San Joaquin County and Delta Water Quality Coalition

San Joaquin County Resource Conservation District
3422 W. Hammer Lane, Suite A
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209-472-7127 ext 125

March 1, 2013

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 2013 Annual Monitoring Report (AMR) and Quarterly Monitoring Data Report (fourth quarter 2012) 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, 2012 through December 31, 2012 and covers monitoring, reporting, outreach and education activities that occurred during this time. Accompanying this letter are the following:

1. 2013 Annual Monitoring Report (electronic and hard copy)
2. Appendices I – IX (electronic and hard copy)
3. 2012 Level III Laboratory Reports (electronic)
4. 2012 Field Sheets (electronic)
5. 2012 Site Pictures (electronic)
6. SWAMP Comparable Database with SJCDWQC results through 2012 (Microsoft Access; electronic) and GIS Geodatabase (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

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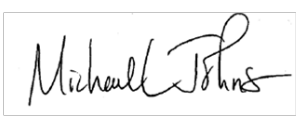
of reports in a timely manner to the CVRWQCB.

The Coalition's monitoring program met MRP requirements as described in the attached AMR. Sampling occurred during all twelve months (including three storm events 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 through December 2012. 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
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Annual Monitoring Report

San Joaquin County & Delta Water Quality Coalition

January 2012 – December 2012

March 1, 2013

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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
CalPIP	California Pesticide Information Portal
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
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
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
DWSC	Deep Water Ship Channel
EPA	Environmental Protection Agency
FD	Field Duplicate
HCH	Hexachlorocyclohexane
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
MVP	Mid Valley Pesticide
NA	Not Applicable
ND	Not Detected
NM	Normal
OP	Organophosphate pesticides
PAM	Polyacrylamide
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
UCCE	University of California County Extension
VOA	Volatile Organic Analyte
WQO	Water Quality Objective
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
g	gram
kg	kilogram
L	liter
lbs	pounds
mg	milligram
mL	milliliter
mm	millimeter
ng	nanograms
NTU	Nephelometric Turbidity Units
sec	second
µg	microgram
µm	micrometer
µmhos	micromhos
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 Quality Assurance requirements
Normal Monitoring –Refers to monitoring in the most recent Monitoring and Reporting Program Plan (MRPP).
Regional Board – Central Valley Regional Water Quality Control Board
Site subwatershed – Starting from the sampling site, all waterbodies that drain, directly or indirectly, into the waterbody 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 (Environmental Protection Agency (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.
Waterbody –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).

ANNUAL MONITORING REPORT (AMR) REQUIREMENTS – SECTION KEY

REQUIRED SECTION – MONITORING AND REPORTING PROGRAM (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, List of Appendices
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 Records
8. Location map(s) of sampling sites, crops and land uses;	Sampling Site Descriptions and Rainfall Records, Appendix VIII (Land Use Maps and 2012 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;	Monitoring Results and Sample Details, Discussion of Results, Conclusions and Recommendations
11. Electronic data submitted in a SWAMP comparable format;	SWAMP Comparability Access Database and Electronic Data Deliverables (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 Quality Control 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
18. Electronic or hard copies of photos obtained from all monitoring sites, clearly labeled	Appendix VIII (Land Use Maps and 2012 Annual Site Photos)

REQUIRED SECTION – MONITORING AND REPORTING PROGRAM (MRP)	SECTION NAME/LOCATION - AMR
with site identification and date.	
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), Pesticide Use Report 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

QC- Quality Control
SWAMP- Surface Water Ambient Monitoring Program

Table 1. SJCDWQC MRPP and QAPP amendments summary.

Original SJCDWQC MRP and QAPP Plans submitted August 25, 2008 and approved September 15, 2008.

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
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[1]	May 6, 2010	Table 16, page 85[1]	May 17, 2010
6	Updated MRPP to consolidate all approved amendments since 9/15/2008 MRPP approval. Updates included type corrections as well.	October 20, 2010	Verbiage, page 8 Table 11, page 61 Table 13, page 69	January 18, 2011

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
7	Request to replace sample locations Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd and Core site in Zone 4 with Roberts Island @ Whiskey Slough Pump.	December 1, 2011	Verbiage, page 8 Table 2, page 10 Verbiage, page 19 Figure 8, page 20 Verbiage, page 32 Table 4, page 37 Table 5, page 39 Verbiage, page 46 Table 6, page 51 Table 9, page 55 Verbiage, page 56	January 12, 2012
Modifications to Original SJCDWQC QAPP Plan				
1	QAPP updated to consolidate all approved amendments since 9/15/2008 QAPP approval. Updates include typo corrections.	October 20, 2010	Verbiage, page 2 List of Acronyms, Page 6 Figure 1, page 11 Verbiage, page 8 Table 5, page 22 Table 8, page 26 Table 15, page 46 Table 16, page 47 Verbiage, page 51 Table 17, page 53 Table 18, page 55 Table 19, page 57 Verbiage, page 58 Figure 4, page 61 Appendices XI-XXXII Appendices XXXV-XXXVII	January 18, 2011
2	QAPP updated method validation package for analysis of pyrethroids in sediment using GC/MS-NCI SIM.	December 6, 2010	Table 2, page 16 Table 13, page 42 Table 15, page 46 Table 16, page 47	February 18, 2011
3	Request to update QAPP sampling collection methods and quality control.	November 26, 2012	Verbiage, Page 62 Table 14, Pages 66-69	January 15, 2013

[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 San Joaquin County as well as portions of Contra Costa, Alameda, Calaveras and Stanislaus Counties. There are three major rivers in the Coalition region other than the San Joaquin River: the Stanislaus River, the Calaveras River, and the Mokelumne River. The eastern boundary of the Coalition area is the crest of the Sierra Nevada, and the drainage area is bordered by the San Joaquin River to the west, the Stanislaus River to the south and the Mokelumne River to the north.

The Coalition area is divided into six zones based on hydrology, crop types, land use, soil types, and precipitation. Zone names are based on the Core Monitoring location within that zone: 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. A Core Monitoring location was not established in Zone 5 until October 2008, therefore Zone 5 is not named after the Core Monitoring location (Walthall Slough @ Woodward Ave), the zone's name remains the Lower San Joaquin Zone.

The SJCDWQC monitoring program zones include a Core site and rotating Assessment site. Core sites establish trends in water quality and will be monitored continuously during the life of the Conditional Waiver program. There are fewer constituents monitored at Core Monitoring locations (primarily physical parameters and nutrients). Zone 6 does not contain a Core Monitoring location due to increased urbanization in Contra Costa County and lack of agriculture in the southern portion of this zone. Assessment Monitoring locations characterize discharge in the zone in which they are located. Assessment Monitoring includes a larger suite of constituents than Core Monitoring. Assessment sites are rotated every year across the Coalition region. Core sites are monitored for Assessment constituents according to the rotating schedule outlined in the Monitoring and Reporting Program Plan (MRPP), pages 53-55.

Monitoring Program Objectives

The Coalition's water quality monitoring program is outlined in the SJCDWQC MRPP (approved September 15, 2008, amended and approved January 18, 2011). Changes to the monitoring program in 2012 include the exchange of one site and the removal of active management plans for specific constituent based on improved water quality results.

The Coalition was approved on January 12, 2012 to modify the SJCDWQC MRPP to exchange Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd for a more representative monitoring location at Roberts Island @ Whiskey Slough Pump. Roberts Island @ Whiskey Slough Pump is not the Core Monitoring location in Zone 4 and all management plan constituents from the other two sites are monitored at the new location.

The Coalition was approved on March 22, April 17 and May 21, 2012 to remove specific site/constituent pairs from active management plans. Based on 2012 monitoring, the Coalition submitted a second letter petitioning to remove specific site/constituent pairs from active management plans to the Regional Board on November 13, 2012; this letter is still pending approval. Table 48 lists all of the specific site/constituent pairs approved for removal from active management plans including when the site was last monitored for Assessment Monitoring constituents and when the site will rotate into Assessment Monitoring again. Two consecutive years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality due to improved grower awareness of the offsite movement of agricultural constituents and/or newly implemented management practices. The Coalition will monitor the locations listed in Table 47 when the sites rotate into Assessment Monitoring.

The primary objectives of the monitoring program are to characterize discharge from irrigated agriculture and to determine if the implementation of management practices is effective in reducing or eliminating discharge and impairments to beneficial uses. The Coalition monitored 15 sites in 2012; six sites were part of the Normal Monitoring (NM) schedule in the SJCDWQC MRPP (pages 59-64). Management Plan Monitoring took place at all 15 sites as outlined in the SJCDWQC Management Plan Update Report (MPUR). Nine sites (Bear Creek @ North Alpine Rd, Grant Line Canal @ Clifton Court, Grant Line Canal near Calpack Rd, Kellogg Creek along Hoffman Ln, Littlejohns Creek @ Jack Tone Rd, Lone Tree Creek @ Jack Tone Rd, Mormon Slough @ Jack Tone Rd, Sand Creek @ Hwy 4 Bypass and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) were monitored as MPM only. Monitoring for MPM constituents took place at six sites that were also scheduled for Assessment or Core Monitoring (Duck Creek @ Hwy 4, Mokelumne River @ Bruella Rd, French Camp Slough @ Airport Way, Terminous Tract Drain @ Hwy 12, Roberts Island @ Whiskey Slough Pump and Walthall Slough @ Woodward Ave).

Assessment Monitoring includes 45 pesticides, *E. coli*, physical parameters (total dissolved solids (TDS), total suspended solids (TSS) and turbidity), nine metals, total organic carbon (TOC), five nutrients, field parameters (dissolved oxygen (DO), Power of Hydrogen (pH), specific conductivity (SC), 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 61-63).

Monitoring Program Compliance

For 2012, the Coalition was able to meet its monitoring program objectives by 1) determining the concentration and load of specific contaminants in discharges to surface waters, 2) evaluating compliance with existing narrative and numeric water quality limit triggers to determine if implementation of additional management practices are necessary to improve and/or protect water quality, and 3) assessing the impact of discharges from irrigated agriculture to surface water. The Coalition uses management practice survey results to determine which practices to implement in order to reduce discharge of specific wastes that impact water quality in receiving waters of the Coalition region.

Coalition monitoring conducted in 2012 resulted in exceedances of Water Quality Trigger Limits (WQTLs) for DO, pH, SC, *E. coli*, TDS, nitrate, copper, chlorpyrifos, dieldrin and diuron. Water column toxicity to *C. dubia* and *S. capricornutum* as well as sediment toxicity to *H. azteca* occurred. Non-contiguous samples collected from Duck Creek @ Hwy 4 on February 14, 2012 and from French Camp Slough @ Airport Way on November 6, 2012 resulted in exceedances of the WQTL for DO. Non-contiguous samples collected from Duck Creek @ Hwy 4 on March 15, 2012 resulted in an exceedance of DO and sediment toxicity to *Hyalella azteca*.

The physical parameter exceedances were for DO (68), pH (7), SC (41), TDS (21), nitrate (3) and *E. coli* (13). An exceedance of the hardness based WQTL for dissolved copper occurred during Assessment Monitoring in both environmental sample and field duplicate at Duck Creek @ Hwy 4. One exceedance of each of the WQTLs for chlorpyrifos, dieldrin and diuron occurred. Samples collected for MPM at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd resulted in exceedances of the WQTLs for chlorpyrifos and diuron. The exceedance of the WQTL for dieldrin occurred during MPM at Sand Creek @ Hwy 4 Bypass. Exceedances of physical parameters and *E. coli* were the most common exceedances during 2012 monitoring.

Water column toxicity to *S. capricornutum* and *C. dubia* occurred once each out of 99 samples collected for toxicity analysis toxicity. Neither of the two species that exhibited toxicity had survival less than 50% compared to the control; therefore, no Toxicity Identification Evaluation (TIE) was conducted.

A total of six sediment samples of the 21 collected (from both Normal Monitoring and MPM during the storm and irrigation sediment events) tested toxic to *H. azteca*. Five of the six sediment samples had a survival less than 80% compared to the control and were considered ecologically significant." Chemistry analysis was conducted for chlorpyrifos and pyrethroids on the five toxic samples and resulted in detections of pyrethroids in all five toxic samples and chlorpyrifos in all except for one.

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, and 2) an analysis of monitoring data and toxicity results to better understand the potential sources and toxicity of detected constituents.

The Coalition prioritizes subwatersheds in order to conduct focused outreach with individual members. The purpose of grower 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 conducted focused outreach in its first set of high 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 high priority subwatersheds to track changes in management practices. An analysis of the first priority results was submitted in the MPUR on April 1, 2012 to include details on additional members contacted in the Duck Creek @ Hwy 4 subwatershed during 2010; 12 members received further outreach due to continued use/exceedances of chlorpyrifos. Of these 12 members, eight were previously contacted as a targeted member and completed an initial and follow up survey. The remaining four members were contacted based on the Coalition expanding its outreach. The additional contacts from 2010 represent a total of 2,552 enrolled irrigated acres within the Duck Creek @ Hwy 4 direct drainage area. In 2012 further outreach and education focusing on chlorpyrifos use occurred for seven additional contacts within the first priority subwatersheds (three in Duck Creek @ Hwy 4; two previously contacted, two in Lone Tree Creek @ Jack Tone Rd; both previously contacted and two in Unnamed Drain to Lone Tree Creek; one previously contacted). The 2012 additional contacts in the first priority subwatersheds represent 2,065 enrolled irrigated acres. Further analysis of the first priority results will be submitted in the MPUR on April 1, 2013 and will include data on additional practices implemented during 2011 as well as additional contact information for all three subwatersheds contacted during 2012.

Beginning in early 2010 focused outreach was initiated in the 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. In 2012 further outreach and education focusing on chlorpyrifos use occurred for five additional contacts in the Littlejohns Creek @ Jack Tone Rd subwatershed, one of which had been previously contacted. The 2012 additional contacts in the Littlejohns Creek @ Jack Tone Rd represent 645 enrolled irrigated acres. Further analysis of the second priority results will be submitted in the MPUR on April 1, 2013 and will include results from follow up and additional contacts.

Focused outreach was conducted in early 2011 in the third priority site subwatersheds: French Camp Slough @ Airport Way, Mokelumne River @ Bruella Rd and Terminous Tract Drain @ Hwy 12. Growers were contacted and asked to complete surveys documenting current practices and were required to indicate which recommended practices they anticipated implementing in the upcoming year. Follow up with growers was conducted in early 2012 to document implementation of new practices. A complete analysis of the third priority results will be reported in the MPUR to be submitted on April 1, 2013.

Focused outreach began in early 2012 in the fourth priority site subwatersheds: Kellogg Creek along Hoffman Ln, Mormon Slough @ Jack Tone Rd and Sand Creek @ Hwy 4 Bypass. Growers were contacted and asked to complete surveys documenting current practices and were required to indicate which recommended practices they anticipated implementing in the upcoming year. Follow up mailings were sent on February 1, 2013 to growers in the fourth priority site subwatersheds to document implementation of new practices. Letters were sent on January 24, 2013 to members in the fourth priority subwatersheds who did not return their initial contact surveys requesting a response. Results from contacts will be reported in the MPUR to be submitted on April 1, 2013.

Conclusions

The results of the monitoring program for 2012 indicate that although there has been substantial improvement in water quality in many areas, water quality is still not protective of beneficial uses across the entire Coalition region. The most common exceedances of WQTLs were physical parameters such as DO, TDS, and SC which resulted in impaired Agricultural and Aquatic Life beneficial uses. Other causes of impairment to Aquatic life beneficial use were exceedance level concentrations of hardness based dissolved copper, chlorpyrifos and dieldrin. Exceedances of the WQTL for *E. coli* contributed to impaired Recreational beneficial uses. Causes of impairment to Municipal beneficial use (drinking water) were exceedances of the WQTLs for dieldrin, diuron and nitrate/nitrite. Dieldrin was the only constituent to impair more than one beneficial uses (Aquatic life and Municipal).

Discharges from irrigated lands are only 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. DO. For example, locations in the Delta had numerous exceedances of SC and TDS which are the result of the high salt content water of the Delta being used for irrigation or being pumped from Delta islands to allow agriculture.

Pesticide detections are the result of agricultural applications that enter surface waters as a result of spray drift or runoff from storm or irrigation water return flows. In the event of exceedances of pesticides or toxicity, the Coalition identifies sources of WQTL exceedances through the analysis of preliminary PUR data, assessment of water quality data and evaluation of current management practices of targeted growers. 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 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.

2012 monitoring data indicate the Coalition's outreach strategy efforts have had a marked improvement on water quality in the first and second set of high priority subwatersheds. Only one exceedance of diuron occurred during 2012 MPM at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd and one exceedance of the legacy pesticide dieldrin occurred at Sand Creek @ Hwy 4 Bypass. This notable improvement in water quality is likely to be the result of additional outreach that occurred in 2010 and 2012 in first and second priority subwatersheds (Duck Creek, Lone Tree Creek, Unnamed Drain and Littlejohns Creek). Other than the two pesticide exceedances, there were two samples collected for MPM that were toxic to the test species (Grant Line Canal @ Clifton Court Rd, May *S. capricornutum* and Grant Line Canal near Calpack Rd, August *C. dubia*). Many of the exceedances of pesticides that resulted from 2011 monitoring occurred at locations where focused outreach is planned for 2013-2015. Furthermore, based on monitoring data from the past several years, the Coalition was able to send another letter on November 13, 2012 to the Regional Board petitioning to remove specific site/constituent pairs from active management plans based on two years of monitoring with no exceedances. The Coalition anticipates seeing further improvement the water quality in 2013 and 2014 when these fifth priority subwatersheds enter Year 1 of monitoring and focused outreach.

Conclusions from these data are that 1) additional grower outreach from 2010 and 2012 appear to have been an effective method of communicating with members, 2) implementation of management practices is improving water quality in the Coalition region, and 3) improvement in water quality is expected to continue based on upcoming outreach efforts in new priority subwatersheds.

Based on the information provided in the report below, the Coalition will pursue the following in 2013:

1. Continue the current monitoring strategy as outlined in 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.
3. Continue to focus outreach and education efforts around high priority constituents while also educating growers about lower prioritized constituents such as salinity.

The Coalition identified several issues in which the Central Valley Regional Water Quality Control Board (CVRWQCB) involvement could result in improvement in water quality in the SJCDWQC region:

1. Identify and regulate dairies within priority subwatersheds that are using constituents of concern that could be affecting downstream beneficial uses.
2. Develop and deploy methods to monitor illegal dairy discharges and notify the Coalition of any known dairy discharges that may result in water quality impairments including nutrient and *E. coli* exceedances.
3. Continue enforcement actions against non-members who have the potential to discharge.
4. Move forward with the processes to develop plans to study difficult issues such as contamination of surface waters by *E. coli*, causes of elevated pH, and low dissolved oxygen.
5. Continue to work with the CV-SALTS process to develop a better understanding of the sources and sinks of salt in surface and groundwater and potential practices that can be effective in preventing exceedances.

SJCDWQC GEOGRAPHICAL AREA

The San Joaquin County and Delta Water Quality Coalition (SJCDWQC) area includes San Joaquin County as well as portions of Contra Costa, Alameda, Calaveras and Stanislaus Counties. There are three major rivers in the Coalition area other than the San Joaquin River: Stanislaus River, Calaveras River, and Mokelumne River. These 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 bordered 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 through State (California Aqueduct) and Federal Water Projects (Delta Mendota Canal).

IRRIGATED LAND

Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains approximately 1,478,985 acres of which 608,914 acres (41%) 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 the entirety of each county. Land Use Survey data (DWR, http://www.water.ca.gov/landwateruse/lusrvymain.cfm) includes more detailed information regarding specific crop uses (both irrigated and non-irrigated) 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) whether or not the entire county is within the Coalition boundary, and 2) which data were developed most recently.

For Alameda, Calaveras, Contra Costa, and Stanislaus Counties, the Coalition utilized DWR Land Use Survey data to determine irrigated land area because only portions of these counties are included in the Coalition boundary. For San Joaquin County, data from Agricultural Land and Water Use was used as all of San Joaquin County is encompassed in the Coalition boundary (Table 2).

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	
Contra Costa	48,925		1995
Alameda	912		2006
Calaveras	1,098		2000
Stanislaus	18,979		2004
Total	**608,914**		

[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

GEOGRAPHICAL CHARACTERISTICS AND LAND USE

The Coalition area is divided into six zones to facilitate the implementation of a comprehensive monitoring program (Figure 1). These zones are based on hydrology, crop types, land use, soil types, and rainfall. Zone acreages were calculated using Land Use Survey Data (Table 3). Zone names are based on the Core Monitoring locations within the zone: 1) Mokelumne River @ Bruella Rd Zone, 2) French Camp @ Airport Way Zone, 3) Terminous Tract Drain @ Hwy 12 Zone, 4) Roberts Island @ Whiskey Slough Pump Zone, 5) Lower San Joaquin Zone, and 6) Contra Costa Zone. A Core site was not established in Zone 5 until October 2008, therefore Zone 5 is not named after the Core Monitoring location (Walthall Slough @ Woodward Ave) and the zone's name remains the Lower San Joaquin Zone. Zone 6 does not have a Core Monitoring location due to increased urbanization within Contra Costa County and a paucity of agriculture in the zone. Descriptions of zone-specific climate, water drainage and flow, soil characteristics and land use are included in the Coalition's Monitoring and Reporting Program Plan (MRPP pages 10-25). Land use maps for each zone are included in Figures 2-7.

Figure 1. SJCDWQC zone boundaries and Core sites.

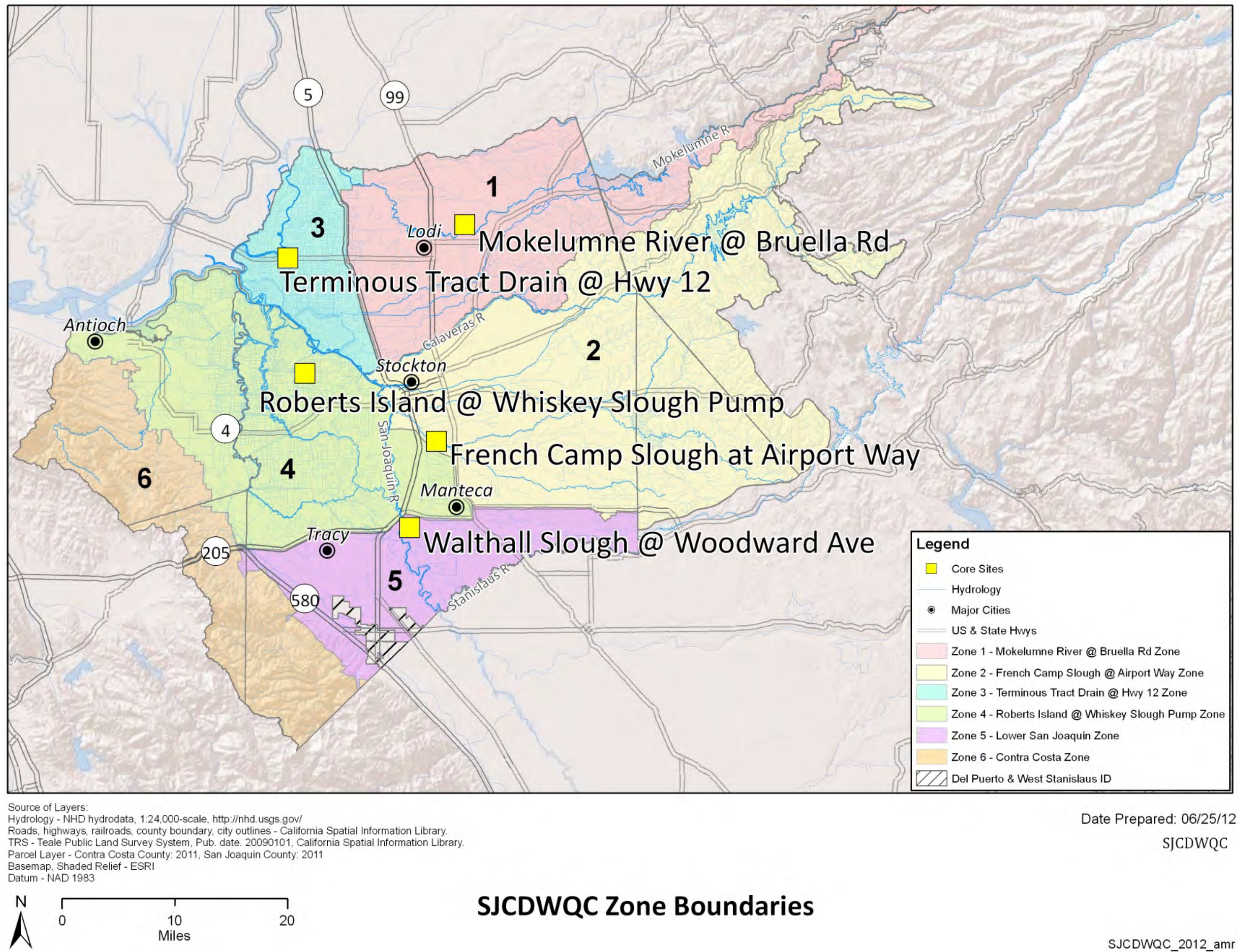


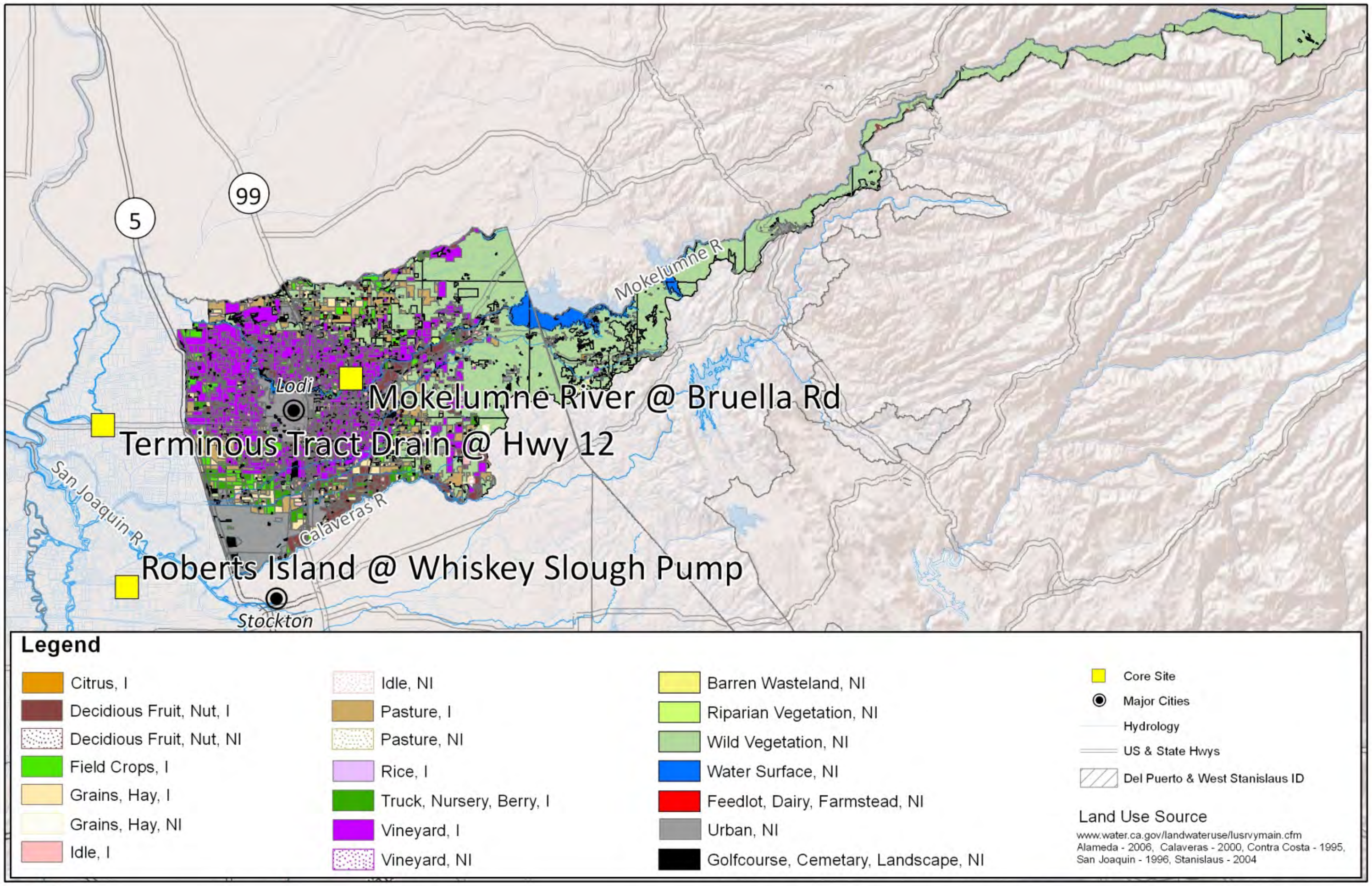
Table 3. SJCWQC 2012 total and irrigated acreages for Zones 1-6.

	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6
	MOKELUMNE RIVER @ BRUELLA RD ZONE	FRENCH CAMP SLOUGH @ AIRPORT WAY ZONE	TERMINOUS TRACT DRAIN @ HWY 12 ZONE	ROBERTS ISLAND @ WHISKEY SLOUGH PUMP ZONE	LOWER SAN JOAQUIN ZONE	CONTRA COSTA ZONE
Total Acres[1]	268,792	514,151	88,019	283,496	139,696	185,583
Irrigated Acres[2]	109,510	171,378	70,704	186,379	95,648	428

[1]Total acres for SJCDWQC Zones have been calculated using DWR Land Use Survey data which is reported for an entire county. ArcGIS measurement processing on data was used to estimate the acreage for the portion of the county that is within each zone. Therefore there are minor differences in the amount of total acres reported in Table 3 versus the amount reported elsewhere.

[2]Irrigated acreage for each zone does not equal the sum of irrigated acres for all SJCDWQC counties due to differences in acreage sources obtained between the county DWR Land Use layers and the Agricultural Land and Water Use estimates for 2001.

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



Source of Layers:
Hydrology - NHD hydrodata, 1:24,000-scale, http://nhd.usgs.gov/
Roads, highways, railroads, county boundary, city outlines - California Spatial Information Library.
TRS - Teale Public Land Survey System, Pub. date. 20090101, California Spatial Information Library.
Parcel Layer - Contra Costa County: 2011, San Joaquin County: 2011
Basemap, Shaded Relief - ESRI
Datum - NAD 1983

Date Prepared: 06/21/12

SJCDWQC

N

0 5 10
Miles

SJCDWQC Zone 1 Land Use

SJCDWQC_2012_amr

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

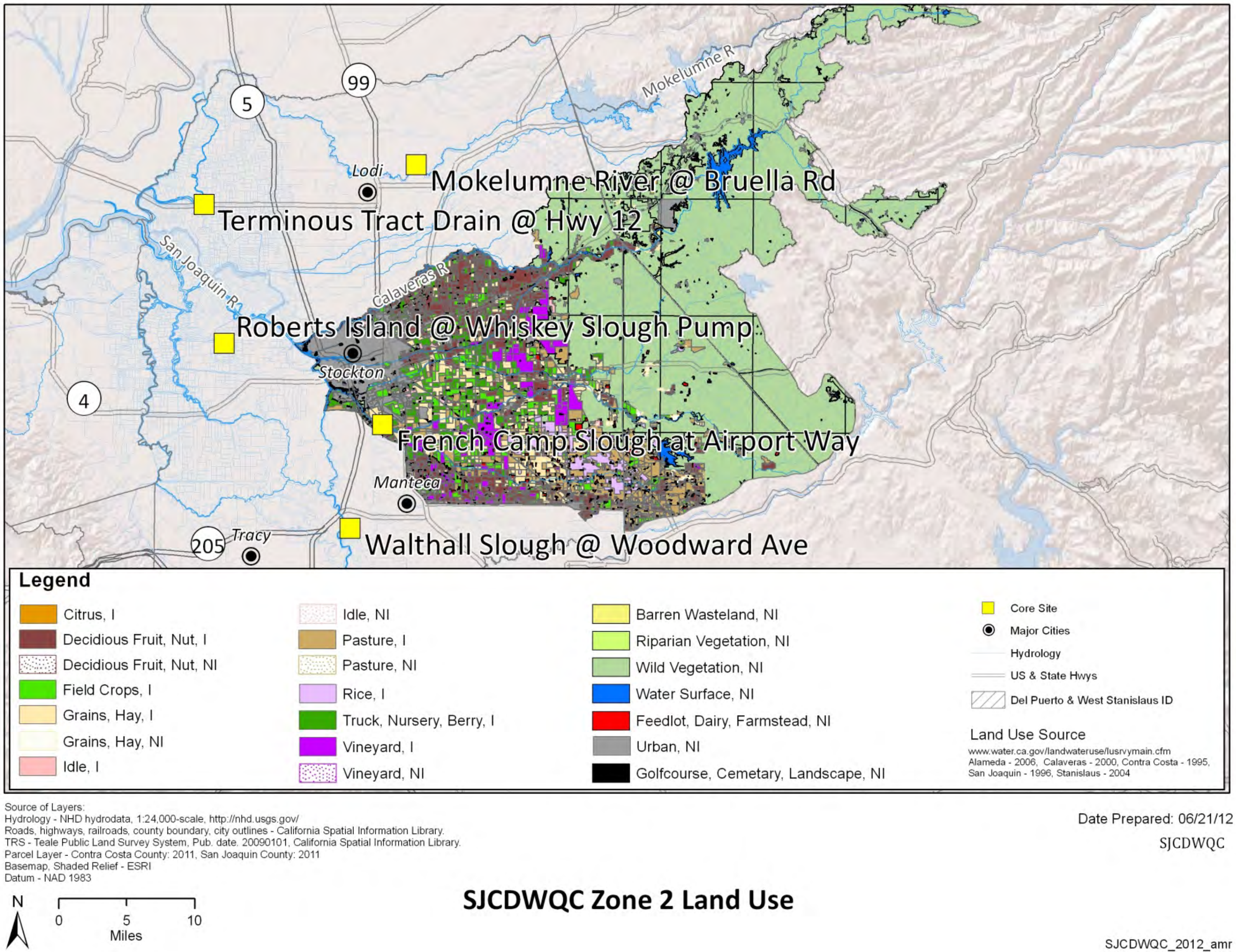


Figure 4. Terminous Tract @ Hwy 12 Zone (Zone 3) Land Use.

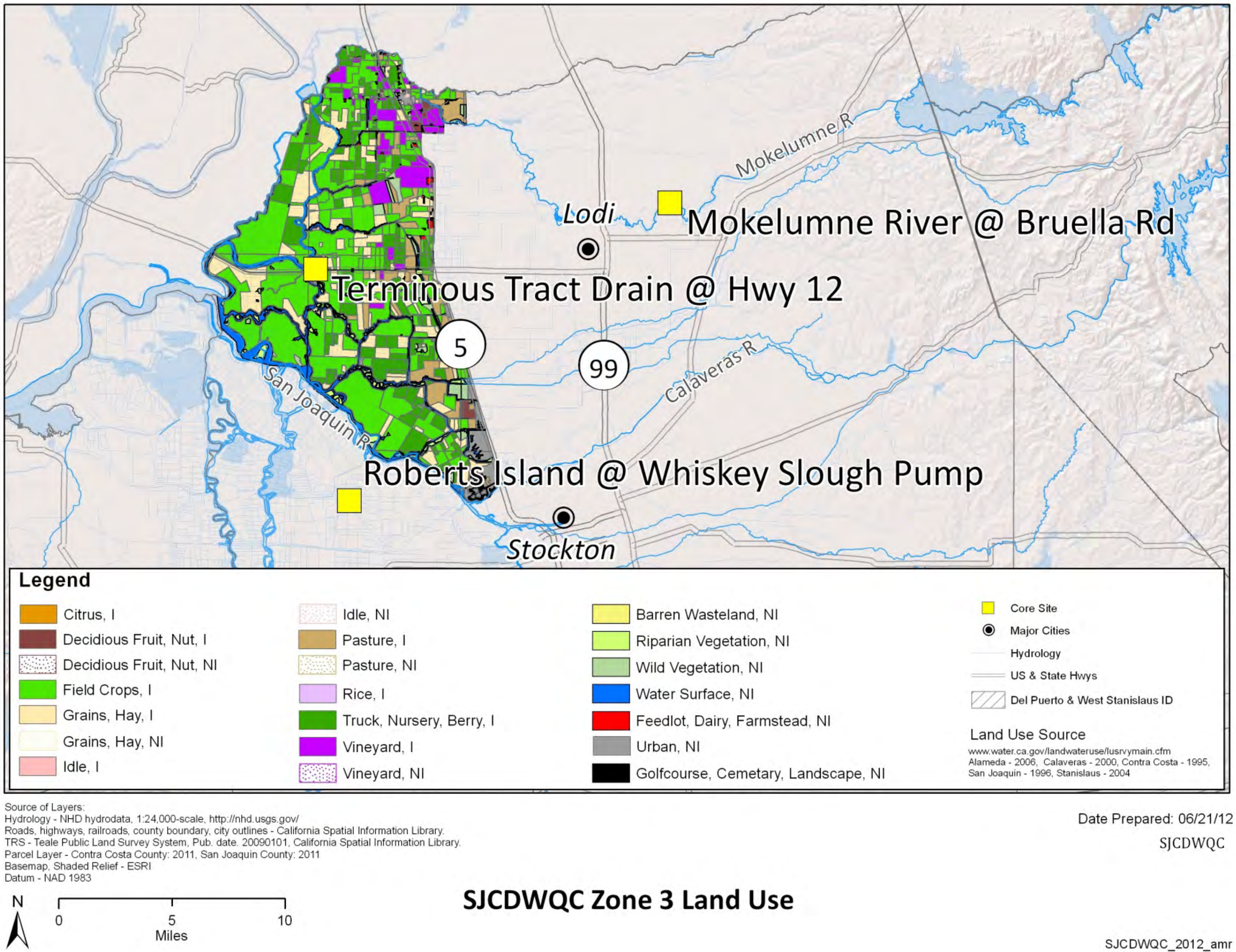


Figure 5. Roberts Island @ Whiskey Slough Pump Zone (Zone 4) Land Use.

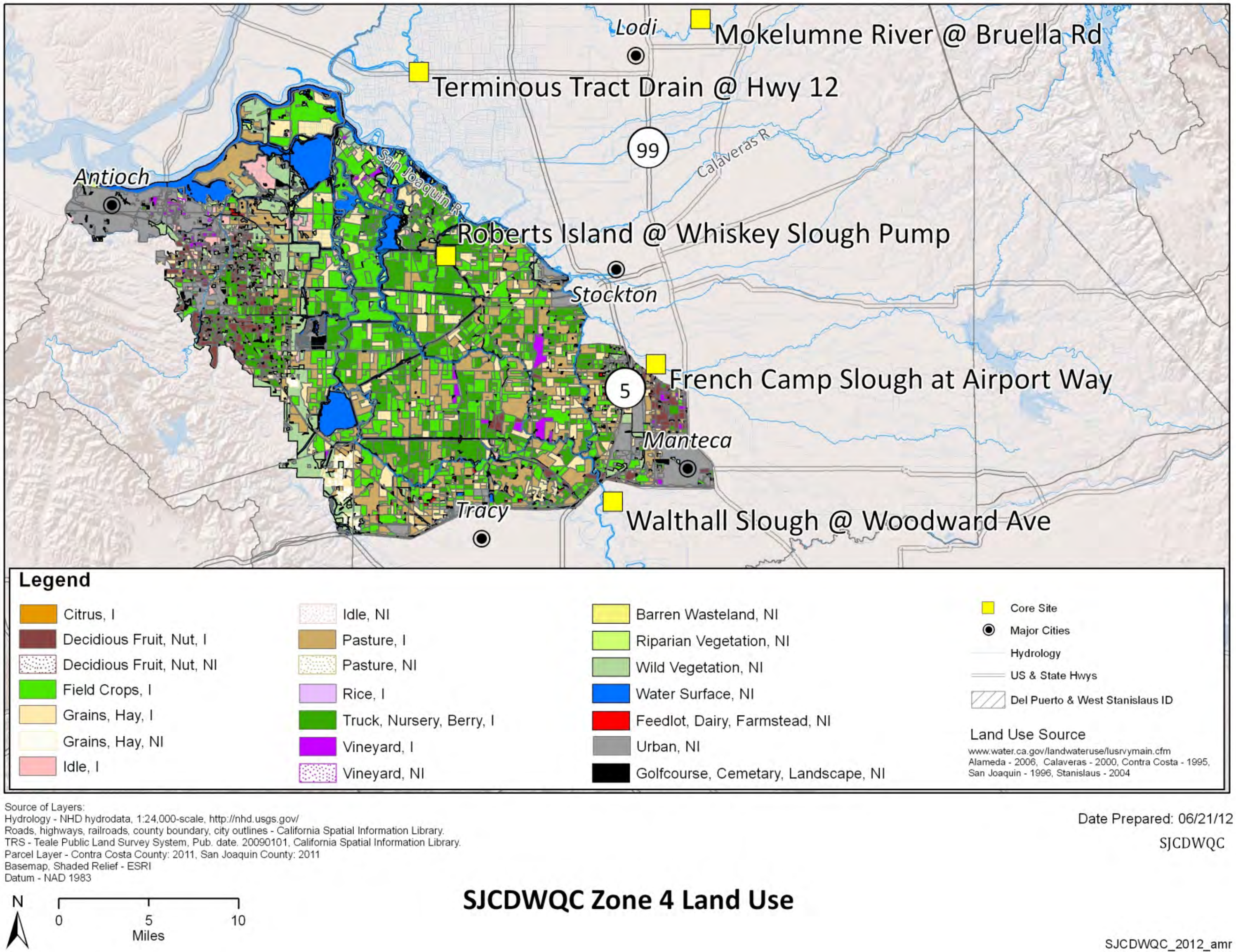


Figure 6. Lower San Joaquin Zone (Zone 5) Land Use.

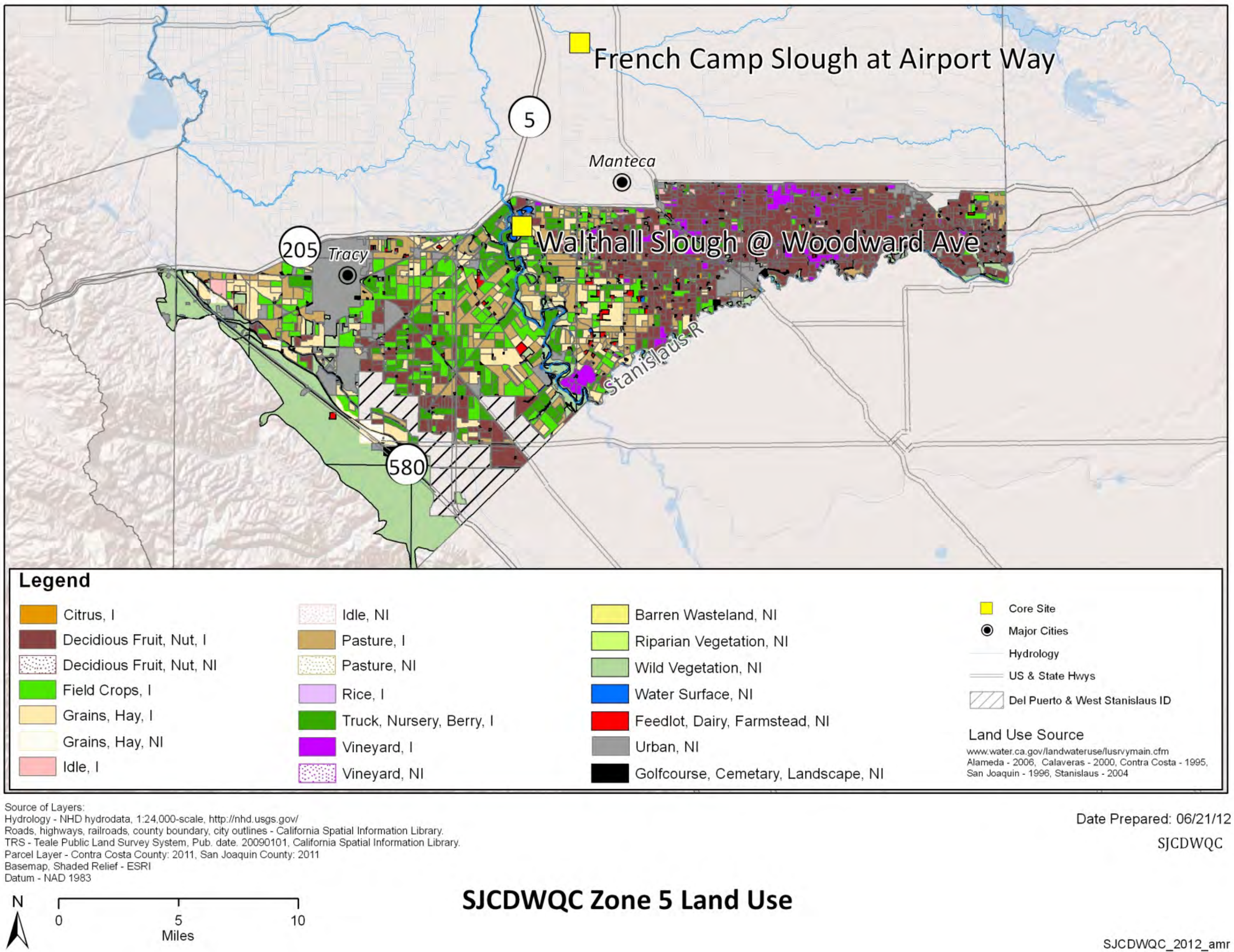
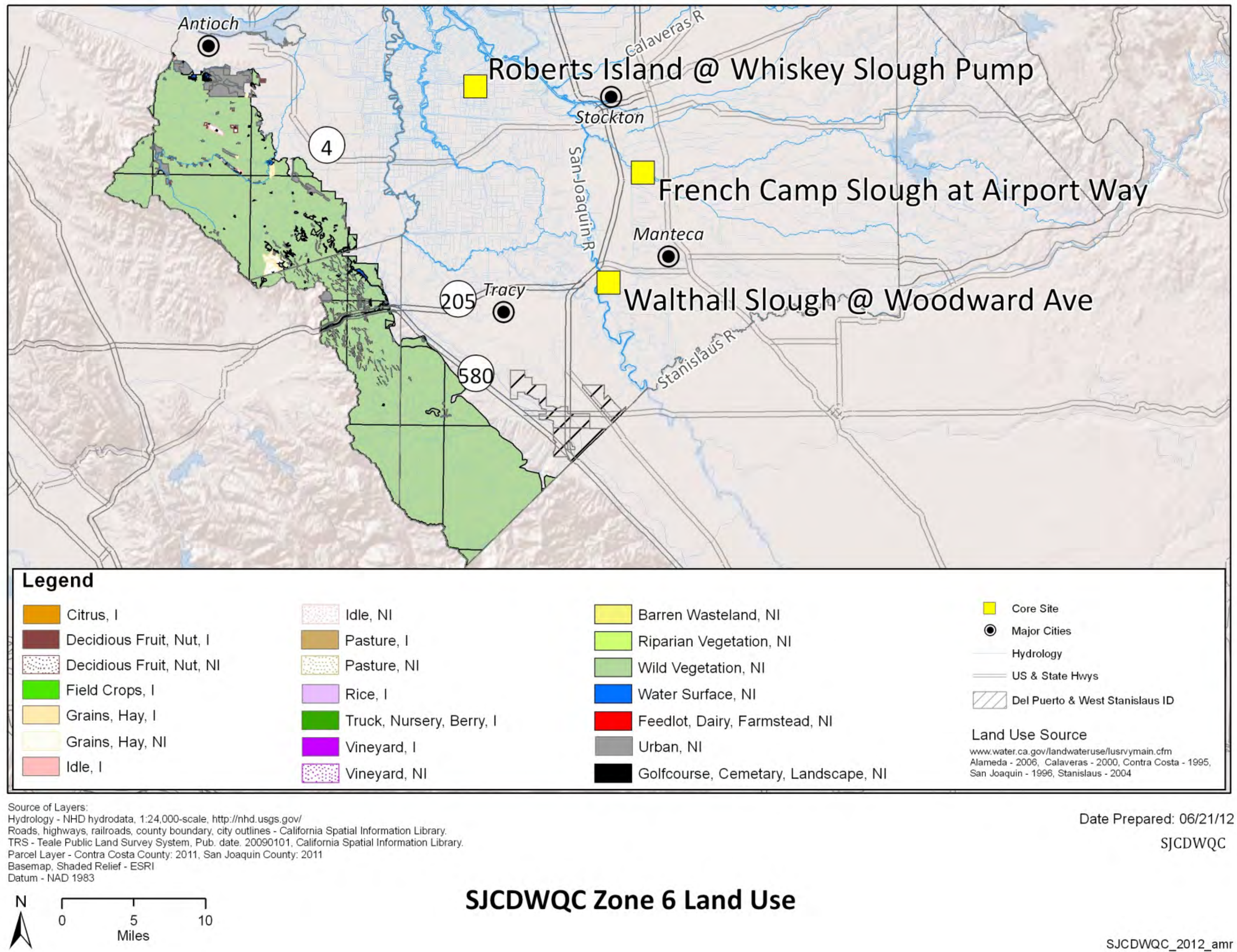


Figure 7. Contra Costa Zone (Zone 6) Land Use.



MONITORING OBJECTIVES AND DESIGN

MONITORING JANUARY THROUGH DECEMBER 2012

The Coalition conducts Normal Monitoring (NM) to characterize discharge from irrigated agriculture and Management Plan Monitoring (MPM) to monitor constituents that require a management plan. Management plans are required as a result of a single exceedance of the Water Quality Trigger Limit (WQTL) of a TMDL constituent, or more than one exceedance of a WQTL of a constituent without a TMDL. From January through December 2012 the Coalition conducted both NM and MPM based on the monitoring strategy outlined in the MRPP (pages 32-34) and Management Plan approved January 23, 2009 (annual updates are submitted on April 1 of each year).

As part of NM, the Coalition sampled both Core and Assessment Monitoring locations once a month including three storm events and two sediment events. The following section briefly describes changes to the Coalition's monitoring plan and the objectives of NM (Core (C), Assessment (A) and Sediment Monitoring) as well as MPM and Total Maximum Daily Load (TMDL) monitoring. This section also describes the overall Coalition sampling design, including sampling seasons and storm triggers.

The Coalition was approved on January 12, 2012 to modify the SJCDWQC MRPP to exchange Roberts Island Drain @ Holt Rd and Roberts Island Drain along House Rd for a more representative monitoring location at Roberts Island @ Whiskey Slough Pump.

After two or more consecutive years of monitoring with zero exceedances, the Coalition was approved on March 22, April 17 and May 21, 2012 to remove specific site/constituent pairs from active management plan and MPM. On November 13, 2012 the Coalition sent a second request to remove specific site/constituent pairs from active management plan and MPM for 27 site specific constituents at nine high priority subwatershed locations based on improved monitoring results. Table 48 in the Status of Management Plans and Special Projects section of this report lists all of the specific site/constituent pairs approved for removal from active management plans and MPM.

MONITORING OBJECTIVES

The objectives of the SJCDWQC monitoring program are to:

1. Determine the concentration and load of waste(s) 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 15 sites in 2012. Management Plan Monitoring took place at all 15 sites as outlined in the SJCDWQC Management Plan Update Report (MPUR). Nine sites (Bear Creek @ North Alpine Rd, Grant Line Canal @ Clifton Court, Grant Line Canal near Calpack Rd, Kellogg Creek along Hoffman Ln, Littlejohns Creek @ Jack Tone Rd, Lone Tree Creek @ Jack Tone Rd, Mormon Slough @ Jack Tone Rd, Sand Creek @ Hwy 4 Bypass and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) were monitored as MPM only. Monitoring for MPM constituents took place at six sites that were also scheduled for Assessment or Core Monitoring (Duck Creek @ Hwy 4, Mokelumne River @ Bruella Rd, French Camp Slough @ Airport Way, Terminous Tract Drain @ Hwy 12, Roberts Island @ Whiskey Slough Pump and Walthall Slough @ Woodward Ave).

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. In 2012, the Coalition sampled for 34 organic pesticides (Group A pesticides were not monitored at Walthall Slough in 2012 due to the site being scheduled for Core Monitoring, the site will rotate into Assessment Monitoring in 2013 and Group A pesticide monitoring will resume), *E. coli*, physical parameters (total dissolved solids (TDS), total suspended solids (TSS) and turbidity), nine metals, total organic carbon (TOC), five nutrients, field parameters (dissolved oxygen (DO), Power of Hydrogen (pH), specific conductivity (SC)), and water column toxicity to *C. dubia*, *P. promelas,* and *S. capricornutum.* The Coalition also sampled for sediment physical parameters (grain size and TOC), sediment toxicity to *H. azteca,* and nine sediment pesticides as needed (Tables 4, 5 and 6).

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 (at 25°C, field measure)	Assessment and Core
Dissolved Oxygen (DO, field measure)	Assessment and Core
Temperature (field measure)	Assessment and Core
Turbidity	Assessment and Core
Total Dissolved Solids (TDS)	Assessment and Core
Total Suspended Solids (TSS)	Assessment and Core
Hardness	Assessment and Core
Total Organic Carbon (TOC)	Assessment and Core
Bacteria	
E. coli	Assessment and Core
Water Column Toxicity Test	
Algae - *Selenastrum capricornutum*	Assessment
Water Flea - *Ceriodaphnia dubia*	Assessment

Constituents, Parameters, and Tests	Monitoring Type
Fathead Minnow - *Pimephales promelas*	Assessment
Toxicity Identification Evaluation (TIE)**	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
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*	Assessment

Constituents, Parameters, and Tests	Monitoring Type
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
Zinc (total and dissolved)	Assessment
Nutrients	
Total Kjeldahl Nitrogen (TKN)	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 during Assessment Monitoring years as needed to characterize 303d listed waterbodies.

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

Table 5. SJCDWQC January through December 2012 monitoring schedule (nutrients, bacteria, field parameters, physical parameters, metals and pesticides: organophosphates).

SJCDWQC January-December 2012 Monitoring Schedule		Nutrients					Bacteria	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	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	Bear Creek @ North Alpine Rd							F	F	F	F																M						M					
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	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[1]	M[1†]	A	A	A	A	A	A	A	A	A	A
2	French Camp Slough @ Airport Way	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M	M							M	M										
2	Littlejohns Creek @ Jack Tone Rd							F	F	F	F								M								M	M										
2	Mormon Slough @ Jack Tone Rd							F	F	F	F																M											
2	Lone Tree Creek @ Jack Tone Rd							F	F	F	F								M[†]								M	M[†]										
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd							F	F	F	F								M								M											
3	Terminous Tract Drain @ Hwy 12	C	C	C	C	C	C	C	C	C	C	C	C	C	C												M											
4	Grant Line Canal @ Clifton Court Rd							F	F	F	F								M[†]								M											
4	Grant Line Canal near Calpack Rd							F	F	F	F																M											
4	Kellogg Creek along Hoffman Lane							F	F	F	F								M								M											
4	Roberts Island Drain @ Holt Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C												C[2]	C[2]										
5	Walthall Slough @ Woodward Ave	C	C	C	C	C	C	C	C	C	C	C	C	C	C												C[2]	C[2]										
6	Sand Creek @ Hwy 4 Bypass							F	F	F	F																M	M				M						

A - Assessment Monitoring constituent
C - Core Monitoring constituent
F – Field parameters are collected during every sampling event including MPM.
M - Management Plan Monitoring is conducted for Priority A-D constituents during months of past exceedances.
[1]MPM at 2012 Assessment Monitoring sites.
[2]TotalMaximum Daily Load (TMDL) monitoring
† Constituent was approved for removal from active management plan

Table 6. SJCDWQC January through December 2012 monitoring schedule (pesticides: organochlorines, carbamates, herbicides, water column toxicity and sediment parameters).

SJCDWQC January-December 2012 Monitoring Schedule		Pesticides																					Water Column Toxicity			Sediment		
		Organochlorines							Carbamates								Herbicides									Tox	Physical Para-meters	
Zone	Site Name	DDD	DDE	DDT	Dicofol	Dieldrin	Endrin	Methoxychlor	Aldicarb	Carbaryl	Carbofuran	Methiocarb	Diuron	Linuron	Methomyl	Oxamyl	Atrazine	Cyanazine	Simazine	Trifluralin	Paraquat	Glyphosate	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*[1]	TOC	Grain Size
1	Bear Creek @ North Alpine Rd																											
	Mokelumne River @ Bruella Rd																						M		M			
2	Duck Creek @ Hwy 4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	M[2]	A	M[2]†	A	A	A
	French Camp Slough @ Airport Way					M†							M										M		M	M	M	M
	Littlejohns Creek @ Jack Tone Rd																								M			
	Mormon Slough @ Jack Tone Rd																						M		M			
	Lone Tree Creek @ Jack Tone Rd												M†												M†	M†	M†	M†
	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd												M						M†				M†		M†	M	M	M
3	Terminous Tract Drain @ Hwy 12																								M†	M	M	M
4	Grant Line Canal @ Clifton Court Rd																								M	M	M	M
	Grant Line Canal near Calpack Rd																						M		M	M	M	M
	Kellogg Creek along Hoffman Lane																						M		M	M	M	M
	Roberts Island Drain @ Holt Rd												M										M		M	M	M	M
5	Walthall Slough @ Woodward Ave																									M	M	M
6	Sand Creek @ Hwy 4 Bypass					M																	M		M	M	M	M

A - Assessment Monitoring constituent
C - Core Monitoring constituent
F – Field parameters are collected during every sampling event including MPM.
M - Management Plan Monitoring is conducted for Priority A-D constituents during months of past exceedances.
Tox-Toxicity
[1]If *H. azteca* survival is less than 80% compared to the control, sediment will be analyzed for pesticides (Table 4 lists specific pesticides).
[2] MPM at 2012 Assessment Monitoring sites.
† Constituent was approved for removal from active management plan

MONITORING SEASONS

The Coalition categorizes monitoring by fall, winter, irrigation, and storm seasons (Table 7). Fall monitoring (October – December) occurs after irrigation is finished across the majority of crops in the Coalition region and generally before dormant sprays. Winter monitoring occurs from January through March when dormant sprays and significant rainfalls are expected. Irrigation monitoring (April – September) characterizes the discharge from irrigated agriculture and irrigation return flows. A storm event can occur at any time of the year but is expected to occur during the winter season. Additional details regarding storm sampling events and their rainfall trigger are included in the Sampling Site Descriptions and Rainfall Records section of this report.

Table 7. 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 of rain within 24 hours; may occur during any month although generally occurs from January through March.
Irrigation	April through September	Summer months with possible irrigation.

MONITORING DESIGN

Normal Monitoring

Starting October 2008, the Coalition began monitoring under the current approved MRPP that includes a schedule of Core and Assessment locations to be monitored on a monthly basis (MRPP Table 9, page 55). Prior to the 2008 MRPP, the Coalition monitored twice during the storm season (January through March) as determined by a 24 hour rainfall trigger of 0.50 inches and during the irrigation season (April through September). The first year in which the Coalition monitored from October through December was in 2008. Table 8 provides the locations and seasons of Coalition monitoring from 2004 through 2012.

Five Core Monitoring locations and one Assessment Monitoring location are monitored annually as the NM program. Due to the large urban influence in Zone 6, there is not a Core or Assessment Monitoring location in the Contra Costa Zone. The monitoring schedule outlined in the SJCDWQC MRPP (MRPP Table 9, page 55) requires the yearly rotation of the Assessment Monitoring location within different zones. During each year the rotating Assessment site is sampled in a zone where the Core site is also being monitored for all Assessment Monitoring constituents.

The Coalition attempts to sample two storm events per year, where storm event monitoring is defined as occurring within three days of a rainfall event that exceeds 0.5 inches within 24 hours. Storm samples were collected at sites in the SJCDWQC on March 15, April 12 and December 3, 2012. A description of the rainfall that occurred in 2012 including when samples were collected relative to the amount of precipitation is included in the section "Sample Site Descriptions and Rainfall Records".

Core Monitoring

Core Monitoring occurs at Core sites within the SJCDWQC zones and is designed to track water quality trends over time. There are fewer constituents (primarily physical parameters and nutrients) monitored at Core sites during Core Monitoring years (Table 4). Data generated from the Core sites are used to establish trends in water quality necessary to evaluate the effectiveness of the Coalition's efforts to reduce or eliminate the impact of irrigated agriculture on surface waters. Core sites undergo Assessment Monitoring every third year.

Assessment Monitoring

Assessment Monitoring occurs at Assessment sites that are rotated between the SJCDWQC zones annually (with the exception of Contra Costa Zone) and Core sites every third year. 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 water quality of all waters of the State within the Coalition region that receive irrigated discharge. Samples collected from Assessment Monitoring locations are analyzed for a large suite of constituents to effectively characterize water quality (Table 4).

Sediment Monitoring

Sediment samples are collected twice a year at annual rotating Assessment Monitoring locations within each zone. Sediment samples are collected after the winter rainfall events (between March 1 and April 30) and before the height of the irrigation season. A second set of sediment samples are collected at the end of the irrigation season (between August 15 and October 15), when irrigation is mostly complete, and water levels are low and safe enough to sample sediment. In 2012, sediment samples were collected on March 15, 2012 and September 18, 2012.

Table 8. Sample sites and years monitored.

Station Name	2004	2005		2006		2007		2008			2009				2010				2011				2012			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm[5]	Winter	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Bear Creek @ North Alpine Rd								x		x	x	x							x	x	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	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	x	x	x	x	x	x	x	x
Grant Line Canal @ Clifton Court Rd		x	x	x	x	x	x	x	x								x		x		x		x	x	x	
Grant Line Canal near Calpack Rd		x	x	x	x	x	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										Dry		x		x	x	x	
Littlejohns Creek @ Escalon-Bellota Rd[1]									x																	
Littlejohns Creek @ Jack Tone Rd	x	x	x	x	x	x	x	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	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	x	x	x	x	x	x	x	x
Mokelumne River @ Fish Hatchery[1]			x																							
Mormon Slough @ Jack Tone Rd					x	x	x	x	x												x			x	x	
Potato Slough @ Hwy 12	x	x	x	x																						
Roberts Island @ Whiskey Slough Pump																							x	x	x	x
Roberts Island Drain @ Holt Rd					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				

Station Name	2004	2005		2006		2007		2008			2009				2010				2011				2012			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Storm[5]	Winter	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	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										x		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	x	x	x	x	x	x	x	x
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd					x	x	x	x	x				x		x	x	x	x	x		x	Dry	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	x	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).
[5]2009 Storm samples were collected November 4, 2008 under the current MRPP.
A blank cell indicates that no sampling occurred at that site during the specified season.
"Dry" indicates that the site was dry during one or more events during the specified monitoring season.

Management Plan Monitoring

The Coalition conducted MPM as part of the SJCDWQC Management Plan's strategy to identify sources of contaminants and evaluate effectiveness of newly implemented management practices. For more details on the Coalitions strategy for MPM refer to the Status of Management Plans and Special Projects section of this report.

Management Plan Monitoring occurred at 15 sites during 2012: Bear Creek @ North Alpine Rd, Duck Creek @ Highway 4, Lone Tree Creek @ Jack Tone Road, Unnamed Drain to Lone Tree Creek @ Jack Tone Road (also known as Temple Creek), Grant Line Canal @ Clifton Court Rd, Grant Line Canal near Calpack Rd, Littlejohns Creek @ Jack Tone Rd, French Camp Slough @ Airport Way, Mokelumne River @ Bruella Rd, Terminous Tract Drain @ Hwy 12, Kellogg Creek along Hoffman Ln, Mormon Slough @ Jack Tone Rd, Roberts Island @ Whiskey Slough Pump, Sand Creek @ Hwy 4 Bypass and Walthall Slough @ Woodward Ave.

Management Plan Monitoring was conducted for water column toxicity (*C. dubia* and *S. capricornutum*), sediment toxicity (*H. azteca*), copper, lead, chlorpyrifos, diazinon, dieldrin, disulfoton, diuron, malathion, and simazine (Table 9). Details on the process and the schedule of MPM are available in the SJCDWQC 2008 Management Plan approved January 23, 2009. The MPM schedule is updated annually in the SJCDWQC MPUR (submitted annually on April 1).

After two or more consecutive years of monitoring with zero exceedances, the Coalition was approved to remove specific site/constituent pairs from an active management plan on March 22, April 17 and May 21, 2012. As sites were approved to remove specific constituents from active management plans, the Coalition updated its MPM schedule accordingly (Table 9). Table 9 lists sites and constituents that were monitored for MPM in 2012, all constituents approved for removal from active management plans have been omitted from the MPM table. Table 48 in the section Status of Management Plans and Special Projects lists sites and constituents approved for removal from active management plans.

Table 9. January through December 2012 MPM sites and constituents.

Site Name	High Priority Subwtershed	Site Name	Copper	Lead	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	Diuron	Malathion	Simazine	*C. dubia*	*H. azteca*	*S. capricornutum*
French Camp Slough @ Airport Way	3rd	January				X			X					
Grant Line Canal @ Clifton Court Rd	2nd	January			X									X
Grant Line Canal near Calpack Rd	2nd	January												X
Lone Tree Creek @ Jack Tone Rd	1st	January	X		X	X			X					X
Roberts Island @ Whiskey Slough Pump	5th	January			X				X					X
Sand Creek @ Hwy 4 Bypass	4th	January				X								
Terminous Tract Drain @ Hwy 12	3rd	January												X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	January			X				X		X	X		
Duck Creek @ Hwy 4	1st	February				X								X
French Camp Slough @ Airport Way	3rd	February	X		X	X			X			X		X

Site Name	High Priority Subwtershed	Site Name	Copper	Lead	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	Diuron	Malathion	Simazine	*C. dubia*	*H. azteca*	*S. capricornutum*
Grant Line Canal @ Clifton Court Rd	2nd	February			X									
Grant Line Canal near Calpack Rd	2nd	February												X
Kellogg Creek along Hoffman Ln	4th	February	X		X							X		
Littlejohns Creek @ Jack Tone Rd	2nd	February	X		X	X								
Lone Tree Creek @ Jack Tone Rd	1st	February	X		X	X			X					X
Mokelumne River @ Bruella Rd	3rd	February										X		
Roberts Island @ Whiskey Slough Pump	5th	February			X									
Terminous Tract Drain @ Hwy 12	3rd	February												X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	February			X				X		X	X		X
French Camp Slough @ Airport Way	3rd	March										X	X	
Grant Line Canal @ Clifton Court Rd	2nd	March			X								X	
Grant Line Canal near Calpack Rd	2nd	March			X							X	X	
Kellogg Creek along Hoffman Ln	4th	March										X	X	
Littlejohns Creek @ Jack Tone Rd	2nd	March												X
Lone Tree Creek @ Jack Tone Rd	1st	March											X	X
Mokelumne River @ Bruella Rd	3rd	March										X		X
Roberts Island @ Whiskey Slough Pump	5th	March										X	X	
Sand Creek @ Hwy 4 Bypass	4th	March											X	
Terminous Tract Drain @ Hwy 12	3rd	March											X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	March											X	X
Walthall Slough @ Woodward Ave	5th	March											X	
Duck Creek @ Hwy 4	1st	April			X							X		
French Camp Slough @ Airport Way	3rd	April			X									X
Grant Line Canal near Calpack Rd	2nd	April												X
Kellogg Creek along Hoffman Ln	4th	April										X		X
Littlejohns Creek @ Jack Tone Rd	2nd	April			X									X
Lone Tree Creek @ Jack Tone Rd	1st	April												X
Mokelumne River @ Bruella Rd	3rd	April												X
Mormon Slough @ Jack Tone Rd	4th	April												X
Roberts Island @ Whiskey Slough Pump	5th	April												X
Sand Creek @ Hwy 4 Bypass	4th	April												X
Terminous Tract Drain @ Hwy 12	3rd	April												X
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	April	X											
Bear Creek @ North Alpine Rd	5th	May								X				
Duck Creek @ Hwy 4	1st	May			X									
French Camp Slough @ Airport Way	3rd	May	X	X	X									
Grant Line Canal @ Clifton Court Rd	2nd	May												X
Grant Line Canal near Calpack Rd	2nd	May			X							X		X
Kellogg Creek along Hoffman Ln	4th	May												X
Littlejohns Creek @ Jack Tone Rd	2nd	May	X											
Lone Tree Creek @ Jack Tone Rd	1st	May												X
Mokelumne River @ Bruella Rd	3rd	May												X
Mormon Slough @ Jack Tone Rd	4th	May			X							X		X
Roberts Island @ Whiskey Slough Pump	5th	May												X
Sand Creek @ Hwy 4 Bypass	4th	May			X		X	X				X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	May	X		X									X
Duck Creek @ Hwy 4	1st	June			X									
French Camp Slough @ Airport Way	3rd	June	X	X										
Grant Line Canal @ Clifton Court Rd	2nd	June												
Littlejohns Creek @ Jack Tone Rd	2nd	June	X		X									
Mokelumne River @ Bruella Rd	3rd	June										X		
Sand Creek @ Hwy 4 Bypass	4th	June			X		X	X				X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	June			X									
Duck Creek @ Hwy 4	1st	July			X							X		

Site Name	High Priority Subwatershed	Site Name	Copper	Lead	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	Diuron	Malathion	Simazine	*C. dubia*	*H. azteca*	*S. capricornutum*
French Camp Slough @ Airport Way	3rd	July	X		X									
Grant Line Canal near Calpack Rd	2nd	July			X									X
Kellogg Creek along Hoffman Ln	4th	July	X											
Littlejohns Creek @ Jack Tone Rd	2nd	July			X									X
Lone Tree Creek @ Jack Tone Rd	1st	July			X									
Mokelumne River @ Bruella Rd	3rd	July												X
Mormon Slough @ Jack Tone Rd	4th	July			X									X
Roberts Island @ Whiskey Slough Pump	5th	July							X			X		X
Sand Creek @ Hwy 4 Bypass	4th	July				X						X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	July	X		X									
Duck Creek @ Hwy 4	1st	August			X									
French Camp Slough @ Airport Way	3rd	August	X		X									
Grant Line Canal near Calpack Rd	2nd	August			X							X		
Kellogg Creek along Hoffman Ln	4th	August												X
Littlejohns Creek @ Jack Tone Rd	2nd	August												X
Lone Tree Creek @ Jack Tone Rd	1st	August			X									
Mokelumne River @ Bruella Rd	3rd	August												X
Mormon Slough @ Jack Tone Rd	4th	August			X									
Roberts Island @ Whiskey Slough Pump	5th	August			X									
Sand Creek @ Hwy 4 Bypass	4th	August					X	X						X
Terminous Tract Drain @ Hwy 12	3rd	August			X									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	August	X		X									
Bear Creek @ North Alpine Rd	5th	September			X					X				
Duck Creek @ Hwy 4	1st	September			X							X		
French Camp Slough @ Airport Way	3rd	September			X								X	
Grant Line Canal @ Clifton Court Rd	2nd	September			X								X	
Grant Line Canal near Calpack Rd	2nd	September											X	
Kellogg Creek along Hoffman Ln	4th	September											X	
Littlejohns Creek @ Jack Tone Rd	2nd	September	X											
Mokelumne River @ Bruella Rd	3rd	September										X		
Mormon Slough @ Jack Tone Rd	4th	September			X							X		
Roberts Island @ Whiskey Slough Pump	5th	September			X								X	
Sand Creek @ Hwy 4 Bypass	4th	September											X	
Terminous Tract Drain @ Hwy 12	3rd	September			X								X	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	September	X		X								X	
Walthall Slough @ Woodward Ave	5th	September			X								X	
Bear Creek @ North Alpine Rd	5th	October			X									
French Camp Slough @ Airport Way	3rd	October			X									
Walthall Slough @ Woodward Ave	5th	October			X									
Littlejohns Creek @ Jack Tone Rd	2nd	November			X									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	November			X									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	December			X									

Total Maximum Daily Load Monitoring

During 2012, TMDL monitoring occurred to evaluate compliance with approved TMDL's for: chlorpyrifos, diazinon, salts (SC and TDS), boron, and DO. The Status of Management Plans and Special Projects section of this Report includes further details on Coalition monitoring and activities concerning these TMDL constituents.

In June 2006, the Regional Board finalized the *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento-San Joaquin Delta* (hereafter Basin Plan Amendment), establishing a TMDL for the organophosphate pesticides (OP) chlorpyrifos and diazinon in the Delta. As dictated by the Basin Plan Amendment, a surveillance and monitoring program was developed by the SJCDWQC to collect the required information necessary to assess compliance with the seven monitoring objectives dictated in the Basin Plan Amendment. The monitoring objectives are 1) determine load capacity compliance, 2) determine load allocation compliance, 3) determine degree of implemented management practices, 4) determine effectiveness of implemented management practices, 5) determine if alternative pesticides are impairing water quality, 6) determine if additive or synergistic effects of multiple pollutants are causing toxicity, and 7) demonstrate management practices achieve the lowest pesticide levels technically and economically achievable. The Sacramento-San Joaquin Delta is divided into seven areas that include agricultural drainages monitored by the SJCDWQC under the ILRP. The Coalition evaluates compliance with water quality objectives, loading capacity, and load allocations within the Delta waterway subareas as well as 303 (d) listed waterbodies that are within the SJCDWQC boundaries through representative monitoring.

A brief description of the Coalition's participation in monitoring for TMDL constituents can be referenced in the Status of Management Plans and Special Projects section of this report. The results of 2012 monitoring and outreach as they relate to the seven monitoring objectives will be discussed in the 2013 MPUR.

MONITORING CONSTITUENTS

All 2012 constituents and locations monitored are listed in Tables 4, 5 and 6. The following section describes agricultural sources of the constituent groups analyzed 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, have runoff from rainfall events, or from spray drift to surface waters. Irrigation return flows from fields or storm water runoff can move sediment and chemicals to surface waters. The concentrations of chemicals in surface waters are compared to numeric and narrative water quality triggers to determine if concentrations in the water exceed the trigger limit (termed an exceedance). Toxicity testing is complementary to chemical analyses and can provide an independent and more direct assessment of the level of impairment in the waterbody. 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 DO and an inability to support healthy aquatic communities. The Coalition's objective is to determine if exceedances of nutrient trigger limits are occurring and if potential sources can be identified. 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 if they are determined to be cost effective. By understanding the sources of nutrients responsible for the exceedances, the Coalition can properly recommend management practices to address exceedances of nutrients and physical parameters.

Field Parameters

Much like physical parameters, exceedances of water quality objectives for pH, DO, and SC are difficult to track to sources. All of these parameters are non-conserved meaning that they can increase or decrease as water moves downstream. Changes in the values of these parameters are the result of processes that occur on the land surface and in the water column and sediment. Processes affecting DO in waterways include stream flow patterns, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. These processes can vary diurnally. In the case of SC, 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 cost effective). By understanding the sources of constituents that influence field parameters, the Coalition can properly recommend management practices to address the exceedances.

E. coli

E. coli are a natural component of ecosystems and also occur in the intestinal tracts of animals. Coliform bacteria are voided in fecal material which can enter surface waters. *E. coli* may persist in the presence of oxygen in the environment for periods of time after being voided, and are known to reproduce and proliferate in the environment. 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. Furthermore, manure is applied to crops as a fertilizer and can contribute to the presence of *E. coli* bacteria if composting is not conducted appropriately. Manure application practices are intended to keep manure from reaching waterways and proliferating pathogens. Even though landowners and operators are required to follow crop specific manure application practices and guidelines, contamination may occur.

Metals

Nine metals are analyzed in Coalition monitoring: arsenic, boron, cadmium, copper, lead, molybdenum, nickel, selenium and zinc. Five of these metals are analyzed for both dissolved and total concentrations, and four metals are analyzed for total recoverable metal only. Dissolved metals were added to the Coalition monitoring plan in 2008 as a result of a new provision in the 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 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.

There are four general classes of metals: 1) those that are naturally present because of underlying geologic materials but not applied by agriculture (boron, selenium), 2) those that are naturally present because of underlying geologic materials and may be 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 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 applied by agriculture, exceedances of nickel would be expected to primarily be a result of a high concentration of nickel in soil.

Natural weathering of geologic materials can release metals and metalloid elements such as selenium, arsenic, and boron to surface waters. Selenium salts are naturally elevated in the southwest portion of the San Joaquin Valley and are transported to surface waters during storm runoff or irrigation tailwater discharge. These salts are so problematic that there is a prohibition of discharge of irrigation tailwater 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; therefore, 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 impact of agricultural inputs to surface waters.

While all 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 although it was applied in declining amounts over the last several decades before finally being prohibited in the 1990s. Lead was 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 and is still present in many old buildings and structures. Lead is 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 these 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 NM data. Several of these metals can be identified to source using sophisticated analytical equipment and techniques, but these tests are beyond the financial 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 and locations of all sites monitored from January through December 2012 are provided in Table 10. Land use for each subwatershed monitored in 2012 is listed in Table 11.

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 2012 Annual Site Photos Appendix VIII.

SJCDWQC region rainfall data for the months January through December 2012 are described in the section "Record of Rainfall".

SAMPLE SITE LOCATIONS

Figure 8 maps all site subwatersheds (Assessment, Core and MPM) monitored from January through December 2012. Zone boundaries are also mapped for reference.

Figure 8. SJCDWQC January through December 2012 monitoring sites relative to zone boundaries.

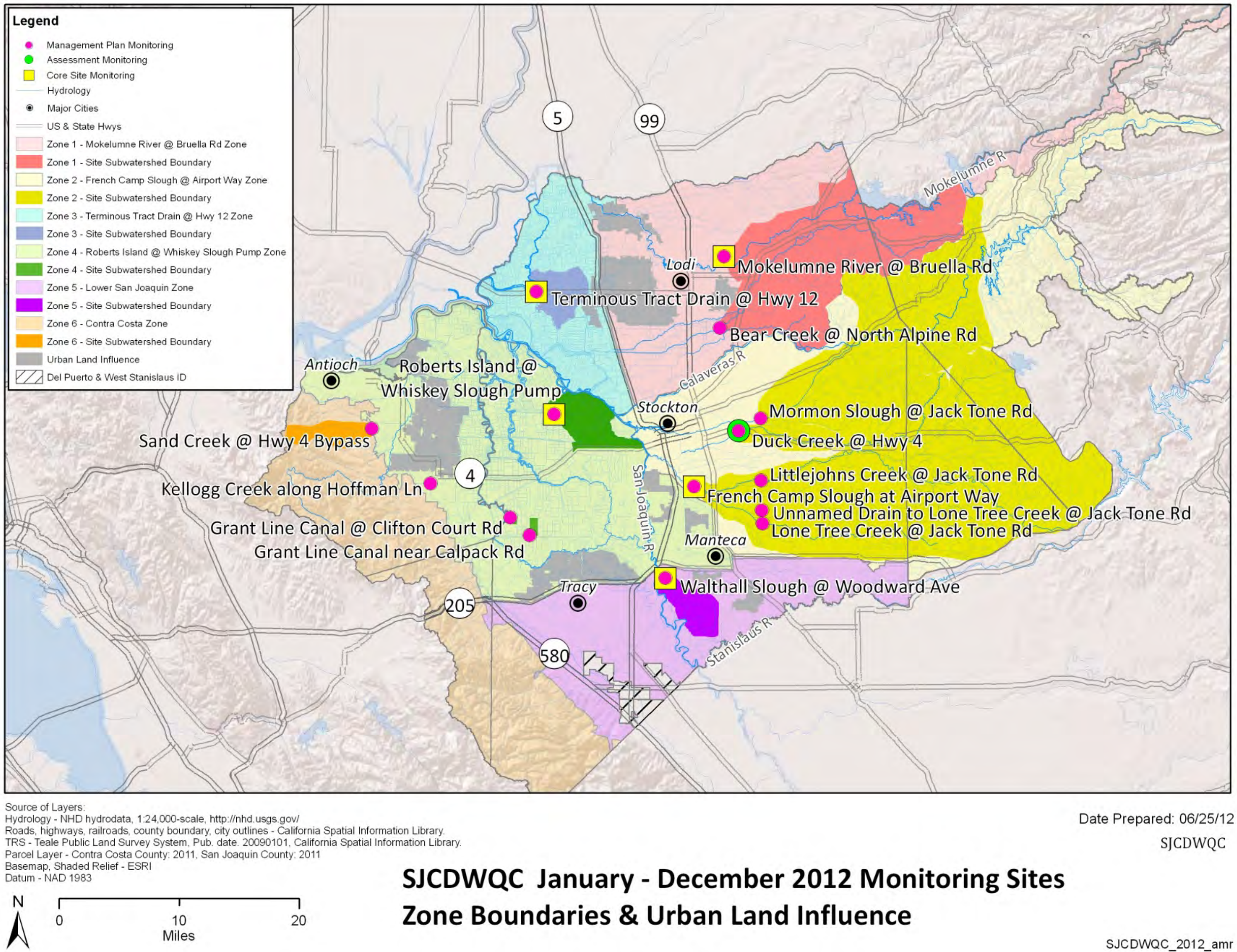


Table 10. SJCDWQC January through December 2012 (sorted by zone and site name) sample locations.

Zone	Site Type[1]	2012 Monitoring	Site Name	Station Code	Latitude	Longitude
1	Assessment	MPM	Bear Creek @ North Alpine Rd	531BCANAR	38.07386	-121.21215
1	Core	C, MPM	Mokelumne River @ Bruella Rd	531XMRABR	38.16022	-121.20643
2	Assessment	A, MPM	Duck Creek @ Highway 4	531XDCAHF	37.94949	-121.18208
2	Core	C, MPM	French Camp Slough @ Airport Way	531SJC504	37.88172	-121.24933
2	Assessment	MPM	Littlejohns Creek @ Jack Tone Rd	531XLCAJR	37.88958	-121.14727
2	Assessment	MPM	Lone Tree Creek @ Jack Tone Rd	531XLTCJR	37.83754	-121.14460
2	Assessment	MPM	Mormon Slough @ Jack Tone Road	544MSAJTR	37.96470	-121.14880
2	Assessment	MPM	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.85360	-121.14570
3	Core	C, MPM	Terminous Tract Drain @ Hwy 12	544XTTHWT	38.11558	-121.49380
4	Assessment	MPM	Grant Line Canal @ Clifton Court Rd	544XGLCAA	37.84182	-121.52999
4	Assessment	MPM	Grant Line Canal near Calpack Rd	544XGLCCR	37.82084	-121.50009
4	Assessment	MPM	Kellogg Creek along Hoffman Lane	544XKCAHL	37.88188	-121.65221
4	Core	C, MPM	Roberts Island @ Whiskey Slough Pump	544RIAWSP	37.96737	-121.46434
5	Core	C, MPM	Walthall Slough @ Woodward Ave	544WSAWAV	37.77046	-121.29227
6	NA	MPM	Sand Creek @ Hwy 4 Bypass	544SCAHFB	37.94750	-121.74300

A-Assessment Monitoring
Blank cells under 'Site Type' column indicate that the site is not a Core Site and no Assessment Monitoring takes place in the zone.
C-Core Monitoring
MPM-Management Plan Monitoring
NA-Not Applicable
[1] Site types are either Assessment or Core based on the MRPP (pages 33-35).

Table 11. SJCDWQC land use acreage of site subwatersheds January through December 2012.

The land uses are designated as irrigated/non-irrigated (I/NI). Sites are alphabetical from Bear Creek @ North Alpine Rd to Walthall Slough @ Woodward Ave. Numbers are rounded to nearest whole number.

Land Use*	I/NI	Bear Creek @ North Alpine Rd	Duck Creek @ Hwy 4	French Camp Slough @ Airport Way	Grant Line Canal near Calpack Rd	Grant Line Canal @ Clifton Ct	Kellogg Creek along Hoffman Ln	Littlejohns Creek @ Jack Tone Rd	Lone Tree Creek @ Jack Tone Rd	Mokelumne River @ Bruella Rd	Mormon Slough @ Jack Tone Rd	Roberts Island @ Whiskey Slough Pump	Sand Creek @ Hwy 4 Bypass	Terminous Tract @ Hwy 12	Unnamed Drain to Lone Creek @ Jack Tone Rd	Walthall Slough @ Woodward Ave
Citrus	I	63		11			4		5	5	234	39			6	
Citrus	NI										33					
Deciduous Nut And Fruit	I	3217	1871	13185			902	2587	6949	2537	11687	13	39		1471	835
Deciduous Nut And Fruit	NI	19								4	2		5			
Field Crop	I	1282	2336	8627	184	25	225	2220	1887	519	1290	4357		5032	3229	1311
Grain And Hay	I	1277	3428	14292	49	235		3589	2698	79	2159	2297	70	2051	4533	2552
Grain And Hay	NI	480	44	1332				977	272	2	138		12		80	
Idle	I	756	91	697			161	85	245	453	453	18	9	34	325	57
Idle	NI	102		42											42	
Barren Wasteland	NI									11	710					
Riparian Vegetation	NI	92		261			5	235	6	311	56	65		23	19	37
Wild Vegetation	NI	45773	17757	106211	2		5329	92625	2016	15105	70931	611	7010	272	14101	437
Water Surface	NI	501	67	1720			16	183	95	4410	617	362		221	1433	190
Pasture	I	6005	1698	25777	423	0.5	52	3047	11071	843	2351	2159		988	8711	2706
Pasture	NI	6		166				46	120		21				30	
Rice	I			7017				244	1577						5025	
Feedlot, Dairy, Farmstead	NI	445	228	3443			45	492	1200	154	429	90	2	20	1300	370
Truck, Nursery, Berry	I	824	2017	5176	26		486	1690	257	342	3062	2832		1273	842	941
Urban	NI	1586	113	3191			151	600	1170	599	3689	868	204	139	403	95
Golf Course, Cemetery, Landscape	I												284			
Golf Course, Cemetery, Landscape	NI	170	18	260				100	51	14	123					
Vineyard	I	6219	1516	8447				2705	1098	5189	3378			351	3757	24
Vineyard	NI	26														
Total Acres		**68861**	**31185**	**199856**	**683**	**260**	**7377**	**111425**	**30720**	**31184**	**101364**	**13711**	**7635**	**10403**	**45308**	**9555**
Irrigated Acres		**19642**	**12958**	**83229**	**682**	**260**	**1831**	**16167**	**25789**	**9966**	**24615**	**11716**	**402**	**9728**	**27900**	**8426**

* Land use information was obtained from data provided by California Department of Water Resources, http://www.water.ca.gov/landwateruse/anaglwu.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 15 site subwatersheds as part of NM and MPM in 2012. Descriptions and irrigated acreages of site subwatersheds monitored in 2012 are alphabetically listed below. Irrigated acres are included in the site subwatershed descriptions; however, these acreages are subject to change due to updated GIS layers and subwatershed boundary modifications. Land use maps of each site subwatershed are included in Appendix VIII (Land Use Maps and 2012 Annual Site Photos).

- Bear Creek @ North Alpine Rd (19,642 irrigated acres) – This site subwatershed is located on the northern edge of the Coalition region; its boundary starts in the north eastern region of San Joaquin County and portions of Calaveras County in its upstream region. Land use in the site subwatershed primarily includes pasture, vineyards and deciduous orchards with some field crops, grains and hay.
- Duck Creek @ Hwy 4 (12,958 irrigated acres) – This site subwatershed 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 grains, hay and field crops. There are also relatively large amounts of deciduous nuts, truck farm/nursery, berry crops, irrigated pasture and vineyards in this site subwatershed.
- French Camp Slough @ Airport Way (83,229 irrigated acres) –French Camp Slough is formed by the confluence of Littlejohns Creek and Lone Tree Creek. 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 waterbodies drain agricultural land to the east of Manteca and Stockton and eventually flow through urban areas prior to their confluence and discharge to the San Joaquin River. This site includes all of the major types of agriculture present in the Coalition region including field crops, orchards, grains, hay, rice, tomatoes, irrigated pasture and vineyards.
- Grant Line Canal near Calpack Rd (682 irrigated acres) – This site subwatershed is located on the southwest section of Union Island. Grant Line Canal near Calpack Rd is adjacent to Grant Line Canal and drains fields immediately north and east. The crops grown are primarily alfalfa, field crops and grain.
- Grant Line @ Clifton Court Rd (260 irrigated acres) – This site subwatershed is located on the southwest section of Union Island. The site is west of the Grant line Canal near Calpack Rd site immediately south of Clifton Court and drains fields east and south. The crops are primarily alfalfa, field crops, grain and hay.
- Kellogg Creek along Hoffman Ln (1,831 irrigated acres) – This site subwatershed is located just southwest of Discovery Bay and drains field crops immediately upstream. The headwaters originate in the Black Hills north of Livermore. Kellogg Creek runs through Discovery Bay and drains into Indian Slough in the western Delta. The agricultural land is primarily deciduous orchards, truck crops and field crops.

- Littlejohns Creek @ Jack Tone Rd (16,167 irrigated acres) – This site subwatershed is upstream from the French Camp Slough @ Airport Way site. The crops grown in the site subwatershed are all of the major types of agriculture present in the Coalition region including field crops, orchards, grains, vineyards and irrigated pastureland.
- Lone Tree Creek @ Jack Tone Rd (25,789 irrigated acres) – This site subwatershed is upstream from the French Camp Slough @ Airport Way site. Lone Tree Creek drains a large portion of the southern SJCDWQC region and confluences downstream with Littlejohns Creek eventually French Camp Slough, where it flows through urban areas before emptying into the Delta. The main agricultural land use upstream consists of deciduous nuts, field crops, grains, irrigated pasture and dairies.
- Mokelumne River @ Bruella Rd (9,966 irrigated acres) – Upstream agriculture are vineyards that are primarily drip irrigated and orchards irrigated by microspray. There is also a small amount of field crops throughout the subwatershed. The Comanche Reservoir controls the amount of flow at this site which integrates the signal from a relatively large upstream area.
- Mormon Slough @ Jack Tone Rd (24,615 irrigated acres) – This site subwatershed is located in the eastern portion of San Joaquin County and extends upstream into Calaveras County. The primary crops consist of orchards (mostly walnut) with smaller amounts of truck farm/nursery, berry crops and vineyards.
- Roberts Island @ Whiskey Slough Pump (11,716 irrigated acres) – This site subwatershed drains the entirety of Roberts Island north of Hwy 4 by a pump located along McDonald Road on the western edge of the island. The primary agriculture upstream of the sample site includes asparagus, field crops, grains, hay (alfalfa) and pasture.
- Sand Creek @ Hwy 4 Bypass (402 irrigated acres) – This site subwatershed is located west of Brentwood at the intersection of Hwy 4 Bypass and Sand Creek. The Roddy Ranch Golf Club located off Empire Mile Rd in Horse Valley is adjacent to an upstream tributary of Sand Creek. The DWR map for land use indicated deciduous nuts, grains and hay; however, recent visits to the site subwatershed indicate the area consists of field crops, grains, hay and pasture. Areas to the east and west of Highway 4 Bypass have recently exploded in urban growth with new housing and shopping developments. Analysis using the USDA Cropland Data layer from 2009 (http://www.nass.usda.gov/research/Cropland/SARS1a.htm) indicate approximately 25 acres of planted corn, wheat, safflower, alfalfa and tomatoes and approximately 775 acres of pasture and grassland.
- Terminous Tract Drain @ Hwy 12 (9,728 irrigated acres) – This site subwatershed drains all of the acreage north and south of State Highway 12 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 Rd (27,900 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 eastern San Joaquin County and flows west eventually converging with Lone Tree Creek just west of Jack Tone Rd. Unlike most of the SJCDWQC area,

rice is a major crop in this site subwatershed. The rest of the agriculture consists of irrigated pasture, deciduous orchards, field crops, grains, and vineyards.

- Walthall Slough @ Woodward Ave (8,426 irrigated acres) – This site subwatershed is located just upstream of the residential area at the confluence of Walthall Slough and the San Joaquin River. The site subwatershed drains land to the south and to the east. Land use includes pasture, field crops, truck/nursery/berry crops, fruits/nuts, grains/hay, and dairy.

RAINFALL RECORDS

The SJCDWQC considers a rainfall 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; therefore if a storm is forecasted within a week before a scheduled sampling event or predicted within two days after the scheduled sampling event, the Coalition moves its sampling date to capture the storm. The Coalition sampled three storms in 2012: March 15, April 12 and December 3, 2012. Below is a description of all the storms that occurred during the 2012 monitoring year, including whether or not they were sampled (further described in the Monitoring Results and Sample Details section of this report).

Daily rainfall records are provided for the two major cities in the Coalition region, Modesto and Stockton (Figure 9, January 2012 – March 2012, Figure 10, April 2012 – June 2012 and Figure 11, October 2012 – December 2012).

January through March 2012

One storm event meeting the trigger limit was monitored from January through March 2012.

The first substantial storm system of 2012 lasted two days, January 20 through January 24, 2012, resulting in 0.89 inches of precipitation in Stockton and 0.66 inches in Modesto (Figure 9). This was the first storm in 2012 and the only rain in January. This storm was not sampled because Coalition sampling had already occurred on January 17, 2012 before this storm materialized.

The next small storm system occurred from February 7 through February 8, 2012 where Stockton reported 0.03 inches of precipitation and Modesto measured 0.17 inches (Figure 9). This storm was not predicted to produce enough precipitation to meet the trigger limit of 0.50 inches within a 24 hour period and therefore no changes were made to the sampling schedule. Another storm brought precipitation the day before sampling on February 13, 2012, but the precipitation totals did not meet the trigger limit, Stockton reported 0.42 inches and Modesto reported 0.21 inches. Sampling was conducted on February 14, 2012. The last storm in the month of February began on February 29, 2012, and continued into the next month never meeting the trigger limit (Figure 9).

March was a wet month with nine days of measurable precipitation. A sizable storm occurred from March 13 through March 18, 2012 resulting in 1.00 inches of rainfall in Stockton and 1.96 inches in Modesto and prompted the Coalition to reschedule sampling for March 15, 2012 in order to capture the storm runoff from the event (Figure 9). Several more small storms occurred in March, none of which resulted in enough precipitation to reach the trigger limit (Figure 9).

April through June 2012

One storm event meeting the trigger limit was monitored from April through June 2012.

In April a storm was predicted to bring enough precipitation to the Coalition area, a couple days after sampling was scheduled. The storm was monitored and sampling was postponed, April 11, 2012 Stockton reported 0.59 inches of precipitations and 0.80 inches in Modesto (Figure 10). Since the rainfall trigger limit was met in both cites on April 11, 2012, storm sampling took place on April 12, 2012. Rainfall continued throughout the day during the sampling event; Stockton received 0.22 inches of precipitation and 0.26 inches of rainfall occurred in Modesto. Rainfall on April 13, 2012 was recorded at 0.67 inches in Stockton and 0.60 inches in Modesto (Figure 10).

May was a dry month with only two days of precipitation; May 25, 2012 had the highest recorded precipitation of 0.15 inches in Modesto and 0.0 in Stockton (Figure 10).

June had three days of measureable precipitation of 0.05 inches or less, these systems were isolated and resulted in very little rainfall in either city (Figure 10).

July through September 2012

No storm events meeting the trigger limit were monitored July through September 2012.

The San Joaquin area had a typical Mediterranean climate in July through September with hot and dry weather and no precipitation. No graph is included for July through September due to the lack of measurable precipitation.

October through December 2012

One storm event meeting the trigger limit was monitored from October through December 2012.

The month of October only had six days with measureable precipitation spread out over two storm systems. The first storm produced 0.02 inches of precipitation and the second storm produced 0.25 inches of precipitation in Stockton over four days and 0.10 inches in Modesto over two days (Figure 11).

November received a total of nine days of measureable precipitation throughout the month, mostly small systems that amounted to less than a quarter of an inch of rainfall in 24 hours. During the end of November a large storm was predicted and on November 30, 2012 it deposited 1.39 inches of precipitation in Stockton and 0.8 inches in Modesto (Figure 11). With this storm system on Friday and another being predicted during the weekend, the laboratories were contacted and arrangements were made for storm sample collection in December.

December began with a storm system which continued from the end of November with 1.23 inches of precipitation in Stockton and 0.8 inches in Modesto on December 2, 2012. With such high amounts of precipitation, the scheduled sampling event was moved to capture the large storm event. The third storm sampling event occurred on December 3, 2012 as the last monitoring event of 2012 (Figure 11). December had ten more days of precipitation and the trigger limit was met two more times, once on December 5, 2012 when Stockton reported 0.59 inches of precipitation and 0.47 inches in Modesto (Figure 11). Since this was only 2 days after sampling the third storm sampling event, no additional monitoring was conducted. The second storm to meet the trigger limit lasted three days starting on December 21, 2012. Rainfall totals for Stockton during this time were 1.34 inches and 1.12 inches for Modesto. However, the Coalition does not have the resources to monitor twice in one month and the first flush runoff had already occurred during the storm event captured in early December (Figure 11).

Figure 9. Precipitation history for Stockton and Modesto, January through March 2012.

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

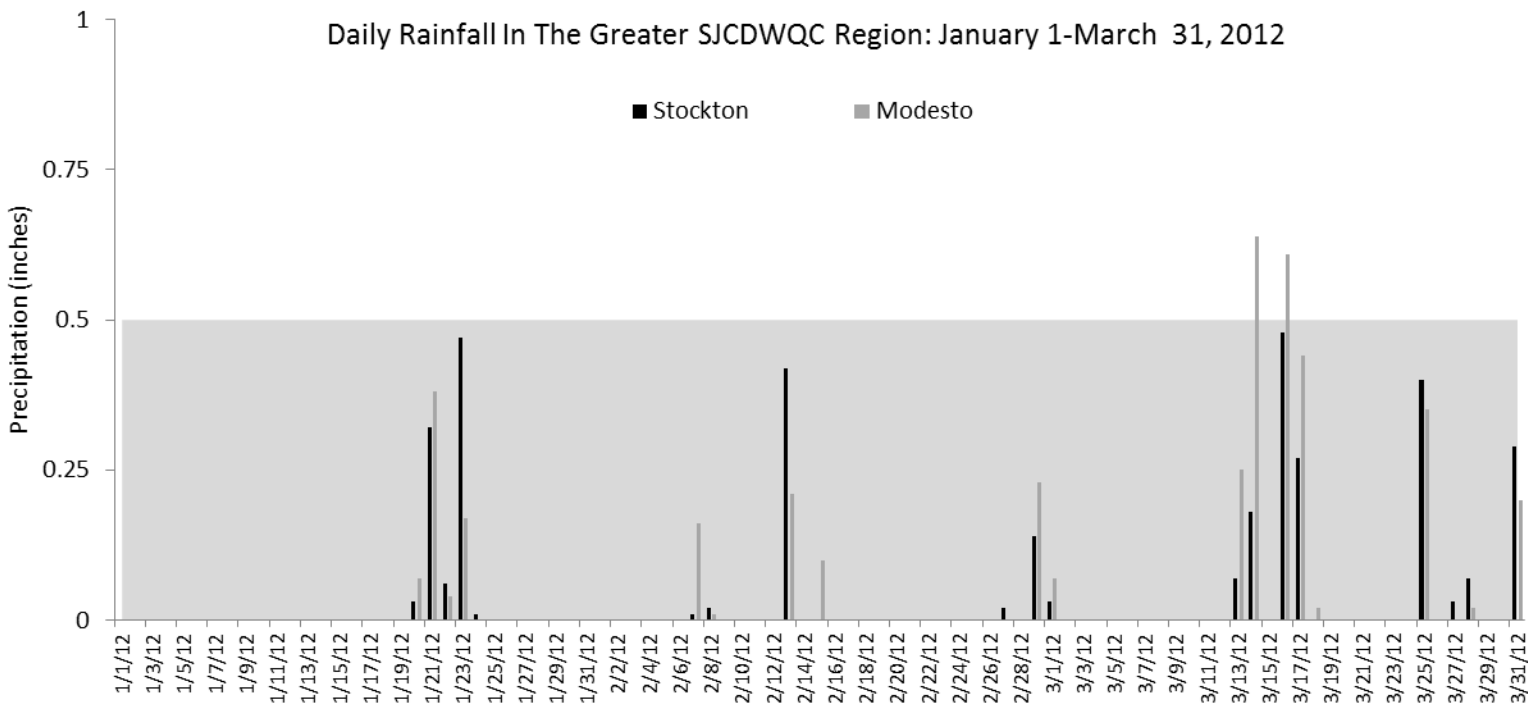


Figure 10. Precipitation history for Stockton and Modesto, April through June 2012.

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

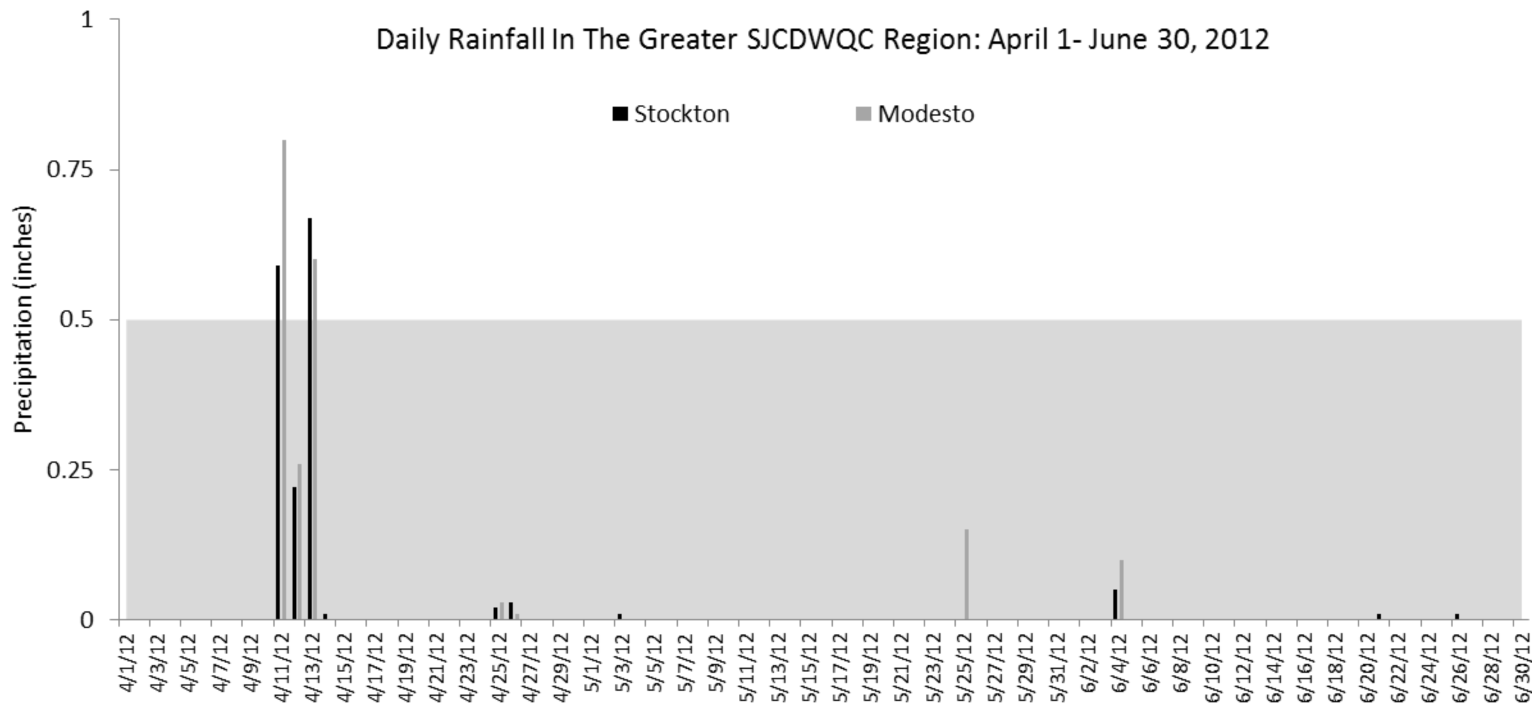
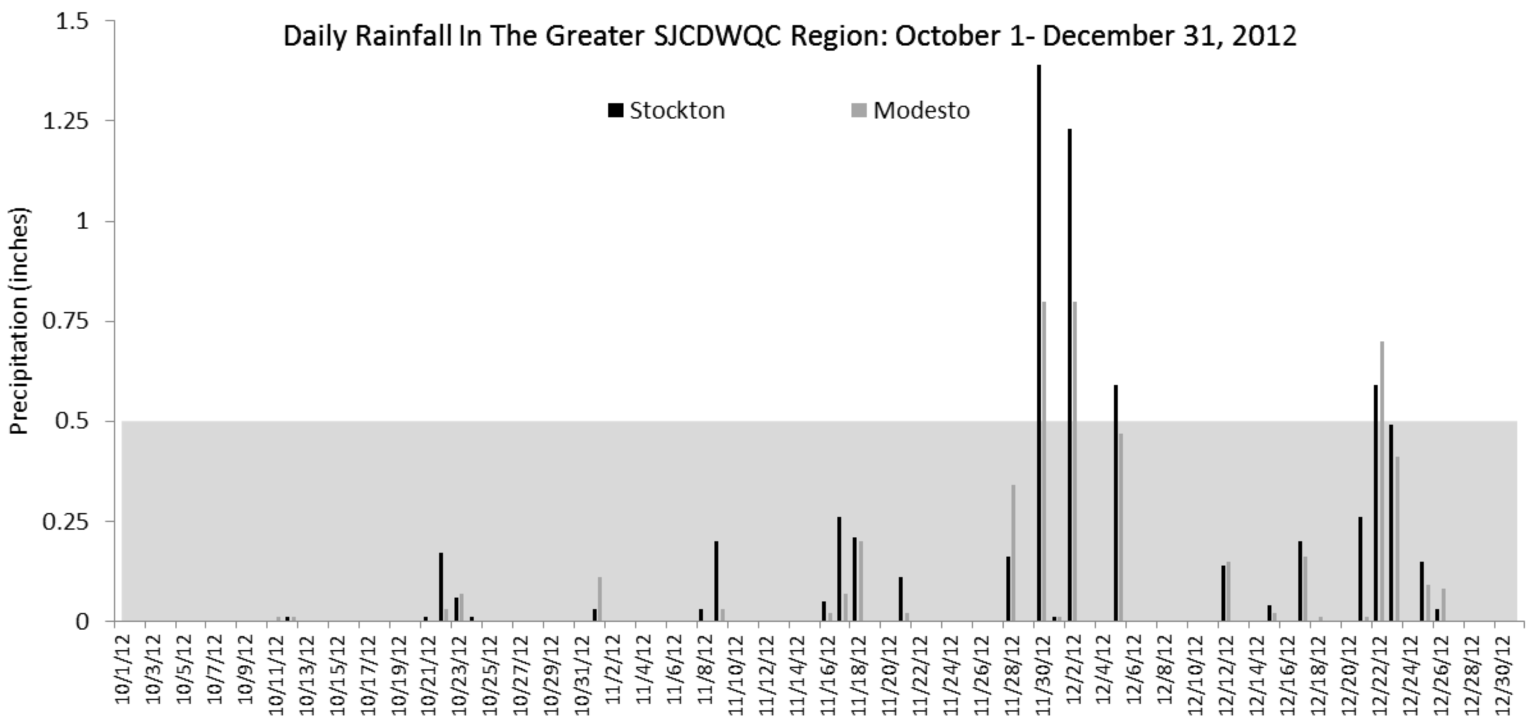


Figure 11. Precipitation history for Stockton and Modesto, October through December 2012.

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



MONITORING RESULTS AND SAMPLE DETAILS

Monitoring occurred at sites in the SJCDWQC from January through December 2012 (Table 12). Original Chain of Custody (COC) forms associated with samples collected for analysis 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. There was one instance of sample failure during SJCDWQC 2012 monitoring; toxicity samples collected during November 6, 2012 were mistakenly discarded by laboratory staff and were recollected on November 7, 2012 as soon as the laboratory notified the Coalition of the error.

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/ft^3 X Concentration (mg/L X 1000 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. Instantaneous load calculation for Total Maximum Daily Load (TMDL) compliance will be included in the MPUR to be submitted on April 1, 2013.

Complete monitoring results from 2012 are located in Appendix II and III. The results include field parameters, organics (pesticides), inorganic constituents including metals and *E. coli*, toxicity (water and sediment), sediment chemistry, and loads for any detectable analytes with corresponding site flow. Monitoring data include results from samples taken for NM, MPM and Sediment Monitoring. Each sampling location, sampling date, sampling time and type of monitoring is listed in Table 12 and all field data sheets from sampling events can be found in Appendix IX. All laboratory reports including electronic Level III data packages for 2012 are submitted with this report.

The Coalition followed sample collection procedures as outlined in the Monitoring and Reporting Program (MRP) Order No R5-2008-005 (Attachment C, Page 17). Sampling occurred for both sediment and water under both no flow and low flow conditions. If a site had no flow, discharge was recorded as zero. If a waterbody had "puddle like conditions" the entire sample was grouped 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 waterbody. During 2012, there were no dry sites and two sites were sampled as non-contiguous waterbodies.

During 2012, the following sites were sampled as non-contiguous waterbodies:

- Duck Creek @ Hwy 4
    - 2/14/2012
    - 3/15/2012
- French Camp Slough @ Airport Way
    - 11/6/2012

Table 12. Sample details for January through December 2012 (sorted by station name, sample date and monitoring event).
Season/Group codes are explained at the bottom of the table.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Bear Creek @ North Alpine Rd	531BCANAR	MPM	Irrigation1, Management Plan Monitoring	05/16/12	8:50	None	May Management Plan Monitoring for malathion. Discharge recorded as zero due to no measurable flow.
Bear Creek @ North Alpine Rd	531BCANAR	MPM	Irrigation5, Management Plan Monitoring	09/18/12	8:50	None	September Management Plan Monitoring for chlorpyrifos and malathion. Discharge recorded as zero due to no measurable flow.
Bear Creek @ North Alpine Rd	531BCANAR	MPM	Fall1, Management Plan Monitoring	10/16/12	8:40	None	October Management Plan Monitoring for chlorpyrifos. Discharge recorded as zero due to no measurable flow.
Duck Creek @ Hwy 4	531XDCAHF	NM	Winter1	01/17/12	9:40	None	Discharge recorded as zero due to no measurable flow.
Duck Creek @ Hwy 4	531XDCAHF	MPM, NM	Management Plan Monitoring, Non-contiguous, Winter2	02/14/12	10:10	None	February Management Plan Monitoring for diazinon and *Selenastrum* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Duck Creek @ Hwy 4	531XDCAHF	NM, Sediment	Non-contiguous, Storm1	03/15/12	13:00	None	Pesticides analyzed for in toxic sediment only. Non-contiguous waterbody. Discharge recorded as zero due to non-contiguous waterbody.
Duck Creek @ Hwy 4	531XDCAHF	NM, MPM	Management Plan Monitoring, Non-contiguous, Storm2	04/12/12	11:00	None	April Management Plan Monitoring for chlorpyrifos and *Ceriodaphnia* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Duck Creek @ Hwy 4	531XDCAHF	NM, MPM	Irrigation1, Management Plan Monitoring	05/16/12	10:30	None	May Management Plan Monitoring for chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	NM, MPM	Irrigation2, Management Plan Monitoring	06/19/12	9:30	None	June Management Plan Monitoring for chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	NM, MPM	Irrigation3, Management Plan Monitoring	07/17/12	10:00	None	July Management Plan Monitoring for chlorpyrifos and *Ceriodaphnia* toxicity. Too deep to measure discharge.
Duck Creek @ Hwy 4	531XDCAHF	NM, MPM	Irrigation4, Management Plan Monitoring	08/21/12	10:00	None	August Management Plan Monitoring for chlorpyrifos.
Duck Creek @ Hwy 4	531XDCAHF	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/18/12	11:00	None	September Management Plan Monitoring for chlorpyrifos and *Ceriodaphnia* toxicity.
Duck Creek @ Hwy 4	531XDCAHF	NM	Fall1	10/16/12	10:10	None	Discharge recorded as zero due to no measurable flow.
Duck Creek @ Hwy 4	531XDCAHF	NM	Fall2	11/06/12	10:00	None	Discharge recorded as zero due to no measurable flow.
Duck Creek @ Hwy 4	531XDCAHF	NM	Fall2	11/07/12	10:40	None	Toxicity resample collected due to lab error on 11/6/12. Discharge recorded as zero due to no measurable flow.
Duck Creek @ Hwy 4	531XDCAHF	NM	Storm3	12/03/12	9:20	None	Too deep to measure discharge.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Management Plan Monitoring, Winter1	01/17/12	13:10	None	January Management Plan Monitoring for diazinon and diuron.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Management Plan Monitoring, Winter2	02/14/12	13:10	None	February Management Plan Monitoring for copper, chlorpyrifos, diuron, diazinon, and *Ceriodaphnia* and *Selenastrum* toxicity.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
French Camp Slough @ Airport Way	531SJC504	MPM, NM, Sediment	Management Plan Monitoring, Storm1	03/15/12	17:20	None	March Management Plan Monitoring for *Ceriodaphnia* toxicity and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only.
French Camp Slough @ Airport Way	531SJC504	NM, MPM	Management Plan Monitoring, Storm2	04/12/12	12:50	None	April Management Plan Monitoring for chlorpyrifos and *Selenastrum* toxicity.
French Camp Slough @ Airport Way	531SJC504	NM, MPM	Irrigation1, Management Plan Monitoring	05/16/12	14:00	None	May Management Plan Monitoring for chlorpyrifos, copper, and lead.
French Camp Slough @ Airport Way	531SJC504	NM, MPM	Irrigation2, Management Plan Monitoring	06/19/12	12:00	None	June Management Plan Monitoring for copper and lead.
French Camp Slough @ Airport Way	531SJC504	NM, MPM	Irrigation3, Management Plan Monitoring	07/17/12	13:30	None	July Management Plan Monitoring for copper and chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	NM, MPM	Irrigation4, Management Plan Monitoring	08/21/12	14:00	None	August Management Plan Monitoring for copper and chlorpyrifos. Pump running downstream.
French Camp Slough @ Airport Way	531SJC504	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/18/12	14:40	None	September Management Plan Monitoring for chlorpyrifos and *Hyalella* toxicity.
French Camp Slough @ Airport Way	531SJC504	NM, MPM	Fall1, Management Plan Monitoring	10/16/12	11:30	None	October Management Plan Monitoring for chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	NM	Fall2, Non-contiguous	11/06/12	11:00	None	Discharge recorded as zero due to non-contiguous waterbody.
French Camp Slough @ Airport Way	531SJC504	NM	Storm3	12/03/12	14:50	None	Too deep to measure discharge.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Management Plan Monitoring, Winter1	01/17/12	10:30	None	January Management Plan Monitoring for chlorpyrifos and *Selenastrum* toxicity. Discharge recorded as zero due to no measurable flow.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Management Plan Monitoring, Winter2	02/14/12	9:40	None	February Management Plan Monitoring for chlorpyrifos. Discharge recorded as zero due to no measurable flow.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM, Sediment	Management Plan Monitoring, Storm1	03/15/12	10:30	None	March Management Plan Monitoring for chlorpyrifos and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge recorded as zero due to no measurable flow.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation1, Management Plan Monitoring	05/16/12	10:40	None	May Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation5, Management Plan Monitoring	09/18/12	11:30	None	September Management Plan Monitoring for chlorpyrifos and *Hyalella* toxicity. Pesticides analyzed in toxic sediment only. Discharge recorded as zero due to no measurable flow.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Management Plan Monitoring, Winter1	01/17/12	11:10	None	January Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Management Plan Monitoring, Winter2	02/14/12	10:10	None	February Management Plan Monitoring for *Selenastrum*. Discharge not measured due to toxicity monitoring only.

STATION NAME	STATION CODE	MONITORING EVENT	SEASON/GROUP	SAMPLE DATE	SAMPLE TIME	FAILURE REASON	SAMPLE COMMENTS
Grant Line Canal near Calpack Rd	544XGLCCR	MPM, Sediment	Management Plan Monitoring, Storm1	03/15/12	11:30	None	March Management Plan Monitoring for chlorpyrifos, *Ceriodaphnia* toxicity and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Pump station not running; discharge recorded as zero.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Management Plan Monitoring, Storm2	04/12/12	10:50	None	April Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation1, Management Plan Monitoring	05/16/12	11:10	None	May Management Plan Monitoring for *Ceriodaphnia* and *Selenastrum* toxicity and chlorpyrifos. Pump station not running; discharge recorded as zero.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation3, Management Plan Monitoring	07/17/12	14:10	None	July Management Plan Monitoring for *Selenastrum* toxicity and chlorpyrifos.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation4, Management Plan Monitoring	08/21/12	11:10	None	August Management Plan Monitoring for chlorpyrifos *Ceriodaphnia* toxicity. Pump station not running; discharge recorded as zero.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation5, Management Plan Monitoring	09/18/12	12:00	None	September Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed in toxic sediment only. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Management Plan Monitoring, Winter2	02/14/12	8:50	None	February Management Plan Monitoring for copper, chlorpyrifos, and *Ceriodaphnia* toxicity. Discharge recorded as zero due to no measurable flow.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM, Sediment	Management Plan Monitoring, Storm1	03/15/12	9:10	None	March Management Plan Monitoring for *Ceriodaphnia* toxicity and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Management Plan Monitoring, Storm2	04/12/12	9:50	None	April Management Plan Monitoring for *Ceriodaphnia* and *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Irrigation1, Management Plan Monitoring	05/16/12	9:50	None	May Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Irrigation3, Management Plan Monitoring	07/17/12	9:50	None	July Management Plan Monitoring for copper.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Irrigation4, Management Plan Monitoring	08/21/12	10:10	None	August Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Irrigation5, Management Plan Monitoring	09/18/12	10:30	None	September Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed in toxic sediment only. Discharge not measured due to toxicity monitoring only.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Management Plan Monitoring, Winter2	02/14/12	12:20	None	February Management Plan Monitoring for copper, chlorpyrifos, and diazinon. Discharge recorded as zero due to no measurable flow.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Management Plan Monitoring, Storm1	03/15/12	14:50	None	March Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Management Plan Monitoring, Storm2	04/12/12	12:50	None	April Management Plan Monitoring for chlorpyrifos and *Selenastrum* toxicity. Discharge recorded as zero due to no measurable flow.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation1, Management Plan Monitoring	05/16/12	12:30	None	May Management Plan Monitoring for copper. Discharge recorded as zero due to no measurable flow.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation2, Management Plan Monitoring	06/19/12	11:10	None	June Management Plan Monitoring for copper and chlorpyrifos. Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation3, Management Plan Monitoring	07/17/12	11:40	None	July Management Plan Monitoring for chlorpyrifos and *Selenastrum* toxicity. Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation4, Management Plan Monitoring	08/21/12	12:30	None	August Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation5, Management Plan Monitoring	09/18/12	14:00	None	September Management Plan Monitoring for copper. Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Fall2, Management Plan Monitoring	11/06/12	11:00	None	November Management Plan Monitoring for chlorpyrifos. Discharge recorded as zero due to no measurable flow.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Management Plan Monitoring, Winter1	01/17/12	12:30	None	January Management Plan Monitoring for copper, chlorpyrifos, diazinon, diuron, and *Selenastrum* toxicity.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Management Plan Monitoring, Winter2	02/14/12	13:20	None	February Management Plan Monitoring for copper, chlorpyrifos, diazinon, diuron, and *Selenastrum* toxicity.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM, Sediment	Management Plan Monitoring, Storm1	03/15/12	16:40	None	March Management Plan Monitoring for *Selenastrum* toxicity and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Management Plan Monitoring, Storm2	04/12/12	13:40	None	April Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation1, Management Plan Monitoring	05/16/12	13:30	None	May Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation3, Management Plan Monitoring	07/17/12	12:40	None	July Management Plan Monitoring for chlorpyrifos. Pesticide application directly upwind of sample location (north).
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation4, Management Plan Monitoring	08/21/12	13:30	None	August Management Plan Monitoring for chlorpyrifos.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter1	01/17/12	8:20	None	Too deep to take discharge.
Mokelumne River @ Bruella Rd	531XMRABR	MPM, NM	Management Plan Monitoring, Winter2	02/14/12	8:00	None	February Management Plan Monitoring for *Ceriodaphnia* toxicity. Too deep to take discharge.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Mokelumne River @ Bruella Rd	531XMRABR	MPM, NM	Management Plan Monitoring, Storm1	03/15/12	8:00	None	March Management Plan Monitoring *Selenastrum* toxicity and *Ceriodaphnia* toxicity. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM, MPM	Management Plan Monitoring, Storm2	04/12/12	8:30	None	April Management Plan Monitoring *Selenastrum* toxicity. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM, MPM	Irrigation1, Management Plan Monitoring	05/16/12	8:00	None	May Management Plan Monitoring *Selenastrum* toxicity. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM, MPM	Irrigation2, Management Plan Monitoring	06/19/12	8:00	None	June Management Plan Monitoring for *Ceriodaphnia* toxicity. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM, MPM	Irrigation3, Management Plan Monitoring	07/17/12	8:00	None	July Management Plan Monitoring for *Selenastrum* toxicity. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM, MPM	Irrigation4, Management Plan Monitoring	08/21/12	8:10	None	August Management Plan Monitoring for *Selenastrum* toxicity. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM, MPM	Irrigation5, Management Plan Monitoring	09/18/12	8:10	None	September Management Plan Monitoring for *Ceriodaphnia* toxicity. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall1	10/16/12	8:00	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall2	11/06/12	8:10	None	Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Storm3	12/03/12	8:00	None	Too deep to measure discharge.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Management Plan Monitoring, Storm2	04/12/12	9:40	None	April Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Irrigation1, Management Plan Monitoring	05/16/12	9:20	None	May Management Plan Monitoring for *Selenastrum* and *Ceriodaphnia* toxicity and chlorpyrifos. Discharge recorded as zero due to no measurable flow.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Irrigation3, Management Plan Monitoring	07/17/12	9:00	None	July Management Plan Monitoring for chlorpyrifos and *Selenastrum* toxicity. Discharge recorded as zero due to no measurable flow.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Irrigation4, Management Plan Monitoring	08/21/12	11:50	None	August Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Irrigation5, Management Plan Monitoring	09/18/12	9:20	None	September Management Plan Monitoring for chlorpyrifos and *Ceriodaphnia* toxicity. Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Management Plan Monitoring, Winter1	01/17/12	12:20	None	January Management Plan Monitoring for chlorpyrifos, diuron, and *Selenastrum* toxicity. Too deep to take discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Management Plan Monitoring, Winter2	02/14/12	11:00	None	February Management Plan Monitoring for chlorpyrifos. Too deep to take discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM, Sediment	Management Plan Monitoring, Storm1	03/15/12	10:50	None	March Management Plan Monitoring for *Ceriodaphnia* toxicity and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM, MPM	Management Plan Monitoring, Storm2	04/12/12	11:40	None	April Management Plan Monitoring for *Selenastrum* toxicity. Too deep to measure discharge.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM, MPM	Irrigation1, Management Plan Monitoring	05/16/12	12:10	None	May Management Plan Monitoring for *Selenastrum* toxicity. Discharge recorded as zero.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Irrigation2	06/19/12	10:00	None	Discharge recorded as zero.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM, MPM	Irrigation3, Management Plan Monitoring	07/17/12	11:20	None	July Management Plan Monitoring for diuron, *Ceriodaphnia* and *Selenastrum* toxicity. Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM, MPM	Irrigation4, Management Plan Monitoring	08/21/12	12:10	None	August Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/18/12	13:00	None	September Management Plan Monitoring for chlorpyrifos and *Hyalella* toxicity. Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Fall1	10/16/12	9:10	None	Discharge recorded as zero due to no measurable flow.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Fall2	11/06/12	9:10	None	Pump station not running; discharge recorded as zero.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Storm3	12/03/12	15:50	None	Too deep to measure discharge.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Management Plan Monitoring, Winter1	01/17/12	9:30	None	January Management Plan Monitoring for diazinon. Discharge recorded as zero due to no measurable flow.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM, Sediment	Management Plan Monitoring, Storm1	03/15/12	7:50	None	March Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge not measured due to toxicity monitoring only.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Management Plan Monitoring, Storm2	04/12/12	9:10	None	April Management Plan Monitoring for *Selenastrum* toxicity. Discharge not measured due to toxicity monitoring only.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation1, Management Plan Monitoring	05/16/12	9:10	None	May Management Plan Monitoring for chlorpyrifos, disulfoton, dieldrin, and *Ceriodaphnia* toxicity. Discharge recorded as zero due to no measurable flow.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation2, Management Plan Monitoring	06/19/12	8:50	None	June Management Plan Monitoring for chlorpyrifos, disulfoton, dieldrin, and *Ceriodaphnia* toxicity. Discharge recorded as zero due to no measurable flow.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation3, Management Plan Monitoring	07/17/12	9:10	None	July Management Plan Monitoring for diazinon and *Ceriodaphnia* toxicity. Discharge recorded as zero due to no measurable flow.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation4, Management Plan Monitoring	08/21/12	9:30	None	August Management Plan Monitoring for disulfoton, dieldrin and *Selenastrum* toxicity. Construction on right bank, upstream. Discharge recorded as zero due to no measurable flow.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation5, Management Plan Monitoring	09/18/12	9:50	None	September Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed in toxic sediment only. Discharge not measured due to toxicity monitoring only.
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM, NM	Management Plan Monitoring, Winter1	01/17/12	8:10	None	January Management Plan Monitoring for *Selenastrum* toxicity.
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM, NM	Management Plan Monitoring, Winter2	02/14/12	9:00	None	February Management Plan Monitoring for *Selenastrum* toxicity.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM, NM, Sediment	Management Plan Monitoring, Storm1	03/15/12	9:20	None	March Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM, MPM	Management Plan Monitoring, Storm2	04/12/12	8:00	None	April Management Plan Monitoring for *Selenastrum* toxicity.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM, MPM	Irrigation1	05/16/12	8:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM, MPM	Irrigation2	06/19/12	8:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM, MPM	Irrigation3	07/17/12	8:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM, MPM	Irrigation4, Management Plan Monitoring	08/21/12	8:10	None	August Management Plan Monitoring for chlorpyrifos.
Terminous Tract Drain @ Hwy 12	544XTTHWT	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/18/12	8:00	None	September Management Plan Monitoring for chlorpyrifos and *Hyalella* toxicity.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM, MPM	Fall1	10/16/12	8:00	None	
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall2	11/06/12	8:00	None	No visible flow while collecting samples went to culvert to measure discharge, very little flow at first but increased as we were taking measurements.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Storm3	12/03/12	16:40	None	Too deep to measure discharge.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Management Plan Monitoring, Winter1	01/17/12	11:50	None	January Management Plan Monitoring for chlorpyrifos, diuron, simazine, and *Ceriodaphnia* toxicity. Discharge recorded as zero due to no measurable flow.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Management Plan Monitoring, Winter2	02/14/12	12:50	None	February Management Plan Monitoring for chlorpyrifos, diuron, simazine, and *Ceriodaphnia* and *Selenastrum* toxicity.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM, Sediment	Management Plan Monitoring, Storm1	03/15/12	15:40	None	March Management Plan Monitoring for *Selenastrum* toxicity and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge not measured due to toxicity monitoring only.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Management Plan Monitoring, Storm2	04/12/12	13:10	None	April Management Plan Monitoring for copper.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation1, Management Plan Monitoring	05/16/12	13:00	None	May Management Plan Monitoring for copper, chlorpyrifos, and *Selenastrum* toxicity.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation2, Management Plan Monitoring	06/19/12	11:30	None	June Management Plan Monitoring for chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation3, Management Plan Monitoring	07/17/12	12:00	None	July Management Plan Monitoring for copper and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation4, Management Plan Monitoring	08/21/12	12:50	None	August Management Plan Monitoring for copper and chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation5, Management Plan Monitoring	09/18/12	13:00	None	September Management Plan Monitoring for copper, chlorpyrifos and *Hyalella* toxicity. Pesticides analyzed in toxic sediment only.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Fall2, Management Plan Monitoring	11/06/12	11:20	None	November Management Plan Monitoring for chlorpyrifos.

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	Management Plan Monitoring, Storm3	12/03/12	11:20	None	December Management Plan Monitoring for chlorpyrifos.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter1	01/17/12	13:40	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter2	02/14/12	12:00	None	
Walthall Slough @ Woodward Ave	544WSAWAV	MPM, NM, Sediment	Management Plan Monitoring, Storm1	03/15/12	17:40	None	March Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Storm2	04/12/12	13:40	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Irrigation1	05/16/12	13:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Irrigation2	06/19/12	11:10	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Irrigation3	07/17/12	12:30	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Irrigation4	08/21/12	13:10	None	
Walthall Slough @ Woodward Ave	544WSAWAV	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/18/12	14:20	None	September Management Plan Monitoring for chlorpyrifos and *Hyalella* toxicity.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Fall1, Management Plan Monitoring	10/16/12	10:20	None	October Management Plan Monitoring for chlorpyrifos.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Fall2	11/06/12	10:10	None	
Walthall Slough @ Woodward Ave	544WSAWAV	NM, MPM	Storm3	12/03/12	14:00	None	

DPR- Department of Pesticide Regulation
MPM-Management Plan Monitoring
NM-Normal Monitoring
YSI- Yellow Springs Instruments

SAMPLING AND ANALYTICAL METHODS

Sample collection criteria and field instruments are provided in Tables 13 and 14, respectively. Site specific discharge methods are included in Table 15. Analytical methods and reporting limits (RLs) are provided in Table 16.

All field sampling and analytical methods were performed as outlined in the Standard Operating Procedures (SOPs) provided in the QAPP amended on October 20, 2010 (Appendix I-XXXVII). Any deviations from these procedures are documented in the Precision, Accuracy and Completeness section of this report.

Table 13. Sampling procedures.

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 ≤6°C	7 Days
Total Suspended Solids	500 mL			7 Days
Turbidity	500 mL			48 Hours
Nutrients				
Soluble Orthophosphate[3]	500 mL	1x 2000 mL Polyethylene	Store at ≤6°C	48 Hours
Total Kjeldahl Nitrogen, Ammonia, Total Phosphorus, Nitrate-Nitrite as N	1000 mL	1x 1000 mL Polyethylene	Preserve to ≤pH 2 with H_2SO_4, store at ≤6°C	28 Days
Metals/Trace Elements				
Metals/Trace Elements, Hardness	500 mL	1x 500 mL Polyethylene	Filter as necessary; preserve to ≤pH 2 with HNO_3, store at ≤6°C	180 Days
Inorganics/Bacteria				
E. coli (pathogens)	100 mL	1x 100 mL Polyethylene	Preserved with $Na_2S_2O_3$, store at <8 °C	24 Hours[4]
Total Organic Carbon	120 mL	3x 40 mL Amber glass VOA with PTFE-lined cap	Preserve with HCl, store at ≤6°C	28 Days
Pesticides				
Carbamates	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Organochlorines	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Organophosphates	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Herbicides (general)	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Herbicides (paraquat)	1 L	1x 1 L brown Polyethylene	Store at ≤6°C; extract within 7 days	21 days
Herbicides (glyphosate)	80 mL	2x 40 mL Glass VOA	Store at ≤6°C; freeze (-20°C) within 2 weeks	6 Months
Water Column Toxicity				
Aquatic Toxicity	5 Gallons	5x 1 Gallon Amber Glass	Store at ≤6°C	36 Hours
Sediment				
Sediment Toxicity	2 L	2x 1 L Glass	Store at ≤6°C, do not freeze	14 Days
Sediment Grain Size[5]	230 mL	2x 8oz. Polyethylene	Store at ≤6°C, do not freeze	28 days
Sediment Total Organic Carbon[5]	230 mL	2x 8oz. Polyethylene	Store at ≤6°C (not frozen), analyze or freeze (-20C) within 28 days	28 days (not frozen) 12 Months (frozen)
Sediment Chemistry	750 mL	2x 8oz. Polyethylene	Store at ≤6°C (not frozen), extract within 14 days or freeze (-20C) within 48 hours	14 days (not frozen) 12 Months (frozen)

[1] Additional volume may be required for Quality Control (QC) analyses.
[2] Holding time is after initial preservation or extraction.
[3] Volume of water necessary to analyze the physical parameters and soluble orthophosphate is typically combined in one 2000 mL polyethylene bottle, which provides sufficient volume for re-analyses and lab spike duplicates.
[4] Samples for bacteria analyses should be set up as soon as possible.
[5] Subcontracted to PTS Laboratories.
PTFE- Polytetraflouroethylene (Teflon™)
VOA- Volatile Organic Analyte

Table 14. Field parameters and instruments used to collect measurements.

PARAMETER	INSTRUMENT
Dissolved Oxygen	YSI Model Professional Plus 556
Temperature	YSI Model Professional Plus 556
pH	YSI Model Professional Plus 556
Specific Conductance	YSI Model Professional Plus 556
Flow	Marsh-McBirney Flow Mate 2000

YSI- Yellow Springs Instruments

Table 15. Site specific discharge methods in 2012.

SITE	DISCHARGE METHOD[1]	METER/ GAUGE
Bear Creek @ North Alpine Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Duck Creek @ Highway 4	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
Kellogg Creek along Hoffman Ln	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
Mormon Slough @ Jack Tone Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Roberts Island @ Whiskey Slough Pump	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Sand Creek @ Hwy 4 Bypass	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

[1]USGS R2 Cross Steamflow Method is only conducted when the stream is safe to wade across. Observed flow is recorded for every site.

Table 16. 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 mg/L	SM 2540 C
Total Suspended Solids	Fresh Water	Caltest	3 mg/L	1 mg/L	SM 2540 D
Inorganics					
Hardness	Fresh Water	Caltest	5 mg/L	1.7 mg/L	SM2340C
Total Organic Carbon	Fresh Water	Caltest	0.5 mg/L	0.30 mg/L	SM 5310 B
Bacteria					
E. coli	Fresh Water	Caltest	1 MPN/ 100 mL	1 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	Fresh Water	APPL Inc	0.01 µg/L	0.003 µg/L	EPA 8081A
DDE	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
DDT	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Dicofol	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8081A
Dieldrin	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endrin	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Methoxychlor	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Group A Pesticides[1]					
Aldrin	Fresh Water	APPL Inc	0.01 µg/L	0.009 µg/L	EPA 8081A
Chlordane	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Heptachlor	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Heptachlor Epoxide	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Hexachlorocyclohexane (alpha-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (beta-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Hexachlorocyclohexane (gamma-BHC; Lindane)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (delta-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan I	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan II	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
Toxaphene	Fresh Water	APPL Inc	0.5 µg/L	0.380 µg/L	EPA 8081A
Organophosphates					
Azinphos-methyl	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	EPA 8141A
Chlorpyrifos	Fresh Water	APPL Inc	0.015 µg/L	0.0026 µg/L	EPA 8141A
Diazinon	Fresh Water	APPL Inc	0.02 µg/L	0.004 µg/L	EPA 8141A

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
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	Fresh Water	APPL Inc	0.2 µg/L	0.1 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	0.08 µg/L	EPA 8141A
Cyanazine	Fresh Water	APPL Inc	0.5 µg/L	0.12 µg/L	EPA 8141A
Diuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Glyphosate	Fresh Water	NCL Ltd	5 µg/L	1.7 µg/L	EPA 547M
Linuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Paraquat	Fresh Water	NCL Ltd	0.4 µg/L	0.19 µg/L	EPA 549.2M
Simazine	Fresh Water	APPL Inc	0.5 µg/L	0.11 µg/L	EPA 8141A
Trifluralin	Fresh Water	APPL Inc	0.05 µg/L	0.036 µg/L	EPA 8141A
Metals					
Arsenic	Fresh Water	Caltest	0.5 µg/L	0.02 µg/L	EPA 200.8 (ICPMS Collision Cell)
Boron	Fresh Water	Caltest	10 µg/L	0.7 µg/L	EPA 200.8 (ICPMS Collision Cell)
Cadmium	Fresh Water	Caltest	0.1 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
Copper	Fresh Water	Caltest	0.5 µg/L	0.07 µg/L	EPA 200.8 (ICPMS Collision Cell)
Lead	Fresh Water	Caltest	0.25 µg/L	0.03 µg/L	EPA 200.8 (ICPMS Collision Cell)
Molybdenum	Fresh Water	Caltest	0.25 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nickel	Fresh Water	Caltest	0.5 µg/L	0.04 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	0.7 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nutrients					
Total Kjeldahl Nitrogen	Fresh Water	Caltest	0.1mg/L	0.07 mg/L	SM 4500-NH3 C v20
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	SM 4500-NH3 C v20
Total Phosphorus	Fresh Water	Caltest	0.01 mg/L	0.007 mg/L	SM 4500-P E
Soluble Orthophosphate	Fresh Water	Caltest	0.01 mg/L	0.006 mg/L	SM 4500-P E
Sediment					
Bifenthrin	Sediment	Caltest	0.33 ng/g dw	0.1 ng/g dw	GCIS/NCI/SIM
Cyfluthrin	Sediment	Caltest	0.33 ng/g dw	0.11 ng/g dw	GCIS/NCI/SIM
Cypermethrin	Sediment	Caltest	0.33 ng/g dw	0.1 ng/g dw	GCIS/NCI/SIM
Deltamethrin: Tralomethrin	Sediment	Caltest	0.33 ng/g dw	0.12 ng/g dw	GCIS/NCI/SIM
Esfenvalerate	Sediment	Caltest	0.33 ng/g dw	0.13 ng/g dw	GCIS/NCI/SIM
Lambda-Cyhalothrin	Sediment	Caltest	0.33 ng/g dw	0.06 ng/g dw	GCIS/NCI/SIM
Permethrin	Sediment	Caltest	0.33 ng/g dw	0.11 ng/g dw	GCIS/NCI/SIM
Fenpropathrin	Sediment	Caltest	0.33 ng/g dw	0.07 ng/g dw	GCIS/NCI/SIM
Chlorpyrifos	Sediment	Caltest	0.33 ng/g dw	0.12 ng/g dw	GCIS/NCI/SIM
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 D422, ASTM D4464M

cfs- Cubic Feet per Second
MDL- Minimum Detection Limit
MPN- Most Probable Number
NA- Not applicable
RL- Reporting Limit
[1]Monitored at a single location during Assessment Monitoring years as needed to characterize 303d listed waterbodies.
[2]Subcontracted to PTS Laboratories.

PRECISION, ACCURACY AND COMPLETENESS

An assessment of precision, accuracy, and completeness is tabulated in Tables 17-31. All data are acceptable and useable. In a few instances, some data quality objectives were not met, but this does not affect the usability of data.

All results are tabulated in the Monitoring Results and Lab and Field Quality Control (QC) Results sections of this report (Appendix II and III). Each result is flagged if it does not meet a data quality objective (acceptability criteria) using Surface Water Ambient Monitoring Program (SWAMP) codes. Results are found in the SWAMP comparable database managed by the Coalition. The Coalition works with the Central Valley Regional Data Center (CV RDC) to ensure that all data remain SWAMP comparable and that all data are suitable to be uploaded to the California Environmental Data Exchange Network (CEDEN). A copy of the database is submitted to the Regional Board with the hardcopy of this report. The database includes all data from 2012 sampling.

For some chemical constituents the concentration in the environmental sample may exceed the amount that the detector can detect accurately and therefore the sample requires 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 is increased by multiplying the reporting limit 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 reporting limits (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.

COMPLETENESS

Completeness is assessed on three levels: field and transport completeness, analytical completeness and batch completeness. Field and transport completeness assesses how many of the scheduled samples were collected and sent for analysis. Completeness may be less than 100% for field and transport for reasons such as bottle breakage during transportation or inability to access a site. Dry sites are considered "collected" and do not count against completeness for field and transport. Analytical completeness assesses the number of samples that arrived at a laboratory and were analyzed. Completeness may be less than 100% for analytical completeness for various reasons including bottle breakage while the sample was stored at the laboratory or laboratory error resulting in an analysis not being performed. Batch completeness assesses whether chemistry and toxicity batches have all of the required laboratory quality control. For batch completeness, the number of batches with complete laboratory quality control is compared to the overall number of batches. Table 17 includes an evaluation of completeness for the various levels.

Field and Transport Completeness

Field and transport completeness is calculated by dividing the number of samples collected by the number of samples scheduled to be collected for each analyte. All sites and constituents were monitored as scheduled in 2012 (100% completeness).

The constituents sampled from January through December 2012 are listed by site in Tables 5 and 6. Table 17 includes the specific analyte, the expected number of environmental samples scheduled to be collected, the number of total samples collected (including environmental and field quality control samples), a breakdown of the number and percentages of samples that were field blanks, field duplicates, equipment blanks, travel blanks and an overall assessment of completeness. Overall, field blanks, field duplicates, equipment blanks and travel blanks comprised more than 5% of samples collected for each analyte and field quality control samples were collected every event (Table 17).

Field parameter measurements, including DO, discharge, pH, SC and temperature were taken at each site for all sampling events. Dissolved oxygen, pH, SC and temperature were each measured 136 times compared to the schedule 135 times (100.7% completeness for each field parameter). In November, samples had to be recollected due to a transportation issue. This did not affect the completeness for those samples since they were recollected; however, since the field parameters were already collected once the resample resulted in an additional result for each field parameter. Discharge was measured at 64% of site visits and was not measured for one or more of the following reasons: 1) sediment and toxicity monitoring only event (load calculations are not possible and therefore discharge is not required 2) the water was too deep to safely measure or 3) the water was too shallow to measure discharge. Documentation of why discharge was not taken is included in the sample details table (Table 12).

Analytical Completeness

All samples collected (including field quality control) were preserved and analyzed, resulting in 100% analytical completeness (Table 17).

Batch Completeness

All chemistry batches were reviewed for Quality Assurance/Control (QA/QC) completeness. A complete batch must have a minimum of one laboratory blank (method blank), laboratory duplicate, laboratory control spike (LCS) and matrix spike (MS) with the exception of Turbidity, *E. coli*, Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) which do not require a MS. Batch completeness for all 2012 data is 99%. Two sediment grain size lab batches analyzed in March 2012 were missing laboratory duplicates due to laboratory miscommunication; based on other duplicate analysis run by the laboratory around the same time it has been determined that the missing duplicates does not affect the overall usability of the environmental results in those batches.

Batches are determined by the laboratory and for chemistry analysis generally do not include more than 20 samples (environmental and QC samples). Therefore, although the Coalition may collect extra sample volume for a matrix spike and matrix spike duplicate, the laboratory may not be able to use that sample for every batch associated with that event. For example, depending on other projects and other samples being analyzed, Coalition samples from an event may be split into two or more batches. However, the matrix spike water collected by the Coalition is only enough for analysis in one batch. A matrix spike associated with an environmental sample collected as part of another project, a non-project (NONPJ) matrix spike, can be used for laboratory quality assurance purposes. The use of NONPJ samples allows the Coalition to evaluate the accuracy and/or precision of the batches and ensures that the laboratory can achieve batch completeness. When a NONPJ matrix spike is used for either accuracy or precision, the batch is flagged accordingly. Matrix interference can be determined by both project and NONPJ samples.

All toxicity batches were reviewed for QA/QC completeness. A toxicity batch must include a control negative. Toxicity batch completeness was 100%.

HOLD TIME COMPLIANCE

Hold times for all chemistry water and sediment analyses were met; hold time compliance for all chemistry analysis was 100%.

All toxicity water and sediment tests met holding time requirements, with the exception of one *H. azteca* batch containing twelve samples (12 of 22; 54.5%, Table 28). The samples were analyzed 4 days outside of the 14 day hold time due to a miscommunication with the subcontracted laboratory. The sediment toxicity laboratory generally initiates toxicity testing within 28 days of sampling per EPA guidance in EPA 600/R-99/064. The EPA manual suggests a hold time of less than two weeks for samples with high concentrations of labile chemicals (e.g., ammonia, volatile organics). For samples with low to moderate toxicity, studies have found that it is best to wait two weeks before initiating sediment toxicity tests. This was found to reduce variability between samples that may have been due to indigenous predators in the sediment. Two of the 11 samples tested were toxic despite being run 4 days outside of the 14 day hold time requirement. Based on the number of days that the samples exceeded the hold time, EPA method recommendations and discussions with the toxicity laboratory, data analyzed 4 days outside of the 14 day hold time are considered usable. It has been clarified with the sediment toxicity laboratory that all future samples will be run within 14 day hold time and tests will be initiated as soon as possible. All sediment toxicity samples collected in September were analyzed within 14 days.

PRECISION AND ACCURACY

A review of the number of samples analyzed and the percentage of samples per analyte that meets acceptability criteria are listed in the tables following this section (Tables 17 through 31); data quality objectives are addressed as follows:

- Field and laboratory blank quality control sample evaluations (Tables 18,21, 30)

- Equipment and travel blank quality control sample evaluations (Table 19)
- Field precision met by analyzing field duplicates (Table 20)
- Laboratory accuracy met by analyzing LCS and MS percent recoveries (Tables 22,24)
- Laboratory precision met by analyzing LCS and MS and laboratory duplicates (Tables 23,25,26)
- Surrogate recoveries to evaluate LABQA (Table 27)
- Summary of holding time evaluations (Table 28)
- Laboratory and field precision met when analyzing sediment grain size (Table 31)

All analytes are grouped by type and listed alphabetically; all pesticides, metals and nutrients are grouped and discussed together. Batches are approved by evaluating all measures of precision and accuracy such that although a single quality control sample may be outside of acceptability criteria, the entire batch may be accepted due to the other quality control samples within that batch meeting acceptability criteria. Overall, precision and accuracy criteria were met for more than 90% of the samples for all criteria and all data are considered usable.

Chemistry

E. coli: Prior to August 2012, the laboratory performed the following quality control:

Per batch:

- sterility checks of laboratory blanks,
- positive/negative controls, and
- positive/positive controls

Per new media lot:

- negative/negative non-coliform controls

Since August 2012, the laboratory has been performing all controls and a laboratory blank with every batch. Level III data packages document this information and are submitted electronically with the quarterly data submittal and with the Annual Monitoring Report. One hundred percent of laboratory blanks met acceptability criteria. One hundred percent of field blanks collected had *E. coli* counts 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. One hundred percent of *E. coli* laboratory and field duplicates had R_{log} values below the criteria acceptance level. All *E. coli* data are accepted and usable.

Hardness: One hundred percent of hardness field blanks were below the reporting limit. One hundred percent of hardness field duplicates met acceptability criteria. All laboratory blanks and LCSs met laboratory QC criteria. Ninety-two percent of MS samples met the acceptability criteria (24 of 26) and

100% of MSDs met acceptability criteria for precision (RPD <u><</u>25). All hardness data are accepted and usable.

Inorganic sediment (grain size and Total Organic Carbon): Sediment grain size and TOC were analyzed for both sets of sediment samples collected during 2012 (March 15 and September 18).

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. 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).

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 from other percentages in the sample). 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

Both sets of sediment samples analyzed for grain size met 100% acceptability criteria for field and laboratory duplicates.

The criterion used in this report to assess precision for sediment total organic carbon is RPD ≤ 20% and certified reference materials (CRM) samples were analyzed in each batch to assess accuracy. One hundred percent of the sediment TOC lab blank samples had results less than the RL. One hundred percent of the field duplicate and lab duplicate samples were within acceptability criteria (RPD ≤20%). One hundred percent of the TOC CRMs were within acceptability criteria (PR 75-125). The laboratory CRM acceptability criteria varies in each of the PTS reports and therefore the data are being evaluated based on the ILRP MRP acceptability requirement of 75-125%. Sediment inorganic samples (grain size and TOC analysis) are accepted and useable.

Metals (dissolved): One hundred percent of dissolved metal field blanks met acceptability criteria. Equipment blanks were analyzed with all dissolved metal batches and 100% met acceptability criteria. Laboratory blanks were run with each metals batch and 100% met acceptability criteria.

Overall dissolved metal field duplicate samples met acceptability criteria (RPD ≤25%) for 100% of the samples analyzed except for: dissolved lead (9 of 12, 75%) and dissolved zinc (9 of 12, 75%).

Five of the six dissolved metal environmental sample and associated field duplicate pairs with RPDs greater than 25 had results below the RL making it difficult to calculate an accurate RPD. Of the samples not meeting the field duplicate criteria, one pair of samples analyzed for dissolved zinc had a concentration above the RL. It is possible that metals present in the sediment could have been mobilized in the water column due to the increased flow resulting in slight differences between dissolved metals for these samples. The same sample pair was analyzed for total zinc and the RPD was less than 25. Overall, field duplicate precision for all dissolved metals was 96%. One hundred percent of laboratory spiked samples for dissolved metals (LCS, MS and MS duplicates) recovered within acceptable limits. All dissolved metal results are accepted and useable.

Metals (total): One hundred percent of field and travel blanks for total metals met acceptability criteria. Laboratory blanks were run with each total metals batch and 100% met acceptability criteria. At least 90% of the field duplicates analyzed for total metals met acceptability criteria (FD RPD ≤ 25%).

The LCSs and Laboratory Control Spike Duplicates (LCSDs) were within acceptable recovery limits for 100% of samples run. The MS recoveries were within control limits for 98% of all total metals samples analyzed. Matrix spike recoveries were within acceptability criteria for more than 90% of the total metal samples. Ninety-three percent of all total nickel and total zinc MS/MSD samples were within control limits (PR 70-130). All total metal MS/MSD pairs met the acceptability criteria for precision (RPD $\leq$25%). All total metal results are accepted and useable.

Nutrients: Ammonia as N field blanks met 100% acceptability criteria. Seventy-five percent of field duplicates had RPDs $\leq$25% (9 of 12). Both the environmental sample and associated field duplicate pairs had results below the reporting limit making it difficult to calculate an accurate RPD. One hundred percent of laboratory blanks, LCS and LCSDs met acceptability criteria. Matrix spike and MSD samples were run with each batch and 100% met acceptability criteria for both precision and accuracy.

Unionized ammonia values were determined by calculating 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.

Nitrate + Nitrite as N field blanks met 100% acceptability criteria. Ninety-one percent of field duplicates had RPDs below 25% (11 of 12). Laboratory blanks and LCS samples were run with each batch and 100%

of the samples met acceptance criteria. Ninety-six percent of MS were within the acceptability criteria (23 of 24). One hundred percent of MSDs met the acceptability requirement for precision.

Nitrogen, Total Kjeldahl (TKN) field blanks had concentrations that were < RL or < 1/5 of the environmental sample and were 100% acceptable. Field duplicates met the acceptance criteria (RPDs ≤ 25%) in 91.7% of the samples analyzed (11 of 12). Laboratory blanks were run with every batch and 100% were less than the RL. Laboratory control spikes and LCSDs were within acceptance criteria for all batches. Matrix spikes were performed in each TKN batch with 88.5% meeting acceptability requirements (23 of 26). One pair of TKN MS and MSD samples collected in February 2012 recovered below the control limits (PR 90-110) due to possible matrix interference and one TKN MS sample collected in June 2012 recovered below the control limits; in both batches, the LCSs recovered within acceptable limits. In all cases the batch QC data was accepted based on LCS and MSD and results. One hundred percent of MSDs met the requirements for precision.

Orthophosphate as P field blanks and field duplicates collected met 100% acceptance criteria. Laboratory blanks were run with every batch and 100% were less than the RL. The LCSs were within acceptability criteria for all batches. The MS samples were performed in each batch with 100% meeting acceptability criteria. One hundred percent of MSD samples had RPDs less than 25%.

Phosphate as P field blanks met acceptance criteria in 100% of the samples collected. Ninety-two percent of field duplicates had RPDs less than 25%. Laboratory blanks and LCS samples were within acceptability criteria for all batches. One hundred percent of MS and MSD samples met acceptability criteria for accuracy and precision.

All nutrient data are accepted and useable.

Pesticides: Pesticides were analyzed in seven different groups: organochlorines (EPA 8081A), organophosphates (EPA 8141A), carbamates (EPA 8321A), methamidophos (EPA 8321A), paraquat (EPA 549.2M), glyphosate (EPA 547M) and triazines (EPA 619). Laboratory blanks were run with each batch and 100% met acceptability criteria. One hundred percent of field blanks and field duplicates met acceptability criteria.

Surrogates were run for each applicable pesticide analysis (surrogates are not performed for glyphosate and paraquat analysis). All surrogate recoveries were within specific acceptance criteria for more than 90% of all samples analyzed with the exception of triphenyl phosphate (EPA 8141A) where 88% (129 of 146) of samples met the acceptable criteria. Out of the five batches with triphenyl phosphate (surrogate) PRs outside of acceptable limits, environmental and laboratory QC samples for four of the batches were re-run and the surrogates recovered within control limits; the re-run results confirmed the original results and all samples were confirmed as non-detect. The original results were recorded in the database since the re-analysis occurred outside of hold time. The surrogate and the associated environmental sample were flagged.

Matrix spikes and LCS samples were analyzed in each batch to assess accuracy as well as possible matrix interference. Either a MSD and/or a LCSD were performed per batch to assess precision. At least ninety percent of MS samples were within acceptability criteria for specific pesticides except glyphosate (20 of 24, 83%), paraquat (3 of 24, 12.5%), diazinon (21 of 24, 87.5%), phosmet (21 of 24, 87.5%), disulfoton (21 of 24, 87.5%), and phorate (20 of 24,) 83%. Two pairs of MS/MSDs were above the control limit for glyphosate (PR 78-118). All environmental samples were non-detect and all LCS PRs were within acceptable limits, therefore the data are usable. All paraquat samples that recovered outside of control limits were recovered low, possibly due to matrix spike interference. Of the paraquat MS samples that recovered below the acceptable limits, 90% had remaining QC samples in the batch within acceptable recovery ranges and all environmental samples were non-detect; all paraquat data are acceptable. Paraquat readily binds to suspended particles making it a difficult analyte to characterize in the water column. Diazinon MS recovered below acceptable limits (PR 57-130) in two organophosphate batches, and one diazinon MS recovered above acceptable limits in one organophosphate batch. All batches contained LCS PRs within acceptable limits and all results were non-detect; all diazinon data within the three batches are acceptable. One phosmet MS analyzed in August 2012 recovered below control limits; all other QC samples analyzed in the batch were within acceptable limits. Samples collected and analyzed in February 2012 had phosmet MS, MSD and LCS recoveries below the control limits. The analyzing laboratory performed a Nonconforming Work report and determined that phosmet had degraded in the standard. Because phosmet is a sensitive analyte and degrades easily, the action taken was to shorten the expiration date on all standards using phosmet. No further action was taken as it was determined the low recovery was caused by the standard and not by the extraction process. All samples were screened to the MDL and any samples with low surrogates were re-extracted to confirm results. All environmental samples were non-detect. Ninety-three percent of PRs for phosmet LCS samples recovered within acceptable limits. One pair of MS/MSD and a single MS sample were below control limits (PR 47-117) for disulfoton. All remaining QC samples in the batch were within acceptable recovery ranges and all environmental samples were non-detect. One pair of MS/MSD and the associated LCS PR were above control limits for phorate. No additional corrective actions were taken by the laboratory because the QC samples for phorate recovered high. This could indicate an increased sensitively bias, however as all the samples were non-detect; no further action was required. Two additional phorate MS samples from separate batches recovered below acceptability criteria. All other QC samples from the associated batches were within the control limits. All 2012 environmental samples were non-detect and 93% of PRs for phorate LCS samples recovered within acceptable limits.

At least 90% of pesticide LCS samples analyzed for specific pesticides met the acceptability criteria except for paraquat (79%). Paraquat LCS/D recovered below the acceptability criteria (PR 70-130) in four batches. In one batch, samples and QC were re-extracted past hold time and re-analyzed. LCSD and MS/D recoveries were better, but still below 70%. LCS recovered within the acceptance limit at 72%. The second batch with QC recoveries outside of acceptable limits was also re-extracted and re-analyzed and low recovery was confirmed. In the third batch, the LCS duplicate recovered within control limits. For the fourth batch, LCS PR was slightly below acceptable limits (68.3% vs. 70.0%); the magnitude of the deviation was not sufficient to impact the data. As discussed with the MS recoveries, paraquat is a difficult chemical to analyze due to its high partitioning coefficient and is difficult to recover in both laboratory and sample water. All paraquat results were non-detects and based on the chromatograms, re-analysis, laboratory technician interpretation and batch quality control data, all data are accepted and useable.

Sediment Pesticides: Sediment pesticides were analyzed if the sample exhibited significant *Hyalella azteca* toxicity when the survival compared to the control is less than 80%. A total of six sediment samples were analyzed for additional pesticides (chlorpyrifos and pyrethroids). One hundred percent of laboratory blanks met acceptability criteria (< RL).

Field duplicate samples were analyzed and all analytes had greater than 90% of field duplicate samples below the RPD criteria of 25% except for cyfluthrin, cypermethrin, deltamethrin and permethrin (all with 1 of 2 below control limit, 50%), and bifenthrin and cyhalothrin (0 of 2, 0%). The field duplicate and associated environmental results for cypermethrin were below the RL making it difficult to calculate an accurate RPD since the results are estimated. For the other pyrethroid results where the field duplicate and environmental sample RPD was greater than 25%, heterogeneity of the sediment may be the reason for the difference in results. Despite a rigorous sediment sampling procedure designed to ensure similar composite samples between the environmental and field duplicate sample, it is common for the sediment organic duplicates to vary more than the acceptable criteria due to the nature of sediment particles and the volume of sediment that must be collected for the various analysis.

An MS and LCS were performed to assess accuracy for each pesticide analyzed. One hundred percent of LCS samples met acceptability criteria for accuracy. The individual pyrethroids with less than 90% of acceptable MS samples were bifenthrin (67%, 4 of 6), chlorpyrifos (50%, 3 of 6) and cyfluthrin (88%, 7 of 8). The bifenthrin MS was below control limits and the bifenthrin MSD was above control limits. The associated LCS/LCSD recoveries were acceptable. Chlorpyrifos MS/MSDs outside of the acceptable limits were all above the QC limit and the associated environmental results were below the RL. One cyfluthrin MS was above the acceptable limit and the associated environmental sample result was 4.7 ng/g dw. All associated LCS/LSD recoveries for cyfluthrin were acceptable. The laboratory that analyzes sediment pesticides has since updated their percent recovery ranges to include a broader limit. One hundred percent of LCS samples met acceptability criteria for accuracy. Based on the high recoveries for the matrix spikes, the acceptable LCS recoveries, and laboratory technician interpretation of the associated chromatograms, data associated with an MS or LCS outside of recovery criteria are considered useable.

Laboratory precision met acceptability criteria. All LCS/LCSD pairs had RPDs less than 25%. All MS/MSD pairs hade RPDs less than 25% with the exception of cyfluthrin (3 of 4) and fenpropathrin (2 of 3). All NONPJ MS duplicate RPDs ran with the batch were within the acceptable criteria.

Surrogates were run for each sediment pesticide analysis. Surrogate recoveries were within specific acceptance criteria for 100% of all samples analyzed.

All sediment pesticide data are accepted and useable.

Total Dissolved Solids (TDS): Field blanks met acceptability criteria for at least 90% of the samples. Field duplicates met acceptability criteria for 100% of the TDS samples analyzed. Lab blanks were run with every batch and met acceptance criteria for 100% of samples. The LCS samples met acceptability criteria in 100% of the samples analyzed. One hundred percent of lab duplicates met the batch precision requirements, RPD ≤ 25%. Matrix spikes are not performed for TDS analysis. At least 90% of all TDS QC analyzed were within acceptable limits and all data are acceptable.

Total Organic Carbon (TOC): At least 90% of field blanks had results less than the RL. One hundred percent of field duplicates had RPDs less than 25%. Laboratory blanks and LCSs met acceptance criteria for 100% of the samples. Ninety-three percent of TOC MS were within QC limits and 100% of MSD samples analyzed met acceptability requirements. All TOC data are acceptable and useable.

Total Suspended Solids (TSS): One hundred percent of field blanks met acceptability criteria. Sixty-seven percent of field duplicates (8 of 12) had RPDs less than 25%. The four field duplicate RPDs greater than 25% ranged from 34% to 140%. One of the TSS pairs had both results below or equal to the reporting limit (estimated value) making it difficult to calculate an accurate RPD. All sampling SOPs were followed to ensure that field duplicates were collected at the same time and manner as the associated environmental sample. It is likely that the differences in TSS results are due to heterogeneity of the water column and low flow and/or high turbidity. One hundred percent of lab blanks, LCSs and laboratory duplicates met acceptance criteria. Matrix spikes are not performed for TSS. All TSS data are accepted and useable.

Turbidity: One hundred percent of all QC samples were run with every batch and 100% met acceptability criteria. Matrix spikes are not performed for turbidity. All turbidity data are accepted and useable.

Toxicity

For aquatic toxicity testing, 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 Toxicity Identification Evaluations (TIEs)). Test acceptability requirements are documented in the method documents for each bioassay method and are included in the SJCDWQC QAPP.

Water Column Toxicity: Field duplicates were collected during every monitoring event and were tested for toxicity to *C. dubia*, *S. capricornutum* and *P. promelas* (Table 29). One hundred percent of field duplicates were within the acceptability criteria (Table 29). For *S. capricornutum* samples, 91.7% of the field duplicate samples had RPDs less than 25 (11 of 12). Negative controls (CNEGs) were performed with each toxicity batch for each species and met acceptability criteria (Table 32). All water column toxicity tests are acceptable and useable.

Sediment Toxicity: Sediment samples were collected on March 15 and September 18, 2012. Two field duplicates were collected and one had an RPD less than 25%. Recovery of CNEG (lab controls) had 100% of samples within the acceptability criteria. All sediment toxicity tests are acceptable and useable.

CORRECTIVE ACTIONS

Corrective actions were performed by Coalition laboratories as outlined in the SJCDWQC Quality Assurance Project Plan (QAPP; approved on October 20, 2010) for QA/QC results that did not meet acceptance criteria in 2012. If corrective actions occurred (e.g. reanalysis), details are included in the above sections.

Two sediment batches analyzing grain size did not have complete QA/QC performed due to laboratory miscommunication. Discussions occurred with the laboratory to ensure that future analysis will include the required QA/QC. No additional corrective actions were taken.

Discharge in 2012 was only calculated for 64% of the events due to either 1) unsafe conditions that did not allow for samplers to wade the water to take flow measurements necessary to calculate discharge or 2) no flow observed. Samplers recorded an observed flow during all sampling events and recorded this information on field sheets. No corrective action was necessary.

Samples collected and analyzed in February 2012 had phosmet MS, MSD and LCS recoveries below the control limits. The analyzing laboratory performed a Nonconforming Work report and determined that phosmet had degraded in the standard. All samples were screened to the MDL and any samples with low surrogates were re-extracted to confirm results. One pair of MS/MSD and the associated LCS PR were above control limits for phorate. No additional corrective actions were taken by the laboratory because the QC samples for phorate recovered high. This could indicate an increased sensitively bias, however as all the samples were non-detect; no further action was required.

Toxicity samples were lost while being transported to the toxicity laboratory however due to effective communication with the laboratory samples were recollected the next day. No corrective actions were necessary. Since 2011, the Coalition has developed an email tracking system to communicate the following between the various parties involved: 1) when samples have been shipped, 2) when samples have been delivered, and 3) when samples have been received by the laboratories. This email tracking system ensures that all samples arrive safely to their destination and enable the sampling agencies to recollect samples in a timely manner if needed.

A hold time violation occurred for March sediment toxicity samples. The samples were analyzed outside of the 14 day hold time due to a miscommunication with the subcontracted lab. The Coalition has ensured that the lab is aware of the 14 day hold time and all sediment toxicity samples collected in September were analyzed within 14 days.

Table 17. SJCDWQC environmental sample, field quality, and field parameter counts and percentages.

Samples collected from January through December 2012; sorted by method and analyte.

Method	Analyte	Env. Samples Scheduled (#)	Env. Samples Collected (#)	Field and Transport Completeness (%)	Env. Sample Analyzed (#)	Env. Sample Completeness (%)	Env. and Field QC Samples (#)	Field Blank (#)	Field Blank (%)	Field Dup. (#)	Field Dup. (%)	Equip Blank (#)	Equip Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8321A CARB	Aldicarb	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8321A CARB	Carbaryl	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8321A CARB	Carbofuran	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8321A CARB	Methiocarb	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8321A CARB	Methomyl	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8321A CARB	Oxamyl	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8321A CARB	Diuron	20	20	100.0%	20	100.0%	44	12	27.3%	12	27.3%		NA		NA
EPA 8321A CARB	Linuron	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 619	Atrazine	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 619	Cyanazine	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 619	Simazine	14	14	100.0%	12	100.0%	38	12	31.6%	12	31.6%		NA		NA
EPA 547M	Glyphosate	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 549.2M	Paraquat	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	DDD(p,p')	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	DDE(p,p')	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	DDT(p,p')	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Dicofol	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Dieldrin	15	15	100.0%	15	100.0%	39	12	30.8%	12	30.8%		NA		NA
EPA 8081A	Endrin	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8081A	Methoxychlor	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Azinphos methyl	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Chlorpyrifos	80	80	100.0%	80	100.0%	104	12	11.5%	12	11.5%		NA		NA
EPA 8141A OP	Diazinon	43	43	100.0%	43	100.0%	67	12	17.9%	12	17.9%		NA		NA
EPA 8141A OP	Dichlorvos	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Dimethoate	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Demeton-s	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Disulfoton	15	15	100.0%	15	100.0%	39	12	30.8%	12	30.8%		NA		NA
EPA 8141A OP	Malathion	14	14	100.0%	14	100.0%	38	12	31.6%	12	31.6%		NA		NA
EPA 8141A OP	Methidathion	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Parathion, Methyl	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Phorate	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8141A OP	Phosmet	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA

Method	Analyte	Env. Samples Scheduled (#)	Env. Samples Collected (#)	Field and Transport Completeness (%)	Env. Sample Analyzed (#)	Env. Sample Completeness (%)	Env. and Field QC Samples (#)	Field Blank (#)	Field Blank (%)	Field Dup. (#)	Field Dup. (%)	Equip Blank (#)	Equip Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8141A OP	Trifluralin	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
EPA 8321A	Methamidophos	12	12	100.0%	12	100.0%	36	12	33.3%	12	33.3%		NA		NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	30	30	100.0%	30	100.0%	54	12	22.2%	12	22.2%		NA		NA
SM 2540 C	Total Dissolved Solids	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 2540 D	Total Suspended Solids	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
EPA 180.1	Turbidity	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 4500-NH3 C v20	Ammonia as N	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
EPA 353.2	Nitrate + Nitrite as N	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 4500-P E	OrthoPhosphate as P	72	72	100.0%	72	100.0%	101	12	11.9%	12	11.9%		NA		NA
SM 4500-P E	Phosphate as P	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 5310 B	Total Organic Carbon	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 9223B	E. coli	72	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
EPA 200.8	Arsenic	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%		NA	12	25.0%
EPA 200.8	Boron	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%		NA	12	25.0%
EPA 200.8	Cadmium	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%		NA	12	25.0%
EPA 200.8	Copper	30	30	100.0%	30	100.0%	66	12	18.2%	12	18.2%		NA	12	18.2%
EPA 200.8	Lead	14	14	100.0%	14	100.0%	50	12	24.0%	12	24.0%		NA	12	24.0%
EPA 200.8	Molybdenum	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%		NA	12	25.0%
EPA 200.8	Nickel	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%		NA	12	25.0%
EPA 200.8	Selenium	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%		NA	12	25.0%
EPA 200.8	Zinc	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%		NA	12	25.0%
EPA 200.8	Cadmium (Dissolved)	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%	12	25.0 %		NA
EPA 200.8	Copper (Dissolved)	30	30	100.0%	30	100.0%	66	12	18.2%	12	18.2%	12	18.2 %		NA
EPA 200.8	Lead (Dissolved)	14	14	100.0%	14	100.0%	50	12	24.0%	12	24.0%	12	24.0 %		NA
EPA 200.8	Nickel (Dissolved)	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%	12	25.0 %		NA
EPA 200.8	Zinc (Dissolved)	12	12	100.0%	12	100.0%	48	12	25.0%	12	25.0%	12	25.0 %		NA

Method	Analyte	Env. Samples Scheduled (#)	Env. Samples Collected (#)	Field and Transport Completeness (%)	Env. Sample Analyzed (#)	Env. Sample Completeness (%)	Env. and Field QC Samples (#)	Field Blank (#)	Field Blank (%)	Field Dup. (#)	Field Dup. (%)	Equip Blank (#)	Equip Blank (%)	Travel Blank (#)	Travel Blank (%)
Walkley-Black	Total Organic Carbon (sediment)	21	21	100.0%	21	100.0%	23		NA	2	8.7%		NA		NA
ASTM D4464M,ASTM D422	Sediment Grain Size	20	20	100.0%	20	100.0%	22		NA	2	9.1%		NA		NA
EPA 8270M_NCI	Bifenthrin	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Chlorpyrifos	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Cyfluthrin	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Cyhalothrin, lambda	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Cypermethrin	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Deltamethrin:Tralomethrin	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Esfenvalerate/Fenvalerate	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Fenpropathrin	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 8270M_NCI	Permethrin	6	6	100.0%	6	100.0%	8		NA	2	25.0%		NA		NA
EPA 821/R-02-012	*Ceriodaphnia dubia*	33	33	100.0%	33	100.0%	45		NA	12	26.7%		NA		NA
EPA 821/R-02-012	*Pimephales promelas*	12	12	100.0%	12	100.0%	24		NA	12	50.0%		NA		NA
EPA 821/R-02-013	*Selenastrum capricornutum*	54	54	100.0%	54	100.0%	66		NA	12	18.2%		NA		NA
EPA 600/R-99-064	*Hyalella azteca*	21	21	100.0%	21	100.0%	23		NA	2	8.7%		NA		NA
USGS R2Cross streamflow	Discharge, cfs	135	136	100.7%	87	64.0%	NA		NA		NA		NA		NA
SM 4500-O	Dissolved Oxygen, mg/L	135	136	100.7%	136	100.0%	NA		NA		NA		NA		NA
EPA 150.1	pH	135	136	100.7%	136	100.0%	NA		NA		NA		NA		NA
EPA 120.1	Specific Conductivity, uS/cm	135	136	100.7%	136	100.0%	NA		NA		NA		NA		NA
SM 2550	Temperature, Deg C	135	136	100.7%	136	100.0%	NA		NA		NA		NA		NA
	TOTAL	**1698**	**1698**	**100.0%**	**2327**	**100%**	**3189**	**708**	**26.5%**	**768**	**25.8%**	**60**	**23.4 %**	**108**	**24.1%**

NA-Not applicable

Table 18. SJCDWQC summary of field blank quality control sample evaluations.
Samples collected from January through December 2012, 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	<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 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 8321A	Methamidophos	<RL or < (env sample/5)	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL or < (env sample/5)	12	12	100.00
SM 2540 C	Total Dissolved Solids	<RL or < (env sample/5)	12	11	91.67
SM 2540 D	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
SM 4500-NH3 C v20	Ammonia as N	<RL or < (env sample/5)	12	12	100.00
SM 4500-NH3 C v20	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	12	100.00
SM 4500-P E	OrthoPhosphate as P	<RL or < (env sample/5)	12	12	100.00
SM 4500-P E	Phosphate as P	<RL or < (env sample/5)	12	12	100.00
SM 5310 B	Total Organic Carbon	<RL or < (env sample/5)	12	11	91.67
SM 9223B	*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

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
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	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Chlorpyrifos (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Cyfluthrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Cypermethrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Fenpropathrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Permethrin (sediment)	NA	NA	NA	NA
		TOTAL	**708**	**706**	**99.72**

NA- Not applicable

Table 19. SJCDWQC summary of equipment blank (dissolved metals) and travel blank (total metals) quality control sample evaluations.

Samples collected from January through December 2012, sorted by method and analyte.

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	BLANKS 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	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
		TRAVEL BLANK TOTAL	**108**	**108**	**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)	5	5	100.00
		EQUIPMENT BLANK TOTAL	**65**	**65**	**100.00**

Table 20. SJCDWQC summary of field duplicate quality control sample evaluations.
Samples collected from January through December 2012, 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	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 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	12	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	12	12	100.00
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	12	12	100.00
SM 2540 D	Total Suspended Solids	RPD ≤ 25	12	8	66.67
EPA 180.1	Turbidity	RPD ≤ 25	12	12	100.00
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 25	12	9	75.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 25	12	11	91.67
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	12	11	91.67
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 25	12	12	100.00
SM 4500-P E	Phosphate as P	RPD ≤ 25	12	12	100.00
SM 5310 B	Total Organic Carbon	RPD ≤ 25	12	12	100.00
SM 9223B	*E. coli*	Rlog ≤ 1.30	12	12	100.00
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	11	91.67
EPA 200.8	Copper	RPD ≤ 25	12	12	100.00
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	12	100.00
EPA 200.8	Selenium	RPD ≤ 25	12	11	91.67

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 200.8	Zinc	RPD ≤ 25	12	12	100.00
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	9	75.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	12	9	75.00
Walkley-Black	Total Organic Carbon (sediment)	RPD ≤ 20	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	RPD <25	2	0	0.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD <25	2	1	50.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD <25	2	0	0.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD <25	2	1	50.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD <25	2	1	50.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD <25	2	1	50.00
		TOTAL	**728**	**702**	**96.43**

Table 21. SJCDWQC summary of method blank quality control sample evaluations.

Samples analyzed in batches with samples collected from January through December 2012, 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	13	13	100.00
EPA 549.2M	Paraquat	<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 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 8321A	Methamidophos	<RL	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL	13	13	100.00
SM 2540 C	Total Dissolved Solids	<RL	13	13	100.00
SM 2540 D	Total Suspended Solids	<RL	12	12	100.00
EPA 180.1	Turbidity	<RL	13	13	100.00
SM 4500-NH3 C v20	Ammonia as N	<RL	12	12	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	<RL	13	13	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL	12	12	100.00
SM 4500-P E	OrthoPhosphate as P	<RL	13	13	100.00
SM 4500-P E	Phosphate as P	<RL	13	13	100.00
SM 5310 B	Total Organic Carbon	<RL	13	13	100.00
SM 9223B	*E. coli*	<RL	12	12	100.00
EPA 200.8	Arsenic	<RL	12	12	100.00
EPA 200.8	Boron	<RL	12	12	100.00
EPA 200.8	Cadmium	<RL	12	12	100.00
EPA 200.8	Copper	<RL	12	12	100.00
EPA 200.8	Lead	<RL	12	12	100.00
EPA 200.8	Molybdenum	<RL	12	12	100.00
EPA 200.8	Nickel	<RL	12	12	100.00
EPA 200.8	Selenium	<RL	12	12	100.00
EPA 200.8	Zinc	<RL	12	12	100.00
EPA 200.8	Cadmium (Dissolved)	<RL	12	12	100.00

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 200.8	Copper (Dissolved)	<RL	13	13	100.00
EPA 200.8	Lead (Dissolved)	<RL	12	12	100.00
EPA 200.8	Nickel (Dissolved)	<RL	12	12	100.00
EPA 200.8	Zinc (Dissolved)	<RL	12	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	<RL	3	3	100.00
EPA 8270M_NCI	Permethrin (sediment)	<RL	3	3	100.00
		TOTAL	**747**	**747**	**100.00**

Table 22. SJCDWQC summary of laboratory control spike quality control sample evaluations.
Laboratory control spikes and laboratory control spike duplicates analyzed in batches with samples collected from January through December 2012, 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	14	14	100.00
EPA 619	Cyanazine	PR 22-172	14	14	100.00
EPA 619	Simazine	PR 21-179	14	14	100.00
EPA 547M	Glyphosate	PR 84-113	26	26	100.00
EPA 549.2M	Paraquat	PR 70-130	24	19	79.17
EPA 8081A	DDD(p,p')	PR 38-135	12	12	100.00
EPA 8081A	DDE(p,p')	PR 21-134	12	12	100.00
EPA 8081A	DDT(p,p')	PR 18-145	12	12	100.00
EPA 8081A	Dicofol	PR 40-135	12	12	100.00
EPA 8081A	Dieldrin	PR 48-121	12	12	100.00
EPA 8081A	Endrin	PR 24-143	12	12	100.00
EPA 8081A	Methoxychlor	PR 30-163	12	12	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	14	14	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	14	13	92.86
EPA 8141A OP	Diazinon	PR 57-130	14	14	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	14	14	100.00
EPA 8141A OP	Dimethoate	PR 68-202	14	14	100.00
EPA 8141A OP	Demeton-s	PR 40-125	14	14	100.00
EPA 8141A OP	Disulfoton	PR 47-117	14	14	100.00
EPA 8141A OP	Malathion	PR 47-125	14	13	92.86
EPA 8141A OP	Methidathion	PR 50-150	14	14	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	14	14	100.00
EPA 8141A OP	Phorate	PR 44-117	14	13	92.86
EPA 8141A OP	Phosmet	PR 50-150	14	13	92.86
EPA 8141A OP	Trifluralin	PR 40-148	14	14	100.00
EPA 8321A	Methamidophos	PR 25-136	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	13	13	100.00
SM 2540 C	Total Dissolved Solids	PR 80-120	13	13	100.00
SM 2540 D	Total Suspended Solids	PR 80-120	12	12	100.00
EPA 180.1	Turbidity	PR 90-110	13	13	100.00
SM 4500-NH3 C v20	Ammonia as N	PR 90-110	19	19	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	PR 90-110	19	19	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	12	12	100.00
SM 4500-P E	OrthoPhosphate as P	PR 90-110	13	13	100.00
SM 4500-P E	Phosphate as P	PR 90-110	13	13	100.00
SM 5310 B	Total Organic Carbon	PR 80-120	14	14	100.00
SM 9223	*E. coli*	NA	NA	NA	NA
EPA 200.8	Arsenic	PR 85-115	12	12	100.00
EPA 200.8	Boron	PR 85-115	12	12	100.00
EPA 200.8	Cadmium	PR 85-115	12	12	100.00
EPA 200.8	Copper	PR 85-115	12	12	100.00
EPA 200.8	Lead	PR 85-115	12	12	100.00
EPA 200.8	Molybdenum	PR 85-115	12	12	100.00
EPA 200.8	Nickel	PR 85-115	12	12	100.00
EPA 200.8	Selenium	PR 85-115	12	12	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 200.8	Zinc	PR 85-115	12	12	100.00
EPA 200.8	Cadmium (Dissolved)	PR 85-115	12	12	100.00
EPA 200.8	Copper (Dissolved)	PR 85-115	13	13	100.00
EPA 200.8	Lead (Dissolved)	PR 85-115	12	12	100.00
EPA 200.8	Nickel (Dissolved)	PR 85-115	12	12	100.00
EPA 200.8	Zinc (Dissolved)	PR 85-115	12	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	PR 50-150	5	5	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 50-150	5	5	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 50-150	5	5	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	PR 50-150	5	5	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	PR 50-150	5	5	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	PR 50-150	5	5	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	PR 50-150	5	5	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	PR 50-200	5	5	100.00
EPA 8270M_NCI	Permethrin (sediment)	PR 50-150	5	5	100.00
		TOTAL	**823**	**814**	**98.91**

NA- Not applicable

Table 23. SJCDWQC summary of lab control spike duplicate quality control sample evaluations.

Laboratory control spikes duplicates analyzed in batches with samples collected from January through December 2012, 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	NA	NA
EPA 8321A CARB	Carbaryl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbofuran	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methiocarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methomyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Oxamyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Diuron	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Linuron	RPD ≤ 25	NA	NA	NA
EPA 619	Atrazine	RPD ≤ 25	4	4	100.00
EPA 619	Cyanazine	RPD ≤ 25	4	4	100.00
EPA 619	Simazine	RPD ≤ 25	4	4	100.00
EPA 547M	Glyphosate	RPD ≤ 25	26	26	100.00
EPA 549.2M	Paraquat	RPD ≤ 25	24	24	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDE(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDT(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dicofol	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dieldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Methoxychlor	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	4	4	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	NA	NA	NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 20	NA	NA	NA
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	NA	NA	NA
SM 2540 D	Total Suspended Solids	RPD ≤ 20	NA	NA	NA
EPA 180.1	Turbidity	RPD ≤ 20	NA	NA	NA
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 20	12	12	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 20	12	12	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 20	NA	NA	NA
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 25	NA	NA	NA
SM 4500-P E	Phosphate as P	RPD ≤ 20	NA	NA	NA
SM 5310 B	Total Organic Carbon	RPD ≤ 20	NA	NA	NA
SM 9223B	*E. coli*	NA	NA	NA	NA
EPA 200.8	Arsenic	RPD ≤ 20	NA	NA	NA
EPA 200.8	Boron	RPD ≤ 20	NA	NA	NA
EPA 200.8	Cadmium	RPD ≤ 20	NA	NA	NA
EPA 200.8	Copper	RPD ≤ 20	NA	NA	NA
EPA 200.8	Lead	RPD ≤ 20	NA	NA	NA
EPA 200.8	Molybdenum	RPD ≤ 20	NA	NA	NA
EPA 200.8	Nickel	RPD ≤ 20	NA	NA	NA

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 200.8	Selenium	RPD ≤ 20	NA	NA	NA
EPA 200.8	Zinc	RPD ≤ 20	NA	NA	NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	NA	NA	NA
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD ≤ 25	4	4	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD ≤ 25	4	4	100.00
		TOTAL	**174**	**174**	**100.00**

NA- Not applicable

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

Matrix spikes and matrix spike duplicates collected from January through December 2012. Non-project matrix spikes are included for batch Quality Assurance completeness 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	24	100.00
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	23	95.83
EPA 619	Cyanazine	PR 22-172	24	24	100.00
EPA 619	Simazine	PR 21-179	24	24	100.00
EPA 547M	Glyphosate	PR 84-113	24	20	83.33
EPA 549.2M	Paraquat dichloride	PR 70-130	24	3	12.50
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 8141A OP	Azinphos methyl	PR 36-189	24	24	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	24	22	91.67
EPA 8141A OP	Diazinon	PR 57-130	24	21	87.50
EPA 8141A OP	Dichlorvos	PR 10-175	24	22	91.67
EPA 8141A OP	Dimethoate	PR 68-202	24	22	91.67
EPA 8141A OP	Demeton-s	PR 40-125	24	23	95.83
EPA 8141A OP	Disulfoton	PR 47-117	24	20	83.33
EPA 8141A OP	Malathion	PR 47-125	24	23	95.83
EPA 8141A OP	Methidathion	PR 50-150	24	24	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	24	23	95.83
EPA 8141A OP	Phorate	PR 44-117	24	20	83.33
EPA 8141A OP	Phosmet	PR 50-150	24	21	87.50
EPA 8141A OP	Trifluralin	PR 40-148	24	23	95.83
EPA 8321A	Methamidophos	PR 25-136	24	24	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	26	24	92.31
SM 2540 C	Total Dissolved Solids	PR 80-120	NA	NA	NA
SM 2540 D	Total Suspended Solids	PR 80-120	NA	NA	NA
EPA 180.1	Turbidity	PR 90-110	NA	NA	NA
SM 4500-NH3 C v20	Ammonia as N	PR 90-110	26	26	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	PR 90-110	26	23	88.46
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	24	23	95.83
SM 4500-P E	OrthoPhosphate as P	PR 90-110	26	26	100.00
SM 4500-P E	Phosphate as P	PR 90-110	26	26	100.00
SM 5310 B	Total Organic Carbon	PR 80-120	28	26	92.86
SM 9223B	*E. coli*	NA			NA
EPA 200.8	Arsenic	PR 70-130	24	24	100.00
EPA 200.8	Boron	PR 70-130	24	24	100.00
EPA 200.8	Cadmium	PR 70-130	24	24	100.00
EPA 200.8	Copper	PR 70-130	24	24	100.00
EPA 200.8	Lead	PR 70-130	24	24	100.00
EPA 200.8	Molybdenum	PR 70-130	24	24	100.00
EPA 200.8	Nickel	PR 70-130	28	26	92.86

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 200.8	Selenium	PR 70-130	24	24	100.00
EPA 200.8	Zinc	PR 70-130	28	26	92.86
EPA 200.8	Cadmium (Dissolved)	PR 70-130	24	24	100.00
EPA 200.8	Copper (Dissolved)	PR 70-130	26	24	92.31
EPA 200.8	Lead (Dissolved)	PR 70-130	24	24	100.00
EPA 200.8	Nickel (Dissolved)	PR 70-130	24	24	100.00
EPA 200.8	Zinc (Dissolved)	PR 70-130	26	24	92.31
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	PR 50-150	6	4	66.67
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 50-150	6	3	50.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 50-150	8	7	87.50
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	PR 50-150	6	6	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	PR 50-150	6	6	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	PR 50-150	6	6	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	PR 50-150	8	8	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	PR 50-200	6	6	100.00
EPA 8270M_NCI	Permethrin (sediment)	PR 50-150	6	6	100.00
		TOTAL	**1404**	**1336**	**95.16**

NA- Not applicable

Table 25. SJCDWQC summary of matrix spike duplicate quality control sample evaluations.

Matrix spike duplicates collected from January through December 2012. Non project matrix spikes are included for batch Quality Assurance completeness 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	10	83.33
EPA 619	Cyanazine	RPD ≤ 25	12	10	83.33
EPA 619	Simazine	RPD ≤ 25	12	10	83.33
EPA 547M	Glyphosate	RPD ≤ 25	12	12	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	12	11	91.67
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 8141A OP	Azinphos methyl	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Diazinon	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Dichlorvos	RPD ≤ 25	12	11	91.67
EPA 8141A OP	Dimethoate	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Demeton-s	RPD ≤ 25	12	9	75.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	12	9	75.00
EPA 8141A OP	Malathion	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Methidathion	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Phorate	RPD ≤ 25	12	10	83.33
EPA 8141A OP	Phosmet	RPD ≤ 25	12	9	75.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	10	83.33
EPA 8321A	Methamidophos	RPD ≤ 25	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 20	13	13	100.00
SM 2540 C	Total Dissolved Solids	NA	NA	NA	NA
SM 2540 D	Total Suspended Solids	NA	NA	NA	NA
EPA 180.1	Turbidity	NA	NA	NA	NA
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 20	13	13	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 20	13	13	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 20	12	12	100.00
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 20	13	13	100.00
SM 4500-P E	Phosphate as P	RPD ≤ 20	13	13	100.00
SM 5310 B	Total Organic Carbon	RPD ≤ 20	12	12	100.00
SM 9223B	*E. coli*	NA	NA	NA	NA
EPA 200.8	Arsenic	RPD ≤ 20	12	12	100.00
EPA 200.8	Boron	RPD ≤ 20	12	12	100.00
EPA 200.8	Cadmium	RPD ≤ 20	12	12	100.00
EPA 200.8	Copper	RPD ≤ 20	12	12	100.00
EPA 200.8	Lead	RPD ≤ 20	12	12	100.00
EPA 200.8	Molybdenum	RPD ≤ 20	12	12	100.00
EPA 200.8	Nickel	RPD ≤ 20	12	12	100.00

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 200.8	Selenium	RPD ≤ 20	12	12	100.00
EPA 200.8	Zinc	RPD ≤ 20	12	12	100.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 20	12	12	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	13	13	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	12	12	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	14	14	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	12	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	RPD <25	3	3	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD <25	3	3	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD <25	4	3	75.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD <25	3	3	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD <25	3	3	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD <25	3	3	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD <25	3	3	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD <25	3	2	66.67
EPA 8270M_NCI	Permethrin (sediment)	RPD <25	3	3	100.00
		TOTAL	**698**	**661**	**94.70**

NA- Not applicable

Table 26. SJCDWQC summary of laboratory duplicate quality control sample evaluations.

Lab duplicates were analyzed in batches with samples collected January through December 2012. Non project samples are included for batch Quality Assurance completeness purposes. Evaluations 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	NA	NA
EPA 8321A CARB	Carbaryl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbofuran	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methiocarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methomyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Oxamyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Diuron	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Linuron	RPD ≤ 25	NA	NA	NA
EPA 619	Atrazine	RPD ≤ 25	NA	NA	NA
EPA 619	Cyanazine	RPD ≤ 25	NA	NA	NA
EPA 619	Simazine	RPD ≤ 25	NA	NA	NA
EPA 547M	Glyphosate	RPD ≤ 25	NA	NA	NA
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDD(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDE(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDT(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dicofol	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dieldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Methoxychlor	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Diazinon	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Dichlorvos	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Dimethoate	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Demeton-s	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Disulfoton	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Malathion	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Methidathion	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Phorate	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Phosmet	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Trifluralin	RPD ≤ 25	NA	NA	NA
EPA 8321A	Methamidophos	RPD ≤ 25	NA	NA	NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	1	1	100.00
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	13	13	100.00
SM 2540 D	Total Suspended Solids	RPD ≤ 25	13	12	92.31
EPA 180.1	Turbidity	RPD ≤ 25	13	13	100.00
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 25	NA	NA	NA
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 25	NA	NA	NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	NA	NA	NA
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 25	NA	NA	NA
SM 4500-P E	Phosphate as P	RPD ≤ 25	NA	NA	NA
SM 5310 B	Total Organic Carbon	RPD ≤ 25	NA	NA	NA
SM 9223B	*E. coli*	Rlog ≤ 1.3	12	12	100.00
EPA 200.8	Arsenic	RPD ≤ 25	NA	NA	NA
EPA 200.8	Boron	RPD ≤ 25	NA	NA	NA
EPA 200.8	Cadmium	RPD ≤ 25	NA	NA	NA
EPA 200.8	Copper	RPD ≤ 25	NA	NA	NA
EPA 200.8	Lead	RPD ≤ 25	NA	NA	NA
EPA 200.8	Molybdenum	RPD ≤ 25	NA	NA	NA

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 200.8	Nickel	RPD ≤ 25	NA	NA	NA
EPA 200.8	Selenium	RPD ≤ 25	NA	NA	NA
EPA 200.8	Zinc	RPD ≤ 25	NA	NA	NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	NA	NA	NA
Walkley-Black	Total Organic Carbon (sediment)	RPD ≤ 20	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Cypermethrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Permethrin (sediment)	RPD ≤ 25	NA	NA	NA
		TOTAL	**52**	**51**	**98.08**

NA- Not applicable

Table 27. SJCDWQC summary of surrogate recovery quality control sample evaluations.

Surrogates were run with samples collected and Laboratory Quality Assurance (LABQA) analyzed from January through December 2012 for all organics except paraquat and glyphosate and for sediment analysis. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 36-140	92	92	100.00
EPA 8321A	Diphenamid(Surrogate)	RPD ≤ 25; PR 52-122	84	79	94.05
EPA 619	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 62-145	80	73	91.25
EPA 619	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 54-144	80	76	95.00
EPA 619	Decachlorobiphenyl(Surrogate)	RPD ≤ 25; PR 16-146	4	4	100.00
EPA 619	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	4	4	100.00
EPA 8081A	Decachlorobiphenyl(Surrogate)	RPD ≤ 25; PR 16-146	87	87	100.00
EPA 8081A	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	87	87	100.00
EPA 8141A	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 60-150	146	132	90.41
EPA 8141A	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 56-129	146	129	88.36
EPA 8141A	Decachlorobiphenyl(Surrogate)	RPD ≤ 25; PR 16-146	5	5	100.00
EPA 8141A	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	5	5	100.00
EPA 8270M_NCI	Decachlorobiphenyl(Surrogate) sediment	RPD ≤ 25; PR 50-150 (MS), PR 76-172 (LCS)	22	22	100.00
		TOTAL	**842**	**795**	**94.42**

Table 28. SJCDWQC summary of holding time evaluations for environmental, field blank, field duplicate and matrix spike samples.

Samples collected from January through December 2012; 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	48	48	100.00
EPA 8321A CARB	Carbaryl	7 days	48	48	100.00
EPA 8321A CARB	Carbofuran	7 days	48	48	100.00
EPA 8321A CARB	Methiocarb	7 days	48	48	100.00
EPA 8321A CARB	Methomyl	7 days	48	48	100.00
EPA 8321A CARB	Oxamyl	7 days	48	48	100.00
EPA 8321A CARB	Diuron	7 days	56	56	100.00
EPA 8321A CARB	Linuron	7 days	48	48	100.00
EPA 619	Atrazine	7 days	48	48	100.00
EPA 619	Cyanazine	7 days	48	48	100.00
EPA 619	Simazine	7 days	50	50	100.00
EPA 547M	Glyphosate	14 days	48	48	100.00
EPA 549.2M	Paraquat dichloride	7 days	48	48	100.00
EPA 8081A	DDD(p,p')	7 days	48	48	100.00
EPA 8081A	DDE(p,p')	7 days	48	48	100.00
EPA 8081A	DDT(p,p')	7 days	48	48	100.00
EPA 8081A	Dicofol	7 days	48	48	100.00
EPA 8081A	Dieldrin	7 days	51	51	100.00
EPA 8081A	Endrin	7 days	48	48	100.00
EPA 8081A	Methoxychlor	7 days	48	48	100.00
EPA 8141A OP	Azinphos methyl	7 days	48	48	100.00
EPA 8141A OP	Chlorpyrifos	7 days	116	116	100.00
EPA 8141A OP	Diazinon	7 days	79	79	100.00
EPA 8141A OP	Dichlorvos	7 days	48	48	100.00
EPA 8141A OP	Dimethoate	7 days	48	48	100.00
EPA 8141A OP	Demeton-s	7 days	48	48	100.00
EPA 8141A OP	Disulfoton	7 days	51	51	100.00
EPA 8141A OP	Malathion	7 days	48	48	100.00
EPA 8141A OP	Methidathion	7 days	48	48	100.00
EPA 8141A OP	Parathion, Methyl	7 days	48	48	100.00
EPA 8141A OP	Phorate	7 days	48	48	100.00
EPA 8141A OP	Phosmet	7 days	48	48	100.00
EPA 8141A OP	Trifluralin	7 days	48	48	100.00
EPA 8321A	Methamidophos	7 days	50	50	100.00
SM 2540 C	Hardness as CaCO3 (Dissolved)	6 months	67	67	100.00
SM 2540 D	Total Dissolved Solids	7 days	96	96	100.00
EPA 180.1	Total Suspended Solids	7 days	96	96	100.00
SM 4500-NH3 C v20	Turbidity	48 hours	96	96	100.00
SM 4500-NH3 C v20	Ammonia as N	Field acidify, 28 days	109	109	100.00
EPA 353.2	Nitrogen, Total Kjeldahl	Field acidify, 28 days	109	109	100.00
SM 4500-P E	Nitrate + Nitrite as N	Field acidify, 28 days	108	108	100.00
SM 4500-P E	OrthoPhosphate as P	48 hours	114	114	100.00
SM 5310 B	Phosphate as P	Field acidify, 28 days	109	109	100.00
SM 9223B	Total Organic Carbon	28 days	110	110	100.00
SM 9223B	*E. coli*	24 hours	96	96	100.00
EPA 200.8	Arsenic	Field acidify, 6 months	60	60	100.00
EPA 200.8	Boron	Field acidify, 6 months	60	60	100.00
EPA 200.8	Cadmium	Field acidify, 6 months	60	60	100.00
EPA 200.8	Copper	Field acidify, 6 months	78	78	100.00
EPA 200.8	Lead	Field acidify, 6 months	62	62	100.00
EPA 200.8	Molybdenum	Field acidify, 6 months	60	60	100.00

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 200.8	Nickel	Field acidify, 6 months	62	62	100.00
EPA 200.8	Selenium	Field acidify, 6 months	60	60	100.00
EPA 200.8	Zinc	Field acidify, 6 months	62	62	100.00
EPA 200.8	Cadmium (Dissolved)	Field acidify, 6 months	60	60	100.00
EPA 200.8	Copper (Dissolved)	Field acidify, 6 months	79	79	100.00
EPA 200.8	Lead (Dissolved)	Field acidify, 6 months	62	62	100.00
EPA 200.8	Nickel (Dissolved)	Field acidify, 6 months	60	60	100.00
EPA 200.8	Zinc (Dissolved)	Field acidify, 6 months	60	60	100.00
Walkley-Black	Total Organic Carbon (sediment)	Freeze or analyze within 28 days	23	23	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	Freeze within 48 hours; 12 months	11	11	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	Freeze within 48 hours; 12 months	11	11	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	Freeze within 48 hours; 12 months	12	12	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	Freeze within 48 hours; 12 months	11	11	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	Freeze within 48 hours; 12 months	11	11	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	Freeze within 48 hours; 12 months	11	11	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	Freeze within 48 hours; 12 months	11	11	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	Freeze within 48 hours; 12 months	12	12	100.00
EPA 8270M_NCI	Permethrin (sediment)	Freeze within 48 hours; 12 months	11	11	100.00
EPA 600/R-99-064	*Hyalella azteca*	Store at $\leq$6°C do not freeze, 14 days	22	12	54.55
EPA 821/R-02-012	*Ceriodaphnia dubia*	Store at $\leq$6°C, 36 Hours	45	45	100.00
EPA 821/R-02-012	*Pimephales promelas*	Store at $\leq$6°C, 36 Hours	24	24	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	Store at $\leq$6°C, 36 Hours	66	66	100.00
		TOTAL	**4025**	**4015**	**99.75**

Table 29. SJCDWQC summary of toxicity field duplicate sample evaluations.

Samples collected from January through December 2012; 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	11	91.67
EPA 600/R-99-064	*Hyalella azteca*	2	RPD ≤ 25	1	50.00

Table 30. SJCDWQC summary of toxicity lab control sample evaluations.

Samples collected from January through December 2012; sorted by method and species.

METHOD	TOXICITY SPECIES	TOTAL LAB CONTROL SAMPLES	DATA QUALITY OBJECTIVE (DQO)	TOTAL LAB CONTROLS WITHIN DQO	PERCENT SAMPLES WITHIN ACCEPTABLE CRITERIA
EPA 821/R-02-012	*Ceriodaphnia dubia*	12	Survival in control samples ≥90%	12	100.00
EPA 821/R-02-012	*Pimephales promelas*	12	Survival in control samples ≥80%	12	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	12	> 200,000 cells/mL, variability of controls <20%	12	100.00
EPA 600/R-99-064	*Hyalella azteca*	3	Survival in control samples ≥80%	3	100.00

Table 31. SJCDWQC summary of calculated sediment grain size RPDSD results.

Batch calculations based on the relative percent difference (RPD_{SD}) between the standard deviation (SD) of the environmental samples and the standard deviation of their duplicate samples.

SAMPLE TYPE	ANALYSIS MONTH	Φ5	Φ16	Φ84	Φ95	SD	RPD_{SD}
Environmental Sample	March 2012	0.11	1.15	7.32	8.72	2.84	-
Lab Duplicate	March 2012	-0.1	0.82	6.93	8.51	2.83	1.96
Field Duplicate	March 2012	0.01	0.89	7.2	8.66	2.89	1.43
Environmental Sample	September 2012	0.11	1.15	7.32	8.72	2.85	-
Lab Duplicate	September 2012	-0.01	0.82	6.93	8.51	2.83	1.96
Field Duplicate	September 2012	0.01	0.89	7.2	8.66	2.88	1.43

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

DISCUSSION OF RESULTS

Sites monitored during the reporting period are listed in Table 10 in this report. Tables 4, 5 and 6 outline the constituents monitored from January through December 2012.

Current Pesticide Use Report (PUR) data were reviewed in an effort to determine sources of WQTL exceedances of applied pesticides. All PUR data are considered preliminary and may contain some level of inaccuracy until they are finalized and made available through California Pesticide Information Portal (CalPIP). Preliminary data may include zeros or blank cells in the pounds Active Ingredient (AI) per acre column of the PUR appendix (Appendix IV). Preliminary data do not include the pounds AI per acre and therefore it must be calculated based on the amount applied and area reported. In order for the calculations to work properly it requires that the proper units be reported for the amount applied and for the area treated; if there are errors in the data these calculations cannot be performed and will result in a blank cell for AI per acre. An example of such an error includes dry product with units associated with liquid measures and/or liquid products associated with dry units. In some cases the area over which a product is applied has no reported unit; in such cases the pounds AI per acre is incalculable and left blank. Zeros in the pounds AI per acre column are due to values less than 0.0001 being rounded to zero during the calculation process; this occurs when the amount applied relative to an acre is very minimal. The original data are not rounded; only the calculated pounds AI per acre. The most recent data available from the CalPIP website are through December 2010. Table 32 lists the dates for which preliminary PUR data were available for review for Contra Costa, San Joaquin, and Stanislaus Counties. The Coalition does not expect any outstanding PUR data to become available until August 2013; therefore, an addendum to the AMR (Annual Monitoring Report) will be submitted on August 30, 2013.

The Coalition monitored all constituents as required in the MRP and outlined in the MRPP (Table 11, pages 61-63). At least 90% of samples collected during 2012 met data quality objectives for completeness, precision and accuracy. A discussion of all Quality Assurance/ Quality Control can be found in the Precision and Accuracy section of this report. Exceedances of WQTLs were reported to the Regional Board staff within five business days upon receipt of lab results. Four exceedance reports required amendments. An amended toxicity report was submitted on May 3, 2012 to exclude the toxicity reported on May 2, 2012 in sediment samples collected from Kellogg Creek along Hoffman Ln. The July 17, 2012 field exceedance report was sent six days late (August 1, 2012) due to staff oversight. An amendment to the September 18, 2012 sediment toxicity report was submitted on December 19, 2012 to correct a typo in the percent control reported on October 31, 2012 for Unnamed Drain to Lone Tree Creek @ Jack Tone Rd on; the value was changed from 9% to 10% survival compared to the control. An amendment to the January 11, 2013 exceedance report was sent on February 6, 2013 to amend an incorrectly reported value of *E. coli* from 800 to 820 MPN/100. A list of all WQTLs used to evaluate water quality results is included in Table 33. Coalition monitoring from January through December 2012 resulted in exceedances of WQTLs for DO, pH, SC, *E. coli*, TDS, nitrate, copper, chlorpyrifos, dieldrin and diuron (Tables 34-37). Water column toxicity to *C. dubia*, *S. capricornutum,* and sediment toxicity to *H. azteca* also occurred (Tables 38 and 39). The next section summarizes all exceedance data.

A TIE was performed for samples when survival or growth of the respective target organisms was 50% or less compared to the control. Additional chemistry analysis for chlorpyrifos and pyrethroids was performed if survival of the target organism was 80% or less compared to the control. During 2012, no TIE's were performed; therefore, no TIE report is included in Appendix VI.

Table 32. Obtained PUR data for January through December 2012 exceedances.

COUNTY	2012 PUR DATA OBTAINED	2012 PUR DATA OUTSTANDING
Contra Costa	January through December	None
San Joaquin	January through May	June through December
Stanislaus	January through December	None

Table 33. 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 - 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 - Sources of Drinking Water (water & fish consumption)	1
DDE(p,p')	0.00059 µg/L				
DDT(p,p')	0.00059 µg/L				
Dicofol	NA				

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

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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
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	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
Lead	For aquatic life; variable (see lead worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Molybdenum	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan - San Joaquin River, Mouth of the Merced River to Vernalis	1
	50 µg/L			Sacramento/San Joaquin Basin Plan - Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River	
	10 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
	35 µg/L		Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level.	
Nickel	For aquatic life variable (see Nickel worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	100 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Selenium	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
	5 µg/L (4-day average)	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR Freshwater Aquatic Life Protection - Continuous Concentration - 4-Day Average	
Zinc	For aquatic life variable (see Zinc worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness/	1
Nutrients					
Nitrate as 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				
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. WQTL exceedance is based on implementation of narrative objective. All detections should be tracked. None are default exceedances.
MCL- Maximum Contaminant Level
MPN- Most Probable Number
MUN-Municipal and Domestic Supply
NA-Not applicable
ND-Not Detected
USEPA- United States Environmental Protection Agency
(*)-Water Quality Control Plan for the Sacramento and San Joaquin River Basins. Revised 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 and communications are included in Appendix V. If any errors occurred in the original communication of the exceedance, an updated report was emailed to the Regional Board. Tallies of all exceedances occurring from January through December 2012 are listed by constituent group in Tables 34-38. Additional sediment chemistry results associated with sediment toxicity are found in Table 39. Where applicable, exceedances are tallied by the number of NM exceedances, the number of exceedances that occurred in non-contiguous waterbodies (not connected to downstream waterbody), the number of MPM exceedances (red bolded values) and total count for all WQTL exceedances. If an exceedance occurred in both the environmental and the associated field duplicate samples, the result was counted only once.

Table 34. Exceedances of field parameter WQTLs (including DO, pH, and SC).

WQTLs are listed below each constituent. 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 approved January 23, 2009, Prioritization of Exceedances section) or when a site is monitored for a high priority constituent in a management plan.

Station Name	Sample Date	Season	DO <7 µg/L	pH <6.5 or >8.5	SC >700 µS/cm
Grant Line Canal @ Clifton Court Rd	1/17/2012	Winter1	6.00		1966
Grant Line Canal near Calpack Rd	1/17/2012	Winter1			877
Roberts Island @ Whiskey Slough Pump	1/17/2012	Winter1			911
Sand Creek @ Hwy 4 Bypass	1/17/2012	Winter1			1703
Terminous Tract Drain @ Hwy 12	1/17/2012	Winter1			767.7
Walthall Slough @ Woodward Ave	1/17/2012	Winter1	4.07		
Duck Creek @ Hwy 4	2/14/2012	Winter2 Non-contiguous	6.40		
French Camp Slough @ Airport Way	2/14/2012	Winter2		8.78	
Grant Line Canal @ Clifton Court Rd	2/14/2012	Winter2			1742
Grant Line Canal near Calpack Rd	2/14/2012	Winter2	4.60		1475
Kellogg Creek along Hoffman Ln	2/14/2012	Winter2		9.14	
Lone Tree Creek @ Jack Tone Rd	2/14/2012	Winter2			796
Mokelumne River @ Bruella Rd	2/14/2012	Winter2		8.70	
Roberts Island @ Whiskey Slough Pump	2/14/2012	Winter2			1052
Terminous Tract Drain @ Hwy 12	2/14/2012	Winter2			1405
Walthall Slough @ Woodward Ave	2/14/2012	Winter2	0.77		763
Duck Creek @ Hwy 4	3/15/2012	Storm1 Non-contiguous, SED	3.26		
Grant Line Canal @ Clifton Court Rd	3/15/2012	Storm1 SED	4.92		2241
Grant Line Canal near Calpack Rd	3/15/2012	Storm1 SED	6.25		1278
Roberts Island @ Whiskey Slough Pump	3/15/2012	Storm1 SED	5.18		1096
Sand Creek @ Hwy 4 Bypass	3/15/2012	Storm1 SED	4.28		1442
Terminous Tract Drain @ Hwy 12	3/15/2012	Storm1 SED	4.40		1309
Walthall Slough @ Woodward Ave	3/15/2012	Storm1 SED	0.53		767
Grant Line Canal near Calpack Rd	4/12/2012	Storm2	5.11		
Roberts Island @ Whiskey Slough Pump	4/12/2012	Storm2			1345
Terminous Tract Drain @ Hwy 12	4/12/2012	Storm2			997
Walthall Slough @ Woodward Ave	4/12/2012	Storm2	2.69		
Bear Creek @ North Alpine Rd	5/16/2012	Irrigation1	1.90		
Duck Creek @ Hwy 4	5/16/2012	Irrigation1	6.78		
Grant Line Canal @ Clifton Court Rd	5/16/2012	Irrigation1	4.20		2230
Grant Line Canal near Calpack Rd	5/16/2012	Irrigation1	3.35		1118
Kellogg Creek along Hoffman Ln	5/16/2012	Irrigation1		8.89	
Littlejohns Creek @ Jack Tone Rd	5/16/2012	Irrigation1	6.02		
Mormon Slough @ Jack Tone Rd	5/16/2012	Irrigation1	6.48	8.60	
Roberts Island @ Whiskey Slough Pump	5/16/2012	Irrigation1	5.71		867
Sand Creek @ Hwy 4 Bypass	5/16/2012	Irrigation1	3.91		1711
Terminous Tract Drain @ Hwy 12	5/16/2012	Irrigation1	3.61		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	5/16/2012	Irrigation1	6.93		
Walthall Slough @ Woodward Ave	5/16/2012	Irrigation1	1.35		
Duck Creek @ Hwy 4	6/19/2012	Irrigation2	3.89		
Roberts Island @ Whiskey Slough Pump	6/19/2012	Irrigation2	5.31		785
Sand Creek @ Hwy 4 Bypass	6/19/2012	Irrigation2			1439
Terminous Tract Drain @ Hwy 12	6/19/2012	Irrigation2	4.08		
Walthall Slough @ Woodward Ave	6/19/2012	Irrigation2	3.40		
Duck Creek @ Hwy 4	7/17/2012	Irrigation3	4.25		
Grant Line near Calpack Rd	7/17/2012	Irrigation3			858
Kellogg Creek along Hoffman Ln	7/17/2012	Irrigation3		8.51	
Littlejohns Creek @ Jack Tone Rd	7/17/2012	Irrigation3	6.80		
Mormon Slough @ Jack Tone Rd	7/17/2012	Irrigation3	6.58		
Roberts Island @ Whiskey Slough Pump	7/17/2012	Irrigation3	5.60		780

STATION NAME	SAMPLE DATE	SEASON	DO <7 µG/L	PH <6.5 OR >8.5	SC >700 µS/CM
Sand Creek @ Hwy 4 Bypass	7/17/2012	Irrigation3	5.64		1481
Terminous Tract Drain @ Hwy 12	7/17/2012	Irrigation3	3.77		
Walthall Slough @ Woodward Ave	7/17/2012	Irrigation3	6.16		
Duck Creek @ Hwy 4	8/21/2012	Irrigation4	3.50		
French Camp Slough @ Airport Way	8/21/2012	Irrigation4	6.84		
Grant Line Canal near Calpack Rd	8/21/2012	Irrigation4	6.31		1037
Kellogg Creek along Hoffman Ln	8/21/2012	Irrigation4	6.99		
Littlejohns Creek @ Jack Tone Rd	8/21/2012	Irrigation4	5.67		
Roberts Island @ Whiskey Slough Pump	8/21/2012	Irrigation4	3.29		747
Sand Creek @ Hwy 4 Bypass	8/21/2012	Irrigation4	4.28		1709
Terminous Tract Drain @ Hwy 12	8/21/2012	Irrigation4	5.26		
Walthall Slough @ Woodward Ave	8/21/2012	Irrigation4	1.98		
Bear Creek @ North Alpine Rd	9/18/2012	Irrigation5	0.41		
Duck Creek @ Hwy 4	9/18/2012	Irrigation5	0.41		
Grant Line Canal @ Clifton Court Rd	9/18/2012	Irrigation5	3.20		728
Grant Line Canal near Calpack Rd	9/18/2012	Irrigation5	4.66		1264
Kellogg Creek along Hoffman Ln	9/18/2012	Irrigation5		8.86	
Littlejohns Creek @ Jack Tone Rd	9/18/2012	Irrigation5	4.52		
Roberts Island @ Whiskey Slough Pump	9/18/2012	Irrigation5	6.69		1134
Sand Creek @ Hwy 4 Bypass	9/18/2012	Irrigation5	5.92		1826
Terminous Tract Drain @ Hwy 12	9/18/2012	Irrigation5	6.06		
Walthall Slough @ Woodward Ave	9/18/2012	Irrigation5	2.61		
Bear Creek @ North Alpine Rd	10/16/2012	Fall1	1.03		
Duck Creek @ Hwy 4	10/16/2012	Fall1	1.98		
Roberts Island @ Whiskey Slough Pump	10/16/2012	Fall1	4.48		1328
Terminous Tract Drain @ Hwy 12	10/16/2012	Fall1	5.32		
Walthall Slough @ Woodward Ave	10/16/2012	Fall1	3.98		
Duck Creek @ Hwy 4	11/6/2012	Fall2	2.66		
French Camp Slough @ Airport Way	11/6/2012	Fall2, Non-contiguous	5.90		
Littlejohns Creek @ Jack Tone Rd	11/6/2012	Fall2	5.55		
Roberts Island @ Whiskey Slough Pump	11/6/2012	Fall2	5.64		1446
Terminous Tract Drain @ Hwy 12	11/6/2012	Fall2	5.73		1476
Duck Creek @ Hwy 4	11/7/2012	Fall2	2.60		
Roberts Island @ Whiskey Slough Pump	12/3/2012	Storm3	5.79		1511
Terminous Tract Drain @ Hwy 12	12/3/2012	Storm3	4.17		824
Walthall Slough @ Woodward Ave	12/3/2012	Storm3	5.63		701
		Non-contiguous Waterbody Exceedances	**3**	**0**	**0**
		TOTAL Exceedances	**68**	**7**	**41**

SED – Sediment monitoring

Table 35. Exceedances of *E. coli*, nutrients, metals and physical parameters WQTLs.

If a field duplicate and an environmental sample both exceeded the WQTL, only the environmental sample exceedance was included in this table. If an exceedance in the field duplicate sample and not the environmental sample occurred, the field duplicate result was included and noted by (FD) at the end of the station name. Constituents under a management plan that are not applied by agriculture are classified as Priority E constituents and are monitored only as a part of Normal Monitoring and not counted toward MPM exceedances (see Management Plan approved January 23, 2009, Prioritization of Exceedances section). Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season	*E. coli* 235 MPN/100 mL	TDS 450 mg/L	Nitrate + Nitrite 10 mg/L	Copper Dissolved[1] (hardness based trigger limit) µg/L
Roberts Island @ Whiskey Slough Pump	1/17/2012	Winter1		620		
Terminous Tract Drain @ Hwy 12	1/17/2012	Winter1		530		
Roberts Island @ Whiskey Slough Pump	2/14/2012	Winter2		550		
Terminous Tract Drain @ Hwy 12	2/14/2012	Winter2		820		
Walthall Slough @ Woodward Ave	2/14/2012	Winter2		500		
Roberts Island @ Whiskey Slough Pump	3/15/2012	Storm1 SED		740		
Terminous Tract Drain @ Hwy 12	3/15/2012	Storm1 SED		900		
Walthall Slough @ Woodward Ave	3/15/2012	Storm1 SED		490		
French Camp Slough at Airport Way	4/12/2012	Storm2	>2400			
Roberts Island @ Whiskey Slough Pump	4/12/2012	Storm2	690	620		
Terminous Tract Drain @ Hwy 12	4/12/2012	Storm2		640		
French Camp Slough at Airport Way	5/16/2012	Irrigation1	440			
Roberts Island @ Whiskey Slough Pump	5/16/2012	Irrigation1	260	550		
French Camp Slough at Airport Way	6/19/2012	Irrigation2	250			
Roberts Island @ Whiskey Slough Pump	6/19/2012	Irrigation2		570		
French Camp Slough at Airport Way	7/17/2012	Irrigation3	320			
Roberts Island @ Whiskey Slough Pump	7/17/2012	Irrigation3		520		
Terminous Tract Drain @ Hwy 12	8/21/2012	Irrigation4	280			
Roberts Island @ Whiskey Slough Pump	9/18/2012	Irrigation5	270	690		
Roberts Island @ Whiskey Slough Pump	10/16/2012	Fall1		1000		
Roberts Island @ Whiskey Slough Pump	11/6/2012	Fall2		840		
Terminous Tract Drain @ Hwy 12	11/6/2012	Fall2		980		
Walthall Slough @ Woodward Ave	11/6/2012	Fall2		460		
Duck Creek @ Hwy 4	12/3/2012	Storm3	>2400			3.60 (3.56)
French Camp Slough @ Airport Way	12/3/2012	Storm3	>2400			
Mokelumne River @ Bruella Rd	12/3/2012	Storm3	>2400			
Roberts Island @ Whiskey Slough Pump	12/3/2012	Storm3	820	960	11	
Terminous Tract Drain @ Hwy 12	12/3/2012	Storm3	>2400	580	13	
Walthall Slough @ Woodward Ave	12/3/2012	Storm3		500	12	
Normal Monitoring Exceedances			**13**	**21**	**3**	**1**
Non-contiguous Waterbody Exceedances			**0**	**0**	**0**	**0**
Management Plan Monitoring Exceedances[2]			**0**	**0**	**0**	**0**
TOTAL Exceedances			**13**	**21**	**3**	**1**

[1] If copper exceedance is the dissolved fraction of copper, the limit based on hardness is indicated in parenthesis.
[2] Management Plan Monitoring not conducted for nutrients, *E. coli*, TDS or arsenic even if they are under a management plan.
SED-Sediment monitoring

Table 36. Exceedances of pesticide WQTLs.

If a field duplicate and an environmental sample both exceeded the WQTL, only the environmental sample exceedance was included in this table. If an exceedance in the field duplicate sample and not the environmental sample occurred, the field duplicate result was included and noted by (FD) at the end of the station name. Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season	Monitoring Type[1]	Chlorpyrifos 0.015 µg/L	Dieldrin 0.00014 µg/L	Diuron 2.0 µg/L
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2/14/2012	Winter2	MPM			**2.4**
Sand Creek @ Hwy 4 Bypass	6/19/2012	Irrigation2	MPM		**0.096**	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	12/3/2012	Storm3	MPM	**0.019**		
			Normal Monitoring Exceedances	**0**	**0**	**0**
			Non-contiguous Waterbody Exceedances[2]	**0**	**0**	**0**
			Management Plan Monitoring Exceedances[3]	**1**	**1**	**1**
			TOTAL Exceedances	**1**	**1**	**1**

MPM – Management Plan Monitoring
[1]Monitoring type refers to the type of monitoring the constituent that exceeded the WQTL was undergoing during the month of monitoring.
[2]Non-contiguous waterbody exceedances that occurred at an MPM site are counted in both MPM exceedance and non-contiguous waterbody exceedance rows.
[3]Managment Plan Monitoring exceedance totals include sites either scheduled for MPM only or scheduled for NM and MPM.

Table 37. Water column and sediment toxicity exceedance summary.

If a field duplicate and an environmental sample both exceeded the WQTL, only the environmental sample exceedance was included in this table. If an exceedance in the field duplicate sample and not the environmental sample occurred, the field duplicate result was included and noted by (FD) at the end of the station name. Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season & Monitoring Type[1]	Species	Toxicity End Point	Mean	Percent Control	Toxicity Significance	Summary Comments
Duck Creek @ Hwy 4	3/15/2012	Storm1 NM, Non-contiguous, SED	*H. azteca*	Survival (%)	61	**68**	SL	Pyrethroids and chlorpyrifos detected.
Sand Creek @ Hwy 4 Bypass	3/15/2012	Storm1 MPM, SED	*H. azteca*	Survival (%)	57	**63**	SL	Pyrethroids detected.
Grant Line Canal @ Clifton Court Rd	5/16/2012	Irrigation1 MPM	*S. capricornutum*	Total Cell Count (cells/mL)	49801 0	**57**	SL	
Grant Line Canal near Calpack Rd	8/21/2012	Irrigation 4 MPM	*C. dubia*	Survival (%)	60	**60**	SL	
Duck Creek @ Hwy 4	9/18/2012	Irrigation5 MPM, NM, SED	*H. azteca*	Survival (%)	0	**0**	SL	Pyrethroids and chlorpyrifos detected.
Grant Line Canal @ Clifton Court Rd	9/18/2012	Irrigation5 MPM, SED	*H. azteca*	Survival (%)	4	**4**	SL	Pyrethroids and chlorpyrifos detected.
Grant Line Canal near Calpack Rd	9/18/2012	Irrigation5 MPM, SED	*H. azteca*	Survival (%)	0	**0**	SL	Pyrethroids and chlorpyrifos detected.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/18/2012	Irrigation5 MPM, SED	*H. azteca*	Survival (%)	9	**10**	SL	Pyrethroids and chlorpyrifos detected.

MPM – Management Plan Monitoring
SED – Sediment monitoring
SL-Statistically significantly different from control; Less than 80% threshold
[1]Season & Sample Type column includes the type of monitoring the toxic species was undergoing during the month of monitoring.

Table 38. Water column toxicity tally.

If a field duplicate and an environmental sample both exceeded the WQTL, only the environmental sample exceedance was included in this table. If an exceedance in the field duplicate sample and not the environmental sample occurred, the field duplicate result was included and noted by (FD) at the end of the station name. Red bolded values represent MPM exceedances.

Monitoring Type	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Normal Monitoring Exceedances	0	0	0	1
Non-contiguous Waterbody Exceedances[1]	0	0	0	1
Management Plan Monitoring Exceedances[2]	**1**	**0**	**1**	**4**
Total	1	0	1	6

[1]Non-contiguous waterbody exceedances that occurred at a MPM site are counted in both MPM exceedance and non-contiguous waterbody exceedance rows.
[2]Management Plan Monitoring exceedance totals include sites either scheduled for MPM only or scheduled for NM and MPM.

Table 39. Sediment toxicity chemistry results for samples with 80% or less survival compared to control.

Station Name	Sample Date	Monitoring Type	H. azteca (%Control)	Sediment Pesticides µg/kg dw										TOC (mg/Kg dw)	Mean GS Description	Median GS (mm)
				Bifenthrin, µg/kg	Chlorpyrifos, µg/kg	Cyfluthrin, µg/kg	Cyhalothrin, lambda µg/kg	Cypermethrin, µg/kg	Deltamethrin:Tralomethrin, µg/kg	Esfenvalerate/Fenvalerate, µg/kg	Fenpropathrin, µg/kg	Permethrin, µg/kg	Tetramethrin µg/kg			
Duck Creek @ Hwy 4	3/15/2012	NM, Non-contiguous, SED	68	1.6	J0.40	ND	ND	ND	ND	ND	ND	ND	ND	21000	Sand (Fine)[1]	0.049
Sand Creek @ Hwy 4 Bypass	3/15/2012	MPM, SED	63	27.2	ND	4.7	1.7	J0.69	1.5	ND	ND	2.4	ND	18000	Silt[2]	0.025
Duck Creek @ Hwy 4	9/18/2012	MPM, NM, SED	0	59	1.8	ND	0.49	ND	ND	J0.25	ND	ND	ND	22000	Sand (Fine)[1]	0.037
Duck Creek @ Hwy 4 (FD)	9/18/2012	MPM, NM, SED	0	160	2.3	ND	0.84	ND	ND	0.59	J0.08	ND	ND	22000	Silt[2]	0.023
Grant Line Canal @ Clifton Court Rd	9/18/2012	MPM, SED	0	5.3	3.2	ND	20	1.8	ND	33	ND	ND	ND	45000	Silt[2]	0.014
Grant Line Canal near Calpack Rd	9/18/2012	MPM, SED	4	45	0.99	ND	0.59	ND	ND	J0.20	ND	1.8	ND	21000	Silt[2]	0.008
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	9/18/2012	MPM, SED	10	35	13	ND	1.6	ND	ND	7	2	6	ND	21000	Sand (Fine)[1]	0.057

GS- Grain Size
J-Estimated value
MPM-Management Plan Monitoring
ND- Not Detected
SED-Sediment monitoring
TOC- Total Organic Carbon
[1]Sand (Fine): 0.075 to <0.425 mm
[2]Silt: 0.005 to <0.075 mm

DISCUSSION OF EXCEEDANCES

Pesticide Use Report Data

Available PUR data are provided to the Coalition from each of the County Agricultural Commissioner's offices and registered products recorded in the database are evaluated for applications relevant to exceedances of WQTLs. To assess possible sources of toxicity, 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, pesticides with a relatively high K_{oc} (1600 or greater) are considered potential causes. If water toxicity occurs, pesticides with a relatively low K_{oc} (below 1900) are evaluated. Most pesticides were queried for applications made within 30 days prior to water sampling. Applications of pyrethroid pesticides, due to their long half-life, are queried for a period of 180 days prior to the date of the exceedance, and metals are queried for a period of 90 days prior to the exceedance (Table 40). If there were no applications within the specified time period, the PUR database was queried 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. When PUR data for any county are unattainable the Coalition makes a note in Appendix IV. Information regarding available and outstanding PURs is included in Table 32. Any outstanding PUR will be submitted in an addendum to the AMR on August 30, 2013.

If exceedances of WQTLs for aldrin, dieldrin, endrin, hexachlorocyclohexane (HCH), DDD, DDE, DDT or molybdenum occur, these constituents cannot be queried for associated applications since there are no longer any registered products containing these chemicals. Of the exceedances of pesticide WQTLs in 2012, PUR data could not be associated or queried for dieldrin because it is not a registered product; therefore there are no longer any applications of the product recorded in the PUR database.

Table 40. Pesticide Use Data collected for reported exceedances.

EXCEEDANCE TYPE	PESTICIDE USE DATA COLLECTED
Pesticides	30 days
Metals	90 days
Sediment Toxicity	90 days with 180 days for pyrethroids
Water Column Toxicity	30 days with 180 days for pyrethroids and 90 days for metals

Exceedances that occurred in 2012 are tabulated by zone in Tables 41-46. The tables are followed by a discussion of exceedances and an assessment of agricultural pesticide applications that are potential sources of the exceedances. All PUR data relevant to pesticide exceedances and toxicity are based on pounds (lbs) of AI applied upstream of the sampling site. Measures taken to address these exceedances are described in the Actions Taken to Address Water Quality Exceedances section of this report.

Zone 1 (Bear Creek @ North Alpine Rd and Mokelumne River @ Bruella Rd)

Field Parameters and E. coli

In Zone1, exceedances of the WQTLs for DO (3), pH (1) and *E. coli* (1) occurred from January through December 2012 (Table 41). Both locations in Zone 1 were monitored for MPM constituents during months of past exceedances and Mokelumne River @ Bruella Rd was monitored for Core constituents (Tables 5 and 6).

Exceedances of water quality objectives for field parameters such as DO, SC and pH are difficult to track and source. All of these parameters are non-conserved meaning that they can increase or decrease as water moves downstream. The concentrations of these parameters are the result of processes occurring in the water column and in the sediment. These processes can vary diurnally and seasonally. In the case of SC, tidal flux plays a significant role in determining the Delta salinity. All three of the exceedances of the WQTL for DO occurred at Bear Creek @ North Alpine Rd and ranged from 0.41 to 1.90 mg/L. Discharge was less than 1 cfs during all months of MPM at Bear Creek @ North Alpine Rd; these low flow conditions may have contributed to the low DO detected during monitoring.

An exceedance of the upper WQTL for pH of 8.5 occurred during one monitoring event in February (8.70) at Mokelumne River @ Bruella Rd. During the December 3, 2012 storm event, a single exceedance of the 235 MPN/100mL WQTL for *E. coli* occurred at Mokelumne River @ Bruella Rd with >2400 MPN/mL. This was the only exceedance of the WQTL for *E. coli* at the location during 2012. There are a few dairies located upstream of the Mokelumne River @ Bruella Rd sample location, and it is possible that the dairies could have contributed to the elevated levels of *E. coli* detected in samples collected from the site during the December storm event. Heavy rainfall from November 31 through December 2, 2012 was recorded as well as increased flows in the Mokelumne River. Any storm runoff carrying bacteria from dairies in the subwatershed could have transported the bacteria to the waterway and contributed to the exceedance of the WQTL for *E. coli*. Although dairies are not allowed to discharge into the waterways, past instances of dairy discharge have been noted in the Coalition area and can result in detections of bacteria in the water column. Furthermore, dairies have also been known to sell manure compost to adjacent farms where the compost is applied as fertilizer. If environmental conditions are suitable and manure compost has not been managed and/or applied properly, it is possible for bacteria to flourish and contribute to exceedance level detections of bacteria if allowed to enter the waterway. It is possible that the December storm exceedance of the WQTL for *E. coli* was associated with applications of manure in the subwatershed (Table 41). The December exceedance of the WQTL of *E. coli* was the first exceedance to occur in Mokelumne River @ Bruella Rd since October 2011 and the concentration was the highest ever recorded in the subwatershed.

Table 41. Zone 1 (Bear Creek @ North Alpine Rd and Mokelumne River @ Bruella Rd) exceedances.

Zone 1 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	*E. coli*, MPN/100 mL
Bear Creek @ North Alpine Rd	MPM	5/16/2012	1.90		
Bear Creek @ North Alpine Rd	MPM	9/18/2012	0.41		
Bear Creek @ North Alpine Rd	MPM	10/16/2012	1.03		
Mokelumne River @ Bruella Rd	MPM, NM	2/14/2012		8.70	
Mokelumne River @ Bruella Rd	NM	12/3/2012			>2400

MPM-Management Plan Monitoring
NM-Normal Monitoring

Zone 2 (Duck Creek @ Hwy 4, French Camp Slough @ Airport Way, Littlejohns Creek @ Jack Tone Rd, Lone Tree Creek @ Jack Tone Rd, Mormon Slough @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd)

Field Parameters and E. coli

In Zone 2, exceedances of the WQTLs for DO (20), pH (2), SC (1) and *E. coli* (7) occurred from January through December 2012 (Table 42). All locations in Zone 2 were monitored for MPM constituents during months of past exceedances in 2012; Duck Creek @ Hwy 4 was the Assessment Monitoring location and French Camp @ Airport Way was also monitored for Core constituents (Tables 5 and 6). Two sites in Zone 2 were monitored as non-contiguous waterbodies in 2012; Duck Creek @ Hwy 4 (February and March) and French Camp Slough @ Airport Way (November).

Of the 20 exceedances of the WQTL for DO, there were 10 at Duck Creek @ Hwy 4 (two non-contiguous), two at French Camp @ Airport Way (one non-contiguous), five at Littlejohns Creek @ Jack Tone Rd, two at Mormon Slough @ Jack Tone Rd and one at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Discharge was less than 1 cfs during all months of MPM at Littlejohns Creek @ Jack Tone Rd and Mormon Slough @ Jack Tone Rd; these low flow conditions may have contributed to the low DO detected at the sites.

Both of the exceedances of the WQTL for pH were above the upper limit of 8.5; one occurred at French Camp Slough @ Airport Way (February) and the other at Mormon Slough @ Jack Tone Rd (May). The single exceedance of the WQTL for SC occurred during February MPM at Lone Tree Creek @ Jack Tone Rd.

During 2012 Assessment Monitoring at Duck Creek @ Hwy 4, a single exceedance of the WQTL for *E. coli* occurred in both the environmental sample and field duplicate collected during the December storm monitoring event. This was the only time elevated levels of *E. coli* were detected in Duck Creek during 2012 monitoring. Heavy rainfall from November 31 through December 2, 2012 was recorded and increased flows in Duck Creek (discharge was too deep to measure). Any storm runoff carrying bacteria from dairies in the subwatershed could have contributed to the exceedance of the WQTL for *E. coli* during the December storm monitoring event. A dairy operation is located directly across Hwy 4 from the sample site. Five exceedances of the WQTL for *E. coli* of 235 MPN/100mL occurred at French Camp Slough @ Airport Way from April through July and ranged from 250 to 2400 MPN/mL. During 2012, none of the tributaries to French Camp Slough were monitored for *E. coli* (Littlejohns Creek, Lone Tree Creek and Unnamed Drain to Lone Tree Creek drain into French Camp Slough @ Airport Way). There are numerous dairies in the subwatersheds upstream of French Camp Slough @ Airport Way and in the Duck Creek @ Hwy 4 subwatershed. It is possible that dairy discharge or manure fertilizer applications could have contributed to the elevated levels of *E. coli* detected in samples collected from the sites. French Camp exceedances of the WQTL for *E. coli* occurred from April through June and during the December storm event; the highest concentrations occurred in April and in December when heavy rainfall was recorded in the area (Table 42).

Copper

There are a number of possible sources of copper in waterbodies within the Coalition region. Copper is applied as a fungicide to a variety of vegetable crops, grains, and fruit and nut orchards in forms such as copper hydroxide, copper sulfide and copper oxide. Copper can also enter drainage systems from sources other than agriculture. Copper is commonly used by dairies and can also enter waterbodies 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 urban areas. A definitive source for copper exceedances has not been clearly identified in the Coalition region; however, there are four potential sources including 1) recent agricultural applications (either through storm/irrigation runoff or spray drift), 2) dairy uses of copper sulfate in footbaths, 3) resuspension of historic copper from upstream mining, brake pads and other anthropogenic uses, and 4) copper used for algae and aquatic weed control in irrigation supply ditches. Dissolved copper results are adjusted for the hardness of the water to determine if the bioavailable amount of copper could be toxic to aquatic life. Therefore, the WQTL for dissolved copper will be different for each sample. In Zone 2, there was an exceedance of the WQTL for hardness based dissolved copper during the December storm event in both environmental sample and field duplicate (Table 42).

Samples collected during the third storm event on December 3, 2012 at Duck Creek @ Hwy 4 contained 3.60 µg/L dissolved copper in the environmental sample and 3.70 µg/L in the associated field duplicate. This was the first exceedance of the hardness based dissolved copper WQTL at Duck Creek @ Hwy 4. Toxicity was not associated with the elevated levels of copper. Heavy rainfall from November 31 through December 2, 2012 was recorded and increased flows significantly in Duck Creek (discharge was too deep to measure). Storm runoff could have transported copper to the creek contributing to the exceedance of the hardness based WQTL for copper that occurred during the December event. The PUR data associated with the December 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 August 30, 2013.

Chlorpyrifos

Chlorpyrifos is an organophosphate pesticide applied for pest control on a wide variety of crops in California. In a waterbody, 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 *C. dubia* is 0.055µg/L. In Zone 2 one exceedance of the WQTL for chlorpyrifos occurred in 2012 in samples collected from Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Table 42).

Samples collected for MPM during the third storm event on December 3, 2012 from Unnamed Drain to Lone Tree Creek @ Jack Tone Rd resulted in a detection above the WQTL for chlorpyrifos containing 0.019µg/L (Table 42). Heavy rainfall from November 31 through December 2, 2012 was recorded and increased flows significantly in Unnamed Drain. Discharge recorded in November was only 0.03 cfs compared to 42.71 cfs in December. Any storm runoff carrying pesticides could have contributed to the exceedance of the WQTL for chlorpyrifos that occurred during the December storm event. There are vineyards in the subwatershed and growers have been known to apply chlorpyrifos during winter months to eradicate vine mealybug larvae before the spring growing season. The PUR data associated with the December 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 August 30, 2013. Management Plan Monitoring for chlorpyrifos will continue at Unnamed Drain to Lone Tree Creek during months of past exceedances in 2013.

Diuron

Diuron is a broad-spectrum herbicide used for weed control on agriculture, highway rights of way, and by homeowners. It inhibits photosynthesis and also affects seed germination. Diuron has a half-life (in soil) of about 90 days and is very mobile. Diuron inhibits growth of *S. capricornutum* with an Effective Concentration of 50% of the measured endpoint (EC_{50}) of 2.4 µg/L compared to the WQTL of 2 µg/L (Table 42). A single exceedance of the diuron WQTL occurred in MPM samples collected in Zone 2.

Samples for diuron MPM were collected from Unnamed Drain to Lone Tree Creek @ Jack Tone Rd in January and February; the second winter event samples in February resulted in an exceedance of the diuron WQTL with 2.4 µg/L. The PUR data associated with the February exceedance of the WQTL for diuron indicate there were three applications between 6.60 and 114.00 lbs AI of diuron (Dupont Direx 4L Herbicide and Diuron 4L) across 120 acres of wine grapes and alfalfa on December 12 and 14, 2011 and January 27, 2012 (Appendix IV). No toxicity was associated with this exceedance. Management Plan Monitoring for diuron will continue at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd in 2013.

Toxicity

In Zone 2, five sediment samples were toxic to *H. azteca*, four of the toxic samples (environmental and field duplicate samples) occurred during March and September Assessment Monitoring at Duck Creek @ Hwy 4. The fifth toxicity occurred during September sediment MPM at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Table 42).

Sediment samples were collected from Duck Creek @ Hwy 4 on March 15, 2012 and were toxic to *H. azteca* with 68% (environmental) and 92% (field duplicate) survival compared to the control. At that time, Duck Creek was non-contiguous. Since survival was less than 80% compared to the control in the environmental sample, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was required. The chemistry results for the March samples are reported in Table 39 and indicate detections of bifenthrin (1.6 µg/kg dw) and chlorpyrifos (0.40 µg/kg dw, estimated value). Total organic carbon concentration was 21,000 mg/kg for this sample with a median grain size of 0.049 mm (fine sand). The PUR data indicate that a total of 18 applications ranging between 0.87 and 539 lbs AI were associated with this toxicity. The majority of applications were to olive, walnut and outdoor plants across 380 acres between September 30, 2011 and March 12, 2012 (Appendix IV). September 18, 2012 sediment samples were again toxic to *H. azteca* with 0% survival compared to the control for both the environmental and field duplicate samples. Since survival was less than 80% compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was required. The chemistry results for the September samples are reported in Table 39. Detections of pyrethroids and chlorpyrifos occurred in both environmental and field duplicate samples including bifenthrin (59 and 160 µg/kg dw), chlorpyrifos (1.8 and 2.3 µg/kg dw), lambda cyhalothrin (0.49 and 0.84 µg/kg dw), esfenvalerate/fenvalerate (J0.25 and 0.59 µg/kg dw) and fenpropathrin (J0.080 µg/kg dw field duplicate only). Total organic carbon concentration was 22,000 mg/kg for both the environmental sample and field duplicate with a median grain size of 0.037 mm (fine sand) in the environmental sample and 0.023 mm (silt) in the field duplicate. The PUR data associated with the 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 August 30, 2013. The March toxicity was the second time Duck Creek @ Hwy 4 sediment samples tested toxic to *H. azteca* (sediment was toxic for the first time in September 2010); therefore, sediment toxicity will be added to the sites management plan in 2013. Monitoring resulting in management plans will be discussed in more detail in the MPUR to be submitted on April 1, 2013.

Sediment MPM on September 18, 2012 at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd resulted in toxicity to *H. azteca* with 10% survival compared to the control. Since survival was less than 80% compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was performed. The chemistry results for the September samples are reported in Table 39. Detections of pyrethroids and chlorpyrifos occurred: bifenthrin (35 µg/kg dw), chlorpyrifos (13 µg/kg dw), lambda cyhalothrin (1.6 µg/kg dw), esfenvalerate/fenvalerate (7 µg/kg dw), fenpropathrin (2 µg/kg dw) and permethrin (6 µg/kg dw). Total organic carbon concentration was 21,000 mg/kg for this sample with a median grain size of 0.057 mm (fine sand). The PUR data associated with the 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 August 30, 2013. Management Plan Monitoring for sediment toxicity will continue at Unnamed Drain to Lone Tree Creek in 2013.

Table 42. Zone 2 (Duck Creek @ Hwy 4, French Camp Slough @ Airport Way, Littlejohns Creek @ Jack Tone Rd, Lone Tree Creek @ Jack Tone Rd, Mormon Slough @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd) exceedances.

Zone 2 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, None	SC, µS/cm	*E. coli*, MPN/100 mL	Copper Dissolved, µg/L (hardness based trigger limit)	Chlorpyrifos, µg/L	Diuron, µg/L	*H. azteca*, % control
Duck Creek @ Hwy 4	MPM, Non-contiguous, NM	2/14/2012	6.40							
Duck Creek @ Hwy 4	NM, Non-contiguous, SED	3/15/2012	3.26							68
Duck Creek @ Hwy 4-FD	NM, Non-contiguous, SED	3/15/2012								92
Duck Creek @ Hwy 4	MPM, NM	5/16/2012	6.78							
Duck Creek @ Hwy 4	MPM, NM	6/19/2012	3.89							
Duck Creek @ Hwy 4	MPM, NM	7/17/2012	4.25							
Duck Creek @ Hwy 4	MPM, NM	8/21/2012	3.50							
Duck Creek @ Hwy 4	MPM, NM, SED	9/18/2012	0.41							0
Duck Creek @ Hwy 4-FD	MPM, NM, SED	9/18/2012								0
Duck Creek @ Hwy 4	NM	10/16/2012	1.98							
Duck Creek @ Hwy 4	NM	11/6/2012	2.66							
Duck Creek @ Hwy 4	NM*	11/7/2012	2.60							
Duck Creek @ Hwy 4	NM	12/3/2012				>2400	3.60 (3.56)			
Duck Creek @ Hwy 4-FD	NM	12/3/2012				>2400	3.70 (3.65)			
French Camp Slough @ Airport Way	MPM, NM	2/14/2012		8.78						
French Camp Slough @ Airport Way	MPM, NM	4/12/2012				>2400				
French Camp Slough @ Airport Way	MPM, NM	5/16/2012				440				
French Camp Slough @ Airport Way	MPM, NM	6/19/2012				250				
French Camp Slough @ Airport Way	MPM, NM	7/17/2012				320				
French Camp Slough @ Airport Way	MPM, NM	8/21/2012	6.84							
French Camp Slough @ Airport Way	NM, Non-contiguous	11/6/2012	5.90							
French Camp Slough @ Airport Way	NM	12/3/2012				>2400				
Littlejohns Creek @ Jack Tone Rd	MPM	5/16/2012	6.02							
Littlejohns Creek @ Jack Tone Rd	MPM	7/17/2012	6.80							
Littlejohns Creek @ Jack Tone Rd	MPM	8/21/2012	5.67							
Littlejohns Creek @ Jack Tone Rd	MPM	9/18/2012	4.52							
Littlejohns Creek @ Jack Tone Rd	MPM	11/6/2012	5.55							
Lone Tree Creek @ Jack Tone Rd	MPM	2/14/2012			796					
Mormon Slough @ Jack Tone Rd	MPM	5/16/2012	6.48	8.60						
Mormon Slough @ Jack Tone Rd	MPM	7/17/2012	6.58							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	2/14/2012							2.4	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	5/16/2012	6.93							
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM, SED	9/18/2012								10
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	12/3/2012						0.019		

*Samples recollected for water column toxicity only.
FD-Field duplicate sample
MPM-Management Plan Monitoring
NM-Normal Monitoring
SED-Sediment monitoring

Zone 3 (Terminous Tract Drain @ Hwy 12)

Field Parameters, TDS and E. coli

In Zone 3, exceedances of the WQTLs for DO (9), SC (6), TDS (5), *E. coli* (2) and nitrate (1) occurred in 2012 at Terminous Tract Drain @ Hwy 12 (Table 43). Terminous Tract Drain was the only location monitored in Zone 3 during 2012; monitoring occurred for Core constituents and MPM (Tables 5 and 6). In June 2012, the Coalition was notified by the secretary and attorney for RD 548 (Terminous Tract) that Caltrans road construction would be taking place upstream of the Terminous Tract sampling site from July through the end of 2012 and into 2013 (construction completion date unknown). Caltrans conducted road operations from mid-July through October 2012 then halted construction until after the rainy season. During 2012, Caltrans construction resulted in a significant amount of sediment suspension in the waterway which lasted for several months while culverts were replaced under the road site. In August, elevated levels of TSS and turbidity were detected (1420 mg/L TSS and 380 NTU turbidity); water flows were recorded at 47.98 cfs (Appendices II and III). Caltrans halted construction for the rainy season in the fall of 2012 and the chemical asphalt had not been applied at the time of this report.

Exceedances of the WQTL for DO occurred in March and every month from May through December and ranged from 3.61 to 6.06 mg/L (Table 43). During 2012, two exceedance of the WQTL for *E. coli* occurred in samples collected during August and December. The December monitoring event resulted in high levels of bacteria (>2400 MPN/100 mL) (Table 43). Heavy rainfall from November 31 through December 2, 2012 was recorded resulting in increased flows in the drain (discharge was too deep to measure). Any storm runoff carrying bacteria from anthropogenic sources (site is near a major highway and a mobile home park) or fertilizer/manure applications in the subwatershed could have contributed to the exceedance of the WQTL for *E. coli* during the December storm monitoring event. The December exceedance was associated with high salts, low DO and high nitrates (Table 43).

High salinity levels resulting in exceedances of the WQTLs for SC and TDS are common in the Delta islands due to 1) tidal influence in the area, 2) management of water resources and 3) weather pattern variability. When various factors cause freshwater flows to decrease, salinity levels increase in the Delta. Upstream structure controls (reservoirs that retain freshwater before it enters the Delta) and precipitation levels that affect the amount of Sierra snowmelt captured during the spring are both factors that influence freshwater flows. Values of SC above the 700 µS/cm WQTL occurred from January through April as well as in November and December. Exceedances of the WQTL for SC typically coincide with elevated levels of TDS; exceedances of the WQTLs for TDS and SC occurred from January through April and in November and December.

Nitrates

Potential sources of nitrate in surface waters include fertilizer or organic matter runoff 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 3, a single exceedance of the WQTL for nitrate occurred in samples collected during the December storm event at Terminous Tract Drain @ Hwy 12 (Table 43). The December exceedance of nitrate was the first recorded exceedance of nitrate at Terminous Tract Drain. Heavy rainfall from November 31 through December 2, 2012 occurred and increased flows in the drain (water was too deep to measure discharge). The elevated levels of nitrates also coincided with an exceedance of the WQTL for *E. coli*, this was the second time elevated levels of *E. coli* were recorded at the site during 2012; however, the December event resulted in the highest detection recorded during the year.

Table 43. Zone 3 (Terminous Tract Drain @ Hwy 12) exceedances.

Zone 3 Station Name	Monitoring Type	Sample Date	DO, mg/L	SC, µS/cm	TDS, mg/L	*E. coli*, MPN/100 mL	Nitrate + Nitrite as N, mg/L
Terminous Tract Drain @ Hwy 12	MPM, NM	1/17/2012		767.7	530		
Terminous Tract Drain @ Hwy 12	MPM, NM	2/14/2012		1405	820		
Terminous Tract Drain @ Hwy 12	MPM, NM, SED	3/15/2012	4.40	1309	900		
Terminous Tract Drain @ Hwy 12	MPM, NM	4/12/2012		997	640		
Terminous Tract Drain @ Hwy 12	NM	5/16/2012	3.61				
Terminous Tract Drain @ Hwy 12	NM	6/19/2012	4.08				
Terminous Tract Drain @ Hwy 12	NM	7/17/2012	3.77				
Terminous Tract Drain @ Hwy 12	MPM, NM	8/21/2012	5.26			280	
Terminous Tract Drain @ Hwy 12	MPM, NM, SED	9/18/2012	6.06				
Terminous Tract Drain @ Hwy 12	NM	10/16/2012	5.32				
Terminous Tract Drain @ Hwy 12	NM	11/6/2012	5.73	1476			
Terminous Tract Drain @ Hwy 12	NM	12/3/2012	4.17	824	580	>2400	13

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

Zone 4 (Grant Line Canal @ Clifton Court Rd, Grant Line Canal near Calpack Rd, Kellogg Creek along Hoffman Ln and Roberts Island @ Whiskey Slough Pump)

Field Parameters, TDS, E. coli and nitrate

In Zone 4, exceedances of the WQTLs of DO (20), pH (4), SC (24), TDS (11), *E. coli* (4) and nitrate (1) occurred from January through December 2012 (Table 44). All locations in Zone 4 were monitored for MPM constituents during months of past exceedances and Roberts Island @ Whiskey Slough Pump was also monitored for Core constituents (Tables 5 and 6).

Sites in Zone 4 are agricultural drains within Delta islands and require pumping to remove 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 4 to have exceedances of WQTLs for DO and salt (SC and TDS) due to a lack of flow. In 2012, the highest measurable flow at sites monitored in Zone 4 was 13.89 cfs at Kellogg Creek along Hoffman Ln. Values of DO were below the WQTL of 7 mg/L and ranged from 3.20 to 6.99 mg/L; exceedances of the DO WQTL occurred at all four of the Zone 4 monitoring locations (Table 44). Four exceedances of the upper WQTL for pH of 8.5 occurred at Kellogg Creek along Hoffman Ln. Salinity exceedances are common in Zone 4 due to a majority of the locations being Delta islands. All of the locations within Zone 4 (with the exception of Kellogg Creek along Hoffman Ln) had at least one exceedance of the WQTL for SC with values ranging from 728 to 2241 µS/cm. All exceedances of the WQTL for TDS coincided with exceedances of the WQTL for SC at Roberts Island @ Whiskey Slough Pump.

Four exceedances of the WQTL for *E. coli* occurred at Roberts Island @ Whiskey Slough Pump (April, May, September and December) and ranged from 260 to 820 MPN/100 mL (Table 44). A single exceedance of the WQTL for nitrate occurred in samples collected during the December storm event at Roberts Island @ Whiskey Slough Pump (Table 44). Roberts Island @ Whiskey Slough Pump was monitored for Core Monitoring constituents during 2012. This is the first exceedance of the WQTL for nitrate to occur at any site monitored on Lower Roberts Island. Heavy rainfall from November 31 through December 2, 2012 occurred (discharge was too deep to measure). Any storm runoff carrying nitrates from upstream in the subwatershed could have contributed to the exceedance of the WQTL for nitrate during the December storm monitoring event. The elevated levels of nitrates also coincided with an exceedance of the WQTL for *E. coli*; the December event resulted in the highest detection of *E. coli* recorded at the site in 2012.

Toxicity

In Zone 4, water column toxicity occurred twice, once to *C. dubia* and once to *S. capricornutum* (Table 44). Both toxic samples were collected as per the MPM schedule outlined in the SJCDWQC MPUR. Samples for September sediment MPM were toxic to *H. azteca* at both Grant Line Canal @ Clifton Court Rd and Grant Line Canal near Calpack Rd (Table 44).

Samples collected for MPM at Grant Line Canal @ Clifton Court Rd for *S. capricornutum* were toxic (57% growth compared to the control) on May 16, 2012 (Table 44). A TIE was not initiated since the toxicity compared to the control was greater than 50%. There was no MPM scheduled for metals or herbicides during the May sampling event. The PUR data indicate that a total of 34 applications ranging between 0.49 and 119 lbs AI were associated with this toxicity. The majority of applications were to asparagus, corn, and tomato across 1287 acres between April 22, 2012 and May 16, 2012 (Appendix IV). Sediment collected on September 18, 2012 from Grant Line Canal @ Clifton Court Rd was toxic to *H. azteca* (4% compared to the control). Since survival was less than 80% compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was performed. Chemistry results for September sediment samples are reported in Table 38 and detections of bifenthrin (5.3 µg/kg dw), chlorpyrifos (3.2 µg/kg dw), lambda cyhalothrin (20 µg/kg dw), cypermethrin (1.8 µg/kg dw) and esfenvalerate/fenvalerate (33 µg/kg dw) occurred. Total organic carbon concentration was 45,000 mg/kg for this sample with a median grain size of 0.014 mm (silt). The PUR data associated with the 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 August 30, 2013. Toxicity MPM for *S. capricornutum* and *H. azteca* will continue to occur at Grant Line Canal @ Clifton Court Rd in 2013. All MPM results will be discussed in more detail in the MPUR to be submitted on April 1, 2013.

Samples collected for MPM at Grant Line Canal near Calpack Rd on August 21, 2012 were toxic to *C. dubia* (60% growth compared to the control, Table 44). Chlorpyrifos was not detected during August MPM. A TIE was not conducted since the growth was greater than 50% compared to the control. During the toxicity analysis, the laboratory noted that ammonia levels were elevated (3.8 mg/L). The PUR data associated with the 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 August 30, 2013. Sediment collected on September 18, 2012 from Grant Line Canal near Calpack Rd was toxic to *H. azteca* (0% compared to the control). Since survival was less than 80% compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was required. Chemistry results for the September samples are reported in Table 39; detections of bifenthrin (45 µg/kg dw), chlorpyrifos (0.99 µg/kg dw), cyhalothrin (0.59 µg/kg dw), esfenvalerate/fenvalerate (J0.20 µg/kg dw) and permethrin (1.8 µg/kg dw) occurred. Total organic carbon concentration was 21,000 mg/kg for this sample with a median grain size of 0.008 mm (silt). The PUR data associated with the 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 August 30, 2013. Toxicity MPM for *C .dubia* and *H. azteca* will continue at Grant Line Canal near Calpack Rd in 2013. All MPM results will be discussed in more detail in the MPUR to be submitted on April 1, 2013.

Table 44. Zone 4 (Grant Line Canal @ Clifton Court Rd, Grant Line Canal near Calpack Rd, Kellogg Creek along Hoffman Ln and Roberts Island @ Whiskey Slough Pump) exceedances.

Zone 4 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, None	SC, µS/cm	*E. coli*, MPN/100 mL	TDS, mg/L	Nitrate + Nitrite as N, mg/L	*C. dubia*, % Control	*S. capricornutum*, % Control	*H. azteca*, % control
Grant Line Canal @ Clifton Court Rd	MPM	1/17/2012	3.00		1966						
Grant Line Canal @ Clifton Court Rd	MPM	2/14/2012			1742						
Grant Line Canal @ Clifton Court Rd	MPM, SED	3/15/2012	4.92		2241						
Grant Line Canal @ Clifton Court Rd	MPM	5/16/2012	4.20		2230					57	
Grant Line Canal @ Clifton Court Rd	MPM, SED	9/18/2012	3.20		728						4
Grant Line Canal near Calpack Rd	MPM	1/17/2012			877						
Grant Line Canal near Calpack Rd	MPM	2/14/2012	4.60		1475						
Grant Line Canal near Calpack Rd	MPM, SED	3/15/2012	6.25		1278						
Grant Line Canal near Calpack Rd	MPM	4/12/2012	5.11								
Grant Line Canal near Calpack Rd	MPM	5/16/2012	3.35		1118						
Grant Line Canal near Calpack Rd	MPM	7/17/2012			858						
Grant Line Canal near Calpack Rd	MPM	8/21/2012	6.31		1037				60		
Grant Line Canal near Calpack Rd	MPM, SED	9/18/2012	4.66		1264						0
Kellogg Creek along Hoffman Ln	MPM	2/14/2012		9.14							
Kellogg Creek along Hoffman Ln	MPM	5/16/2012		8.89							
Kellogg Creek along Hoffman Ln	MPM	7/17/2012		8.51							
Kellogg Creek along Hoffman Ln	MPM	8/21/2012	6.99								
Kellogg Creek along Hoffman Ln	MPM, SED	9/18/2012		8.86							
Roberts Island @ Whiskey Slough Pump	NM	1/17/2012			911		620				
Roberts Island @ Whiskey Slough Pump	NM	2/14/2012			1052		550				
Roberts Island @ Whiskey Slough Pump	NM	3/15/2012	5.18		1096		740				
Roberts Island @ Whiskey Slough Pump	MPM, NM	4/12/2012			1345	690	620				
Roberts Island @ Whiskey Slough Pump	MPM, NM	5/16/2012	5.71		867	260	550				
Roberts Island @ Whiskey Slough Pump	NM	6/19/2012	5.31		785		570				
Roberts Island @ Whiskey Slough Pump	MPM, NM	7/17/2012	5.60		780		520				
Roberts Island @ Whiskey Slough Pump	MPM, NM	8/21/2012	3.29		747						
Roberts Island @ Whiskey Slough Pump	MPM, NM, SED	9/18/2012	6.69		1134	270	690				
Roberts Island @ Whiskey Slough Pump	NM	10/16/2012	4.48		1328		1000				
Roberts Island @ Whiskey Slough Pump	NM	11/6/2012	5.64		1446		840				
Roberts Island @ Whiskey Slough Pump	NM	12/3/2012	5.79		1511	820	960	11			

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

Zone 5 (Walthall Slough @ Woodward Ave)

Field Parameters and nitrate

In Zone 5, exceedances of the WQTLs for DO (11), SC (3) and TDS (4) occurred from January through December 2012 (Table 45). The only sampling location suitable for Coalition monitoring is Walthall Slough @ Woodward Ave. Walthall Slough @ Woodward Ave is the Core Monitoring location in Zone 5 and the site was monitored for MPM constituents during months of past exceedances as well as chlorpyrifos and diazinon as part of the chlorpyrifos and diazinon TMDL (Tables 5 and 6).

Exceedances of the WQTL for DO occurred during every month from January through December with the exception of November and ranged from 0.53 to 6.16 mg/L. During February, March and December exceedances of the WQTLs for SC and TDS coincided.

A single exceedance of the WQTL for nitrate occurred in samples collected during the December storm monitoring event (Table 45). Heavy rainfall from November 31 through December 2, 2012 occurred and increased flows in Walthall Slough. Flows in the slough were recorded at only 1.8 cfs in November and 4.45 cfs in December. There are numerous dairies located in the subwatershed. Any storm runoff carrying nitrates from upstream dairies in the subwatershed could have contributed to the exceedance of the WQTL for nitrate during the December storm monitoring event.

Table 45. Zone 5 (Walthall Slough @ Woodward Ave) exceedances.

Zone 5 Station Name	Monitoring Type	Sample Date	DO, mg/L	SC, µS/cm	TDS, mg/L	Nitrate + Nitrite as N, mg/L
Walthall Slough @ Woodward Ave	NM	1/17/2012	4.07			
Walthall Slough @ Woodward Ave	NM	2/14/2012	0.77	763	500	
Walthall Slough @ Woodward Ave	MPM, NM, SED	3/15/2012	0.53	767	490	
Walthall Slough @ Woodward Ave	NM	4/12/2012	2.69			
Walthall Slough @ Woodward Ave	NM	5/16/2012	1.35			
Walthall Slough @ Woodward Ave	NM	6/19/2012	3.40			
Walthall Slough @ Woodward Ave	NM	7/17/2012	6.16			
Walthall Slough @ Woodward Ave	MPM, NM	8/21/2012	1.98			
Walthall Slough @ Woodward Ave	MPM, NM, SED	9/18/2012	2.61			
Walthall Slough @ Woodward Ave	MPM, NM	10/16/2012	3.98			
Walthall Slough @ Woodward Ave	NM	11/6/2012			460	
Walthall Slough @ Woodward Ave	NM	12/3/2012	5.63	701	500	12

NM-Normal Monitoring
MPN-Most Probable Number
SED-Sediment monitoring

Zone 6 (Sand Creek @ Hwy 4 Bypass)

Field Parameters

In Zone 6, exceedances of the WQTLs for DO (5) and SC (7) occurred from January through December 2012. Monitoring in Zone 6 was scheduled at a single MPM location, Sand Creek @ Hwy 4 Bypass.

During 2012, five exceedances of the WQTL for DO occurred. Discharge at Sand Creek was less than 1 cfs during all months of MPM; these low flow conditions could have contributed to the low DO detected during most monitoring events. Exceedances of the WQTL for SC occurred during every MPM event. It is typical for SC to be above 1400 µS/cm at Sand Creek @ Hwy 4 Bypass; in 2012, SC detections ranged from 1439 to 1826 µS/cm (Table 46).

Dieldrin

Dieldrin is an organochlorine insecticide. Dieldrin was used as a wood preservative, to control termites and insects such as locusts and mosquitoes; the product was applied to cotton, corn and citrus crops until it was banned in 1987. Dieldrin is no longer produced in the United States and it has been banned globally due to its toxic effects on humans, fish and wildlife (http://www.panna.org/resources/organochlorines). The chemical is extremely persistent and does not break down easily in the environment becoming bioaccumulative (increasing in concentration as it moves up the food chain) in humans and other wildlife (http://www.epa.gov/pbt/pubs/aldrin.htm). Dieldrin has a high K_{oc} and consequently binds to sediment where it can remain for extended periods of time. All detections of dieldrin in the environment are from past uses and therefore no PUR data can be associated with the legacy pesticide. In Zone 6, one exceedance of the dieldrin WQTL occurred during MPM (Table 46).

Samples collected for dieldrin MPM from Sand Creek @ Hwy 4 Bypass resulted in an exceedance of the WQTL with 0.096 µg/L on June 19, 2012. Dieldrin MPM will continue during months of past exceedances at Sand Creek @ Hwy 4 Bypass in 2013.

Toxicity

In Zone 6, one instance of sediment toxicity occurred during March storm MPM at Sand Creek @ Hwy 4 Bypass (Table 46).

Sediment toxicity to *H. azteca* occurred during the storm MPM at Sand Creek @ Hwy 4 Bypass on March 15, 2012 (63% survival compared to the control). Chemistry analysis was performed on the sediment samples (Table 39) and the following pesticides were detected: bifenthrin (27.2 µg/kg dw), cyfluthrin (4.7 µg/kg dw), cypermethrin (J0.69 µg/kg dw), deltamethrin: tralomethrin (0.59 µg/kg dw), lambda-cyhalothrin (1.7 µg/kg dw), deltamethrin: tralomethrin (1.5 µg/kg dw) and permethrin (2.4 µg/kg dw). Total organic carbon concentration was 18,000 mg/kg for this sample with a median grain size of 0.025 mm (silt). The PUR data indicate that a total of 3 applications of pyrethroids ranging between 0.99 and 1.2 lbs AI were associated with this toxicity. All three applications were to fruiting pepper on a total of 8 acres on September 22, 2011. The applications were made by air indicating a potential for spray drift from parcels adjacent to the creek being treated (Appendix IV). During 2013, MPM for sediment toxicity will continue at Sand Creek @ Hwy 4 Bypass.

Table 46. Zone 6 (Sand Creek @ Hwy 4 Bypass) exceedances.

Zone 6 Station Name	Monitoring Type	Sample Date	DO, mg/L	SC, µS/cm	Dieldrin, µg/L	*H. azteca*, % control
Sand Creek @ Hwy 4 Bypass	MPM	1/17/2012		1703		
Sand Creek @ Hwy 4 Bypass	MPM, SED	3/15/2012	4.28	1442		63
Sand Creek @ Hwy 4 Bypass	MPM	5/16/2012	3.91	1711		
Sand Creek @ Hwy 4 Bypass	MPM	6/19/2012		1439	0.096	
Sand Creek @ Hwy 4 Bypass	MPM	7/17/2012	5.64	1481		
Sand Creek @ Hwy 4 Bypass	MPM	8/21/2012	4.28	1709		
Sand Creek @ Hwy 4 Bypass	MPM, SED	9/18/2012	5.92	1826		

MPM-Management Plan Monitoring
SED- Sediment monitoring

ACTIONS TAKEN TO ADDRESS WATER QUALITY EXCEEDANCES

The Coalition conducts monitoring of ambient surface waters to characterize discharges from irrigated agriculture. Results from each event within a monitoring season are used to identify constituents, agricultural lands, crops and/or specific pesticides that need to be managed to reduce or eliminate runoff from agriculture to surface water. Actions taken to determine the potential sources of chemicals causing exceedances may include the following: 1) the use of PUR data 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 they are appropriate and cost effective.

The Coalition notified the Regional Board of all exceedances with electronically submitted Exceedance Reports (Appendix V). Any discrepancies or omissions were described in the Discussion of Results section.

The Coalition also notifies members of exceedances and works with growers to address water quality impairments. Monitoring results are disseminated to Coalition members via grower mailings, at grower outreach meetings and in some cases, by personal communication with growers. Appendix VII includes sampling of mailings, meeting agendas and handouts; all documents associated with outreach are available from the Coalition upon request. The Coalition encourages growers to be cognizant of water quality concerns and, when applicable, to implement management practices designed to improve water quality. Grower notification, management practice outreach and education, and management practice implementation and tracking are all additional actions taken by the Coalition to ensure that growers are aware of and taking actions to address downstream water and sediment quality concerns.

MANAGEMENT PRACTICES

The Coalition provides growers with information through mailings and meetings concerning different management practices designed to 1) reduce storm water runoff, 2) manage discharge of irrigation tailwater, 3) spray management and 4) avoid mobilization of sediments into receiving waters. Applicable management practices include use of alternative products, structural or procedural changes to manage irrigation and storm water, and utilizing pesticide application practices that minimize spray drift.

The Coalition obtains management practice information by conducting focused outreach to growers in subwatersheds operating under a management plan. The Coalition's Management Plan includes a schedule of prioritized subwatersheds and details regarding the prioritization strategy (last updated in the 2012 MPUR, Table 6, page 19). 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. The information provided in 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.

The Coalition conducted focused outreach in the first and second sets of priority site subwatersheds: Duck Creek @ Hwy 4, Lone Tree Creek @ Jack Tone Road and Unnamed Drain to Lone Tree Creek @ Jack Tone Road (2008-2010) and Littlejohn's Creek @ Jack Tone Road, Grant Line Canal @ Clifton Court and Grant Line Canal near Calpack Road (2010-2012). Initial grower meetings, during which current management practices and any recommended practices were documented, and follow up meetings, which assessed the implementation of new management practices, are complete for 100% of targeted growers in all six subwatersheds. The Coalition reported results of all focused outreach in first and second priority subwatersheds in the 2011 MPUR Summary of Implemented Management Practices section (pages 43-71). During 2010, the Coalition conducted additional focused outreach to 12 members in the Duck Creek subwatershed due to continued exceedances of the WQTL for chlorpyrifos in the subwatershed. The Coalition contacted growers who reported continued use of chlorpyrifos and operated parcels in close proximity to the creek; the results were reported in the 2012 MPUR (pages 45-47). The Coalition also conducted additional, individual contacts in the first and second priority subwatersheds during 2012. The Coalition contacted three, two, three and two members in the Duck Creek, Lone Tree Creek, Unnamed Drain to Lone Tree Creek and Littlejohns Creek subwatersheds; respectively, during May and June of 2012 to discuss water quality and review management practices (Table 47). The results of these additional contacts will be reported in the 2013 MPUR.

The Coalition continued its focused outreach and management practice tracking strategy in the third set of high priority subwatersheds (2011-2013): French Camp Slough @ Airport Way, Mokelumne River @ Bruella Rd, and Terminous Tract Drain @ Hwy 12. The Coalition completed initial contact meetings with 100% of targeted growers in 2011 (Actions Taken to Address Water Quality Exceedances section of the 2012 AMR, pages 125-133), and the Coalition reported results in the Management Practices section of the 2012 MPUR (pages 50-66). The Coalition sent a follow up mailing to targeted growers on January 13, 2012 that included a follow up survey with instructions to complete and return the survey (Table 47). The Coalition has since received and recorded 100% of follow up survey responses in the database. Results of follow up contacts will be reported in the 2013 MPUR.

The Coalition also initiated focused outreach in the fourth set of high priority subwatersheds (2012-2014): Kellogg Creek along Hoffman Ln, Mormon Slough @ Jack Tone Rd, and Sand Creek @ Hwy 4 Bypass. A mailing on December 14, 2011 and a reminder postcard on January 5, 2012 notified targeted growers of initial contact meetings (Table 47). Growers were informed of the management practice tracking strategy and their responsibilities to complete a survey at the January 19, 2012 (Mormon Slough) and January 20, 2012 (Kellogg Creek and Sand Creek) grower meetings (Table 47). On September 20, 2012, the Coalition sent reminder mailings to 15 growers who had yet to return their initial contact surveys, and the remaining seven growers with outstanding surveys were reminded again via phone calls in October 2012 (Table 47). On January 25, 2013, the Coalition mailed a final notice to two and four growers in the Mormon Slough and Kellogg Creek subwatersheds, respectively, informing the growers they had until February 15, 2013 to complete and return their initial contact surveys or they would lose their Coalition membership. As of February 15, 2013, the Coalition had not received any surveys from the six outstanding members. Information attained from members in these subwatersheds will be reported in the 2013 MPUR.

The Coalition began focused outreach for the fifth set of high priority subwatersheds (2013-2015): Bear Creek @ North Alpine Rd, Roberts Island @ Whiskey Slough Pump and Walthall Slough @ Woodward Ave. The Coalition mailed letters on January 8, 2013 to the eight, seven and nine targeted growers in the Bear Creek, Roberts Island and Walthall Slough subwatersheds; respectively, announcing upcoming required initial contact meetings (Table 47). The meetings were held on January 22, 2013. The Coalition will report on the results of the fifth priority initial contact meetings in the 2014 AMR and on the results obtained from surveys in the 2014 MPUR.

OUTREACH AND EDUCATION

Outreach and education activities are an important component of the Coalition monitoring program. The Coalition continues to provide information to growers through mailings, regular meetings and workshops, meetings conducted by the County Agricultural Commissioner and by personal contact. During 2012 grower meetings, the Coalition presented information to members concerning the Coalition's progress in achieving water quality goals, site subwatershed specific monitoring results and management practices proven to be effective to reduce the discharge of pesticides to waterbodies. All outreach and education activities are documented in Table 47.

To keep growers informed of relevant Coalition news, the Coalition distributes a newsletter. The newsletter was mailed to all members in May 2012 and highlighted the implications of the upcoming, long term ILRP. Articles outlined new nutrient regulations, continued pesticide impairments in surface waterways and management practices to reduce pesticide water quality impairments.

Overall, Coalition representatives conducted or participated in 16 meetings from January 2012 through December 2012. Of those meetings, 13 addressed irrigation water quality, storm water quality and sediment runoff. Ten meetings included discussions of specific site subwatershed management plans, and six meetings included discussions of management practices.

The Coalition continues to coordinate with other entities to educate broader grower audiences, including growers who are not Coalition members. The 60th Annual Lodi Grape Day occurred on February 7, 2012 and an estimated 625 growers attended presentations from field experts on topics such as invasive species and eradication processes, mildew and bunch rot and applicable management practices, and potassium nutrition. Several presentations during the 60th Annual Lodi Grape Day were available in Spanish. On February 8, 2012, the Coalition participated in the Stockton area Spray Safe Sponsored Grower Meeting to discuss applicable laws and regulations, management practices and new technologies used to promote safe pesticide use. The Coalition also participated in the Tomato Drip Irrigation Workshop on March 9, 2012. Coalition representatives, along with University of California Davis and University of California Cooperative Extension (UCCE) representatives discussed implementing drip irrigation on tomato crops as a management practice to reduce irrigation runoff and offsite movement of agricultural constituents. Thirty-five growers attended the Tomato Drip Irrigation

Workshop which was also available as a webinar. An email on February 17, 2012 announcing the workshop was sent to growers listed as contacts of the UCCE in San Joaquin County, and an advertisement for the workshop ran in the San Joaquin County Farm Bureau Monthly Newsletter and UCCE Farm Advisor Brenna Aegerter's newsletter. Coalition representatives presented at two continuing education classes hosted by the Contra Costa County Agricultural Commissioner on November 17 and December 4, 2012. Topics included water quality and exceedances, grower responsibilities, management practices and management practice funding. Lastly, a Coalition representative participated in the Mid Valley Pesticide (MVP) Safety Consulting Pesticide Control Advisor's (PCA's) Meeting on December 17, 2012 (the pesticide safety branch of Mid Valley Ag). The representative discussed monitoring results, the management plan strategy and status, and the long term ILRP and implications for members to an audience of 35 growers. All MVP clients were invited, which includes approximately 210 growers, through an announcement sent on November 19, 2012.

The Coalition participated in the annual San Joaquin County Agricultural Commissioner's Meetings that occur each fall. Coalition representatives gave presentations at the eight San Joaquin County meetings that occurred between November 13 and December 11, 2012 (Appendix VII). Presentations included information on monitoring results and exceedances, management plan strategy and status, the long term ILRP and grower responsibilities. Over 1,100 growers attended the eight meetings.

The Coalition hosts a website which serves as a clearing house for Coalition activities and outreach on management practices (http://www.sjdeltawatershed.org/). Information provided through the website is a useful supplement to regular grower contacts and meetings. Interested entities can find information on past exceedances in site subwatersheds, management plans, links to management practices websites, upcoming grower meeting dates and the long term ILRP.

PEST CONTROL ADVISORS, AGRICULTURAL COMMISSIONERS, AND REGISTRANTS

The Coalition collaborates with County Agricultural Commissioners, PCAs, and pesticide registrants to provide growers within the SJCDWQC region with information on effective management practices. As mentioned above, the Coalition participated in the February 8, 2012 meeting hosted by Spray Safe, presented at two grower continuing education classes hosted by the Contra Costa County Agricultural Commissioner on November 17 and December 4, 2012, and participated in the MVP Safety Consulting PCA's Meeting on December 17, 2012. Coalition representatives also participated at the eight San Joaquin County Agricultural Commissioner Meetings held in November and December 2012 (Table 47).

Table 47. Outreach and education activities performed by the SJCDWQC during 2012.

All grower notifications, management practice tracking and management practice outreach and education activities covered all agricultural constituents.

Area	Date	Category	Details	Who
Kellogg Creek, Mormon Slough, and Sand Creek subwatersheds (4th P)	14-Dec-11	Grower Notification / Management Practice Tracking	4th Priority Initial Contact Grower Meeting Announcement Mailing: sent to 11 Kellogg Creek members, 31 Mormon Slough members, and 1 Sand Creek member. Packet contained a cover letter explaining the management plan process, grower responsibilities and meeting details. A letter from the CVRWQCB and management practice survey was also included.	Mike Wackman
Kellogg Creek, Mormon Slough, and Sand Creek subwatersheds (4th P)	5-Jan-12	Grower Notification / Management Practice Tracking	4th Priority Initial Contact Grower Meeting Reminder Postcard: sent to 11 Kellogg Creek members, 34 Mormon Slough members, and 1 Sand Creek member.	Mike Wackman
French Camp Slough, Mokelumne River, and Terminous Tract Subwatersheds (3rd P)	13-Jan-12	Grower Notification / Management Practice Tracking	3rd Priority Follow Up Mailing: sent to 13 French Camp Slough members, 11 Mokelumne River members, and 4 Terminous Tract members. Mailing included follow up survey with instructions to complete and return the survey to the Coalition.	Mike Wackman
Mormon Slough subwatershed (4th P)	19-Jan-12	BMP Outreach and Education / Management Practice Tracking	4th Priority Initial Contact Grower Meeting: 26 of the 31 targeted members attended the meeting. Coalition staff discussed the management plan high priority subwatershed tracking process, the water quality concerns for the local subwatershed, and helped growers to fill out their individual management practice surveys.	Terry Prichard, Mike Wackman
Kellogg Creek and Sand Creek subwatersheds (4th P)	20-Jan-12	BMP Outreach and Education / Management Practice Tracking	4th Priority Initial Contact Grower Meeting: 8 of the 12 targeted members attended the meeting (7 from Kellogg Creek and 1 from Sand Creek). Coalition staff discussed the management plan high priority subwatershed tracking process, the water quality concerns for the local subwatershed, and helped growers to fill out individual management practice surveys.	Terry Prichard, Mike Wackman
Lodi	7-Feb-12	BMP Outreach and Education	60th Annual Lodi Grape Day: 625 in attendances. Presentations included invasive species and eradication processes, mildew and bunch rot and applicable management practices, and potassium nutrition. Presentations available in Spanish.	Terry Prichard
Stockton	8-Feb-12	BMP Outreach and Education	Spray Safe Grower Meeting: more than 200 growers attended. Meeting topics included management practices and water quality, applicable laws and regulations, and new technologies.	Mike Wackman
San Joaquin County	17-Feb-12	Grower Notification	Tomato Drip Irrigation Workshop Announcement Mailing: sent to entire UCCE San Joaquin County grower list, approximately 1,000 growers.	Terry Prichard
San Joaquin County	Mar-2012	Grower Notification	San Joaquin County Farm Bureau Monthly Newsletter and UCCE Farm Advisor Brenna Aegerter's newsletter Meeting Announcement: sent to all growers on either entity's mailing list. Newsletters contained advertisement for Tomato Drip Irrigation Workshop on March 9, 2012.	Terry Prichard

Area	Date	Category	Details	Who
Stockton	9-Mar-12	BMP Outreach and Education	Tomato Drip Irrigation Workshop: 35 growers attended. UC Davis, UCCE, and Coalition representatives discussed implementing drip irrigation on tomato crops as a management practice to reduce irrigation runoff and offsite movement of agricultural constituents. The meeting was also available as a webinar.	Terry Prichard
Entire Coalition Region	May-2012	Grower Notification	Coalition Newsletter: mailed to all members. Included articles on the upcoming new WDR, new nutrient regulations, continued pesticide impairments in surface waterways, and management practices to reduce pesticide water quality impairments.	Mike Wackman, John Brodie, MLJ-LLC
Duck Creek, Lone Tree Creek, and Unnamed Drain to Lone Tree Creek (1st P) and Littlejohns Creek (2nd P)	May and June 2012	Grower Notification / Management Practice Tracking	Additional Individual Grower Meetings: 3 Duck Creek, 2 Lone Tree Creek, 3 Unnamed Drain to Lone Tree Creek, and 5 Littlejohns Creek growers. Coalition representative met individually with growers to discuss water quality and review management practices. Phone calls were made to schedule the individual meetings.	Terry Prichard
Kellogg Creek and Mormon Slough subwatersheds (4th P)	20-Sep-12	Grower Notification / Management Practice Tracking	4th Priority Initial Contact Grower Surveys Reminder Mailing: sent to 7 Kellogg Creek members and 8 Mormon Slough members who had yet to return their initial grower survey. Cover letter reviewed the management plan strategy process and member responsibilities. The mailing included a letter from the CVRWQCB and management practice survey. Growers were instructed to return surveys by October 8, 2012.	Mike Wackman
Kellogg Creek and Mormon Slough subwatersheds (4th P)	Oct-2012	Grower Notification / Management Practice Tracking	4th Priority Initial Contact Grower Surveys Reminder Phone Calls: to 5 Kellogg Creek members and 2 Mormon Slough members who had yet to return their initial grower survey.	Terry Prichard
San Joaquin County (Lodi Staff)	13-Nov-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 107 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman
Contra Costa County	17-Nov-12	BMP Outreach and Education	Contra Costa County Agricultural Commissioner Continuing Education Course. Reviewed water quality and exceedances, grower responsibilities, management practices and management practice funding.	Mike Wackman
Entire Coalition Region	19-Nov-12	Grower Notification	Mid-Valley Ag Services MVP Safety Program Meeting Announcement: sent to all MVP clients (210 growers).	Terry Prichard
San Joaquin County (Simms Staff)	20-Nov-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 193 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman

Area	Date	Category	Details	Who
San Joaquin County (Lodi Staff)	27-Nov-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 189 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman
San Joaquin County (Stockton Staff)	27-Nov-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 103 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman
San Joaquin County (Simms Staff)	29-Nov-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 99 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman
San Joaquin County (Simms Staff)	4-Dec-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 222 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman
San Joaquin County (Lodi Staff)	4-Dec-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 111 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman
Contra Costa County	4-Dec-12	BMP Outreach and Education	Contra Costa County Agricultural Commissioner Continuing Education Course. Reviewed water quality and exceedances, grower responsibilities, management practices and management practice funding.	John Brodie
San Joaquin County (Stockton Staff)	11-Dec-12	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 166 attendees at meeting. Reviewed Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term Irrigated Lands Program, and implications for members.	Mike Wackman
Linden Area	17-Dec-12	BMP Outreach and Education	Mid-Valley Ag Services MVP Safety Program Meeting: 35 attendees. Coalition representative reviewed past years Coalition monitoring results and status of management plan strategy. Discussed updates in regulations, the long term ILRP, and implications for members.	Terry Prichard
Bear Creek, Roberts Island, and Walthall Slough subwatersheds (5th P)	8-Jan-13	Grower Notification / Management Practice Tracking	5th Priority Initial Contact Grower Meeting Announcement Mailing: sent to 8 Bear Creek members, 7 Roberts Island members, and 9 Walthall Slough members. Packet contained a cover letter and letter from the Regional Board explaining the management plan process and grower responsibilities, meeting details and agenda, and grower survey.	Mike Wackman
Kellogg Creek and Mormon Slough subwatersheds (4th P)	1/25/13	Grower Notification / Management Practice Tracking	4th Priority Initial Contact Grower Surveys Final Mailing: sent to 4 Kellogg Creek members and 2 Mormon Slough members who had yet to return their initial grower survey. Cover letter indicated the growers would be dropped from the Coalition if they did not respond by Feb. 15, 2013.	Mike Wackman

BMP – Best management practice
MVP – Mid Valley Pesticide
P – Priority
UCCE – University of California County Extension

STATUS OF MANAGEMENT PLANS AND SPECIAL PROJECTS

The SJCDWQC developed 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 includes TMDL requirements for dischargers and requires that dischargers comply with the monitoring and management criteria defined in the Basin Plan. If a single exceedance occurs for a constituent under an EPA approved TMDL (TMDL constituents include chlorpyrifos, diazinon, dissolved oxygen, salinity/boron and methyl mercury), a management plan will be required for that constituent and site subwatershed. In addition, if there is no TMDL for a constituent, a management plan will be developed if more than one exceedance of the same parameter at the same location occurs within a three year period.

A management plan requires additional focused efforts within subwatersheds. Coalition efforts include but are not limited to: 1) continued monitoring as outlined in the Coalition's approved MRPP, 2) analysis of PUR data, 3) MPM, 4) site subwatershed grower meetings, 5) encouraging and evaluating implementation of management practices, and 6) addressing the seven surveillance and monitoring objectives described in the Basin Plan, where applicable. The Coalition addresses toxicity, and exceedances involving pesticides, and sediment bound analytes with specific management practices whether or not there is a TMDL in place. A narrative concerning each monitoring constituent was provided in the Coalition's Management Plan approved on January 23, 2009 (pages 23-36) as well as an explanation of how the Coalition prioritizes exceedances to meet the TMDL requirements for Coalition members (pages 38-43). The MPUR to be submitted on April 1, 2013 will document all management plan related activities that occurred during 2012.

If there are two or more consecutive years of monitoring at a site with no exceedances of the WQTL for the management plan constituent (either during Core Monitoring, Assessment Monitoring, MPM, or a combination of any of the three), the Coalition may petition to remove the constituent from an active management plan.

The Coalition was approved on March 22, April 17 and May 21, 2012 to remove specific site/constituent pairs from active management plans. Based on 2012 monitoring, the Coalition submitted a second letter petitioning to remove specific site/constituent pairs from active management plans to the Regional Board on November 13, 2012; this letter is still pending approval. Table 48 lists all of the specific site/constituent pairs approved for removal from active management plans including when the site was last monitored for Assessment Monitoring constituents and when the site will rotate into Assessment Monitoring again. Two consecutive years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality due to improved grower awareness of the offsite movement of agricultural constituents and/or newly implemented management practices. The Coalition will monitor the locations listed in Table 48 when the sites rotate into Assessment Monitoring.

Table 48. Status of management plan constituents at SJCDWQC site subwatersheds (active-X, removed-grey cell, or pending approval to remove-P).

Site Subwatershed	Most Recent Assessment Monitoring	Future Assessment Monitoring	DO*	pH*	SC*	Arsenic	Copper (Total & Dissolved)	Lead (Total & Dissolved)	Ammonia	*E. coli*	Nitrate/Nitrite	TDS	Chlorpyrifos	DDE	DDT	Diazinon	Dieldrin	Diuron	Disulfoton	HCH, delta	Malathion	Simazine	*C. dubia* Toxicity	*H. azteca* Toxicity	*P. promelas* Toxicity	*S. capricornutum* Toxicity
Bear Creek @ North Alpine Rd	2011	after 2035	X	X						X			X								X					
Drain @ Woodbridge Rd	2010	after 2035	X		X	X				X		X	X													
Duck Creek @ Hwy 4	2012	2035	X							X			X										X	X		
French Camp Slough @ Airport Way	2011	2014	X	X			P	P		X			X			P		P					P	X		P
Grant Line Canal @ Clifton Court	2008†	after 2035	X	P	X	X				X		X	P	X										X		X
Grant Line Canal near Calpack Rd	2008†	after 2035	X		X	X				X		X	P											X		X
Kellogg Creek along Hoffman Ln	2008†	after 2035	P	X	X		P			X		X	P	X	X								P	X		P
Littlejohns Creek @ Jack Tone Rd	2008†	2021	X				X			X			X			P										P
Lone Tree Creek @ Jack Tone Rd	2008†	2026	P	X					X	X		X	P												X	
Mokelumne River @ Bruella Rd	2011	2014		X						X													P			P
Mormon Slough @ Jack Tone Rd	2008†	2017	X	X									X										P			P
Roberts Island @ Whiskey Slough Pump	2014	2017	X	X	X					X		X	X	X				X					X	X		X
Sand Creek @ Hwy 4 Bypass	2008†	NA	X		X					X		X	P	X	X	P	X		P				P	X		P
South Webb Tract Drain	2009	after 2035	X		X	X				X		X														
Terminous Tract Drain @ Hwy 12	2010	2013	X		X	X				X		X	X											X		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	2008†	2030	X		X		X	X		X		X	X					X						X		
Walthall Slough @ Woodward Ave	2010	2013	X		X					X	X	X	X							X				X		
Total Approved to be removed 2012 (Grey Cells)			**1**	**1**	**1**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**4**
Total Pending 2013 (P)			**2**	**1**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**3**	**0**	**1**	**1**	**0**	**0**	**0**	**5**	**0**	**0**	**6**
Total Management Plan Constituents Remaining Active (X)			**16**	**8**	**10**	**5**	**4**	**2**	**1**	**16**	**1**	**11**	**15**	**4**	**2**	**3**	**1**	**3**	**0**	**1**	**1**	**0**	**7**	**10**	**1**	**9**

*Field parameters will continue to be monitored during Assessment, Core and Management Plan Monitoring events.
†Site was monitored for Assessment Monitoring constituents under the 2006 MRPP where monitoring was not defined as Core or Assessment Monitoring.
"X" the constituent is still in an active management plan.
"P" the Coalition is in the process of requesting the constituent to be approved by the Regional Board for removal from the sites management plan.
Grey shaded cells indicate the constituent has been approved for removal from the site subwatershed's management plan.
NA-No Assessment Monitoring will occur in Zone 6 due to large urban influence.

The Coalition's Management Plan also describes the Coalition's strategy for evaluating new management practices implemented to reduce the effects of agricultural practices on water quality. As illustrated in the Actions Taken to Address Water Quality Exceedances section, intensive outreach and documentation of management practices occur throughout the Coalition region when sites rotate into high priority status. An updated proposed schedule for addressing each site subwatershed as high priority will be provided in the MPUR (to be submitted on April 1, 2013).

The 2013 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 and
4. Status of TMDL constituents and Basin Plan requirements.

SPECIAL PROJECTS

The only special project monitoring other than scheduled MPM that took place in the Coalition region during 2012 was TMDL monitoring to evaluate compliance with representative monitoring approved TMDLs. Approved TMDLs for within the SJCDWQC region are for the following constituents: chlorpyrifos and diazinon, salt and boron, DO and *E. coli*.

Chlorpyrifos and Diazinon

The TMDL Monitoring subsection of the Monitoring Objectives and Design section of this report outlines the SJCDWQC monitoring plan for assessing compliance with the seven monitoring objectives dictated in the Basin Plan Amendment. The Coalition evaluates compliance with WQOs, loading capacity, and load allocations within four Delta waterway sections and the 303d listed waterbodies that are within the SJCDWQC boundaries through representative monitoring. During 2012, the Coalition incorporated analyses for chlorpyrifos and diazinon into monitoring conducted at Core and Assessment sites located within and/or representative of the subareas of the Delta that are located within the Coalition region. The results of 2012 monitoring and outreach as they relate to the seven monitoring objectives will be discussed in the 2013 MPUR.

Salt and Boron

The Coalition recognizes that salt, nitrate and boron water quality impairments are a Central Valley-wide concern. The Coalition closely follows the planning and reviewing of studies relevant to the development of a Basin Plan amendment for salt, nutrients and boron and will participate in the efforts concerning the Delta area once the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) process has been completed. The Coalition monitors for salt (SC and TDS) in every zone and boron in three zones and includes these constituents in conversations with growers about water quality impairments and applicable management practices.

DO

The Coalition continues to follow progress in achieving DO WQOs in the Stockton Deep Water Ship Channel (DWSC). The Coalition participated in several DO TMDL Technical Working Group meetings during 2010 to discuss the progress of several studies and pilot programs (2011 MPUR, page 99, Table 28). These include the upper San Joaquin River DO project and the performance of the Aeration Facility, located at the west (downstream) end of Rough and Ready Island at the Port of Stockton. Because DO is a field parameter, the Coalition monitors for DO at all sites scheduled for monitoring. The Coalition will continue to participate in meetings and review technical documents as they are made available.

Methyl Mercury

On October 20, 2011, the EPA approved the *Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Methyl mercury and Total Mercury in the Sacramento-San Joaquin River Delta Estuary*. Several meetings were held over the past year as part of the stakeholder process. Coalition representatives attend Stakeholder meetings to ensure the Coalition is participating in the development of work plans for studies needed to determine how the Coalition can meet its assigned load allocation. The Coalition will incorporate the outcomes of the mercury control plan into its management plan so that members remain in compliance and continue to implement measures to improve water quality.

E. coli

On February 17, 2012, the Regional Board sent a letter informing Coalitions that a joint Work Plan is to be developed to identify, characterize and address potential agricultural sources of *E. coli* as well as identify appropriate management practices to prevent discharges to surface waters. The Coalition keeps informed of any updates where *E. coli* is concerned and will participate in focus group discussions and meetings with Regional Board staff to aid in the process of developing the *E. coli* Work Plan.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations answer the five key programmatic questions (ILRP MRP Order No. R5-2008-0005) based on water quality information obtained under the Coalition's MRPP for January through December 2012. The Coalition utilizes monitoring data as well as analysis data from focused outreach results (presented in MPURs submitted annually on April 1) to make the following conclusions.

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 CVRWQB has determined that waters of the State receiving discharge from irrigated lands must be protective of beneficial uses (BUs) for Agricultural Supply (AG), Aquatic Life (AQ, including cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat), Water Contact Recreation (REC 1) and Municipal and Domestic Supply (MUN or Municipal). Waters of the State are protected if no exceedances of constituent specific WQTLs occur during monitoring events. Table 49 lists the constituents monitored by the Coalition and the beneficial uses impaired by exceedances of the WQTLs of the constituents. Figure 12 includes percentages of impaired beneficial uses based on 2012 Coalition wide monitoring results. Table 50 includes a summary of when overall water quality was protective of beneficial uses from 2008 through 2012.

Results of the monitoring program from January through December 2012 indicate there has been significant improvement in water quality in the Coalition region. During 2012, there was a substantial reduction in exceedances; only two exceedances of the WQTLs of applied pesticides (diuron and chlorpyrifos) occurred in MPM samples and one exceedance of copper occurred during NM. The most common exceedances of WQTLs involved the physical parameters SC and DO which resulted in impaired Agricultural and Aquatic Life beneficial uses (Figure 12). A single exceedance of dieldrin resulted in impairments to both Aquatic Life and Municipal beneficial uses (Figure 12). However, dieldrin is not an applied pesticide and the source of the exceedance is not clear. *E. coli* is the only constituent monitored by the Coalition that can cause impairment to the Recreational beneficial use (Table 50). Therefore, any instance of impaired Recreational beneficial use is due to exceedances of the WQTL for *E. coli*. Even though significant improvements are evident from 2012 monitoring results, water quality is still not protective of all beneficial uses across the Coalition region.

Table 49. Impairments of beneficial uses due to exceedances of constituent specific WQTLs in 2012 (denoted by an X).

Beneficial Use	Boron	DO	SC	TDS	E. coli	Ammonia[1]	Nitrates	Dissolved Metals (Hardness Based)	Total Metals	Molybdenum[1]	Herbicides	Pesticides[1,2]
AQ Life		X				X		X				X
AG	X		X	X						X		
MUN						X	X		X	X	X	X
REC 1					X							

[1] Different WQTLs apply to different beneficial uses; see Table 32.
[2] Different pesticides affect different beneficial uses; see Table 32.
AQ Life-Aquatic Life (includes cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat)
AG-Agricultural
MUN-Municipal and Domestic Supply
REC 1-Water Contact Recreation

The 2012 SJCDWQC monitoring results indicate that elevated levels of SC and TDS were the only parameters resulting in impairments to Agricultural beneficial use (Table 49, Figure 12). High salinity levels resulting in exceedances of WQTLs for SC and TDS are common in Delta islands (Coalition Zones 3 and 4) due to 1) tidal influence, 2) management of water resources and 3) weather pattern variability. Various factors cause freshwater flows to decrease; consequently, salinity levels increase in the Delta. Freshwater flows in the Delta are influenced by both upstream structure controls that contain freshwater retaining reservoirs and precipitation levels that affect the amount of Sierra snowmelt captured during the spring. Parameters such as SC and TDS are non-conserved and can increase or decrease as water moves downstream, concentrations of these parameters vary diurnally and seasonally. Managing the concentrations of salts is beyond the scope of what the Coalition can control through agricultural management practices and is the focus of the Valley-wide CV-SALTS process.

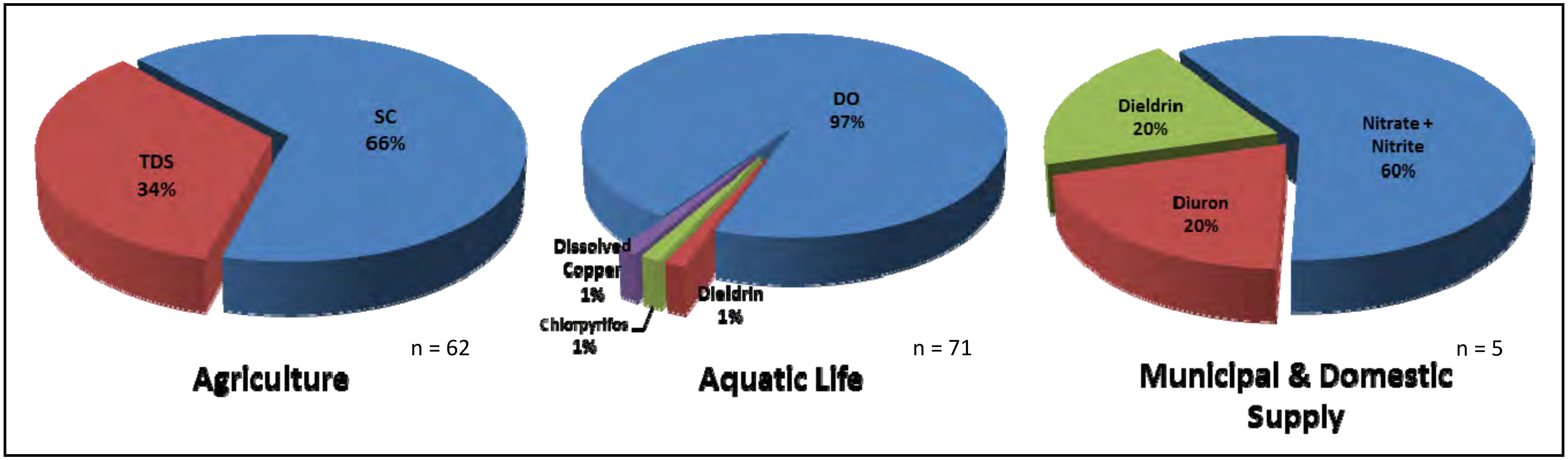
Monitoring results indicate that exceedances of the WQTLs for DO, copper, chlorpyrifos and dieldrin resulted in impairments to Aquatic Life beneficial use (Table 49, Figure 12). Ninety-seven percent of the exceedances causing impairments to Aquatic Life beneficial uses were due to DO exceedances (Figure 12). During 2012, exceedances of the WQTL for DO occurred at every monitoring site at least once with the exception of Mokelumne River @ Bruella Rd. Non-conserved parameters such as DO can increase or decrease in concentration as water moves downstream. Also, for Delta islands, water becomes aerated during the process of pumping from the delta islands to the delta channels. Processes occurring on the land surface, in the water column, and in the sediment can reduce levels of DO. Processes affecting DO in waterways include stream flow patterns, fluctuations in temperature, loss of vegetation around streams, geography (region, morphology and patterns of flow) as well as excessive nutrients resulting in algal growth and decomposition. During education and outreach, growers in the Coalition region receive recommendations to implement management practices designed to prevent the offsite movement of constituents and sediment into the waterway, by reducing irrigation tailwater and storm runoff. As growers implement management practices to reduce discharge, the amount of water flowing into tributaries is reduced this in turn affects flow and potentially DO concentration of the water.

Exceedances of WQTLs for copper (3.60 µg/L) and chlorpyrifos (0.019 µg/L) occurred during the December storm event at Duck Creek @ Hwy 4 (NM) and Unnamed Drain to Lone Tree Creek (MPM), respectively (Table 42). Combined, the copper and chlorpyrifos make up 2% of the exceedances affecting Aquatic Life beneficial uses (Figure 12). Duck Creek @ Hwy 4 was an Assessment Monitoring site during 2012 and December was the first time elevated levels of copper were detected at the site. Heavy rainfall from November 31 through December 2, 2012 increased water flows in the region and could have transported the copper to the creek. Unnamed Drain to Lone Tree Creek is a first priority subwatershed and additional outreach has been occurring within this subwatershed since 2008. In 2012, additional growers were targeted due to continued exceedances and continued use of chlorpyrifos. Between initial contacts and additional contacts, growers in the subwatershed indicated they 1) implemented management practices to reduce runoff or reduce spray drift, 2) have no irrigation runoff, and/or 3) no longer use chlorpyrifos. It is possible that chlorpyrifos could possibly be entering the creek from a non-member who may not be implementing adequate management practices. The SJCDWQC MPUR to be submitted on April 1, 2013 will include an assessment of all chlorpyrifos exceedances that have occurred at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd including a more detailed evaluation of pesticide use and newly implemented management practices. In June, an exceedance of the WQTL for dieldrin occurred in MPM samples collected from Sand Creek @ Hwy 4 Bypass. Dieldrin is no longer produced in the United States, and it has been banned globally due to its toxic effects on humans, fish and wildlife. All detections of dieldrin in the environment are from past use. The concentration of dieldrin (0.096 µg/L) was above both the Aquatic Life beneficial uses WQTL (0.056 µg/L, AQ) and Municipal and Domestic Supply beneficial use WQTL (0.00014 µg/L, MUN). Both Aquatic Life and Municipal beneficial uses were impaired due to this single exceedance (Figure 12).

Exceedances of WQTLs for nitrate/nitrite (60%), dieldrin (20%) and diuron (20%) caused impairment to Municipal beneficial use (Figure 12). During the December storm event, samples collected from Roberts Island @ Whiskey Slough Pump, Terminous Tract Drain @ Hwy 12 and Walthall Slough @ Woodward Ave contained elevated levels of nitrates. This was the first time exceedances of the WQTL for nitrates occurred in samples from Roberts Island @ Whiskey Slough Pump and Terminous Tract Drain @ Hwy 12. Both Roberts Island and Terminous Tract are dominated by field crops included irrigated hay/grains. In November/December winter wheat is planted and fertilized before heavy winter rains; it is possible that if winter wheat was being planted prior to the storm the nitrates within the water may have been due to recent fertilizer applications. Walthall Slough @ Woodward Ave is downstream of dairies and has had previous exceedances of the nitrate WQTL. In 2012, this was the only event where nitrates were above the 10 mg/L WQTL. Storm runoff carrying nitrates from upstream dairies could have contributed to the exceedances during the December storm monitoring event. February MPM samples collected from Unnamed Drain to Lone Tree Creek contained elevated levels of diuron. Focused outreach has occurred within the Unnamed Drain to Lone Tree Creek subwatershed for both diuron and chlorpyrifos. The SJCDWQC MPUR includes additional details regarding past exceedances and management practice implementation within the subwatershed. It is possible that exceedance detections of both diuron and chlorpyrifos could be from a non-member source.

Figure 12. Percentages of impairments of beneficial uses due to exceedances of constituent specific WQTLs in 2012.

Aquatic Life includes all categories (cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat).



n-Total number of exceedances per each beneficial use.

Beneficial uses are listed in the Basin Plan by waterbodies and not all of the Coalition's monitoring sites are listed in the Basin Plan. Therefore, beneficial uses for Coalition monitoring sites are applied based on the most immediate downstream waterbody. Table 50 includes a summary of when Coalition monitoring site specific water quality was protective of beneficial uses from 2008 through 2012.

A trend of improving water quality in the Coalition region is evident from 2008 through 2012, where monitoring data indicate a significant decrease in frequency of exceedances of WQTLs of high priority constituents. For example, exceedances of applied metals have decreased from 3.8% (nine exceedances) in 2008 to 1.2% (one exceedance) in 2012 (Table 53). For applied pesticides, exceedances have decreased from 2.2% (40 exceedances) in 2008 to 0.6% (two exceedances) in 2012 (Table 53). Growers in high priority subwatersheds have implemented management practices that have been successful in reducing exceedances of the WQTLs for metals, herbicides and pesticides.

Improvements in water quality are most noticeable in high priority subwatersheds where concentrations of constituents monitored in the water column and sediment have been consistently protective of assigned beneficial uses in recent years including Duck Creek @ Hwy 4, Lone Tree Creek @ Jack Tone Rd, Littlejohns Creek @ Jack Tone Rd, both Grant Line Canal locations, French Camp Slough @ Airport Way and Mokelumne River @ Bruella Rd (Table 49). Lone Tree Creek @ Jack Tone Rd is one of the first high priority site subwatersheds, and the Coalition has completed its focused outreach strategy in the subwatershed. Even when detected, the concentrations of chemicals in Lone Tree Creek have been protective of Aquatic Life and Municipal beneficial uses over the last four years (since additional outreach began). Likewise, water quality in the second set of high priority subwatersheds has also improved. Both Grant Line Canal @ Clifton Court Rd and Grant Line Canal along Calpack Rd monitoring results indicate Municipal beneficial uses have been protected since outreach began. Monitoring results from the third and fourth sets of high priority subwatersheds indicate improvements in water quality started even before focused outreach was initiated and continued in French Camp @ Airport Way (Municipal and Agricultural), Mokelumne River @ Bruella Rd (Municipal and Aquatic Life), Mormon Slough @ Jack Tone Rd (Municipal) and Kellogg Creek along Hoffman Ln site subwatersheds (Municipal, Table 50).

Waste discharged from irrigated lands is one of many possible sources of impairments of beneficial uses. In many instances, natural conditions or other sources could potentially be the cause of impairment in waterways monitored by the Coalition. Water quality protective of beneficial uses within Coalition Group boundaries may not depend exclusively on the Coalition efforts alone; other dischargers may need to improve the management of their operations. The difference in geology and geography between Coalition zones influences monitoring results for constituents such as DO, SC and TDS. Monitoring sites in Zones 3 and 4 are geographically located in an area where high salinity levels are customary resulting in exceedances of the WQTLs for SC and TDS (Table 50). These geological and geographical factors are outside the scope of what the Coalition is capable of improving through modified agricultural practices.

Table 50. Evaluation of beneficial uses applied to 2008-2012 monitoring locations (alphabetical by Zone).

'X' indicates no sampling occurred during the years specified.

Zone	Monitoring Site and High Priority Year	Immediate Downstream Waterbody	Beneficial Use Immediate Downstream Waterbody	Status 2008 Meets BUs?	Status 2009 Meets BUs?	Status 2010 Meets BUs?	Status 2011 Meets BUs?	Status 2012 Meets BUs?
1	Bear Creek @ North Alpine Rd (2013-2015)	Sacramento San Joaquin Delta	MUN	Yes	X	X	Yes	Yes
			AG	Yes	X	X	Yes	Yes
			REC 1	No	X	X	No	X
			AQ Life	Yes	X	X	No	No
1	Mokelumne River @ Bruella Rd (2011-2013)	Mokelumne River (Camanche Res to Delta Reach)	MUN	Yes	No	Yes	Yes	Yes
			AG	Yes	Yes	Yes	Yes	Yes
			REC 1	Yes	No	Yes	No	No
			AQ Life	No	No	Yes	Yes	Yes
2	Duck Creek @ Hwy 4 (2008-2010)	Sacramento San Joaquin Delta	MUN	Yes	Yes	Yes	Yes	Yes
			AG	Yes	Yes	Yes	Yes	Yes
			REC 1	Yes	X	X	X	No
			AQ Life	No	No	No	No	No
2	French Camp Slough @ Airport Way (2011-2013)	Sacramento San Joaquin Delta	MUN	No	Yes	Yes	Yes	Yes
			AG	Yes	No	Yes	Yes	Yes
			REC 1	No	No	No	No	No
			AQ Life	No	No	No	No	No
2	Littlejohns Creek @ Jack Tone Rd (2010-2012)	San Joaquin Delta	MUN	Yes	X	Yes	Yes	Yes
			AG	Yes	X	Yes	Yes	Yes
			REC 1	Yes	X	X	X	X
			AQ Life	No	X	No	No	No
2	Lone Tree Creek @ Jack Tone Rd (2008-2010)	Sacramento San Joaquin Delta	MUN	No	Yes	Yes	Yes	Yes
			AG	No	Yes	Yes	Yes	No
			REC 1	No	X	X	X	X
			AQ Life	No	No	No	Yes	Yes
2	Mormon Slough @ Jack Tone Rd (2012-2014)	Sacramento San Joaquin Delta	MUN	No	X	X	Yes	Yes
			AG	Yes	X	X	Yes	Yes
			REC 1	Yes	X	X	X	X
			AQ Life	No	X	X	No	No
2	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (2008-2010)	Sacramento San Joaquin Delta	MUN	No	Yes	Yes	Yes	No
			AG	No	Yes	Yes	No	Yes
			REC 1	No	X	X	X	X
			AQ Life	No	No	No	No	No
3	Drain @ Woodbridge Rd (2014-2016)	Sacramento San Joaquin Delta	MUN	No	No	No	X	X
			AG	No	No	No	X	X
			REC 1	No	Yes	No	X	X
			AQ Life	No	No	No	X	X

Zone	Monitoring Site and High Priority Year	Immediate Downstream Waterbody	Beneficial Use Immediate Downstream Waterbody	Status 2008 Meets BUs?	Status 2009 Meets BUs?	Status 2010 Meets BUs?	Status 2011 Meets BUs?	Status 2012 Meets BUs?
3	Terminous Tract Drain @ Hwy 12 (2011-2013)	Sacramento San Joaquin Delta	MUN	No	Yes	No	Yes	No
			AG	No	No	No	No	No
			REC 1	No	No	No	No	No
			AQ Life	No	No	No	No	No
4	Grant Line Canal @ Clifton Court Rd (2010-2012)	San Joaquin Delta	MUN	No	X	Yes	Yes	Yes
			AG	No	X	No	No	No
			REC 1	No	X	X	X	X
			AQ Life	No	X	No	No	No
4	Grant Line Canal near Calpack Rd (2010-2012)	San Joaquin Delta	MUN	No	X	Yes	Yes	Yes
			AG	No	X	No	No	No
			REC 1	No	X	X	X	X
			AQ Life	No	X	No	No	No
4	Kellogg Creek along Hoffman Ln (2012-2014)	Sacramento San Joaquin Delta	MUN	No	X	X	Yes	Yes
			AG	Yes	X	X	No	Yes
			REC 1	Yes	X	X	X	X
			AQ Life	No	X	X	No*	No
4	Roberts Island Drain @ Holt Rd	Sacramento San Joaquin Delta	MUN	Yes	No	Yes	No	X
			AG	No	No	No	No	X
			REC 1	No	No	No	No	X
			AQ Life	No	No	No	No	X
4	Roberts Island @ Whiskey Slough Pump (2013-2015)	Sacramento San Joaquin Delta	MUN	X	X	X	X	No
			AG	X	X	X	X	No
			REC 1	X	X	X	X	No
			AQ Life	X	X	X	X	No
5	Walthall Slough @ Woodward Ave (2013-2015)	Sacramento San Joaquin Delta	MUN	X	No	No	No	No
			AG	X	No	No	No	No
			REC 1	X	No	No	No	Yes
			AQ Life	X	No	No	No	No
6	Sand Creek @ Hwy 4 Bypass (2012-2014)	Sacramento San Joaquin Delta	MUN	No	X	X	No	No
			AG	No	X	X	No	No
			REC 1	No	X	X	X	X
			AQ Life	No	X	X	No	No

AG- Agriculture
AQ Life- Aquatic Life (cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat).
MUN- Municipal and Domestic Supply
REC 1- Water Contact Recreation
X-Site was not scheduled for sampling during the year.
*Does not meet BUs requirements due to sediment toxicity to *H. azteca* in one or more occurrences.

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 through December 2012. Exceedances occurred in every zone during 2012 (Table 51). To address magnitude, Table 51 focuses on the number and percentage of exceedances compared to the number of samples collected by zone across the Coalition region.

In 2012, there was one exceedance each within the following pesticide groups: herbicides, organochlorines and herbicides; there were no exceedances of any carbamate WQTL (Table 51). A single exceedance (<1% of samples collected) occurred of a metal WQTL. Exceedances of WQTLs for physical parameters (137 of 480 samples, 29%) were more common than exceedances of pesticides (3 of 501 samples, <1%) or metals (1 of 208 samples, <1%, Table 51). Some exceedances were more common seasonally; during summer months, warm water with little or no flow coincided with exceedances of the DO WQTL.

As described in the Discussion of Results section of this report, water quality differed substantially in the number and types of exceedances relative to each zone. In Zones 3 and 4 (Terminous Tract @ Hwy 12 Zone and Roberts Island @ Whiskey Slough Pump Zone) there were a large number of exceedances of SC and TDS as might be expected where irrigation water is brought in directly from the Delta. There were three exceedances of nutrient criterion (3 of 144 samples, 2%) across the Coalition region (nitrate at Walthall Slough @ Woodward Ave, Terminous Tract Drain @ Hwy 12 and Roberts Island @ Whiskey Slough Pump). The single metal exceedance was from Duck Creek @ Hwy 4 in Zone 2. This was a decrease from the three exceedances of metals in 2011 and 13 metals exceedances in 2010 that occurred.

In 2012, there was a single exceedance of the WQTL for chlorpyrifos at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (1 of 248 samples of organophosphates, <1%). In 2011, there were 15 chlorpyrifos exceedances (2% of samples). Chlorpyrifos is registered for use on agricultural crops only and its chemistry is such that it can leave fields in storm water, in irrigation return flows, or bound to sediment. Unnamed Drain to Lone Tree Creek is a first priority subwatershed that received additional outreach in 2012. The exceedance occurred after the additional outreach had been completed. The Coalition has considered the possibility that the chemical could be coming from a non-member. The chlorpyrifos exceedances occurred in 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. A majority of dairy operators in the Dairy Program have declined to join the Coalition and participate in Coalition programs to reduce the movement of chlorpyrifos to surface waters. 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 members in the area (Table 51).

The only other registered pesticide exceedance to occur was for diuron (1 of 106 samples, 1%) at Unnamed Drain to Lone Tree Creek (Table 51).

For the past three years, water column toxicity occurred one time each for *C. dubia* and *S. capricornutum* in samples collected from the Coalition area. In 2012, there were two instances of water column toxicity (2 of 99 samples, 2%, Table 51). Both samples had greater than 50% growth/survival compared to the control.

In 2012, sediment toxicity occurred during storm and irrigation sampling (6 of 21 samples 29%) to *H. azteca* (Table 51). In 2011, sediment samples tested toxic to *H. azteca* during storm and irrigation sediment monitoring 10 times. The quality of sediment in the Coalition area appears to have decreased since 2008 as there were a number of toxic sediment samples in both the spring and the fall of 2011 and 2012. Toxic sediment samples were collected during Assessment Monitoring and as part of the Coalition's MPM schedule. Sediment toxicity has been common in the Coalition region over the years. Some growers have changed to pyrethroids from organophosphate pesticides since pyrethroids are effective on multiple crops and pests, less water soluble than chlorpyrifos and therefore less likely to move off the field into downstream waterbodies. It is unclear if there is an association with the sediment toxicities that occurred from 2010 through 2012 and some growers changing to pyrethroid pesticides. The Coalition is continuing efforts in educating growers about the importance of managing both water and sediment runoff and the potential to affect downstream beneficial uses.

The agricultural landscape is very dynamic with respect to the ownership and operation of different parcels in the Coalition region. As the farming community ages, many operations are sold or divided among family resulting in new growers each year across the entire Coalition region. In many instances, these growers are already members and are adding to their holdings. In these cases, these growers often begin farming and implement the management practices necessary to protect surface waters. In other instances however, new growers begin farming and they have little or no understanding of the water quality issues in their subwatershed or Coalition efforts to improve water quality. Therefore, exceedances may result and when these occur, the Coalition will identify the potential sources and contact the growers as necessary. Consequently, the water quality in various subwatersheds may improve for a few years but exceedances may occur in the future. The Coalition recognizes that performing the monitoring and outreach to maintain good water quality is a long term endeavor and will remain engaged in the process as long as necessary.

Table 51. 2012 exceedances by constituent group and zone.

Analyte Group	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Zone 6[1]		Total Exceed.	Total Samples	Pct. Exceed.
	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples			
Carbamates	0	0	0	72	0	0	0	0	0	0	0	0	0	72	0%
E. coli	1	12	6	24	2	12	4	12	0	12	0	0	13	72	18%
Herbicides	0	0	1	104	0	0	0	2	0	0	0	0	1	106	1%
Metals	0	0	1	204	0	0	0	4	0	0	0	0	1	208	<1%
Nutrients	0	24	0	48	1	24	1	24	1	24	0	0	3	144	2%
Organochlorines	0	0	0	72	0	0	0	0	0	0	1	3	1	75	1%
Organophosphates	0	4	1	178	0	2	0	33	0	24	0	7	1	248	<1%
Physical parameters	4	57	23	195	21	48	59	108	18	48	12	24	137	480	29%
Sediment toxicity	0	0	3	7	0	2	2	8	0	2	1	2	6	21	29%
Water column toxicity	0	9	0	59	0	3	2	22	0	0	0	6	2	99	2%
Count per Zone	**5**	**106**	**35**	**963**	**24**	**91**	**68**	**213**	**19**	**110**	**14**	**42**	**Grand Total**		
Pct. Exceed. per Zone	**5%**		**4%**		**26%**		**32%**		**17%**		**33%**		**165**	**1525**	**11%**

[1]Monitoring conducted in Zone 6 was for MPM only.

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 that result in offsite movement of farm inputs and sediment into waterways. Most exceedances are for parameters that are not applied by irrigated agriculture or which may originate with numerous sources in addition to irrigated agriculture. Source identification is difficult especially for non-conserved constituents and constituents with numerous potential sources. There are numerous non-conserved constituents that cannot be traced upstream, e.g. DO, SC and pH. Even in pristine watersheds, exceedances of these constituents may occur during normal diurnal stream processes. Locations within the Delta (Zones 3 and 4) had numerous exceedances of SC and TDS which are a function of the hydrostatic pressure moving Delta water to the interior of Delta islands or the use of Delta water for irrigation (Table 51). 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, 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. Grant Line Canal sites) reaching over 2000 µS/cm. Finally, groundwater is very shallow. To lower the water table sufficiently to allow farming, the water must be discharged back to the Delta. It cannot be recirculated and must be discharged leading to the potential for exceedances of WQTLs for SC and pesticides. Consequently, Delta locations may have exceedances of WQTLs that result from normal farming practices and those practices will have to be adjusted to reduce the potential for discharges which may 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. During the 2012 reporting period, there was only one exceedance of the WQTL for chlorpyrifos which is a pesticide that is registered for use by agriculture only. The exceedance occurred during MPM at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (1st priority subwatershed under the Coalition's Management Plan).

The only other exceedances of pesticide WQTLs in 2012 were diuron from samples collected at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd and dieldrin at Sand Creek @ Hwy 4 Bypass. Diuron is a broad-spectrum herbicide used for weed control on agriculture and on highway shoulders which inhibits photosynthesis and can also affect seed germination. Diuron has a half-life (in soil) of about 90 days, is relatively mobile and is known to inhibit growth of *S. capricornutum*. Dieldrin is a legacy pesticide that is no longer legal to use. Legacy pesticides are thought to reside in the soil column in agricultural fields. Exceedances of the WQTL for dieldrin occurred in MPM samples collected from Sand Creek @ Hwy 4 Bypass in both 2011 and 2012. If the soil maintains a reservoir of legacy organochlorine pesticides, it is likely that there could be regular exceedances when irrigation or storm water move pesticide residues to surface waters. Sources of legacy pesticides in the water column may never be identified. The Coalition is continuing to identify sources of exceedances of WQTLs of currently registered pesticides through PUR analysis, assessment of water quality data and evaluation of current management practices. The Coalition's sourcing strategy is further described in the Management Plan.

In 2012, an exceedance of the hardness based WQTL for dissolved copper occurred once in both the environmental and field duplicate samples at Duck Creek @ Hwy 4. The Coalition monitors for both dissolved and total copper and only dissolved copper concentrations have resulted in exceedances of the hardness based WQTL. Dissolved copper results are adjusted for the hardness of the water to determine if the bioavailable amount of copper could be toxic to aquatic life. A definitive source for copper exceedances has not been clearly identified in the Coalition region; however, there are four potential sources including 1) recent agricultural applications (either through storm/irrigation runoff or spray drift), 2) dairy uses of copper sulfate in footbaths, 3) resuspension of historic copper from upstream mining, brake pads and other anthropogenic uses, and 4) copper used for algae and aquatic weed control in irrigation supply ditches. Copper is applied by agriculture in a variety of forms mostly as a fungicide. Despite the numerous potential sources of copper, the Coalition continues to identify agricultural sources of copper through PUR data and evaluate current management practices as described in the Coalition's Management Plan.

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

The Coalition has recorded specific management practices that growers in the first, second and third priority subwatersheds have implemented that are effective at reducing the impacts of agricultural discharges on water quality including:

1. Reduction in application rates (including using low risk products),
2. Installation of sprinkler, drip or microspray irrigation,
3. Retention pond/holding basin,
4. Controlling runoff water volumes using irrigation management,
5. Grass waterways or grass filter strips, and
6. Polyacrylamide (PAM).

The MPUR submitted every April 1 includes details on the number of growers implementing practices and acres associated with these specific management practices. The Coalition conducted meetings with targeted growers to document current management practices in the first, second, third, and fourth priority subwatersheds. Fifth priority subwatershed grower meetings were scheduled in January 2013. Follow up contacts with targeted growers to document newly implemented management practices have occurred in the first, second and third priority subwatersheds. Included in the 2013 MPUR are summaries for the first and second priority subwatershed additional contacts and a full analysis of the third high priority subwatersheds including summaries of current and newly implemented management practices. The Coalition initiated follow up contacts in the fourth priority subwatersheds and will re-contact targeted growers in the fifth priority subwatersheds who did not attend the scheduled meeting on January 22, 2013. The Coalition will report on information obtained from fourth priority follow ups and fifth priority contacts in the 2014 MPUR.

The Coalition summarized the acres associated with newly implemented management practices designed to reduce the impacts of irrigated agriculture on the waters of the State within the SJCDWQC in the first, second and third priority subwatersheds (Table 52). When evaluating management practices and the associated acreage, a parcel may be included under multiple management practices. Therefore, the acreages in Table 52 cannot be summed together across management practices for each subwatershed; however, acreages can be used to evaluate number of acres with a particular practice within the overall targeted direct drain acreage of the subwatershed.

Growers within all subwatersheds from the first, second and third priority subwatersheds implemented additional management practices as a result of Coalition outreach and education, and in some cases multiple practices have been implemented on the same acreage (Table 52). Of the acreage within first, second and third priority subwatersheds targeted for outreach, newly implemented management practices associated with the most targeted acres are aimed at 1) reducing or eliminating the use of pesticides that have caused exceedances of WQTL such as chlorpyrifos (73%), 2) reducing runoff volumes by using irrigation management (65%), 3) reducing irrigation tail water by installing sprinkler/micro irrigation (38%), 4) using grass rows/waterways/filter strips (26%), 5) treating runoff waters with PAM (7%), and 6) installing a retention pond/holding basin and other irrigation management practices to reduce runoff such as control timing of discharge, use less water during irrigation (4%). All of these management practices are effective at reducing the impacts of irrigated agriculture on adjacent waterways (Table 52).

Table 52. First, second and third priority subwatershed targeted acreage with newly implemented management practices.

Management Practice	First Priority[1] (2008-2010)	Second Priority[2,3] (2010-2012)	Third Priority (2011-2013)			Sum of Acreage Management Practice	Percent of Targeted Acreage
	15,967 Targeted Acres	4,042 Targeted Acres	French Camp Slough @ Airport Way (3,767 Targeted Acres)	Mokelumne River @ Bruella Rd (937 Targeted Acres)	Terminous Tract Drain @ Hwy 12 (1,778 Targeted Acres)		
Installation of retention pond / holding basin / return systems	704	87	205	0	0	996	4%
Installation of sprinkler or micro irrigation when an option	4999	1643	2,074	172	1,263	10151	38%
Reduce runoff water volumes using irrigation management	4376	6948	3,504	610	1,778	17216	65%
Reduce use of the pesticide types found in exceedance	8398	6521	3,562	898	0	19379	73%
Use of center grass rows, grass waterways, or grass filter strips	2311	2572	1,388	227	515	7013	26%
Treat runoff waters with PAM or other materials	0	1748	0	0	0	1748	7%

[1]Members in the Duck Creek @ Hwy 4 subwatershed included 2,053 member parcel acres with new practices implemented in 2010 and members in all three first priority subwatersheds included 2,903 acres with newly reported management practices following additional outreach in 2012.
[2]Members in Littlejohns Creek @ Jack Tone Rd reported 2,369 acres with newly reported management practices following additional outreach in 2012.
[3]Due to the small size of the Grant Line Canal @ Clifton Court Rd and Grant Line Canal near Calpack Rd subwatersheds, the parcels owned by the targeted members extend beyond the subwatershed boundaries.

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?

Monitoring data indicate that the number of exceedances of pesticides and metals decreased in 2012 relative to previous years. Overall, it appears that water quality in the region is improving. The Coalition anticipates further improvements in water quality at high priority management plan locations in the next 2-4 years due to increased education, outreach and implementation of management practices.

Figure 13 includes the total percentages of exceedances from 2008 through 2012 by constituent category. Toxicity resampling events and exceedances during 2008 upstream MPM that was conducted as part of source evaluation were not included in the calculation. From 2008 through 2012, the majority of exceedances occurred in field parameters (53%) and nutrients, physical parameters and *E. coli* (23%). The percentages of exceedances of pesticides (10%), toxicity (8%) and metals (6%) were relatively small in comparison (Figure 13).

Figure 13 includes the percent of metals exceedances from 2008 through 2012. Copper and zinc are both metals applied to agriculture in the Coalition region; however, the graph only includes copper exceedances because copper was the only applied metal to be detected above the hardness based WQTL at sites in the Coalition region between January 1, 2008 and December 31, 2012. The most notable decline in metals exceedances occurred between the years of 2008 and 2009. The decline in exceedances coincides with the initiation of outreach, education, and management practice implementation and the additional analysis of the dissolved fraction of metals. In October 2008, the Coalition began monitoring for the dissolved fraction of metals in addition to the total fraction to better characterize contamination. When testing for total metals, a calculation was performed to predict dissolved metals based on total metals results. The bioavailable fraction of metals in the water column is more accurately estimated in the samples analyzed for dissolved metals samples collected after October 1, 2008. The lack of exceedances when analyzing for dissolved metals indicates the conversion may not be accurate or appropriate for the Coalition region and it is not known if the improvement in water quality is a result of the inaccurate conversion or a reduction in the concentration of metals in surface waters.

The source of the copper is not known but the relatively restricted geographic areas of exceedances, the broader distribution of applications to the same commodities argues for a natural source rather than an anthropogenic cause. However, Coalition representatives are discussing management practices with growers that should result in reductions of dissolved copper if copper exceedances are the result of applications of copper-based pesticides. Similar discussions with growers have been successful in reducing the exceedances of various pesticide WQTLs. After focused outreach began in 2008, exceedances of copper have continued to decline and have remained relatively low throughout the years. There was only one exceedance of the hardness based WQTL for dissolved copper in 2012 compared to two exceedances in 2011. In 2012, there were only 84 samples collected versus 234 in 2011 (Table 53).

The most significant decline in exceedances of applied pesticide WQTLs occurred directly after initial outreach and education began between 2008 and 2009 (Figure 13 and Table 53). An overall decline in applied pesticide exceedances has continued and is evident from 2012 monitoring results compared to the last several years. In 2012, only 0.6% of the samples analyzed for applied pesticides were an exceedance (Table 52). This is a substantial improvement over the two previous years, where 2.0% (2011) and 1.4% (2011) of the samples collected exceeded the WQTL for an applied pesticide (Table 53).

Initial outreach and education in the first and second high priority subwatersheds is complete. Additional grower outreach occurred in the first and second priority subwatersheds in 2010 and 2012. Growers have implemented management practices and water quality in the seven subwatersheds has improved significantly. Likewise, the implementation of management practices in the third priority subwatersheds are contributing to the reduction of exceedances of WQTLs of high priority constituents as well. Not only have exceedances of high priority constituents been reduced since outreach was initiated, exceedances of other constituents and toxicity have declined as well.

Figure 13. Percentages of exceedances of WQTLs from 2008-2012 in the SJCDWQC.

Figure excludes toxicity resampling events and 2008 upstream MPM that was conducted as part of source evaluation. Pesticides and metal exceedances are for constituents applied by agriculture only.

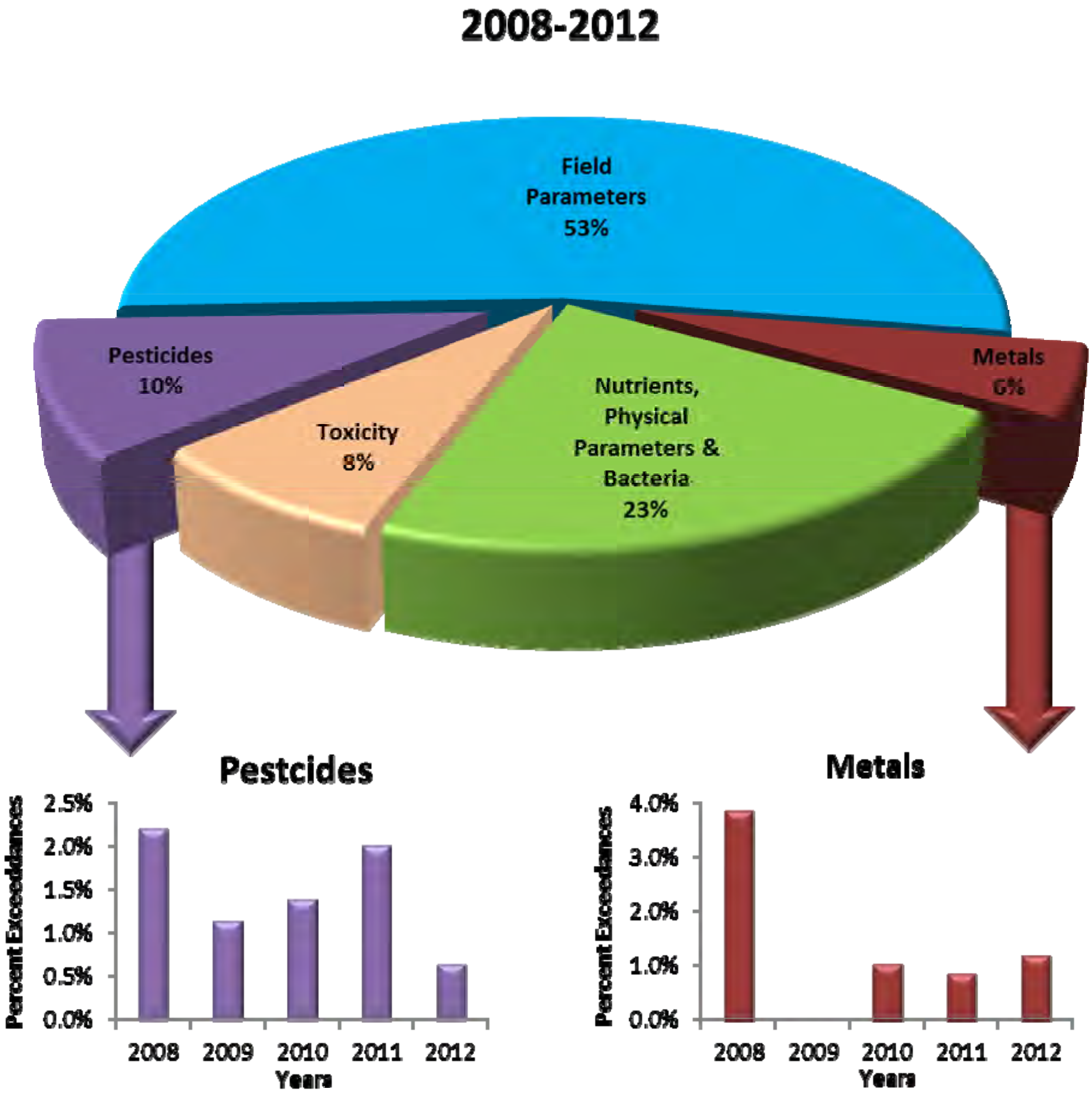


Table 53. Percentages of exceedances of WQTLs for applied metals and applied pesticides from 2008-2012 in SJCDWQC.

	METALS			PESTICIDES		
Years	Exceedances	Sampled	% of Exceedances	Exceedances	Sampled	% of Exceedances
2008	9	234	3.8%	40	1827	2.2%
2009	0	148	0.0%	8	711	1.1%
2010	2	194	1.0%	11	802	1.4%
2011	2	234	0.9%	18	900	2.0%
2012	1	84	1.2%	2	315	0.6%

The conclusions from these data are: 1) grower contacts continue to be an effective method of communicating with members, 2) the implementation of management practices continues to improve water quality in the Coalition region, and 3) there is still opportunity for improvement in subwatersheds where exceedances of WQTLs continue.

Based on the information provided in the report below, the Coalition will pursue the following in 2013:

1. Continue the current monitoring strategy as outlined in 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.
3. Continue to focus outreach and education efforts around high priority constituents while also educating growers about lower prioritized constituents such as salinity.

The Coalition identified several issues in which the Central Valley Regional Water Quality Control Board (CVRWQCB) involvement could result in improvement in water quality in the SJCDWQC region:

1. Identify and regulate dairies within priority subwatersheds that are using constituents of concern that could be affecting downstream beneficial uses.
2. Develop and deploy methods to monitor illegal dairy discharges and notify the Coalition of any known dairy discharges that may result in water quality impairments including nutrient and *E. coli* exceedances.
3. Continue enforcement actions against non-members who have the potential to discharge.
4. Move forward with the processes to develop plans to study difficult issues such as contamination of surface waters by *E. coli*, causes of elevated pH, and low dissolved oxygen.
5. Continue to follow the CV-SALTS process to develop a better understanding of the sources and sinks of salt in surface and groundwater and potential practices that can be effective in preventing exceedances.

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