details	Constituents Addressed	Who
Stockton Area	Jan. 2010	Grower Notification	Spray Safe Sponsored Grower Meeting Announcement: ran in the Farm Bureau News, the UCCE San Joaquin newsletter, and several Central Valley newspapers (Stockton Record, Lodi Sentinel, etc.).	All	Terry Prichard
Littlejohns Creek	6-Jan-10	Grower Notification / Management Practice Tracking	Littlejohns Creek Orchard Grower Meeting Announcement (15 members). Mailing included meeting agenda and individual contact survey to be filled out before and during meeting.	All	MLJ-LLC Staff
Grant Line Canal, Littlejohns Creek	8-Jan-10	Grower Notification / Management Practice Tracking	Grant Line Canal and Littlejohns Creek Row Crop Grower Meeting Announcement (6 members). Mailing included meeting agenda and individual contact survey to be filled out before and during meeting.	All	MLJ-LLC Staff
Littlejohns Creek	25-Jan-10	BMP Outreach and Education / Management Practice Tracking	Littlejohns Creek Orchard Grower Meeting: 15 members invited, 10 members were represented; a total of 21 people attended. Discussion topics included Coalition's purpose, current water issues, ILRP status, and relevant BMPs. Members filled out management practice surveys.	All (focus on chlorpyrifos, diazinon, copper)	Mike Wackman, Terry Prichard, Mick Canevari
Grant Line Canal, Littlejohns Creek	28-Jan-10	BMP Outreach and Education / Management Practice Tracking	Grant Line Canal and Littlejohns Creek Row Crop Grower Meeting: 6 members invited, 4 members were in attendance. Discussion topics included Coalition's purpose, current water issues, ILRP status, and relevant BMPs. Members filled out management practice surveys.	All (focus on chlorpyrifos, diazinon, copper and algae toxicity)	Mike Wackman, Terry Prichard, Mick Canevari
Stockton Area	10-Feb-10	BMP Outreach and Education	Spray Safe Sponsored Grower Meeting. Discussed the grower's responsibility for safety and employee training, safety practices for pesticide applicators, and best management practices and new technologies used to promote safe pesticide use. Included a presentation by Coalition representative Terry Prichard.	All	Terry Prichard

Area	Date	Category	Details	Constituents Addressed	Who
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	19-Mar-10	Grower Notification	Terry Prichard identified and called 15 winegrape growers and their 8 associated PCAs to inform them they would be sent a copy of the DPR Grant--Winegrape Management Practice Workbook. Growers and PCAs were also invited to a winegrape workshop.	All	Terry Prichard
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	22-Mar-10	BMP Outreach and Education	Emailed DPR Grant--Winegrape Management Practice Workbook to 15 identified winegrape growers and their 8 associated PCAs.	All	Terry Prichard
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	25-Mar-10	BMP Outreach and Education	Winegrape Grower Workshop: meeting to introduce and explain how to use the DPR Grant--Winegrape Management Practice Workbook. Of the 15 growers and 8 associated PCAs invited, 90% attended.	All	Terry Prichard, Mike Wackman
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	28-Apr-10	Grower Notification	Terry Prichard identified and contacted 68 walnut growers and their associated PCAs in the target area to inform them they would be sent a copy of the DPR Grant--Walnut Management Practice Workbook. Growers and PCAs were also invited to a walnut workshop.	All	Terry Prichard
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	10-May-10	BMP Outreach and Education	Walnut Grower Workshop: meeting to introduce and explain how to use the DPR Grant--Walnut Management Practice Workbook. Of the 68 growers and associated PCAs invited, 21 attended.	All	Terry Prichard, Mike Wackman, Joe Grant
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	15-Jun-10	Grower Notification	Terry Prichard identified and contacted 26 alfalfa growers and their associated PCAs in the target area to inform them they would be sent a copy of the DPR Grant--Alfalfa Management Practice Workbook. Growers and PCAs were also invited to an alfalfa workshop.	All	Terry Prichard

Area	Date	Category	Details	Constituents Addressed	Who
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	22-Jun-10	BMP Outreach and Education	Mailed DPR Grant--Alfalfa Management Practice Workbook draft to 26 identified alfalfa growers and their 26 associated PCAs.	All	Terry Prichard
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	6-Jul-10	BMP Outreach and Education	Alfalfa Grower Workshop: meeting to introduce and explain how to use the DPR Grant--Alfalfa Management Practice Workbook. Of the 26 growers and associated PCAs invited, 14 attended.	All	Terry Prichard, Mick Canevari
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	28-Jul-10	Grower Notification	Terry Prichard identified and contacted 12 tomato growers and their associated PCAs in the target area to inform them they would be sent a copy of the DPR Grant--Tomato Management Practice Workbook.	All	Terry Prichard
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	12-Aug-10	BMP Outreach and Education	Mailed DPR Grant--Tomato Management Practice Workbook to 12 identified tomato growers and their 12 associated PCAs.	All	Terry Prichard
Entire Coalition Region	31-Aug-10	Grower Notification	Email sent to all Coalition members to inform of proposed Long Term Irrigated Lands Regulatory Program that seeks to regulate irrigation water discharges to surface water (current program) and groundwater (new in long term program). Email included proposed public workshop dates and several links to additional information.	All	Mike Wackman
Duck Creek, Lone Tree Creek, Littlejohns Creek, and Unnamed Drain to Lone Tree Creek	29-Sep-10	BMP Outreach and Education	Tomato Grower Workshop: meeting to introduce and explain how to use the DPR Grant--Tomato Management Practice Workbook. Of the 12 growers and associated PCAs invited, 8 attended.	All	Terry Prichard and Brenna Aegerter

Area	Date	Category	Details	Constituents Addressed	Who
Entire Coalition Region	18-Oct-10	Grower Notification	San Joaquin County Agricultural Commissioner Meeting Announcement. All permitted growers received notice of the meeting and were informed if they failed to attend, they would be required to pass a test to keep their permit. Advertising was done by the County Commission	All	San Joaquin County Agricultural Commission
San Joaquin County	10-Nov-10	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 155 growers attended, 7 of which were license holders. Reviewed past year's pesticide use and Coalition monitoring results. Discussed relevant regulations and applicable management practices, among other topics.	All	Mike Wackman
San Joaquin County	16-Nov-10	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 201 growers attended, 9 of which were license holders. Reviewed past year's pesticide use and Coalition monitoring results. Discussed relevant regulations and applicable management practices, among other topics.	All	Mike Wackman
San Joaquin County	18-Nov-10 (3 meetings)	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting, three meetings occurred on this date at 10:00 AM, 2:00 and 7:00 PM: a combined 395 growers attended the 3 meetings, 18 of which were license holders. Reviewed past year's pesticide use and Coalition monitoring results. Discussed relevant regulations and applicable management practices, among other topics.	All	Mike Wackman
Entire Coalition Region	23-Nov-10	Grower Notification	Role for PCAs/CCAs (Certified Crop Adviser) in Water Quality Protection Meeting Announcement. An email invitation with meeting agenda attached was sent to California Association of PCAs members listed in the Stockton area. A meeting agenda was also sent to local agriculture chemical supply houses.	All	Terry Prichard, Rachelle Antinetti
Entire Coalition Region	30-Nov-10	BMP Outreach and Education	Statewide Irrigated Pest Management Alfalfa Workshop (Parlier, CA) -- Managing Pests While Protecting the Environment: 120 growers and PCAs attended. Coalition representative Terry Prichard gave a presentation on Mitigation Practices to Protect Water Quality.	All	Terry Prichard

Area	Date	Category	Details	Constituents Addressed	Who
Entire Coalition Region	1-Dec-10	BMP Outreach and Education	Statewide California Alfalfa Symposium (Visalia, CA) -- Preventing Offsite Movement of Pesticide Residues in Alfalfa and Corn: 463 registered attendees. Coalition representative Terry Prichard was in attendance.	All	Terry Prichard
Entire Coalition Region	6-Dec-10	BMP Outreach and Education	A Role for PCAs/CCAs in Water Quality Protection Meeting: 42 attendees. Discussed new ILRP requirements, a PCA's role in water quality issues, and the relationship between CCA programs and waste quality issues. Also discussed were pesticide fate and pathways to surface waters and nitrate in groundwater.	All	Terry Prichard, Mike Wackman, Rachelle Antinetti, Mick Canevari
San Joaquin County	7-Dec-10	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 158 growers attended, 19 of which were license holders. Reviewed past year's pesticide use and Coalition monitoring results. Discussed relevant regulations and applicable management practices, among other topics.	All	Mike Wackman
San Joaquin County	8-Dec-10 (3 meetings)	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting; three meetings occurred on this date at 10:00 AM, 2:00 and 7:00 PM; a combined 342 growers attended the three meetings, 18 of which were license holders. Reviewed past year's pesticide use and Coalition monitoring results. Discussed relevant regulations and applicable management practices, among other topics.	All	Mike Wackman, Terry Prichard

MANAGEMENT PLAN STATUS AND SPECIAL PROJECTS

The SJCDWQC 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 within subwatersheds. Coalition efforts include but are not limited to; 1) continued monitoring based on the Coalition's approved MRPP, 2) analysis of PUR data, 3) MPM, 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 in place. A narrative concerning each special monitoring constituent was provided in the Coalition's Management Plan approved on January 23, 2009 (pages 23-29) to describe how the Coalition is meeting the TMDL requirements for Coalition members. This narrative will be updated in the MPUR to be submitted on April 1, 2011 to account for activities that have occurred during 2010. Total maximum daily load constituents currently include chlorpyrifos, diazinon, dissolved oxygen, salinity/boron and mercury.

The Coalition's Management Plan describes the Coalition's strategy for evaluating new management practices implemented to reduce the effects of agricultural practices on water quality. As described in the Actions Taken section, intensive outreach and documentation of management practices occur throughout the Coalition, but greater efforts to acquire these details are made within site subwatersheds designated as High Priority (see Table 6, page 18 of the 2010 MPUR).

The 2011 MPUR 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

The Coalition also received a DPR grant to develop grower management practice workbooks for four crops and evaluate the effectiveness of those workbooks/outreach efforts on water quality within four high priority subwatersheds. This project is described in more detail in the previous section under Outreach and Education. A final report will be submitted to DPR in April 2011 summarizing the outcomes of this project.

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 January through December 2010.

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 January through December 2010 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 44). The most common exceedances of WQTLs involve physical parameters such as dissolved oxygen and specific conductance which resulted in impaired Agricultural and Aquatic Life Beneficial Uses. Other parameters such as *E. coli* and total dissolved solids 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. Waste from irrigated lands is but one of many possible sources of impairments to beneficial uses. Water quality protective of beneficial uses within Coalition Group boundaries may not depend exclusively on the Coalition efforts alone i.e., other dischargers may need to improve the quality of their discharge.

Table 44. Monitoring sites (January through December 2010), beneficial uses (BU) 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?	Status 2010 Meets BUs?
Duck Creek @ Hwy 4	Sacramento San Joaquin Delta	MUN	No	Yes	Yes	Yes
		AG	Yes	Yes	Yes	Yes
		REC 1	No	Yes	Yes	Yes
		AQ Life	No	No	No	No
French Camp Slough @ Airport Way	Sacramento San Joaquin Delta	MUN	No	No	Yes	Yes
		AG	Yes	Yes	No	Yes
		REC 1	No	No	No	No
		AQ Life	No	No	No	No
Drain @ Woodbridge Rd	Sacramento San Joaquin Delta	MUN	X	No	No	No
		AG	X	No	No	No
		REC 1	X	No	Yes	No
		AQ Life	X	No	No	No
Lone Tree Creek @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No	No	Yes	Yes
		AG	Yes	No	Yes	Yes
		REC 1	No	No	Yes	Yes
		AQ Life	No	No	No	No
Mokelumne River @ Bruella Rd	Mokelumne River (Camanche Res to Delta Reach)	MUN	NA	Yes	No	Yes
		AG	Yes	Yes	Yes	Yes
		REC 1	Yes	Yes	No	Yes
		AQ Life	No	No	No	Yes
Roberts Island Drain @ Holt Rd	Sacramento San Joaquin Delta	MUN	No	Yes	No	Yes
		AG	No	No	No	No
		REC 1	No	No	No	No
		AQ Life	No	No	No	No
Unnamed Drain to Lone Tree Cr @ Jack Tone Rd	Sacramento San Joaquin Delta	MUN	No	No	Yes	Yes
		AG	No	No	Yes	Yes
		REC 1	No	No	Yes	Yes
		AQ Life	No	No	No	No
Walthall Slough @ Woodward Ave	Sacramento San Joaquin Delta	MUN	X	X	No	No
		AG	X	X	No	No
		REC 1	X	X	No	No
		AQ Life	X	X	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?	Status 2010 Meets BUs?
Terminous Tract Drain @ Hwy 12	Sacramento San Joaquin Delta	MUN	No	No	Yes	No
		AG	No	No	No	No
		REC 1	No	No	No	No
		AQ Life	No	No	No	No
Grant Line Canal near Calpack Rd	San Joaquin Delta	MUN	No	No	X	Yes
		AG	No	No	X	No
		REC 1	No	No	X	Yes
		AQ Life	No	No	X	No
Grant Line Canal @ Clifton Court Rd	San Joaquin Delta	MUN	No	No	X	Yes
		AG	No	No	X	No
		REC 1	No	No	X	Yes
		AQ Life	No	No	X	No
Littlejohns Creek @ Jack Tone Rd	San Joaquin Delta	MUN	Yes	Yes	X	Yes
		AG	Yes	Yes	X	Yes
		REC 1	No	Yes	X	Yes
		AQ Life	No	No	X	No

MUN- Municipal and Domestic Supply
AG- Agriculture
REC 1- Water Contact Recreation
AQ Life- Aquatic Life

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 January 2010 through December 2010. Exceedances occurred in every zone during 2010 (Table 45).

In 2010 there were no exceedances of WQTLs for carbamates, Group A pesticides or herbicides. Less than 0.5% of the samples exceeded WQTLs for nutrients and organochlorines. Exceedances of physical parameters (121 of 808 samples, 15.0%) and *E. coli* (13 of 72 samples, 18.1%) were more common than exceedances of pesticides (14 of 1367 samples, 1.0%) or metals (13 of 554 samples, 2.3%) (Table 45). Some exceedances were more common seasonally. During the summer months, warm water with little or no flow coincided with exceedances of the dissolved oxygen WQTL.

As described in the Discussion of Results section, the zones differed substantially in the types of exceedances. In Zones 3 and 4 (Terminous Tract @ Hwy 12 Zone and Roberts Island @ Holt Rd Zone) there were a large number of exceedances of specific conductance and total dissolved solids (specific conductance - 17 of 22 and 20 of 22 in Zones 3 and 4 respectively; total dissolved solids – 16 of 22 and 11 of 22 samples respectively) as might be expected from sites in the Delta where irrigation water is brought in directly from the Delta. Zone 3 experienced frequent arsenic exceedances (11 of 22 samples) for reasons that are unknown. There was only one exceedance of nutrient criterion across the entire Coalition region (nitrate at Walthall Slough @ Woodward Ave).

The amount of toxicity was lower in 2010 compared to 2009 (with the exception of sediment toxicity) with only one sample being toxic to *Ceriodaphnia*, one sample was toxic to *Selenastrum*, and eight sediment samples were toxic to *Hyalella*. In 2010 the percentage of samples that were toxic to water column species was 1.3% compared to 3.9% in 2009.

There were 13 chlorpyrifos exceedances during 2010. Chlorpyrifos is registered for use on agricultural crops only and its chemistry is such that it can leave fields in storm water or irrigation return flows or bound to sediment. Consequently, chlorpyrifos exceedances are the responsibility of agriculture. The Coalition represents growers that do not operate dairy facilities and is responsible for outreach to those growers. A majority of dairy operators in the Dairy Program have repeatedly refused to join the Coalition and participate in Coalition programs to reduce the movement of chlorpyrifos to surface waters. Of the 13 chlorpyrifos exceedances to occur, 11 were from Zone 2 where large dairies operate and it is doubtful that chlorpyrifos exceedances can be prevented until all farmers and dairy operators are engaged in active product management. The Coalition is continuing to focus its Management Plan efforts in Zone 2 to reduce discharge of chlorpyrifos in those waterways and is continuing to contact growers in the area.

Table 45. Number of exceedances by constituent group and zone in 2010.

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			
Carbamates	0	0	0	72	0	144	0	0	0	72	0	288	0%
E. coli	0	12	5	12	2	24	3	12	3	12	13	72	18.1%
Group A Pesticides	0	0	0	0	0	0	0	0	0	132	0	132	0%
Herbicides	0	0	0	6	0	192	0	0	0	96	0	294	0%
Metals	0	6	2	34	11	336	0	10	0	168	13	554	2.3%
Nutrients	0	60	0	60	0	120	0	60	1	60	1	360	0.3%
Organochlorines	0	0	0	1	0	168	0	0	1	84	1	253	0.4%
Organophosphates	0	0	11	72	1	312	1	148	0	156	13	688	1.9%
Physical parameters	1	96	16	272	52	198	42	140	10	102	121	808	15.0%
Sediment toxicity	0	0	3	6	2	4	2	2	1	2	8	14	57.1%
Water column toxicity	0	4	0	21	0	72	2	16	0	36	2	149	1.3%
Count per Zone	**1**	**178**	**37**	**556**	**68**	**1570**	**50**	**388**	**16**	**920**	**172**	**3612**	
Pct. Exceed. per Zone	**0.6%**		**6.7%**		**4.3%**		**12.9%**		**1.7%**		**4.8%**		

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 from 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 pH. For example, locations within the Delta (Zones 3 and 4) experienced numerous exceedances of specific conductance and total dissolved solids 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. Many of the exceedances in the Delta are a result of the type of water management that must be employed. Water for irrigation or winter weed control is brought into the Delta islands from the Delta channels. In addition, for Delta islands located below sea level (e.g. South Webb Tract), the hydrostatic pressure from the Delta channels drives water into the islands where it is collected in the interior drain channels. The water is salty with specific conductance values at many Delta locations (e.g. Drain @ Woodbridge Rd) reaching over 2000 µS/cm. Finally, ground water is very shallow. To lower the water table sufficiently to allow farming, the water must be discharged back to the Delta regularly during the growing season. That water is naturally salty as the source is salty. It cannot be recirculated and must be discharged leading to the potential for exceedances of specific conductance and pesticide WQTLs. Consequently, Delta locations may have exceedances that result from normal farming practices and those practices will have to be adjusted to reduce the potential for discharges which impair beneficial uses.

Agricultural applications of pesticides may result in pesticides entering 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. Of the seven subwatersheds with chlorpyrifos exceedances, six are priority subwatersheds under the Coalition's Management Plan. The Coalition is continuing to identify sources of WQTL exceedances through PUR data, 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 only other pesticide exceedance in 2010 was for DDE in a field duplicate sample collected at Walthall Slough @ Woodward Ave (the environmental sample was non detect for DDE). DDE is a legacy pesticide and may be responded in the water column due to disturbance of fine sediment on the bottom of the slough or new deposition from surrounding fields into the slough.

Copper exceedances occurred twice in 2010, once at Littlejohns Creek @ Jack Tone Rd and once at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Both subwatersheds are currently high priority subwatersheds under the Coalition's Management Plan for copper and were monitored based on the MPM schedule. There were no additional subwatersheds with copper water quality issues. Copper is applied by agriculture in a variety of forms mostly as a fungicide. The Coalition monitors for both dissolved and total copper and only dissolved copper concentrations have exceeded WQTL. There are a number of sources that could be responsible for dissolved copper including recent agricultural applications (either through storm/irrigation runoff or spray drift), dairy uses of copper sulfate in footbaths, resuspension of historic copper from upstream mining, break pads and other anthropogenic uses.

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

Meetings are held with growers in high priority subwatersheds during the first year that the site subwatershed rotates into high priority. At the first meeting management practices currently implemented by members are recorded. Coalition representatives met with growers in first priority subwatersheds in 2009 in a variety of settings from grower group meetings to individual contacts. Growers in second high priority subwatershed were invited to grower group meetings in early 2010; growers that were unable to attend were met individually through the spring and summer of 2010. The Coalition initiated meetings with growers in its third high priority subwatersheds. During grower meetings, the Coalition discusses water quality issues and management practices that are effective in protecting downstream beneficial uses. Growers record any additional practices they plan to implement within the next two years following the initial meetings. The 2010 MPUR reviewed current management practices within the first site subwatersheds and the 2011 MPUR will include a summary of the second priority subwatershed management practices.

In 2010, the Coalition followed up with first priority subwatershed growers regarding implemented practices. In early 2011, the Coalition also began contacting second priority subwatershed growers to determine what management practices were implemented in 2010 for those subwatersheds. An assessment of the follow up contacts to growers in the first and second priority site subwatersheds will be provided in the Management Plan Update Report on April 1, 2011.

The Coalition also received a DPR grant to develop grower management practice workbooks for four crops and evaluate the effectiveness of those workbooks/outreach efforts on water quality within four high priority subwatersheds. This project is described in more detail in the previous section under Outreach and Education. A final report will be submitted to DPR in April 2011 summarizing the outcomes of this project.

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 2010 relative to 2009 and previous years although the number of sample sites has also decreased. Contacting growers occurred throughout the spring and summer of 2010 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 improving. Water quality in 2010 was not worse than previous years.

The Coalition anticipates improvements in water quality at high priority management plan locations in the next 2-5 years due to increased education, outreach and implementation of management practices. The Coalition continues to conduct additional outreach in its first priority subwatersheds to both members and non members. Sediment quality appeared to decrease as there were a number of toxic sediment samples in the fall of 2010. Toxic sediment has been common in the Coalition region over the years and it now appears that 2009 represents an anomalous year relative to sediment quality results. Some growers have switched to pyrethroids from organophosphate pesticides since pyrethroids are less water soluble and therefore less likely to move off the field. It is unclear if there is an association with the sediment toxicity experienced in 2010 and the switch of some growers to pyrethroid pesticides. The results also suggest that the factors that determine sediment quality are relatively dynamic. The Coalition is educating growers about the importance of managing both water and sediment runoff and the potential to affect downstream beneficial uses. The Coalition anticipates that water quality results will continue to improve in 2011 based on additional management practices implemented in 2010 and 2011 as a result of focused outreach and education.

Based on the responses above, the Coalition has the following recommendations for 2011:

1. Continue the current monitoring strategy as outlined within the SJCDWQC MRPP and Management Plan to evaluate water quality improvements and impairments
2. Continue to document and assess management practices implemented by Coalition growers in relation to monitoring results
3. Remain active participants in TMDL programs that directly affect SJCDWQC members
4. Continue to focus outreach and education efforts around high priority constituents while also educating growers about lower prioritized constituents such as dissolved oxygen and salinity.

The Coalition recommends that the CVRWQCB do the following:

1. Identify dairies within priority subwatersheds that are using chlorpyrifos and/or copper which may be affecting downstream beneficial uses
2. Notify the Coalition of any known dairy discharges that may result in water quality impairments
3. Continue enforcement actions against non-members who have the potential to discharge