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, 2014

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 2014 Annual Monitoring Report (AMR) and Quarterly Monitoring Data Report (fourth quarter 2013) 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, 2013 through December 31, 2013 and covers monitoring, reporting, outreach and education activities that occurred during this time. Accompanying this letter are the following:

1. 2014 Annual Monitoring Report (electronic and hard copy)
2. Appendices I – IX (electronic and hard copy)
3. 2013 Level III Laboratory Reports (electronic)
4. 2013 Field Sheets (electronic)
5. 2013 Site Pictures (electronic)
6. SWAMP Comparable Database with SJCDWQC results through 2013 (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 of reports in a timely manner to the CVRWQCB.

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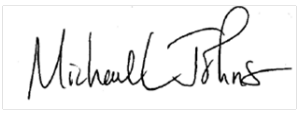
The Coalition's monitoring program met MRP requirements as described in the attached AMR. Sampling occurred during all twelve months (including one storm event and two sediment events), and all data generated are an accurate reflection of conditions in the Coalition region. Overall, there was compliance with completeness, accuracy, and precision requirements for data collected from January through December 2013. The five MRP programmatic questions are addressed in the Conclusions and Recommendations section of the AMR.

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

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

Submitted respectfully,



Michael L. Johnson
SJCDWQC Technical Program Manager
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Cc:
Chris Jimmerson, CVRWQCB
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Michael Wackman, SJCDWQC
John Brodie, SJCDWQC
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Annual Monitoring Report

San Joaquin County & Delta Water Quality Coalition

January 2013 – December 2013

March 1, 2014

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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).
Tributary Rule – Beneficial uses for Coalition monitoring sites are applied based on the most immediate downstream waterbody (not applied to constructed agricultural drains such as ones in Delta islands).
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 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 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	Management Plan Status and Special Projects
22. Conclusions and recommendations	Conclusions and Recommendations

QC- Quality Control
SWAMP- Surface Water Ambient Monitoring Program

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

Table 1. SJCDWQC MRPP and QAPP amendments summary.

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

ITEM NUMBER	AMENDMENTS DESCRIPTIONS	DATE SUBMITTED	MRP PLAN/QAPP 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, Page 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/QAPP 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
8	Request to replace Drain to Bishop Cut @ @ North Rio Blanco Rd with Empire Tract @ 8 Mile Rd.	July 5, 2013	Table 3, Page 28-30 Figure 12, Page 31 Table 4, Page 36-38 Figure 13, Page 41 Verbiage, Page 43 Table 6, Page 50-52 Table 9, Page 55-56	July 7, 2013
9	Request to update the SJCDWQC monitoring strategy for the Sacramento-San Joaquin Delta Chlorpyrifos and Diazinon TMDL with three new compliance monitoring sites.	April 27, 2012	NA	March 15, 2013
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

Item Number	Amendments Descriptions	Date Submitted	MRP Plan/QAPP Page Number	Date Approved
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
4	Request to amend the 2010 QAPP.	February, 15, 2013	Verbiage, Page 1 Verbiage, Page 13 Verbiage, Page 25 Verbiage, Page 55 Figure 1, Page 10 Table 2, Page 15-16 Table 5, Page 22 Table 10, Page 31 Table 12, Page 38 Table 13, Page 44 Table 16, Page 50 Table 17, Page 56-57 Table 18, Page 58-59 Appendices XI-XXXIV	Pending

[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 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 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. Due to increased urbanization in Contra Costa County and lack of agriculture in the southern portion of the zone, Zone 6 does not contain a Core or Assessment Monitoring location.

Each zone in the SJCDWQC monitoring program includes 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). 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 October 20, 2010, and approved January 18, 2011). In 2013, updates to monitoring occurred to include the removal of active management plans for specific constituents based on improved water quality results, the addition of new Total Maximum Daily Load (TMDL) compliance monitoring locations, and the exchange of one site.

The Coalition received approval on February 27, 2013 to remove specific site/constituent pairs from active management plans and Management Plan Monitoring (MPM) for 20 site specific constituents at eight high priority subwatershed locations. Two consecutive years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality.

On March 15, 2013 the Coalition received approval to monitor four (three new) Delta monitoring locations to assess compliance with load capacity as determined in the Sacramento San Joaquin Delta

Diazinon and Chlorpyrifos TMDL. Three of the four locations had not been monitored previously by the Coalition. Monitoring for chlorpyrifos and diazinon TMDL compliance at the four locations is required during one storm event and from May through August annually. Monitoring began at the new TMDL locations on April 2, 2013 (storm monitoring). Additionally, during 2013, TMDL monitoring occurred at Coalition tributary sites to evaluate compliance with approved TMDL's for: chlorpyrifos, diazinon, salts - specific conductance (SC) and total dissolved solids (TDS), boron, and dissolved oxygen (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. Results from 2013 monitoring and outreach as they relate to the seven monitoring objectives will be discussed in the SJCDWQC 2014 MPUR.

The Coalition received approval on July 5, 2013 to exchange the Drain to Bishop Cut @ North Rio Blanco Rd monitoring site with Empire Tract @ 8 Mile Rd due to restricted access related to construction activities by the Reclamation District. Samples were collected from Drain to Bishop Cut @ North Rio Blanco Rd January through March of 2013. Assessment Monitoring commenced in Zone 3 at Empire Tract @ 8 mile Rd in July and will continue through June 2014.

The primary objectives of the monitoring program are to characterize discharge from irrigated agriculture and determine if the implementation of management practices is effective in reducing or eliminating discharge and impairments to the beneficial uses of waterways. The Coalition monitored 21 sites in 2013; three sites were part of the Normal Monitoring (NM) schedule. One of the NM sites was exchanged mid-year and four of the 21 sites were monitored for chlorpyrifos and diazinon TMDL compliance. Management Plan Monitoring took place at 16 of the 21 sites as outlined in the SJCDWQC Management Plan Update Report (MPUR). Eleven sites (Bear Creek @ North Alpine Rd, Drain @ Woodbridge Rd, Duck Creek @ Hwy 4, 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 five sites that were also scheduled for Assessment or Core Monitoring (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 (TDS, total suspended solids (TSS) and turbidity), nine metals, total organic carbon (TOC), five nutrients, field parameters (dissolved oxygen (DO), Power of Hydrogen (pH), SC, water column toxicity to *Ceriodaphnia dubia*, *Pimephales promelas, 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 2013, 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 trigger limits (WQTLs) 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 growers can implement to reduce discharge of specific wastes that impact water quality in receiving waters of the Coalition region.

Coalition monitoring conducted in 2013 resulted in exceedances of Water Quality Trigger Limits (WQTLs) for DO, pH, SC, *E. coli*, TDS, nitrate, arsenic, chlorpyrifos, water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca*. The physical parameter exceedances (including field duplicates) were for DO (62), pH (6), SC (41), TDS (25), nitrate (6) and *E. coli* (4). Three exceedances of the WQTL for chlorpyrifos occurred in samples collected during July MPM from French Camp Slough @ Airport Way, Lone Tree Creek @ Jack Tone Rd, and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Exceedances of the WQTLs for physical parameters, *E. coli,* nitrates, and arsenic were the most common during 2013 monitoring.

Water column toxicity to *S. capricornutum* occurred once out of 131 samples collected for toxicity analysis for all three test species during 2013. A Toxicity Identification Evaluation (TIE) was conducted and both non-polar organics and cationic metals were found to be the cause of the toxicity.

A total of six sediment samples of the 22 collected (from both Normal Monitoring and MPM during the storm and irrigation sediment events) tested toxic to *H. azteca*. Three 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 three toxic samples and resulted in detections of pyrethroids in all three toxic samples and chlorpyrifos in two.

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.

Focused Outreach and Education

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 could be implemented, and document implementation of any new practices.

The Coalition continued focused outreach and management practice tracking 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. The Coalition completed initial contact meetings in 2012 and follow up surveys with 100% of targeted growers in 2013; a preliminary analysis of the results was reported in

the Management Practices section of the 2013 MPUR (Pages 66-80), and a complete analysis of these results will be included in the 2014 MPUR.

The Coalition conducted 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 initial contact letters on January 8, 2013 to targeted growers in the Bear Creek @ North Alpine Rd (7), Roberts Island @ Whiskey Slough Pump (7), and Walthall Slough @ Woodward Ave (8) site subwatersheds. Meetings with targeted growers were held on January 22, 2013. Follow up mailings were sent on February 14, 2014 to growers in the fifth priority site subwatersheds to document implementation of new practices. The Coalition will report on the results of the fifth priority initial contact meetings in the 2014 MPUR.

The Coalition began focused outreach for the sixth high priority subwatershed (2014-2016) Drain @ Woodbridge Rd. The Coalition mailed letters on January 27, 2014 to four targeted growers in the Drain @ Woodbridge Rd site subwatershed announcing the required initial contact meeting date. An informational letter about exceedances of the WQTL for chlorpyrifos and effective management practices was mailed to all seven members in the Drain @ Woodbridge Rd subwatershed on January 27, 2014. 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. The meeting was held on February 5, 2014. The Coalition will report the results of the sixth priority initial contacts in the 2014 MPUR.

Conclusions

The results of the monitoring program for 2013 indicate that although there have been substantial improvements in water quality in many site subwatersheds; 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 uses were exceedance level concentrations of chlorpyrifos. 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 nitrate/nitrite and arsenic.

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 several non-conserved constituents that cannot be traced upstream, e.g. DO. Furthermore, samples collected from locations in the Delta resulted in numerous exceedances of the WQTLs for SC and TDS. These elevated detections are the result of the high salt content in 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 due to spray drift or runoff from storm or irrigation water return flows. In the event of exceedances of the WQTLs of

pesticides or toxicity, the Coalition identifies sources of the constituents with exceedances of WQTLs 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 occurs through 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.

Monitoring data from 2013 indicate the Coalition's outreach strategy efforts have improved water quality in the first through fifth high priority subwatersheds. Monitoring during 2013 resulted in exceedances of the WQTL for only one pesticide (chlorpyrifos) during July MPM at two of the first priority subwatersheds, Lone Tree Creek @ Jack Tone Rd, Unnamed Drain to Lone Tree Creek @ Jack Tone Rd, and one third priority subwatershed, French Camp Slough @ Airport Way. No other pesticide exceedances occurred, and exceedances of the WQTL for arsenic were the only metal exceedances to occur during 2013 monitoring (all from sites in Zone 3). There was only one sample collected for MPM that was toxic, January samples from Grant Line Canal near Calpack Rd were toxic to *S. capricornutum*. This is an improvement in water quality from previous years and is likely to be the result of additional outreach and subsequent implementation of management practices in 2010 and 2012 in the first and second priority subwatersheds (Duck Creek, Lone Tree Creek, Unnamed Drain and Littlejohns Creek). Furthermore, based on monitoring data from the past several years, the Coalition received approval on February 27, 2013 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 of water quality in 2014 and 2015 when the fifth and sixth priority subwatersheds enter Year 2 and Year 1 of monitoring and focused outreach.

Conclusions from these data are that 1) additional grower outreach from 2010 and 2012 appears 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 2014:

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 to further improve water quality.

The Coalition identified several areas 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 constituents that are difficult to source such as contamination of surface waters with *E. coli*, causes of elevated pH, and low DO.
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 identify 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: the Stanislaus River, the Calaveras River, and the Mokelumne River. 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 to the west, the Stanislaus River to the south, and the Mokelumne River to 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.

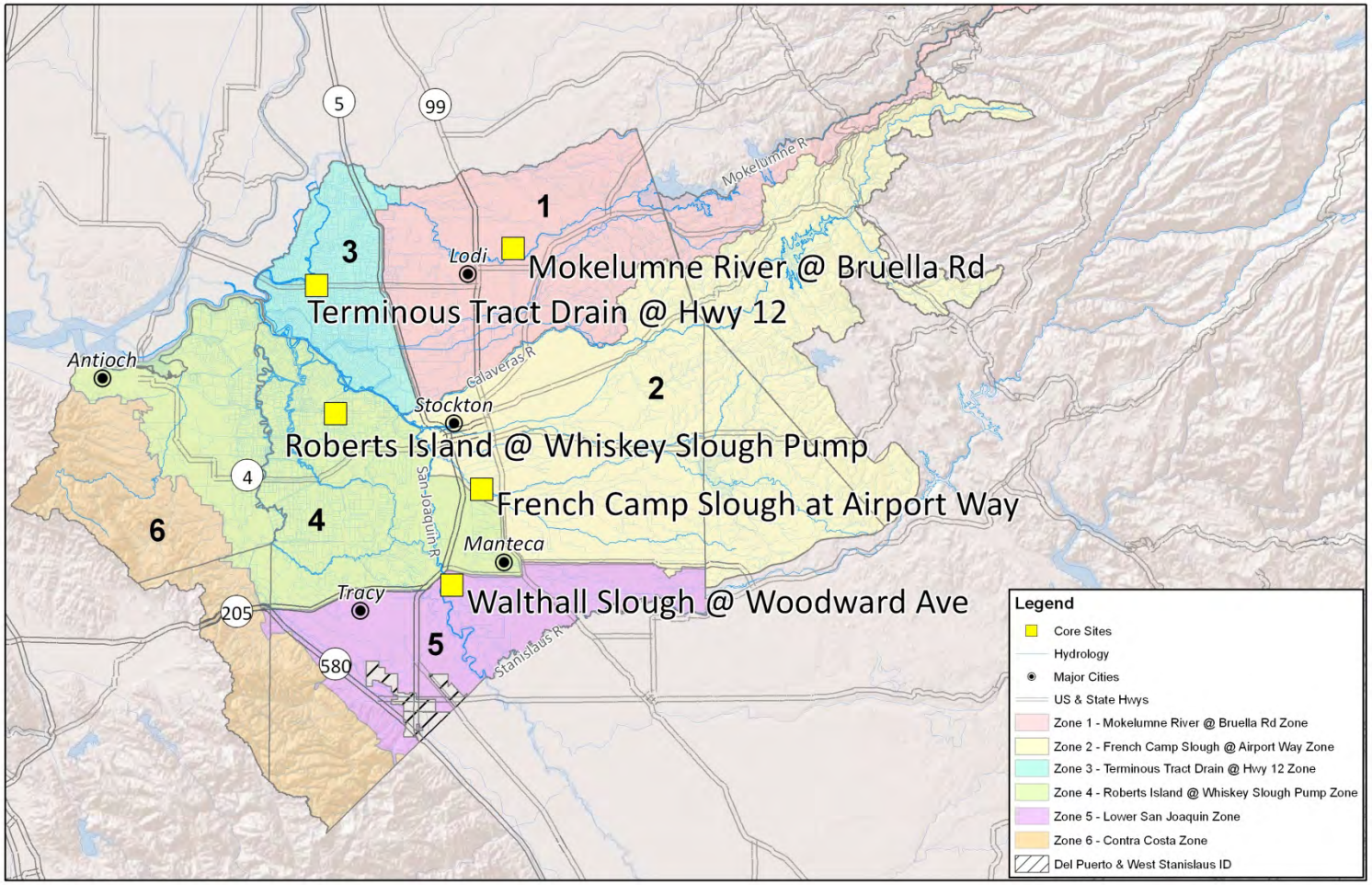
County	Total County Acreage (DWR Land Use)	County Irrigated Land Acreage (Land Use or Land and Water Use 2001)	Data Source Year (Agricultural Land and Water Use)[1]	Data Source Year (Land Use Survey)[2]
Alameda	46,428	912		2006
Calaveras	237,690	1,098		2000
Contra Costa	184,679	48,925		1995
San Joaquin	912,481	539,000	2001	
Stanislaus	97,707	18,979		2004
Total	**1,478,985**	**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); 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.



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: 06/25/12
SJCDWQC

N
0 10 20
Miles

SJCDWQC Zone Boundaries

SJCDWQC_2012_amr

Table 3. SJCWQC 2013 total and irrigated acreages for Zones 1-6.

ZONES	TOTAL ACRES[1] (FROM ARCGIS)	IRRIGATED ACRES[2] (FROM LAND USE)
Zone 1: Mokelumne River @ Bruella Rd Zone	268,792	109,510
Zone 2: French Camp Slough @ Airport Way Zone	514,151	171,378
Zone 3: Terminous Tract Drain @ Hwy 12 Zone	88,019	70,704
Zone 4: Roberts Island @ Whiskey Slough Pump Zone	283,496	186,379
Zone 5: Lower San Joaquin Zone	139,696	95,648
Zone 6: Contra Costa Zone	185,583	428
Total	**1,479,737**	**634,047**

[1]Total zone acreages calculated using ArcGIS. Total acres in Table 3 versus the amount reported elsewhere may differ.
[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.

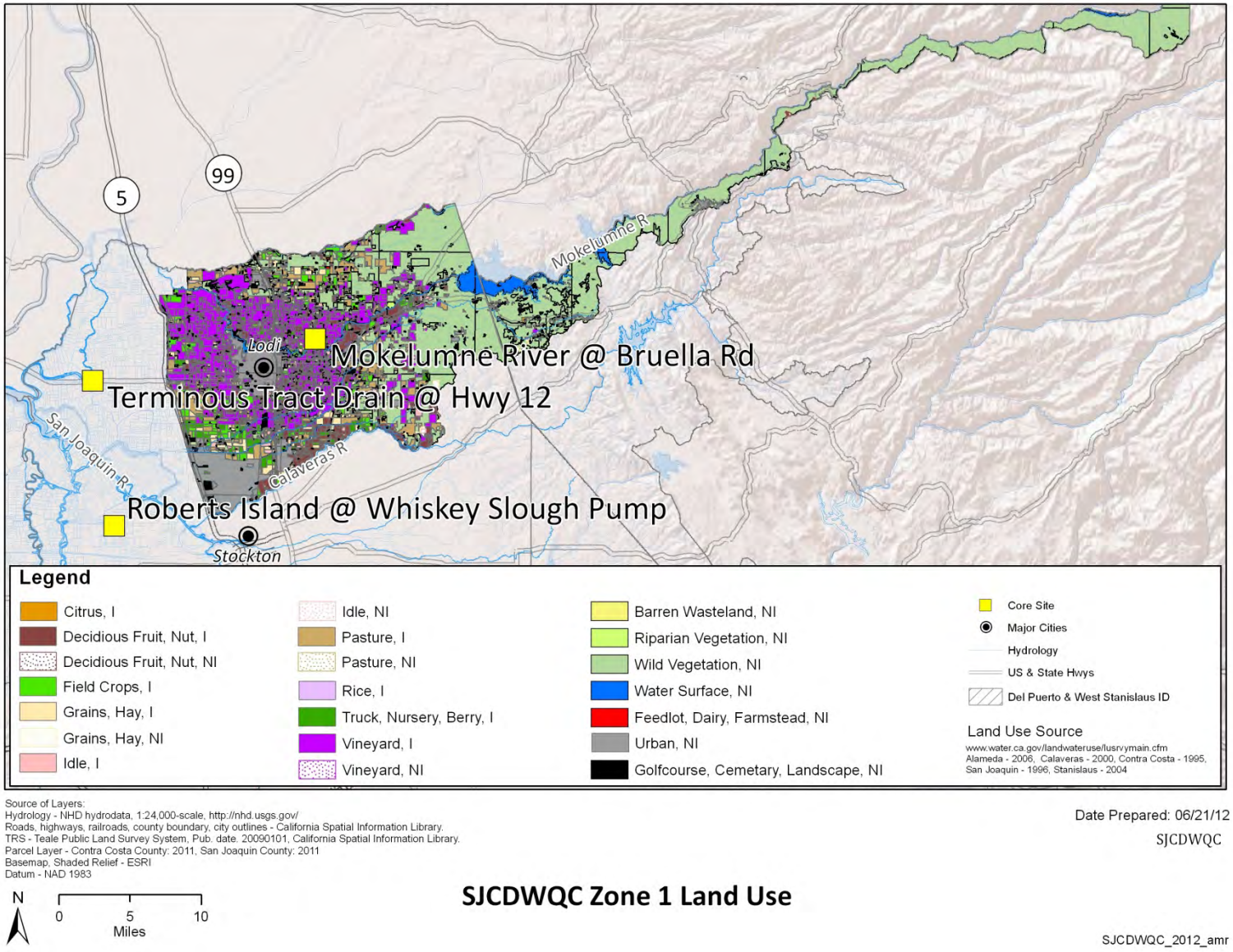


Figure 3. French Camp Slough @ Airport Way Zone (Zone 2) Land Use.

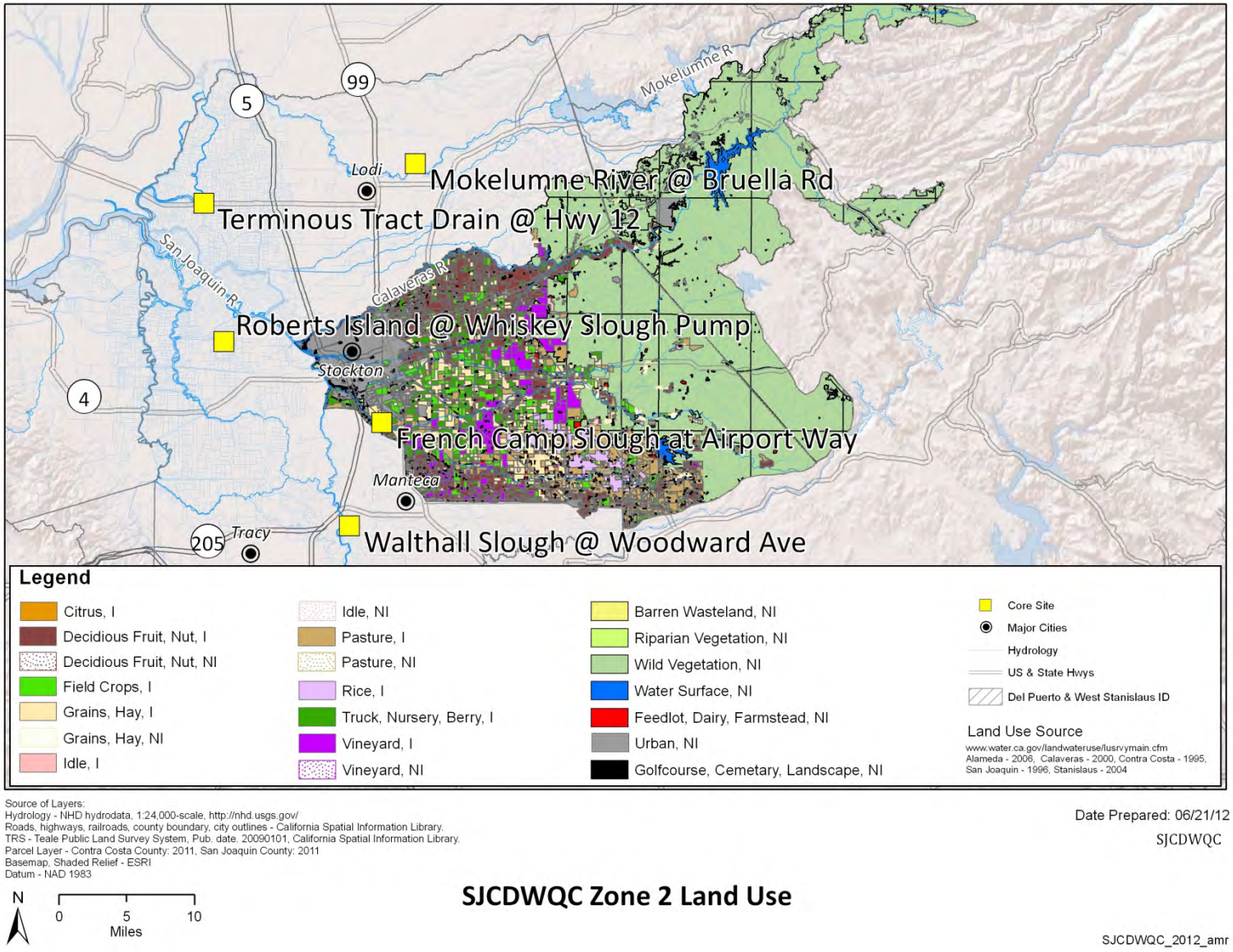


Figure 4. Terminous Tract @ Hwy 12 Zone (Zone 3) Land Use.

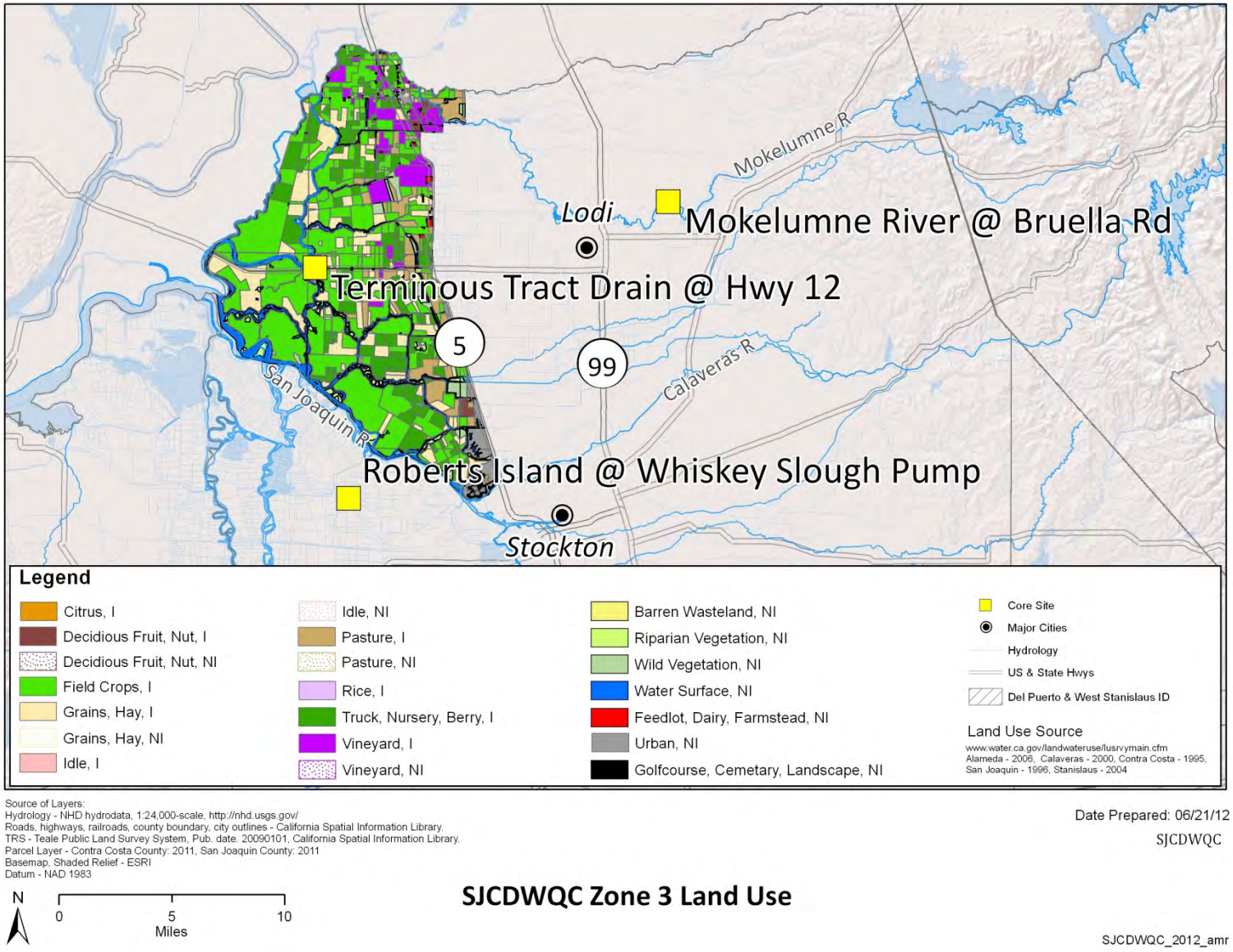


Figure 5. Roberts Island @ Whiskey Slough Pump Zone (Zone 4) Land Use.

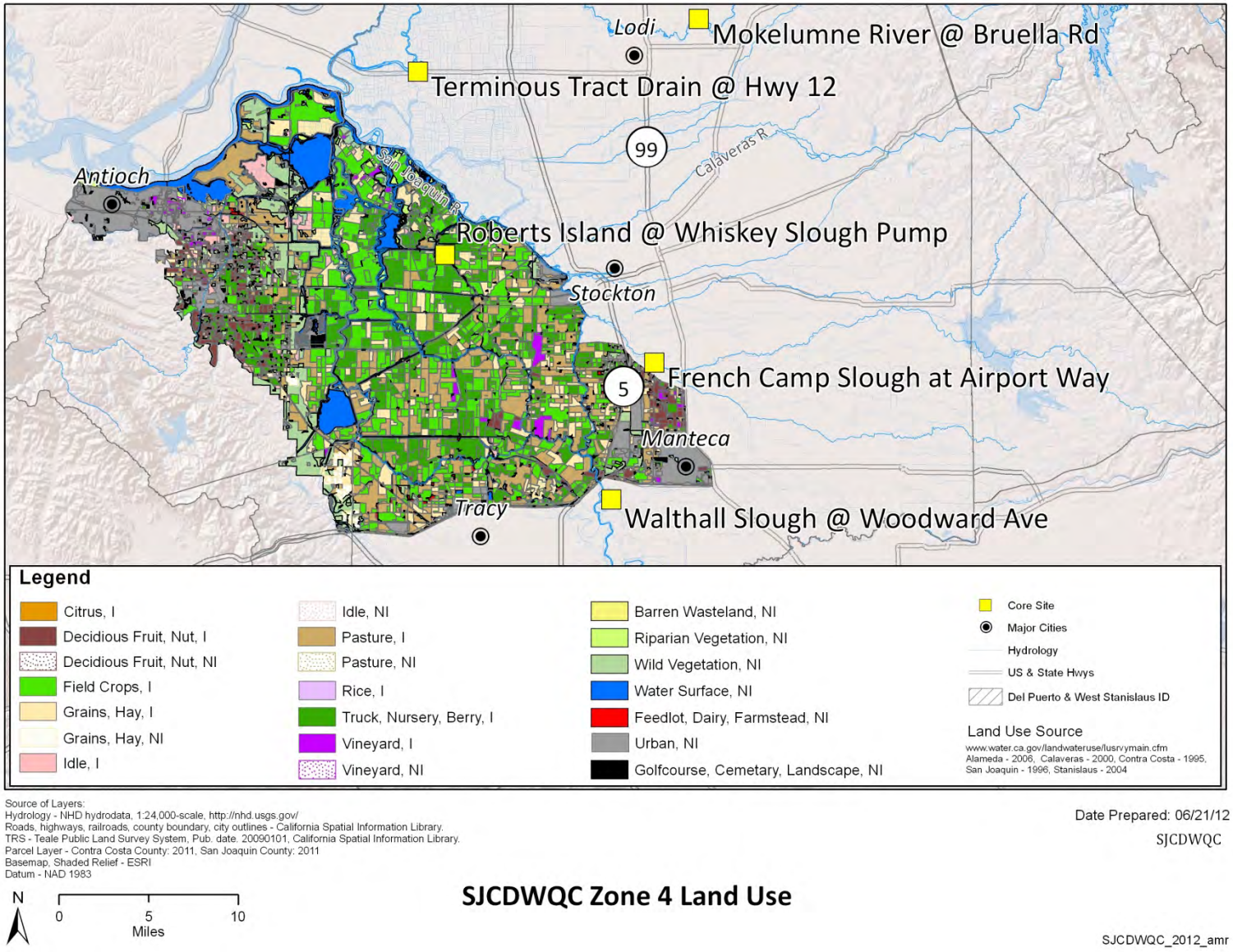


Figure 6. Lower San Joaquin Zone (Zone 5) Land Use.

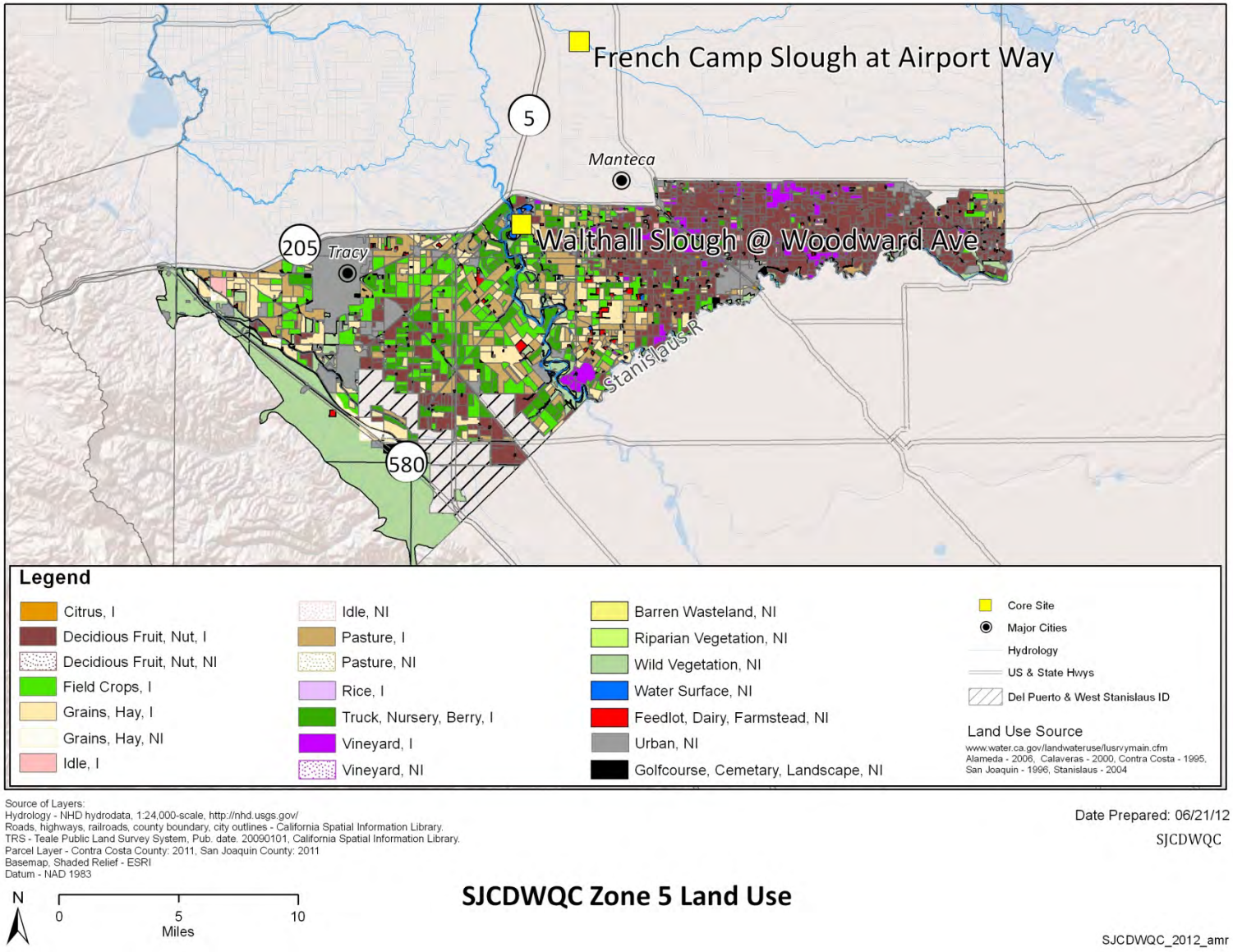
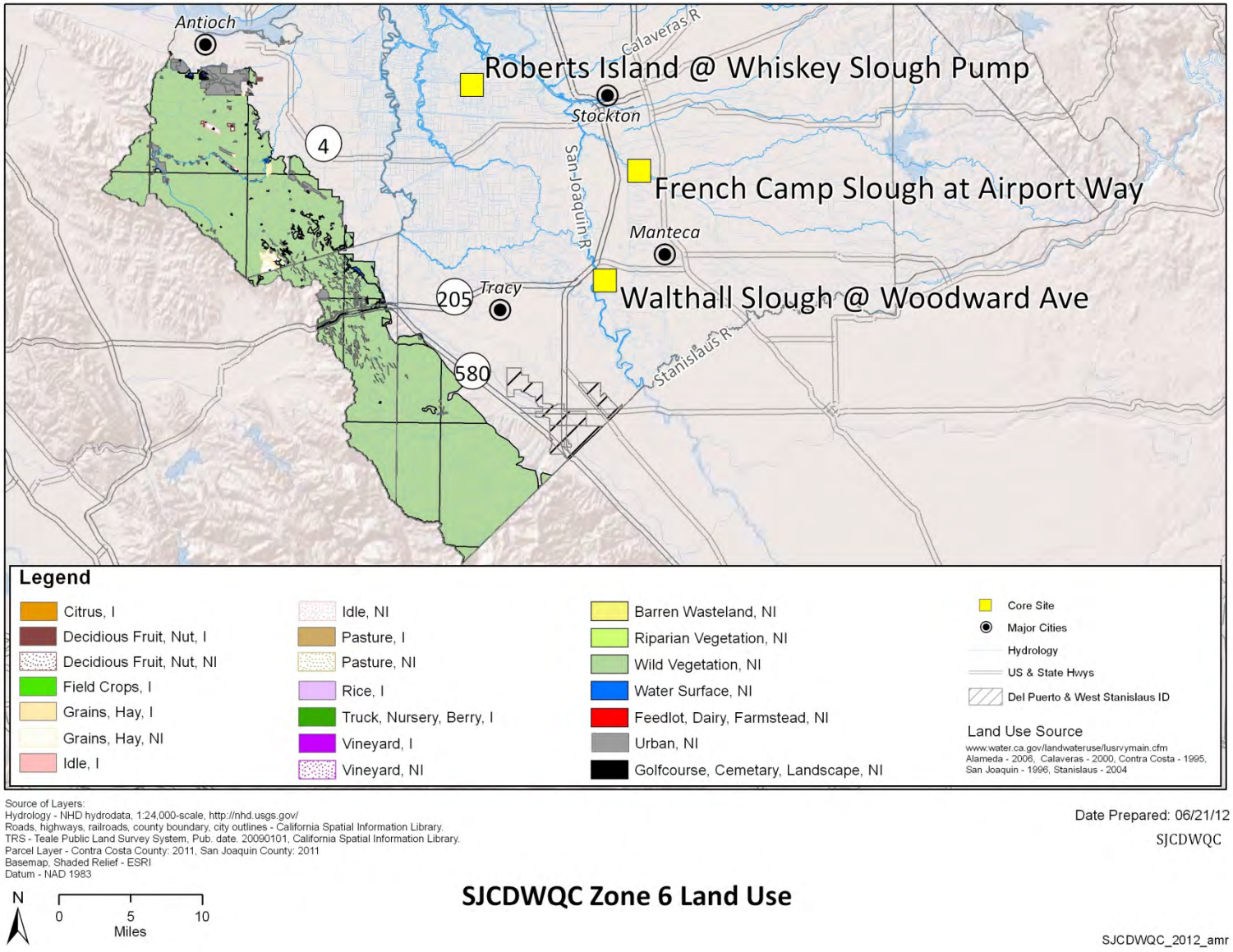


Figure 7. Contra Costa Zone (Zone 6) Land Use.



MONITORING OBJECTIVES AND DESIGN

MONITORING JANUARY THROUGH DECEMBER 2013

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 Total Maximum Daily Load (TMDL) constituent, or more than one exceedance of a WQTL of a constituent without a TMDL. From January through December 2013 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 one storm event 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 TMDL monitoring. This section also describes the overall Coalition sampling design and sampling seasons.

The Coalition received approval on February 27, 2013 to remove specific site/constituent pairs from active management plans and MPM for 20 site specific constituents at eight high priority subwatershed locations. Two consecutive years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality due to newly implemented management practices.

On March 15, 2013 the Coalition received approval to monitor four (three new) Delta monitoring locations to assess compliance with load capacity as determined in the Sacramento San Joaquin Delta Diazinon and Chlorpyrifos TMDL. Three of the four locations had not been monitored previously by the Coalition. Monitoring for chlorpyrifos and diazinon TMDL compliance at the four locations is required during one storm event and from May through August annually. Monitoring began at the new TMDL locations on April 2, 2013 (storm monitoring). Additionally, during 2013, TMDL monitoring occurred at Coalition tributary sites to evaluate compliance with approved TMDL's for: chlorpyrifos, diazinon, salts - specific conductance (SC) and total dissolved solids (TDS), boron, and dissolved oxygen (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. Results from 2013 monitoring and outreach as they relate to the seven monitoring objectives will be discussed in the SJCDWQC 2014 MPUR.

The Coalition received approval on July 5, 2013 to exchange the Drain to Bishop Cut @ North Rio Blanco Rd site with Empire Tract @ 8 Mile Rd due to restricted access related to construction activities by the Reclamation District. Samples were collected from Drain to Bishop Cut @ North Rio Blanco Rd January through March of 2013. Assessment Monitoring commenced in Zone 3 at Empire Tract @ 8 Mile Rd in July and will continue through June 2014.

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 discharges 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 18 sites in 2013 (including Drain to Bishop Cut @ North Rio Blanco from January through March and Empire Tract @ 8 Mile Rd from July through December). Management Plan Monitoring took place at 16 of the 18 sites as outlined in the SJCDWQC Management Plan Update Report (MPUR). Eleven sites were monitored as MPM only (Bear Creek @ North Alpine Rd, Drain @ Woodbridge Rd, Duck Creek @ Hwy 4, 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). Monitoring for MPM constituents took place at five sites that were also scheduled for Assessment or Core Monitoring (French Camp Slough @ Airport Way , Mokelumne River @ Bruella Rd, Terminous Tract Drain @ Hwy 12, Roberts Island @ Whiskey Slough Pump and Walthall Slough @ Woodward Ave). Drain to Bishop Cut @ North Rio Blanco Rd rotated into its first year of Assessment Monitoring (monitored January through March), however; the site was exchanged with Empire Tract @ 8 Mile Rd (monitored July through December) due to restricted access.

Monitoring constituents are established in 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 2013, the Coalition sampled for 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)), 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 pesticides in sediment 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
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

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
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
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

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
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 2013 monitoring schedule (nutrients, bacteria, field parameters, physical parameters, metals and pesticides: organophosphates).

SJCDWQC January-December 2013 Monitoring Schedule		Nutrients					Bacteria	Field Parameters				Physical Parameters				Metals										Pesticides												
																										Organophosphates												
Zone or TMDL Compliance Location	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					
	Mokelumne River @ Bruella Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C																							
2	Duck Creek @ Hwy 4							F	F	F	F																M											
	French Camp Slough @ Airport Way	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M								M	M										
	Littlejohns Creek @ Jack Tone Rd							F	F	F	F								M								M	M										
	Mormon Slough @ Jack Tone Rd							F	F	F	F																M											
	Lone Tree Creek @ Jack Tone Rd							F	F	F	F																M											
	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd							F	F	F	F								M								M											
3	Terminous Tract Drain @ Hwy 12	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	M[3]	A	A	A	A	A	A	A	A	A	A
	Drain @ Woodbridge Rd							F	F	F	F																M											
	Drain to Bishop Cut @ North Rio Blanco Rd[5]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Empire Tract @ 8 Mile Rd[5]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4	Grant Line Canal @ Clifton Court Rd							F	F	F	F																M											
	Grant Line Canal near Calpack Rd							F	F	F	F																											
	Kellogg Creek along Hoffman Lane							F	F	F	F								M								M											
	Roberts Island @ Whiskey Slough Pump	C	C	C	C	C	C	C	C	C	C	C	C	C	C												M, T[4]	T[4]										
5	Walthall Slough @ Woodward Ave	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	M[3], T[4]	A, T[4]	A	A	A	A	A	A	A	A	A
6	Sand Creek @ Hwy 4 Bypass							F	F	F	F																	M				M					
Delta TMDL	San Joaquin River @ West Neugerbauer Rd																										T[2]	T[2]										
	Old River @ the West End of Clifton Court Rd																										T[2]	T[2]										
	Light House Restaurant @ west Brannon Island Rd																										T[2]	T[2]										

A - Assessment Monitoring constituent
C - Core Monitoring constituent
F - Field parameters collected at MPM sites, does not indicate filed parameters are in a management plan.
M - Management Plan Monitoring conducted for Priority A-D constituents in months of past exceedances.
T – TMDL compliance monitoring
[1]If *H. azteca* survival is 80% or less compared to the control, pyrethroids and chlorpyrifos are analyzed.
[2]Monitoring occurred during one storm event and May-August to assess TMDL load capacity.
[3]MPM at sites under Assessment Monitoring in 2013.
[4]Additional monitoring occurred monthly for chlorpyrifos and diazinon.
[5]Assessment Monitoring at Empire Tract @ 8 Mile Rd (July through December 2013) replaced monitoring at Drain to Bishop Cut @ North Rio Blanco Rd (January through March 2013) beginning in July 2013.

Table 6. SJCDWQC January through December 2013 monitoring schedule (pesticides: organochlorines, carbamates, herbicides, water column toxicity and sediment parameters).

SJCDWQC January-December 2013 Monitoring Schedule		Pesticides																					Water Column Toxicity			Sediment		
		Organochlorines							Carbamates								Herbicides									Tox	Physical Para-meters	
Zone or TMDL Compliance Location	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					
2	Duck Creek @ Hwy 4																						M			M	M	M
	French Camp Slough @ Airport Way												M										M		M	M	M	M
	Littlejohns Creek @ Jack Tone Rd																											
	Mormon Slough @ Jack Tone Rd																						M		M			
	Lone Tree Creek @ Jack Tone Rd																											
	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd												M													M	M	M
3	Terminous Tract Drain @ Hwy 12	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	M[3]	M[3]	M[3]
	Drain @ Woodbridge Rd																											
	Drain to Bishop Cut @ North Rio Blanco Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Empire Tract @ 8 Mile Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
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 @ Whiskey Slough Pump												M										M		M	M	M	M
5	Walthall Slough @ Woodward Ave	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	M[3]	M[3]	M[3]
6	Sand Creek @ Hwy 4 Bypass					M																			M	M	M	M
Delta TMDL	San Joaquin River @ West Neugerbauer Rd																											
	Old River @ the West End of Clifton Court Rd																											
	Light House Restaurant @ west Brannon Island Rd																											

A - Assessment Monitoring constituent

M - Management Plan Monitoring conducted for Priority A-D constituents in months of past exceedances.

[1]If *H. azteca* survival is 80% or less compared to the control, pyrethroids and chlorpyrifos are analyzed.

[3]MPM at sites under Assessment Monitoring in 2013.

[5]Assessment Monitoring at Empire Tract @ 8 Mile Rd (July through December 2013) replaced monitoring at Drain to Bishop Cut @ North Rio Blanco Rd (January through March 2013) beginning in July 2013.

MONITORING DESIGN

Normal Monitoring

Starting October 2008, the Coalition began monitoring under the current approved MRPP which 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.

Five Core Monitoring locations and one Assessment Monitoring location are monitored annually for the Coalition's 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 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 monitoring is defined as occurring within three days of a rainfall event that exceeds 0.5 inches within 24 hours. During 2013, storm samples were collected at sites in the SJCDWQC on April 2, 2013. A description of the rainfall that occurred in 2013 including when samples were collected relative to the amount of precipitation is included in the Sampling Site Descriptions and Rainfall Records section of this report.

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 rainfall are included in the Sampling Site Descriptions and Rainfall Records section of this report. Table 8 provides the locations and seasons of Coalition monitoring from 2004 through 2013.

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.

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 Core Monitoring 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 occurs at Core sites every third year. 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 and before the height of the irrigation season (between March 1 and April 30). A second set of sediment samples are collected at the end of the irrigation season when irrigation is mostly complete, and water levels are low and safe enough to sample sediment (between August 15 and October 15). In 2013, sediment samples were collected on March 19, 2013 and September 17, 2013.

Table 8. Sample sites and years monitored.

Station Name	2004	2005		2006		2007		2008			2009				2010				2011				2012				2013			
	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	Winter	Storm	Irrigation	Fall
Bear Creek @ North Alpine Rd								x		x	x	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										x		
Drain to Bishop Cut @ North Rio Blanco Rd																											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	x	x	x	
Empire Tract @ 8 Mile Rd																													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	x	x	x	x
Grant Line Canal @ Clifton Court Rd		x	x	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		x	x	x	
Kellogg Creek @ Hwy 4		x	x	x																									x	
Kellogg Creek along Hoffman Ln			x	x	x	x	x	Dry	x										Dry		x		x	x	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	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		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	x	x	x	x
Mokelumne River @ Fish Hatchery[1]			x																											
Mormon Slough @ Jack Tone Rd					x	x	x	x	x												x			x	x			x	x	
Potato Slough @ Hwy 12	x	x	x	x																										

Station Name	2004	2005		2006		2007		2008			2009				2010				2011				2012				2013			
	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	Winter	Storm	Irrigation	Fall
Roberts Island @ Whiskey Slough Pump																							x	x	x	x	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								
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		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	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	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	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; 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 strategy to identify sources of contaminants and evaluate effectiveness of newly implemented management practices. For more details on the Coalition's strategy for MPM refer to the Status of Management Plans and Special Projects section of this report.

Management Plan Monitoring occurred at 16 sites during 2013: Bear Creek @ North Alpine Rd, Drain @ Woodbridge 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, chlorpyrifos, diazinon, dieldrin, disulfoton, diuron, malathion, and HCH (Table 9). Details on the MPM process and schedule are available in the SJCDWQC 2008 Management Plan (approved January 23, 2009). The MPM schedule is updated annually in the SJCDWQC MPUR (submitted on April 1).

After two or more consecutive years of monitoring with zero exceedances, the Coalition received approval on February 27, 2013 to remove specific site/constituent pairs from active management plan and MPM for 20 site specific constituents at eight high priority subwatershed locations based on improved monitoring results. As sites were approved for management plan completion for specific constituents, the Coalition updated its MPM schedule accordingly (Table 9). Table 9 includes MPM sites and constituents monitored in 2013; all constituents approved for removal from active management plans have been omitted from the MPM table. Table 52 in the section Status of Management Plans and Special Projects includes a list of sites and constituents approved for management plan completion.

Table 9. January through December 2013 MPM sites and constituents.

Site Name	High Priority Subwatershed	Month	Copper	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	Diuron	HCH	Malathion	*C. dubia*	*H. azteca*	*S. capricornutum*
Bear Creek @ North Alpine Rd	5th	January		X						X			
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									
Roberts Island @ Whiskey Slough Pump	5th	January		X				X					X
Sand Creek @ Hwy 4 Bypass	4th	January			X								
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	January		X				X					
Walthall Slough @ Woodward Ave	5th	January							X				
French Camp Slough @ Airport Way	3rd	February	X	X	X			X			X		X

Site Name	High Priority Subwatershed	Month	Copper	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	Diuron	HCH	Malathion	*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									
Mokelumne River @ Bruella Rd	3rd	February									X		
Roberts Island @ Whiskey Slough Pump	5th	February		X									
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	February		X				X					
Duck Creek @ Hwy 4	1st	March										X	
French Camp Slough @ Airport Way	3rd	March										X	
Grant Line Canal @ Clifton Court Rd	2nd	March		X								X	
Grant Line Canal near Calpack Rd	2nd	March									X	X	
Kellogg Creek along Hoffman Ln	4th	March										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	
Walthall Slough @ Woodward Ave	5th	March										X	
Duck Creek @ Hwy 4	1st	April		X							X		
Drain @ Woodbridge Rd	6th	April		X									
French Camp Slough @ Airport Way	3rd	April		X									
Grant Line Canal near Calpack Rd	2nd	April											X
Kellogg Creek along Hoffman Ln	4th	April											X
Littlejohns Creek @ Jack Tone Rd	2nd	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
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									
Grant Line Canal @ Clifton Court Rd	2nd	May											X
Grant Line Canal near Calpack Rd	2nd	May									X		X
Kellogg Creek along Hoffman Ln	4th	May											X
Littlejohns Creek @ Jack Tone Rd	2nd	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						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	May	X	X									
Duck Creek @ Hwy 4	1st	June		X									
Littlejohns Creek @ Jack Tone Rd	2nd	June	X	X									
Sand Creek @ Hwy 4 Bypass	4th	June				X	X						
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	June		X									
Duck Creek @ Hwy 4	1st	July		X							X		
French Camp Slough @ Airport Way	3rd	July		X									
Grant Line Canal near Calpack Rd	2nd	July											X
Littlejohns Creek @ Jack Tone Rd	2nd	July		X									
Lone Tree Creek @ Jack Tone Rd	1st	July		X									
Mormon Slough @ Jack Tone Rd	4th	July		X									X
Roberts Island @ Whiskey Slough Pump	5th	July						X			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									
Grant Line Canal near Calpack Rd	2nd	August									X		
Kellogg Creek along Hoffman Ln	4th	August											X

Site Name	High Priority Subwatershed	Month	Copper	Chlorpyrifos	Diazinon	Dieldrin	Disulfoton	Diuron	HCH	Malathion	*C. dubia*	*H. azteca*	*S. capricornutum*
Lone Tree Creek @ Jack Tone Rd	1st	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	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										
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									
Walthall Slough @ Woodward Ave	5th	November							X				
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	1st	December		X									
Walthall Slough @ Woodward Ave	5th	December							X				

Total Maximum Daily Load Monitoring

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 referred to as the 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 that 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.

On March 15, 2013 the Coalition received approval to monitor four (three new) Delta monitoring locations to assess compliance with load capacity as determined in the Sacramento San Joaquin Delta Diazinon and Chlorpyrifos TMDL. Three of the four locations had not been monitored previously by the Coalition. Monitoring for chlorpyrifos and diazinon TMDL compliance at the four locations is required during one storm event and from May through August annually. Monitoring began at the new TMDL locations on April 2, 2013 (storm monitoring). Additionally, during 2013, TMDL monitoring occurred at Coalition tributary sites to evaluate compliance with approved TMDL's for: chlorpyrifos, diazinon, salts - specific conductance (SC) and total dissolved solids (TDS), boron, and dissolved oxygen (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. Results from 2013 monitoring and outreach as they relate to the seven monitoring objectives will be discussed in the SJCDWQC 2014 MPUR.

MONITORING CONSTITUENTS

All constituents and locations monitored during 2013 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 entering 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 levels of impairments in the waterbody. The objective of the Coalition is to utilize the results of toxicity testing 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 detected above their WQTLs, the Coalition can properly recommend management practices to address exceedances of nutrients and physical parameters.

Field Parameters

Similar to physical parameters, exceedances of the WQTLs for pH, DO, and SC are difficult to track to sources. Both DO and pH are non-conserved meaning they can increase or decrease as water moves downstream. Changes in the values of these parameters result from 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. Two processes can influence the levels of SC; 1) tidal flux plays a role in determining Delta salinity, and 2) hydrostatic pressure moving Delta water to the interior of the islands and/or the use of Delta water for irrigation. 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 recommend management practices to address the exceedances.

E. coli

E. coli is a natural component of ecosystems and also occurs 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 metals "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 2013 are provided in Table 10. Land use for each site subwatershed monitored in 2013 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 2013 Annual Site Photos Appendix VIII.

Rainfall data for the SJCDWQC region for January through December 2013 are described in the Rainfall Records section of this report.

SAMPLE SITE LOCATIONS

The Figure 8 map includes all site subwatersheds (Assessment, Core and MPM) monitored from January through December 2013. Zone boundaries are also mapped in Figure 8 for reference. The Figure 9 map includes the SJCDWQC four TMDL compliance monitoring locations.

Figure 8. S JCDWQC January through December 2013 monitoring sites and zone boundaries.

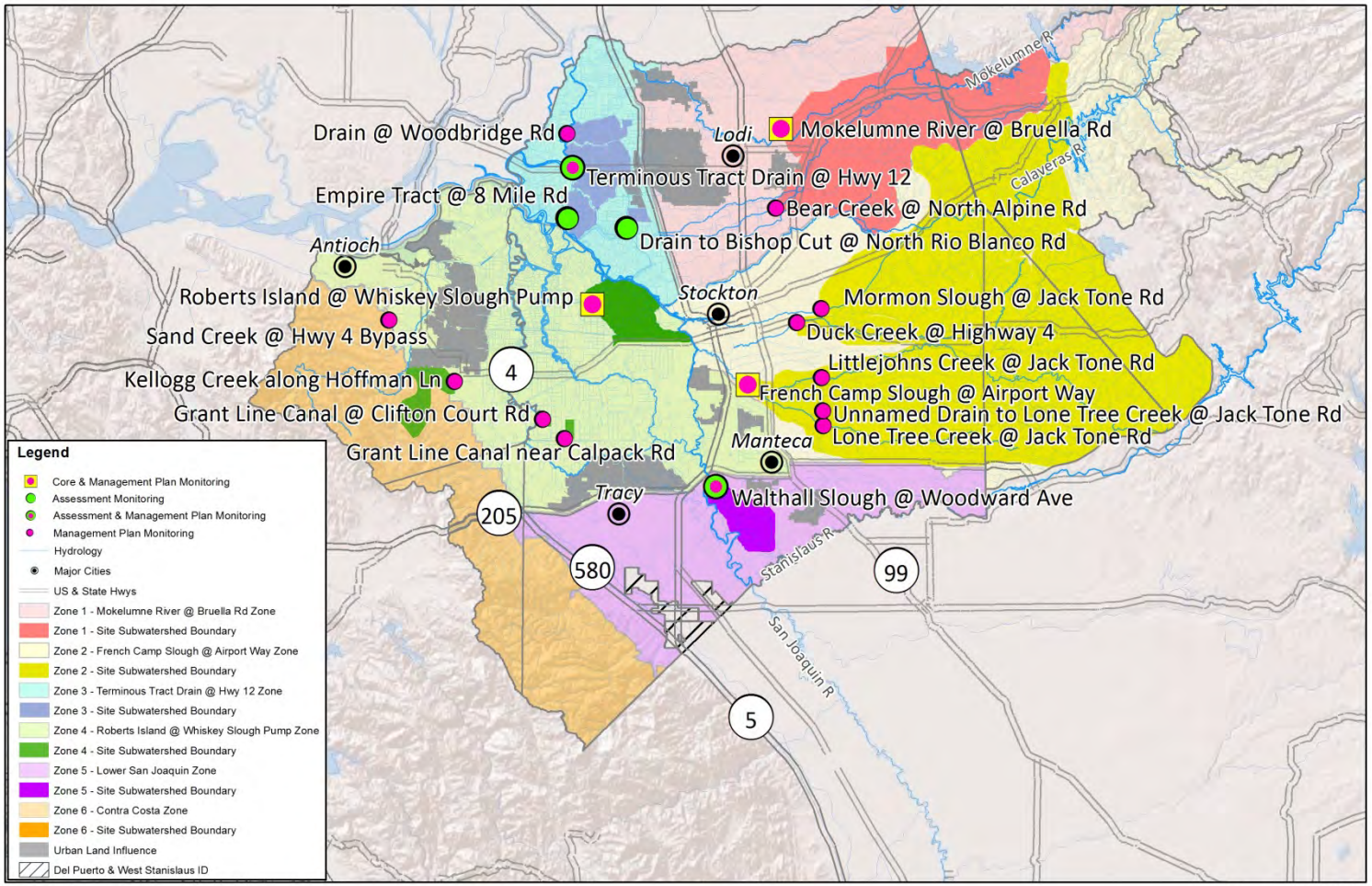


Figure 9. SJCDWQC January through December 2013 Chlorpyrifos and Diazinon TMDL compliance locations.

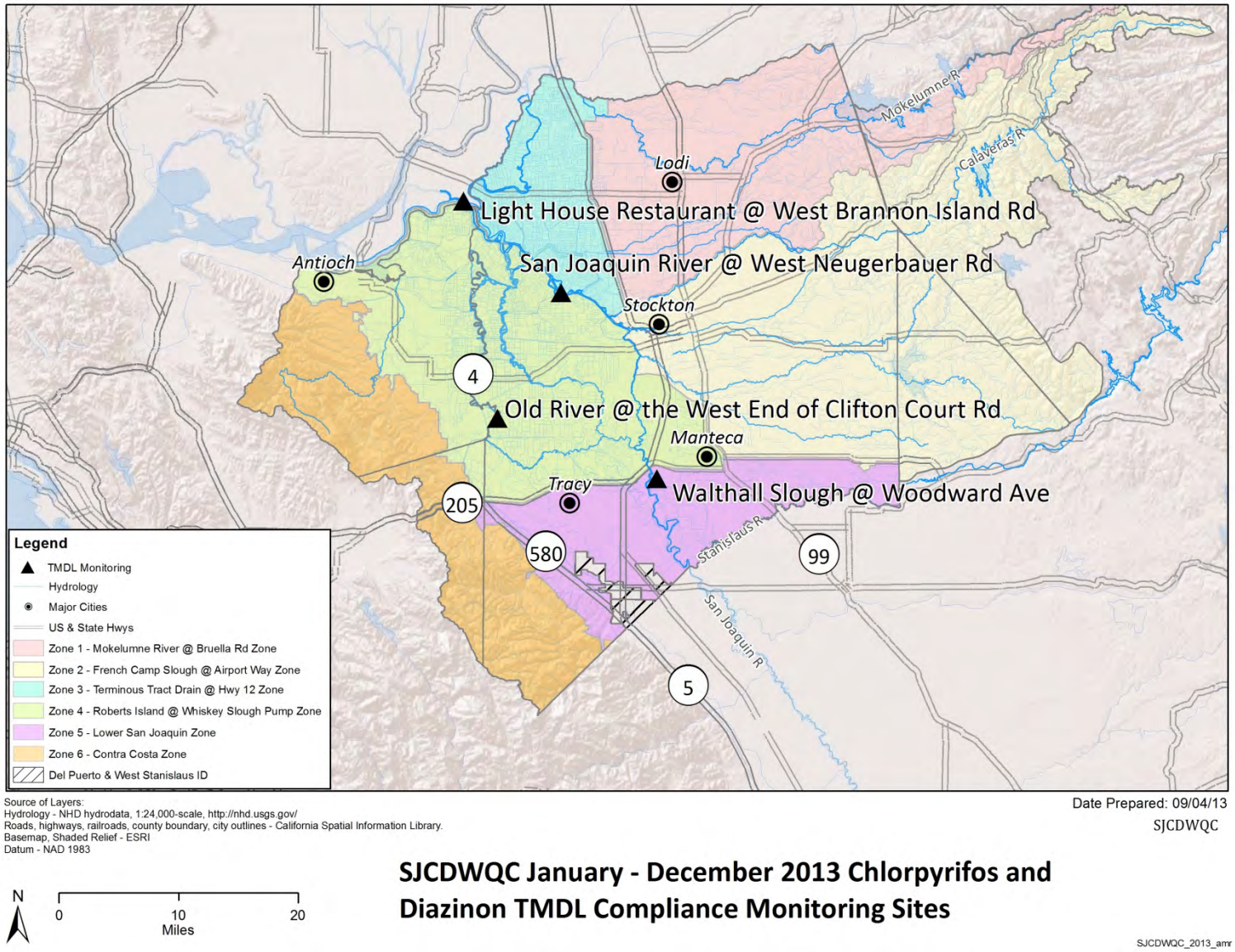


Table 10. SJCDWQC January through December 2013 sample locations (sorted by zone and site).

Zone	Site Type[1]	January-December 2013 Monitoring	Site Name	Station Code	Latitude	Longitude
Zone 1	Assessment	MPM	Bear Creek @ North Alpine Rd	531BCANAR	38.07386	-121.21215
	Core	C, MPM	Mokelumne River @ Bruella Rd	531XMRABR	38.16022	-121.20643
Zone 2	Assessment	MPM	Duck Creek @ Highway 4	531XDCAHF	37.94949	-121.18208
	Core	C, MPM	French Camp Slough @ Airport Way	531SJC504	37.88172	-121.24933
	Assessment	MPM	Littlejohns Creek @ Jack Tone Rd	531XLCAJR	37.88958	-121.14727
	Assessment	MPM	Lone Tree Creek @ Jack Tone Rd	531XLTCJR	37.83754	-121.14460
	Assessment	MPM	Mormon Slough @ Jack Tone Rd	544MSAJTR	37.96470	-121.14880
	Assessment	MPM	Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	37.85360	-121.14570
Zone 3	Assessment	MPM	Drain @ Woodbridge Rd	544DAWRXX	38.15246	-121.50220
	Assessment	A	Drain to Bishop Cut @ North Rio Blanco Rd[2]	544DBCRBR	38.05055	-121.41753
	Assessment	A	Empire Tract @ 8 Mile Rd[2]	544ETAEMR	38.06012	-121.49912
	Core	A, MPM	Terminous Tract Drain @ Hwy 12	544XTTHWT	38.11558	-121.49380
Zone 4	Assessment	MPM	Grant Line Canal @ Clifton Court Rd	544XGLCAA	37.84182	-121.52999
	Assessment	MPM	Grant Line Canal near Calpack Rd	544XGLCCR	37.82084	-121.50009
	Assessment	MPM	Kellogg Creek along Hoffman Ln	544XKCAHL	37.88188	-121.65221
	Core	C, MPM	Roberts Island @ Whiskey Slough Pump	544RIAWSP	37.96737	-121.46434
Zone 5	Core	A, MPM, TMDL	Walthall Slough @ Woodward Ave	544WSAWAV	37.77046	-121.29227
Zone 6	NA	MPM	Sand Creek @ Hwy 4 Bypass	544SCAHFB	37.94750	-121.74300
NA	TMDL	TMDL	Light House Restaurant @ West Brannon Island Rd	510LHRWBI	38.10487	-121.59299
NA	TMDL	TMDL	Old River @ the West End of Clifton Court Rd	544ORAWCC	37.84195	-121.53721
NA	TMDL	TMDL	San Joaquin River @ West Neugerbauer Rd	544SJCAWN	37.99493	-121.44173

A-Assessment Monitoring
C-Core Monitoring
MPM-Management Plan Monitoring
NA-Not Applicable; site is not a Core Site and no Assessment Monitoring takes place in the zone.
TMDL-Total Maximum Daily Load monitoring
[1] Site types are either Assessment or Core based on the MRPP (Pages 33-35).
[2] Assessment Monitoring at Empire Tract @ 8 Mile Rd (July through December 2013) replaced monitoring at Drain to Bishop Cut @ North Rio Blanco Rd (January through March 2013) beginning in July.

Table 11. SJCDWQC January through December 2013 land use acreage per site subwatershed and TMDL compliance location.

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	Drain @ Woodbridge Rd	Drain to Bishop Cut @ North Rio Blanco Rd	Duck Creek @ Hwy 4	Empire Tract @ 8 Mile Rd	French Camp Slough @ Airport Way	Grant Line Canal near Calpack Rd	Grant Line Canal @ Clifton Ct	Kellogg Creek along Hoffman Ln	Light House Restaurant @ West Brannon Island Rd	Littlejohns Creek @ Jack Tone Rd	Lone Tree Creek @ Jack Tone Rd	Mokelumne River @ Bruella Rd	Mormon Slough @ Jack Tone Rd	Old River @ the West End of Clifton Rd	Roberts Island @ Whiskey Slough Pump	San Joaquin river @ west Neugerbauer rd	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	39		5	5	234		39	418			6	
Citrus	NI														33			33				
Deciduous Nut And Fruit	I	3217	5	5	1871		13185			902	940	2587	6949	2537	11687	969	13	86028	39		1471	835
Deciduous Nut And Fruit	NI	19												4	2			2	5			
Field Crop	I	1282	2309	488	2336	2234	8627	184	25	225	45051	2220	1887	519	1290	14021	4357	30012		5032	3229	1311
Grain And Hay	I	1277	761	78	3428	664	14292	49	235		16297	3589	2698	79	2159	8214	2297	34956	70	2051	4533	2552
Grain And Hay	NI	480			44		1332					977	272	2	138	2083		1915	12		80	
Idle	I	756			91		697			161	2142	85	245	453	453	474	18	3880	9	34	325	57
Idle	NI	102					42											104			42	
Barren Wasteland	NI										60			11	710			741				
Riparian Vegetation	NI	92				53	261			5	3608	235	6	311	56	324	65	1382		23	19	37
Wild Vegetation	NI	45773	229	96	17757	136	106211	2		5329	10270	92625	2016	15105	70931	6836	611	244870	7010	272	14101	437
Water Surface	NI	501		5	67	52	1720			16	16814	183	95	4410	617	2120	362	7333		221	1433	190
Pasture	I	6005	650	66	1698		25777	423	0.5	52	5880	3047	11071	843	2351	17070	2159	48715		988	8711	2706
Pasture	NI	6					166					46	120		21			242			30	
Rice	I						7017				13	244	1577					7025			5025	
Feedlot, Dairy, Farmstead	NI	445	10		228		3443			45	396	492	1200	154	429	904	90	6485	2	20	1300	370
Truck, Nursery, Berry	I	824	306	371	2017	490	5176	26		486	18869	1690	257	342	3062	9334	2832	27874		1273	842	941
Urban	NI	1586	7	49	113	3	3191			151	2069	600	1170	599	3689	7288	868	56539	204	139	403	95
Golf Course, Cemetery, Landscape	I			7															284			
Golf Course, Cemetery, Landscape	NI	170			18		260				363	100	51	14	123	63		2119				
Vineyard	I	6219	508		1516		8447				868	2705	1098	5189	3378	750		19329		351	3757	24
Vineyard	NI	26																				
Total Acres		**68861**	**4785**	**1165**	**31185**	**3631**	**199856**	**683**	**260**	**7377**	**123680**	**111425**	**30720**	**30576**	**101364**	**70451**	**13711**	**579999**	**7635**	**10403**	**45308**	**9555**
Irrigated Acres		**19642**	**4540**	**1009**	**12958**	**3388**	**83229**	**682**	**260**	**1831**	**90100**	**16167**	**25789**	**9966**	**24615**	**50833**	**11716**	**258234**	**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 21 site subwatersheds as part of MPM, NM, and TMDL compliance monitoring in 2013. Descriptions and irrigated acreages are alphabetically listed below. Irrigated acres are included in the site subwatershed descriptions; however, these acreages are subject to change due to updates in GIS layers and subwatershed boundary modifications. Land use maps of each site subwatershed are included in Appendix VIII (Land Use Maps and 2013 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.
- Drain @ Woodbridge Rd (4,540 irrigated acres) – This site is located on the northern side of the Coalition region. Water from the drain is pumped to the Mokelumne River close to the sample location. The site drains an area of land to the east of the site between Hog Slough and Sycamore Slough. Land use in the site subwatershed includes field crops, truck/nursery/berry crops, vineyards, pasture, grains/hay, and dairy.
- Drain to Bishop Cut @ North Rio Blanco Rd (1,009 irrigated acres) – This site subwatershed drains the western portion of Bishop Tract. The eastern area includes a golf course while the south is bordered by urban development. The primary agriculture in the site subwatershed is row crops, with some grains, and truck/nursery/berry crops.
- 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 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.
- Empire Tract @ 8 Mile Rd (3,388 irrigated acres) – This site subwatershed represents all of Empire Tract and the sample site is located at the western pumping station on 8 Mile Rd. The pump drains water into Little Connection Slough which in turn drains into Potato Slough and then the San Joaquin River. The primary agriculture in the site subwatershed is row crops, grains, and truck/nursery/berry crops.
- 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, Unnamed Drain @ Jack Tone Rd, 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 predominant land use at this site is pastureland. 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.
- Light House Restaurant @ West Brannon Island Rd (90,100 irrigated acres) – This subwatershed is represented by the drainage from Tyler and Staten Islands to the north, Venice and Boudin Islands to the east and south. Islands within the area are bordered by San Joaquin River on the east, Hwy 4 to the south, and to the west, Discovery Bay and Frank's Tract State recreational Area. The primary agriculture in this subwatershed is row crops, grains and truck/nursery/berry crops with some deciduous nuts and crops, pasture, and vineyards.
- 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) – Water flow in the Mokelumne River is controlled by the amount of water released from the Comanche Reservoir. Water in the Mokelumne River integrates the water quality signal from a relatively large upstream area. Upstream agriculture consists of vineyards that are primarily drip irrigated and orchards irrigated by microspray. The main agricultural land use is fruit and nut orchards, vineyards, and small amounts of field crops throughout the subwatershed.
- 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.
- Old River @ the West End of Clifton Court Rd (50,833 irrigated acres) – This subwatershed is represented by drainage from Fabian Tract south of Clifton Court Rd. The subwatershed is

bordered to the east by San Joaquin River, to the south by highways 120, 205 and 580, and to the west by the foothills on the western side of San Joaquin Valley. The primary agriculture in this subwatershed is pastureland, row crops, grains, and truck/nursery/berry crops.

- 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 pastureland.
- 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 identifies 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 had significant urban development consisting of new residential neighborhoods and shopping outlets in recent years. 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, tomatoes, and approximately 775 acres of pasture and grassland.
- San Joaquin River @ West Neugerbauer Rd (258,234 irrigated acres) – This site subwatershed drains all of the acreage within the Coalition boundary that is south of West Neugerbauer Rd, east of San Joaquin River, and south of Mokelumne Aqueduct. Approximately 40% of the land use in this subwatershed is native vegetation. The irrigated acres are made up of deciduous nuts and fruit, row crops, grain, pastureland, truck/nursery/berry crops, and vineyards.
- 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, truck/nursery/berry crops, 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. The Coalition attempts to sample two storm events per year, where storm monitoring is defined as occurring within three days of a rainfall event that exceeds 0.5 inches within 24 hours. 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. In 2013, the Coalition sampled one storm event on April 2, 2013. Below is a description of all the storms that occurred during the 2013 monitoring year, including whether or not the storm was 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 and near the Coalition region, Modesto and Stockton (January 2013 through March 2013, Figure 10; April 2013 through June 2013, Figure 11; July through September, Figure 12; and October 2013 through December 2013, Figure 13).

January through March 2013

No storm events meeting the trigger limit were monitored from January through March 2013.

The first substantial storm system of 2013 lasted three days, from January 5 through January 7, 2013, resulting in a total of 1.19 inches of precipitation in Stockton and 1.13 inches in Modesto (Figure 10). Rainfall met the trigger limit in both cities; however, storm sampling was not scheduled because the size of the storm exceeded predictions and the laboratories were unable to accommodate the additional monitoring effort on the short notice provided. The next storm with measurable precipitation occurred January 23 through January 26, 2013. During this storm, Stockton received 0.06 inches of precipitation, and Modesto received 0.03 inches (Figure 10). The January 23 through 26, 2013 storm did not meet the trigger limit in either city and therefore storm monitoring was not scheduled.

The next small storm system occurred from February 7 through February 8, 2013 where Stockton and Modesto both reported 0.02 inches of precipitation (Figure 10). The last storm event in February occurred on February 19, 2013, and produced 0.2 inches in Stockton and 0.3 inches in Modesto (Figure 10). Neither of the storms in February met the trigger limit in Stockton or Modesto and therefore storm monitoring was not scheduled.

Three storm events occurred during the month of March, none of which resulted in enough precipitation to reach the trigger limit. The first storm occurred on March 6, 2013, and produced 0.08 inches of precipitation in Stockton and 0.06 inches in Modesto. The second storm occurred March 19 through March 20, 2013; Stockton received a total rainfall of 0.14 inches, while Modesto received 0.09 inches. The final storm during March occurred on March 31 through April 1, 2013. During this event, Stockton received 0.18 inches of precipitation and Modesto received 0.49 inches (Figure 10).

April through June 2013

One storm event meeting the trigger limit was monitored from April through June 2013.

The storm system from March 31 through April 1, 2013 produced 0.18 inches of precipitation in Stockton, and 0.49 inches in Modesto (Figure 11). Storm sampling was conducted on April 2, 2013 to capture the storm event. Only one other day of precipitation was recorded during April; on April 4, 2013 0.39 inches of precipitation was recorded in Stockton and 0.34 inches in Modesto (Figure 11).

During the month of May, there were three storm events that resulted in measureable precipitation (Figure 11). The first storm occurred on May 6, 2013, and produced 0.11 inches in Modesto but 0.0 inches in Stockton. The second and third storm events occurred on May 16 and May 27, 2013. These events produced no measureable amount of rainfall in Modesto, but Stockton received 0.02 and 0.01 inches, respectively. The trigger limit was not met; no storm monitoring occurred in May 2013.

June had one day of measureable precipitation of 0.05 inches or less, this system was isolated and resulted in very little rainfall in either city (Figure 11). No storm samples were collected.

July through September 2013

No storm events met the trigger limit from July through September 2013 and therefore storm monitoring did not take place.

The San Joaquin area had typical Mediterranean climate conditions in July through September with hot and dry weather. However, there were two small storms in the month of September, 2013. The first storm on September 2, 2013 produced 0.01 inches, and was isolated to the Stockton area. The next storm occurred on September 21, 2013, and resulted in 0.27 of precipitation in Stockton and 0.12 inches in Modesto (Figure 12). Neither of the rainfall events produced enough precipitation to meet the storm trigger limit; therefore storm monitoring did not occur.

October through December 2013

No storm events met the trigger limit from October through December 2013 and therefore storm monitoring did not take place.

The first storm during this time period occurred November 19 through November 21, 2013, resulting in 0.86 inches in Stockton and 0.80 inches in Modesto (Figure 13). Coalition monitoring was scheduled for November 19, 2013 and the weather forecast did not indicate precipitation would be above the trigger limit. In addition, forecasts predicted that the rain would come sooner than it did. Rainfall from this storm had not reached the trigger limit when samples were collected (only 0.01 inches in Stockton on November 19). The bulk of rainfall from this storm occurred on November 20, 2013 in a short amount of time. Samples collected on November 19, 2013 did not capture the height of the storm and were considered normal fall monitoring. A second storm occurred on December 7, 2013; Stockton received a total of 0.27 inches of precipitation, while Modesto received 0.23 inches (Figure 13). Rainfall from the December storm did not meet the trigger limit and therefore storm monitoring did not occur.

Figure 10. Precipitation history for Stockton and Modesto, January through March 2013.

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

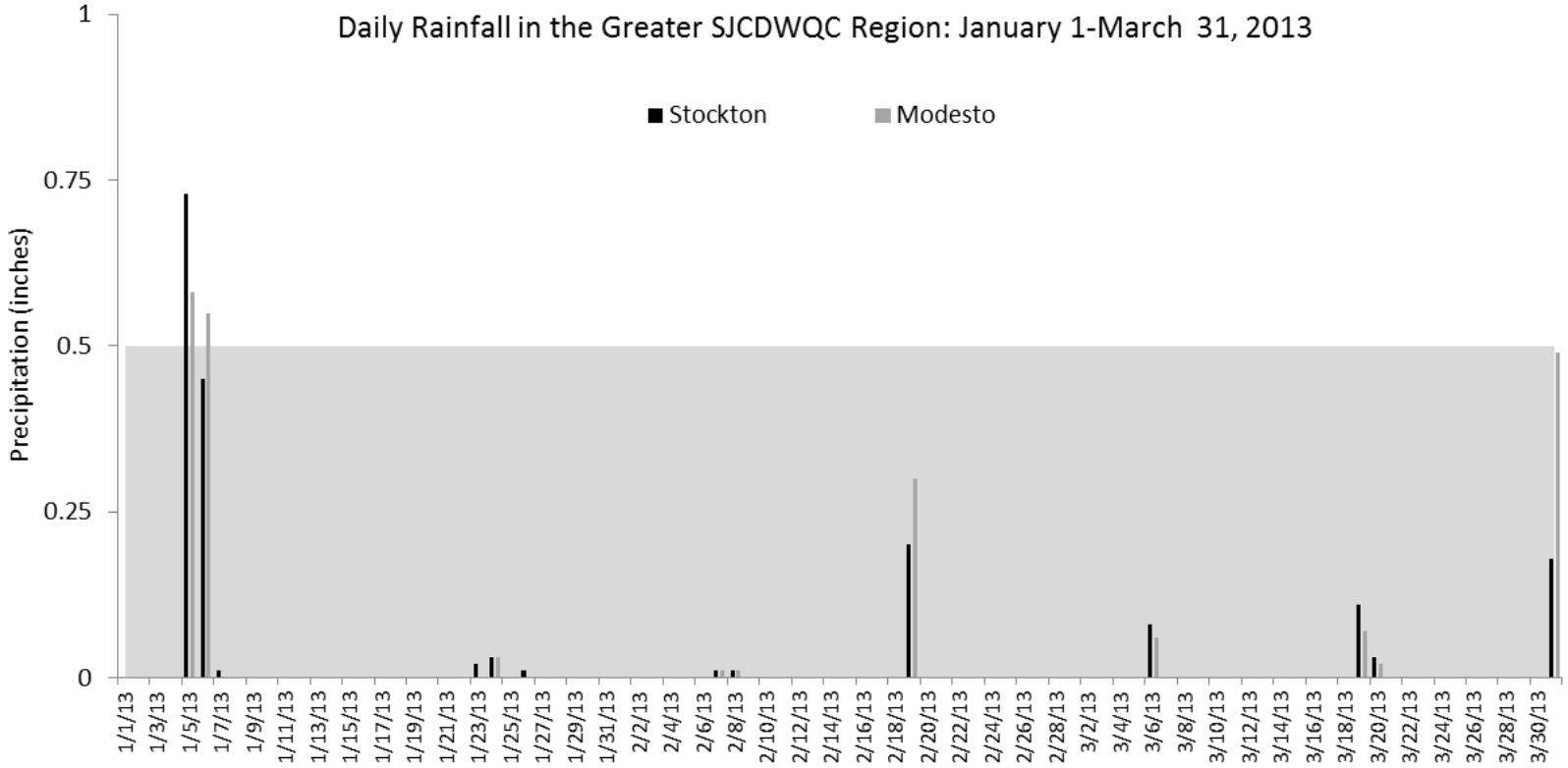


Figure 11. Precipitation history for Stockton and Modesto, April through June 2013.

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

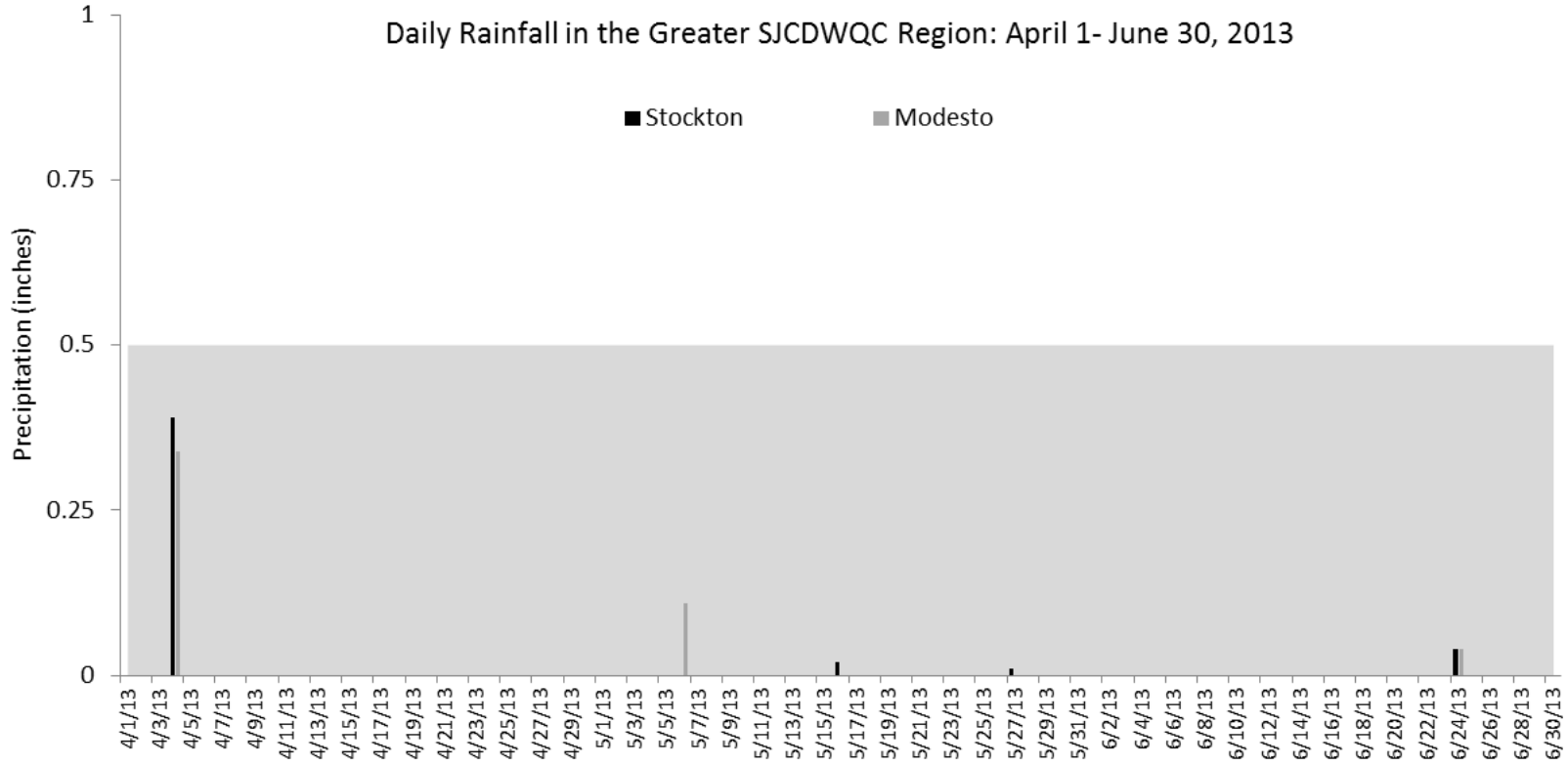


Figure 12. Precipitation history for Stockton and Modesto, July through September 2013.

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

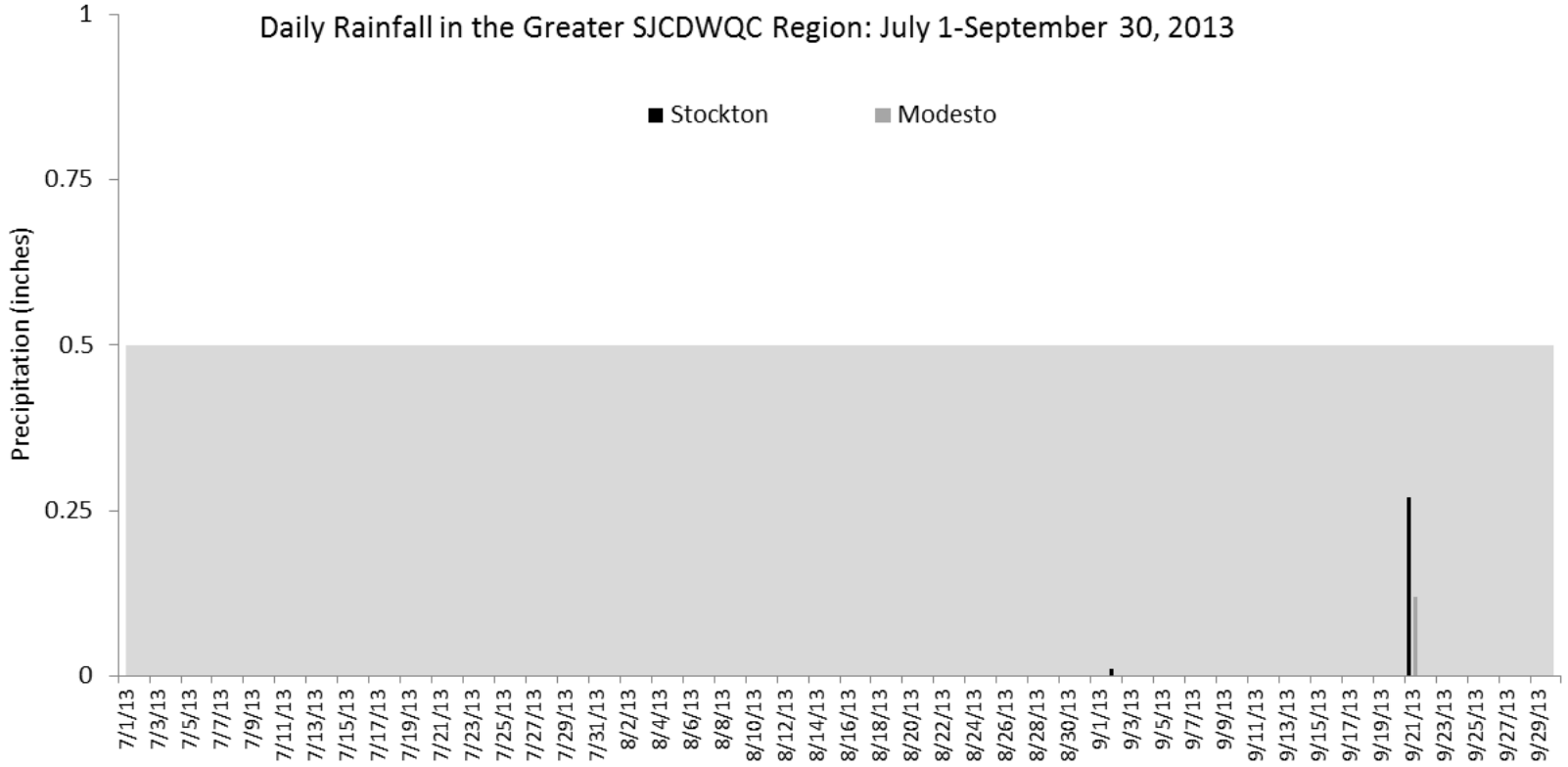
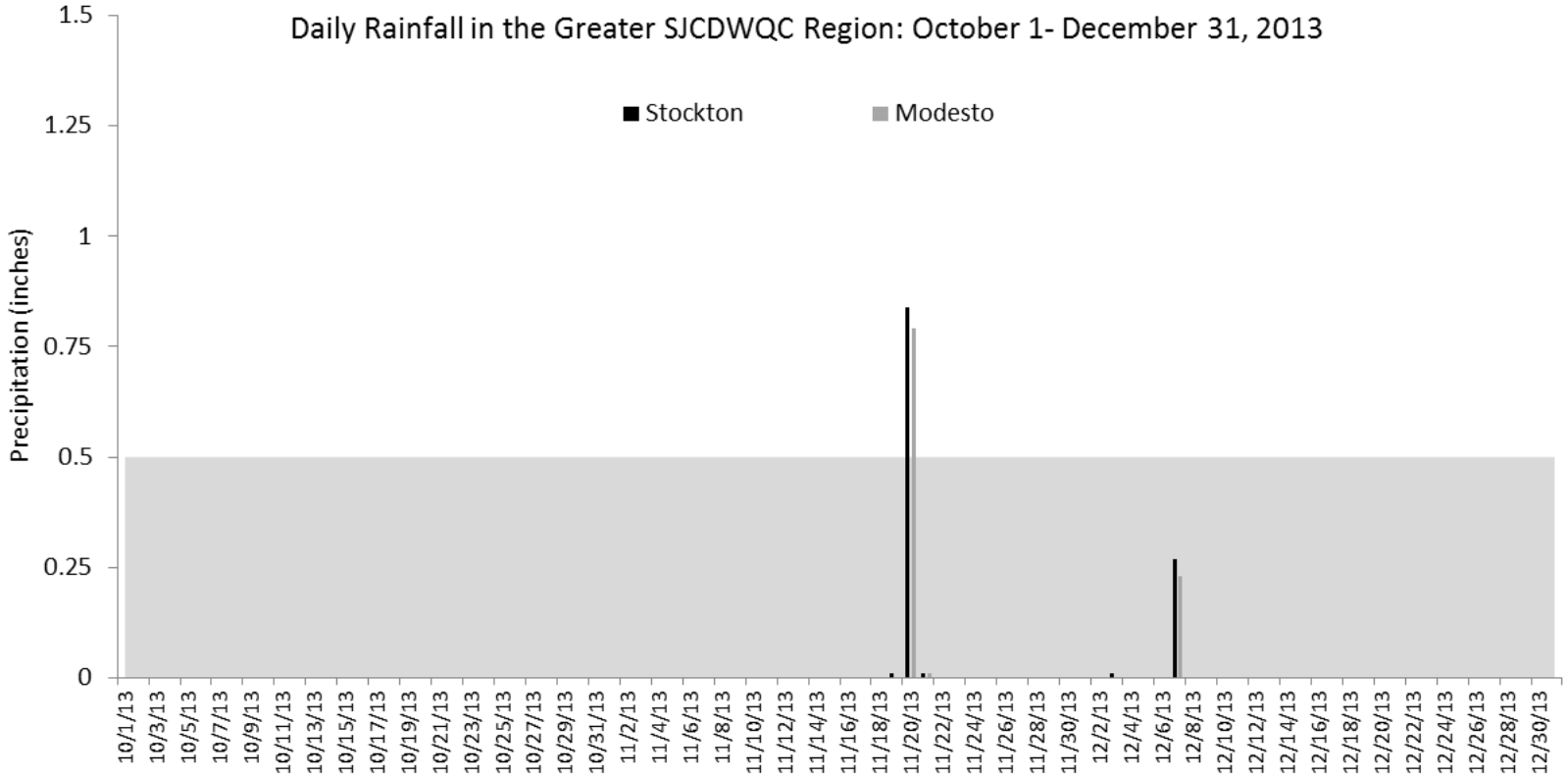


Figure 13. Precipitation history for Stockton and Modesto, October through December 2013.

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 2013 (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), updated on January 15, 2013. If there were any discrepancies between the COC and sample delivery, they 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. Toxicity samples collected during August 20, 2013 were recollected on August 21, 2013 as soon as the laboratory notified the Coalition that the species for the toxicity tests had not arrived on time. September MPM at Mormon Slough @ Jack Tone Rd did not occur since the site was inaccessible due to site construction. Furthermore, samples were not collected from Drain to Bishop Cut @ North Rio Blanco Rd April through June 2013 due to access restrictions. Drain to Bishop Cut @ North Rio Blanco Rd was replaced with Empire Tract @ 8 Mile Rd on July 5, 2013. Refer to the Field and Transport Completeness section of this report for additional information on monitoring completeness in 2013.

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 (µg/L). To convert a concentration measured in mg/L to µg/L, multiply by 1000.

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 of sample were collection. Instantaneous load calculations for TMDL compliance will be included in the SJCDWQC MPUR to be submitted on April 1, 2014.

Complete monitoring results from sampling that occurred from January through December 2013 are located in Appendices II and III. Results are provided for 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 flow data from the site. Monitoring data include results from samples collected during MPM, NM, sediment monitoring, and TMDL compliance monitoring. Each sample location, sample date, sample time and type of monitoring is listed in Table 12. All field data sheets from sampling events can be found in Appendix IX. All laboratory reports including electronic Level III data packages for January through December 2013 are submitted with this report.

During 2013 monitoring, all sample collection procedures were followed 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. Any water quality exceedances from non-contiguous waterbodies should be evaluated with the understanding that the water was not connected to a downstream waterbody. During 2013, there was one site that was not sampled due to lack of water, and two sites sampled as a non-contiguous waterbodies. Furthermore, September MPM samples were not collected from Mormon Slough @ Jack Tone Rd due to site construction.

From January through December 2013, the following sites were sampled as non-contiguous waterbodies (Table 12):

- French Camp Slough @ Airport Way
    - 11/19/2013
- Unnamed Drain to Lone Tree Creek @ Jack Tone Rd
    - 11/19/2013
    - 12/17/2013

From January through December 2013, the following sites were not sampled due to lack of water on the specified sample date:

- Unnamed Drain to Lone Tree Creek @ Jack Tone Rd
    - 2/22/2013

Table 12. Sample details for January through December 2013 (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	Management Plan Monitoring; Winter1	1/15/2013	9:00		January Management Plan Monitoring for chlorpyrifos and malathion.
Drain to Bishop Cut @ North Rio Blanco Rd	544DBCRBR	NM	Winter1	1/15/2013	8:20		Pump station not running; discharge recorded as zero.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Management Plan Monitoring; Winter1	1/15/2013	11:40		January Management Plan Monitoring for diazinon and diuron.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Management Plan Monitoring; Winter1	1/15/2013	11:50		January Management Plan Monitoring for chlorpyrifos and *S. capricornutum* toxicity.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Management Plan Monitoring; Winter1	1/15/2013	12:50		January Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Management Plan Monitoring; Winter1	1/15/2013	10:40		January Management Plan Monitoring for chlorpyrifos.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter1	1/15/2013	8:00		Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Management Plan Monitoring; Winter1	1/15/2013	13:30		January Management Plan Monitoring for chlorpyrifos, diuron and *S. capricornutum* toxicity. Discharge recorded as zero due to no measurable flow.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Management Plan Monitoring; Winter1	1/15/2013	11:10		January Management Plan Monitoring for diazinon. Discharge recorded as zero due to no measurable flow.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Winter1	1/15/2013	9:30		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Management Plan Monitoring; Winter1	1/15/2013	10:10		January Management Plan Monitoring for chlorpyrifos and diuron.
Walthall Slough @ Woodward Ave	544WSAWAV	MPM, NM	Management Plan Monitoring; Winter1	1/15/2013	14:10		January Management Plan Monitoring for HCH.
Drain to Bishop Cut @ North Rio Blanco Rd	544DBCRBR	NM	Winter2	2/21/2013	8:00		Pump station not running; discharge recorded as zero.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Management Plan Monitoring; Winter2	2/21/2013	10:20		February Management Plan Monitoring for chlorpyrifos, diazinon, diuron, copper, *C. dubia* and *S. capricornutum* toxicity.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Management Plan Monitoring; Winter2	2/21/2013	12:40		February Management Plan Monitoring for chlorpyrifos. 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
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Management Plan Monitoring; Winter2	2/21/2013	12:10		February Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Management Plan Monitoring; Winter2	2/21/2013	11:00		February Management Plan Monitoring for chlorpyrifos, copper and *C. dubia* toxicity.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Winter2	2/21/2013	9:10		February Management Plan Monitoring for chlorpyrifos, diazinon and copper. Discharge recorded as zero due to no measurable flow.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Management Plan Monitoring; Winter2	2/21/2013	9:40		February Management Plan Monitoring for chlorpyrifos Too shallow to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	MPM, NM	Management Plan Monitoring; Winter2	2/21/2013	8:10		February Management Plan Monitoring for *C. dubia* toxicity. Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Management Plan Monitoring; Winter2	2/21/2013	13:20		February Management Plan Monitoring for chlorpyrifos. Pump station not running; discharge recorded as zero.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Winter2	2/21/2013	9:00		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Management Plan Monitoring; Winter2	2/21/2013	9:28	Dry	February Management Plan Monitoring for chlorpyrifos and diuron. Dry site, no samples collected.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Winter2	2/21/2013	13:00		
Drain to Bishop Cut @ North Rio Blanco Rd	544DBCRBR	NM, Sediment	Winter3	3/19/2013	8:00		Pesticides analyzed in toxic sediment only. Pump station not running; discharge recorded as zero.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Management Plan Monitoring; Winter3	3/19/2013	9:10		March Management Plan Monitoring for *H. azteca* toxicity. Discharge not measured due to toxicity monitoring only.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Management Plan Monitoring; Winter3	3/19/2013	10:30		March Management Plan Monitoring for *H. azteca* toxicity.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Management Plan Monitoring; Winter3	3/19/2013	13:10		March Management Plan Monitoring for chlorpyrifos and *H. azteca* toxicity.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Management Plan Monitoring; Winter3	3/19/2013	12:30		March Management Plan Monitoring for *C. dubia* and *H. azteca* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Management Plan Monitoring; Winter3	3/19/2013	11:40		March Management Plan Monitoring for *H. azteca* toxicity. Discharge not measured due to toxicity monitoring only.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Winter3	3/19/2013	8:00		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	MPM, NM	Management Plan Monitoring; Winter3	3/19/2013	14:20		March Management Plan Monitoring for *C. dubia* and *H. azteca* toxicity. Too deep to measure discharge.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Management Plan Monitoring; Winter3	3/19/2013	11:00		March Management Plan Monitoring for *H. azteca* toxicity. Discharge not measured due to toxicity monitoring only.
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM, NM	Management Plan Monitoring; Winter3	3/19/2013	9:30		March Management Plan Monitoring for *H. azteca* toxicity.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Management Plan Monitoring; Winter3	3/19/2013	9:50		March Management Plan Monitoring for *H. azteca* toxicity. Discharge not measured due to toxicity monitoring only.
Walthall Slough @ Woodward Ave	544WSAWAV	MPM, NM	Management Plan Monitoring; Winter3	3/19/2013	12:00		March Management Plan Monitoring for *H. azteca* toxicity.
Drain @ Woodbridge Rd	544DAWRXX	MPM	Management Plan Monitoring; Storm1	4/2/2013	7:30		April Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Management Plan Monitoring; Storm1	4/2/2013	18:40		April Management Plan Monitoring for chlorpyrifos and *C. dubia* toxicity.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Management Plan Monitoring; Storm1	4/2/2013	17:10		April Management Plan Monitoring for chlorpyrifos.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Management Plan Monitoring; Storm1	4/2/2013	11:50		April Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Management Plan Monitoring; Storm1	4/2/2013	11:00		April Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Light House Restaurant @ West Brannon Island Rd	510LHRWBI	TMDL	Storm1	4/2/2013	9:40		Too deep to measure discharge.
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Management Plan Monitoring; Storm1	4/2/2013	18:10		April Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Storm1	4/2/2013	19:30		Too deep to measure discharge.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Management Plan Monitoring; Storm1	4/2/2013	18:30		April Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Old River @ the West End of Clifton Court Rd	544ORAWCC	TMDL	Storm1	4/2/2013	12:10		Too deep to measure discharge.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Management Plan Monitoring; Storm1	4/2/2013	12:50		April Management Plan Monitoring for *S. capricornutum* toxicity. Discharge recorded as zero due to no measurable flow.
San Joaquin River @ West Neugerbauer Rd (Roberts Island off Windmill Cove)	544SJCAWN	TMDL	Storm1	4/2/2013	13:20		Too deep to measure discharge.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Management Plan Monitoring; Storm1	4/2/2013	10:30		April Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Storm1	4/2/2013	8:50		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Management Plan Monitoring; Storm1	4/2/2013	17:40		April Management Plan Monitoring for copper.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, TMDL	Storm1	4/2/2013	15:00		
Bear Creek @ North Alpine Rd	531BCANAR	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	16:00		May Management Plan Monitoring for malathion.
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	15:10		May Management Plan Monitoring for chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Irrigation1; Management Plan Monitoring	5/21/2013	13:50		May Management Plan Monitoring for chlorpyrifos
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM	Irrigation4; Management Plan Monitoring	5/21/2013	12:10		May Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	12:50		May Management Plan Monitoring for *S. capricornutum* and *C. dubia* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	11:10		May Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Light House Restaurant @ West Brannon Island Rd	510LHRWBI	TMDL	Irrigation1	5/21/2013	9:20		
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	15:10		May Management Plan Monitoring for copper. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation1	5/21/2013	16:30		Too deep to measure discharge.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	16:10		May Management Plan Monitoring for chlorpyrifos, *C. dubia* and *S. capricornutum* toxicity. Too deep to measure discharge.
Old River @ the West End of Clifton Court Rd	544ORAWCC	TMDL	Irrigation1	5/21/2013	11:50		
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Irrigation1; Management Plan Monitoring	5/21/2013	13:40		May Management Plan Monitoring for *S. capricornutum* toxicity. Too deep to measure discharge.
San Joaquin River @ West Neugerbauer Rd (Roberts Island off Windmill Cove)	544SJCAWN	TMDL	Irrigation1	5/21/2013	14:30		CDEC did not have station information available for the sample date.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	10:20		May Management Plan Monitoring for dieldrin and disulfoton. 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
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation1	5/21/2013	8:00		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation1; Management Plan Monitoring	5/21/2013	14:50		May Management Plan Monitoring for chlorpyrifos and copper.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, TMDL	Irrigation1	5/21/2013	11:30		
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation2; Management Plan Monitoring	6/18/2013	8:50		June Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
French Camp Slough @ Airport Way	531SJC504	NM	Irrigation2	6/18/2013	11:10		
Light House Restaurant @ West Brannon Island Rd	510LHRWBI	TMDL	Irrigation2	6/18/2013	9:00		
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation2; Management Plan Monitoring	6/18/2013	10:20		June Management Plan Monitoring for chlorpyrifos and copper. Too deep to measure discharge.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation2	6/18/2013	8:00		Too deep to measure discharge.
Old River @ the West End of Clifton Court Rd	544ORAWCC	TMDL	Irrigation2	6/18/2013	11:20		
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Irrigation2	6/18/2013	11:50		Too deep to measure discharge.
San Joaquin River @ West Neugerbauer Rd (Roberts Island off Windmill Cove)	544SJCAWN	TMDL	Irrigation2	6/18/2013	12:20		
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation2; Management Plan Monitoring	6/18/2013	10:20		June Management Plan Monitoring for dieldrin and disulfoton. Discharge recorded as zero due to no measurable flow.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation2	6/18/2013	8:00		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation2; Management Plan Monitoring	6/18/2013	9:20		June Management Plan Monitoring for chlorpyrifos.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, TMDL	Irrigation2	6/18/2013	12:20		
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation3; Management Plan Monitoring	7/16/2013	9:00		July Management Plan Monitoring for chlorpyrifos and *C. dubia* a toxicity. Too deep to measure discharge.
Empire Tract @ 8 Mile Rd	544ETAEMR	NM	Irrigation3	7/16/2013	8:00		Too deep to measure discharge.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Irrigation3; Management Plan Monitoring	7/16/2013	11:10		July Management Plan Monitoring for chlorpyrifos.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation3; Management Plan Monitoring	7/16/2013	12:30		July Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Light House Restaurant @ West Brannon Island Rd	510LHRWBI	TMDL	Irrigation3	7/16/2013	10:30		
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM	Irrigation3; Management Plan Monitoring	7/16/2013	9:30		July Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation3; Management Plan Monitoring	7/16/2013	10:40		July Management Plan Monitoring for chlorpyrifos.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation3	7/16/2013	8:00		Too deep to measure discharge.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Irrigation3; Management Plan Monitoring	7/16/2013	8:40		July Management Plan Monitoring for chlorpyrifos and Selenastrum toxicity. Too deep to measure discharge.
Old River @ the West End of Clifton Court Rd	544ORAWCC	TMDL	Irrigation3	7/16/2013	13:00		
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Irrigation3; Management Plan Monitoring	7/16/2013	13:50		July Management Plan Monitoring for diuron, *C. dubia* toxicity and *S. capricornutum* toxicity. Too deep to measure discharge.
San Joaquin River @ West Neugerbauer Rd (Roberts Island off Windmill Cove)	544SJCAWN	TMDL	Irrigation3	7/16/2013	14:30		
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation3	7/16/2013	9:10		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation3; Management Plan Monitoring	7/16/2013	9:50		July Management Plan Monitoring for copper and chlorpyrifos.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, TMDL	Irrigation3	7/16/2013	13:00		
Duck Creek @ Hwy 4	531XDCAHF	MPM	Irrigation4; Management Plan Monitoring	8/20/2013	10:20		August Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Empire Tract @ 8 Mile Rd	544ETAEMR	NM	Irrigation4	8/20/2013	9:00		Too deep to measure discharge.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Irrigation4; Management Plan Monitoring	8/20/2013	12:20		August Management Plan Monitoring for chlorpyrifos.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM	Irrigation4; Management Plan Monitoring	8/20/2013	14:40		August Management Plan Monitoring for *C. dubia* toxicity. Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM	Irrigation4; Management Plan Monitoring	8/20/2013	13:40		August Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Light House Restaurant @ West Brannon Island Rd	510LHRWBI	TMDL	Irrigation4	8/20/2013	11:30		
Lone Tree Creek @ Jack Tone Rd	531XLTCJR	MPM	Irrigation4; Management Plan Monitoring	8/20/2013	11:40		August Management Plan Monitoring for chlorpyrifos.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation4	8/20/2013	8:20		Too deep to measure discharge.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM	Irrigation4; Management Plan Monitoring	8/20/2013	10:10		August Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Old River @ the West End of Clifton Court Rd	544ORAWCC	TMDL	Irrigation4	8/20/2013	15:00		Department of Water Resources station was not working on the sample day.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Irrigation4; Management Plan Monitoring	8/20/2013	15:40		August Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
San Joaquin River @ West Neugerbauer Rd (Roberts Island off Windmill Cove)	544SJCAWN	TMDL	Irrigation4	8/20/2013	16:00		

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM	Irrigation4; Management Plan Monitoring	8/20/2013	13:10		August Management Plan Monitoring for dieldrin, disulfoton and *S. capricornutum* toxicity. Discharge recorded as zero due to no measurable flow.
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM, NM	Irrigation4; Management Plan Monitoring	8/20/2013	10:00		August Management Plan Monitoring for chlorpyrifos.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM	Irrigation4; Management Plan Monitoring	8/20/2013	10:50		August Management Plan Monitoring for copper and chlorpyrifos.
Walthall Slough @ Woodward Ave	544WSAWAV	NM, TMDL	Irrigation4	8/20/2013	14:10		
Empire Tract @ 8 Mile Rd	544ETAEMR	NM	Irrigation4	8/21/2013	14:40		Discharge not measured due to toxicity monitoring only.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Irrigation4	8/21/2013	14:00		Discharge not measured due to toxicity monitoring only.
Walthall Slough @ Woodward Ave	544WSAWAV	NM	Irrigation4	8/21/2013	15:40		Discharge not measured due to toxicity monitoring only.
Kellogg Creek along Hoffman Ln	544XKCAHL	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	12:10		September Management Plan Monitoring for *H. azteca* toxicity..
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	11:20		September Management Plan Monitoring for copper.
Grant Line Canal @ Clifton Court Rd	544XGLCAA	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	13:00		September Management Plan Monitoring for chlorpyrifos and *H. azteca* toxicity.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	11:50		September Management Plan Monitoring for copper, chlorpyrifos and *H. azteca* toxicity.
Duck Creek @ Hwy 4	531XDCAHF	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	10:30		September Management Plan Monitoring for chlorpyrifos, *C. dubia* toxicity and *H. azteca* toxicity.
Grant Line Canal near Calpack Rd	544XGLCCR	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	13:40		September Management Plan Monitoring for *H. azteca* toxicity.
Terminous Tract Drain @ Hwy 12	544XTTHWT	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	10:00		September Management Plan Monitoring for chlorpyrifos and *H. azteca* toxicity.
Mormon Slough @ Jack Tone Rd	544MSAJTR	MPM, NM	Irrigation5; Management Plan Monitoring; Non-Contiguous	9/17/2013	10:00	No Access	September Management Plan Monitoring for chlorpyrifos and *C. dubia* toxicity. Site under construction; samples not collected due to no access.
Walthall Slough @ Woodward Ave	544WSAWAV	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	15:00		September Management Plan Monitoring for chlorpyrifos and *H. azteca* toxicity
Empire Tract @ 8 Mile Rd	544ETAEMR	NM	Irrigation5	9/17/2013	8:30		

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Roberts Island @ Whiskey Slough Pump	544RIAWSP	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	14:20		September Management Plan Monitoring for chlorpyrifos and *H. azteca* toxicity. Pesticides analyzed for in toxic sediment only.
Bear Creek @ North Alpine Rd	531BCANAR	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	8:30		September Management Plan Monitoring for chlorpyrifos and malathion.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Irrigation5	9/17/2013	8:00		
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	12:50		September Management Plan Monitoring for chlorpyrifos and *H. azteca* toxicity.
Sand Creek @ Hwy 4 Bypass	544SCAHFB	MPM, NM	Irrigation5; Management Plan Monitoring	9/17/2013	11:20		September Management Plan Monitoring for *H. azteca* toxicity.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Fall1; Management Plan Monitoring	10/8/2013	10:10		October Management Plan Monitoring for chlorpyrifos.
Bear Creek @ North Alpine Rd	531BCANAR	MPM, NM	Fall1; Management Plan Monitoring	10/8/2013	8:40		October Management Plan Monitoring for chlorpyrifos.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall1	10/8/2013	8:10		
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Fall1	10/8/2013	11:20		
Empire Tract @ 8 Mile Rd	544ETAEMR	NM	Fall1	10/8/2013	10:00		
Walthall Slough @ Woodward Ave	544WSAWAV	MPM, NM	Fall1; Management Plan Monitoring	10/8/2013	12:10		October Management Plan Monitoring for chlorpyrifos.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall1	10/8/2013	8:20		
Empire Tract @ 8 Mile Rd	544ETAEMR	NM	Fall2	11/19/2013	8:00		
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall2	11/19/2013	10:40		
Littlejohns Creek @ Jack Tone Rd	531XLCAJR	MPM, NM	Fall2; Management Plan Monitoring	11/19/2013	11:30		November Management Plan Monitoring for chlorpyrifos.
French Camp Slough @ Airport Way	531SJC504	MPM, NM	Fall2; Non-Contiguous	11/19/2013	12:20		Non-contiguous waterbody.
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Fall2	11/19/2013	16:20		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	531UDLTAJ	MPM, NM	Fall2; Management Plan Monitoring; Non-Contiguous	11/19/2013	11:50		November Management Plan Monitoring for chlorpyrifos. Non-contiguous waterbody.
Walthall Slough @ Woodward Ave	544WSAWAV	MPM, NM	Fall2; Management Plan Monitoring	11/19/2013	14:00		November Management Plan Monitoring for HCH.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall2	11/19/2013	9:10		
Walthall Slough @ Woodward Ave	544WSAWAV	MPM, NM	Fall3; Management Plan Monitoring	12/17/2013	12:40		December Management Plan Monitoring for HCH.
Mokelumne River @ Bruella Rd	531XMRABR	NM	Fall3	12/17/2013	16:00		
Roberts Island @ Whiskey Slough Pump	544RIAWSP	NM	Fall3	12/17/2013	11:00		

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, NM	Fall3; Management Plan Monitoring	12/17/2013	15:10		December Management Plan Monitoring for chlorpyrifos.
Terminous Tract Drain @ Hwy 12	544XTTHWT	NM	Fall3	12/17/2013	8:00		
French Camp Slough @ Airport Way	531SJC504	NM	Fall3	12/17/2013	14:30		
Empire Tract @ 8 Mile Rd	544ETAEMR	NM	Fall3	12/17/2013	9:20		

MPM-Management Plan Monitoring
NM-Normal Monitoring

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 January 15, 2013 (Appendix I-XXXVII). Any deviations from these procedures are documented in the Precision, Accuracy and Completeness section of this report.

Table 13. Sampling procedures.

Groups	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
	TKN, 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	180 Days
Drinking Water	*E. coli* (pathogens)	120 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 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 and Sediment Column Toxicity	Aquatic Toxicity	5 Gallons	5x 1 Gallon Amber Glass	Store at ≤6°C	36 Hours
	Sediment Toxicity	2 L	2x 1 L Glass	Store at ≤6°C, do not freeze	14 Days
	Sediment Grain Size	125 mL	Amber Glass	Store at ≤6°C, do not freeze	28 days
	Sediment Total Organic Carbon	125 mL	Clean Glass Jars	Store at ≤6°C (not frozen), analyze or freeze (-20C) within 28 days	28 days (not frozen) 12 Months (frozen)
	Sediment Chemistry	125 mL	Clean Glass Jars	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.

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 Flo-Mate 2000

YSI- Yellow Springs Instruments

Table 15. Site specific discharge methods in 2013.

Site	Discharge Method[1]	Meter/ Gauge
Bear Creek @ North Alpine Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Drain @ Woodbridge Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Drain to Bishop Cut @ North Rio Blanco Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Duck Creek @ Highway 4	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Empire Tract @ 8 Mile Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
French Camp Slough @ Airport Way	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Grant Line Canal @ Clifton Court	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Grant Line Canal near Calpack Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Kellogg Creek along Hoffman Ln	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Light House Restaurant @ West Brannon Island Rd	Discharge from CDEC station	San Joaquin River at Prisoners PT NR Termino gauge
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
Old River @ the West End of Clifton Court Rd	Discharge from CDEC station	Old River at Clifton Court Intake gauge
Roberts Island @ Whiskey Slough Pump	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
San Joaquin River @ West Neugerbauer Rd	Discharge from CDEC station	Rough and Ready Island gauge
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.

Group	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
Toxic	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

Group	Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
	Sediment Toxicity	Sediment	AQUA-Science[2]	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
	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 547
	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 8141
Metals	Arsenic	Fresh Water	Caltest	0.5 µg/L	0.02 µg/L	EPA 200.8 (ICPMS)
	Boron	Fresh Water	Caltest	10 µg/L	0.7 µg/L	EPA 200.8 (ICPMS)

Group	Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
	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)
	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
	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
	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[3]	200 mg/kg	100 mg/kg dw	Walkley Black
	Grain Size	Sediment	Caltest[3]	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 Nautilus Laboratory.
[3]Subcontracted to PTS Laboratory.

PRECISION, ACCURACY AND COMPLETENESS

An assessment of precision, accuracy, and completeness is tabulated in Tables 17-33. All data are useable. In a few instances, some data quality objectives were not met; this does not affect the usability of data. The following is a narrative explanation of chemistry and toxicity precision, accuracy and completeness, detailing why data are useable.

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 data quality objectives (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 2013 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, variation in minimum detection limits (MDLs) and reporting limits (RLs) is a result of different initial sample weights or dry weight values of samples run within the same batch.

COMPLETENESS

Field and Transport Completeness

All sites scheduled for the 12 sampling events in 2013 were sampled; one site scheduled for MPM was dry. The constituents sampled from January through December 2013 are listed by site in Tables 5 and 6. Table 17 gives a breakdown of the field and transport completeness and includes: the specific analyte, the expected number of environmental samples scheduled to be collected (A), the number of dry sites (B), the number of samples not collected (C), the number of samples collected (D), and field and transport completeness (number of samples collected versus samples scheduled to be collected, [D/ (A-B)]).

Overall, there was 93% completeness for environmental samples collected for water chemistry and toxicity analyses as well as sediment chemistry and toxicity analyses from the 21 sites visited in 2013. Drain to Bishop Cut @ North Rio Blanco Rd was inaccessible from April through June 2013 and therefore no samples were collected or field parameters measured. The Coalition received approval from the

Regional Board to replace Drain to Bishop Cut @ North Rio Blanco Rd with Empire Tract @ 8 Mile Rd on July 5, 2013. Mormon Slough @ Jack Tone Road was also inaccessible during MPM in September 2013 due to construction; therefore, no samples were collected. September was the last month in 2013 the site was scheduled for sampling. Because Drain to Bishop Cut @ North Blanco Rd could not be sampled for 3 months, most Assessment Monitoring constituents have a 91.7% field and transport completeness except for constituents that were also monitored for MPM. The additional samples collected for MPM resulted in higher field and transport completeness for those analytes (e.g. diazinon and chlorpyrifos). Due to Mormon Slough being inaccessible in September, the total number of samples that could not be collected for chlorpyrifos is four resulting in a field and transport completeness of 97.1 for chlorpyrifos (4 out of 102 samples were not collected).

During the August sampling event, one laboratory error occurred which required resampling. The Coalition re-collected toxicity samples at three sites and measured field parameters; therefore, all samples were collected.

Field parameter measurements, including DO, discharge, pH, SC, and temperature were scheduled at each site for all sampling events. Overall, there was 99.4% completeness for field parameters; DO, pH, SC and temperature were collected 162 times out of 164 events. Additional field parameters were taken at three sites when the Coalition re-collected toxicity samples in August; however, they were not collected during four sampling events because two sites could not be accessed. Discharge was measured at 48% of site visits and was not measured for the following reasons: 1) sediment and toxicity monitoring only events (load calculations are not possible and therefore discharge is not required, 24 events), 2) the water is too deep to safely measure discharge (46 events), or 3) the water is too shallow to measure discharge (1 event). Documentation of why discharge was not taken is included in the sample details table (Table 18).

Analytical Completeness

One hundred percent of all samples collected were analyzed; resulting in 100% completeness for environmental samples analyzed for water chemistry and water column toxicity analyses as well as sediment chemistry and sediment toxicity analyses (Table 17). Out of all samples analyzed, including QC samples, 95% were within QC limits and analyzed with no method deviations.

Table 19 includes 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 and travel blanks.

For chemistry analysis, a field duplicate (FD) must be analyzed with each sampling event. In addition, an equipment blank and travel blank were analyzed for dissolved metals and total metals, respectively. For the December event, a field duplicate was collected and analyzed for every analyte with the exception of carbamates and methamidophos. The field duplicate samples collected in December were not analyzed because sample bottles broke during transport and not enough volume was left for analysis. Overall, field blanks and field duplicates comprised more than 5% of samples analyzed for each analyte.

For toxicity analysis, a field duplicate must be analyzed with each sampling event or every 20 samples, whichever is more frequent. Field duplicates were analyzed every sampling event and the overall percentage of field duplicates are as follows: *C. dubia* 21%, *P. promelas* 50%, *S. capricornutum* 18.5%, and *H. azteca* 8.3%.

Batch Completeness

All chemistry batches were reviewed for Quality Assurance/Quality Control (QA/QC) completeness. A complete batch must have a minimum of one lab blank, lab duplicate, LCS and MS (with the exception of turbidity, *E. coli*, total dissolved solids, and total suspended solids). Batch completeness for all chemistry 2013 data is 99%; one carbamate batch analyzing for only diuron and a batch analyzing for phosphorus as P were run without a matrix spike (MS); there have been no issues with matrix interference for diuron in any batches run and eighty one percent of all phosphorus as P MS were recovered within limits during 2013. All other batches are considered acceptable based on an overall assessment of QA/QC samples meeting acceptability criteria in each 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 if there is insufficient volume to include a project matrix spike. When a NONPJ matrix spike is used, the batch is flagged accordingly. The Coalition used project matrix spikes in all batches containing 2013 data except for 35 batches; 56 NONPJ matrix spikes and matrix spike duplicates (MSD) were used due to insufficient volume from project samples. The use of NONPJ samples allowed the Coalition to evaluate the accuracy of the batches and achieve batch completeness.

All toxicity batches have 100% QA/QC completeness.

HOLD TIME COMPLIANCE

Hold times for all chemistry water and sediment analyses were met with the exception of one batch analyzing for diazinon, three paraquat batches and one sediment grain size batch. Hold time compliance for all chemistry analysis was 99% (Table 20). The diazinon and paraquat samples were run originally within hold time and re-extracted/re-analyzed due to low LCS and MS recoveries in the original batches. All environmental samples were non-detects in both the original and re-extracted/re-analyzed batches and are considered useable. The sediment samples analyzed for grain size were outside of the 28 day hold time (ran 29 days after collection) due to a miscommunication with the subcontracted laboratory. Although the sediment grain size analysis was run outside of the QAPP hold time, it did not affect the accuracy of the test and data are considered useable. The Coalition ensured the laboratory is aware of the 28 day hold time for future analyses. Sediment samples collected in March 2013 were analyzed within 28 days.

All water column toxicity and sediment toxicity tests met holding time requirements.

PRECISION AND ACCURACY

A review of the number of samples analyzed and the percentage per analyte that met acceptability criteria are listed in the tables following this section (Tables 21 through 33). A brief overview is provided to assess overall precision and accuracy per analyte. If less than 90% of lab QA samples met acceptability criteria, then further explanation of why data were determined to be acceptable is provided. All analytes are grouped by type and listed alphabetically; all pesticides and metals 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: Positive/negative controls, positive/positive controls, and negative/negative non-coliform controls, and lab blanks were performed with every batch. One hundred percent of the controls and the laboratory blanks met acceptability criteria. Level 3 data packages are submitted electronically with the quarterly data submittal and with the Annual Monitoring Report. 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 Rlog values of environmental and duplicate samples with the Rlog criterion developed by the laboratory using similar samples. The mean Rlog 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 Rlog values below the criteria acceptance level and therefore all *E. coli* data are useable.

Hardness: One hundred percent of hardness field blanks were below the reporting limit. Ninety-two percent of hardness field duplicates and 100% of MSDs met acceptability criteria for precision (RPD $\leq$25). All laboratory blanks met the QC criteria (<RL). Fifty-six percent of MS and MSD samples recovered within the acceptable range (19 of 34). Of the 15 samples that recovered outside of the control limits, all samples had low recoveries and 10 were non project MS samples. One hundred percent of LCS samples met acceptability criteria for precision and all other QC limits were met in hardness batches; therefore all hardness data are useable.

Metals (dissolved): One hundred percent of dissolved metal field blanks met acceptability criteria. Laboratory blanks were run with each metals batch and 100% met acceptability criteria. Equipment blanks were analyzed with all dissolved metal batches and 100% met acceptability criteria except for dissolved zinc (10 of 12, 83%). Zinc was detected in two equipment blanks (1.2 and 1.1 µg/L) at a concentration greater than 1/5 the associated environmental sample (ND). The samples were re-analyzed and the original results were confirmed. In both cases, the blank samples analyzed for total zinc (travel blank and field blank) were non detect and the dissolved zinc sample collected at the same time was non detect. It is unclear why the equipment blank had detections of dissolved zinc but based

on the other QC samples and the lack of zinc in the environmental samples, the results are considered useable. Overall, 96.7% of equipment blanks met the data quality objectives (DQO).

Dissolved metal field duplicate samples met acceptability criteria (FD RPD ≤25%) for 100% of the samples analyzed except for dissolved nickel and zinc (11 of 12, 92%).

The LCSs and MSs were within acceptable recovery limits for 100% of dissolved metals. All dissolved metal MSDs met acceptance criteria for precision. All dissolved metal results are considered acceptable.

Metals (total): One hundred percent of field and laboratory blanks for total metals met acceptability criteria except for total copper and lead field blanks (11 of 12, 92%) and total zinc field blanks (10 of 12, 83%). Zinc was detected in two field blanks in concentrations greater than 1/5 the environmental sample collected in August and November; both samples were re analyzed and the results were confirmed. Travel and equipment blanks collected on the same day were all non detect. Contamination in the field may be due to contamination of the field blank water, the field blank bottle, or contamination from the sampler. All sampling SOPs, which include the steps to prevent contamination, were followed and the sampling crew has reviewed the detections and verified all sample collection and handling procedures were followed.

Travel blanks were run with each total metals batch and 100% met acceptability criteria except for total zinc collected in July (11 of 12, 92%).

Field duplicates met acceptability criteria (FD RPD ≤25) for at least 90% of total metal samples. Ninety-two percent (11 of 12) of total selenium and 58% (7 of 12) of total zinc field duplicates met acceptability criteria. Two total zinc environmental sample and associated field duplicate pairs outside of the acceptable limit had results below the reporting limit (estimated values); since the detections are not quantifiable and the concentrations estimated are so low, it is likely in those situations the RPD will be greater than 25. Of the total zinc RPDs above 25%, three had an RPD of 26%. The dissolved metal field duplicates and environmental samples collected at the same time had RPDs within acceptance criteria. Overall, field duplicate precision for all total metals was 94%.

The total metals LCSs were within acceptable recovery limits for 100% of samples run. The MS recoveries were within control limits for 100% of all total metals samples analyzed and all total metal MSD samples met the acceptability criteria for precision (RPD ≤25%).

Nutrients: One hundred percent of Ammonia as N field blanks met acceptability criteria. Fifty percent of field duplicates had RPDs below 25% (6 of 12). The high RPDs could be because the six pairs of environmental samples and associated field duplicates results were below the reporting limit; low concentrations that are estimated may result in higher RPDs. One hundred percent of laboratory blanks, LCS and LCS duplicates met acceptability criteria. The MS and matrix spike duplicates (MSDs) were run with each batch and 100% met acceptability criteria.

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-two 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. Seventy-six percent of MS were within the acceptability criteria (26 of 34). Five MS and MSDs recovered below the QC limits possibly due to matrix interference and three recovered above. In all cases the batch QC data was accepted based on LCS and MSD results. One hundred percent of MSDs met the requirements for precision.

All total kjeldahl nitrogen (TKN) field blanks had concentrations that were < RL or < 1/5 of the environmental sample and therefore are considered acceptable. Field duplicates met the acceptance criteria (RPDs $\leq$ 25%) in 67% of the samples analyzed (8 of 12). One TKN environmental sample and associated field duplicate had results below the reporting limit. The field sheets describe the sample site as generally having murky, brown colored water with low flow. This could have contributed to non-homogenous samples and the environmental and field duplicate sample results having a higher difference. Lab blanks were run with every batch and 100% were less than the RL. Laboratory control spikes and LCS duplicates were within acceptance criteria for all batches. Matrix spikes were performed in each TKN batch with 77% meeting acceptability requirements (20 of 26). The six individual MS or MSDs were recovered below control limits due to possible matrix interferences. In all cases the batch QC data was accepted based on LCS and RPD results. One hundred percent of MS duplicates met the requirements for precision.

Orthophosphate as P field blanks and field duplicates collected met 100% acceptance criteria. Lab blanks were run with every batch and 100% were less than the reporting limit. 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%.

Phosphorus 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.

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 8141A). Field blanks were run with each batch and overall, 99% of pesticide field blanks met the acceptability criteria. One hundred percent of lab blank samples met acceptability criteria and all field duplicates samples 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 98.6% of all samples analyzed; 97% of triphenylphosphate samples (EPA 8141A) and diphenamid samples (EPA 8321A) met acceptability criteria and 98% of tributylphosphate samples (EPA 8141A) met acceptability criteria (Table 30). When a surrogate is recovered outside of the acceptability criteria, the associated environmental sample is flagged as well.

Matrix spikes and LCS samples were analyzed in each batch to assess accuracy as well as possible matrix interference. A MSD and/or a LCSD were performed per batch to assess precision. One hundred percent of MS samples were within acceptability criteria with the exception of demeton-s (22 of 24, 92%), disulfoton (23 of 24, 96%), phorate (20 of 24, 83%), malathion and paraquat (18 of 24, 75%), and HCH delta (3 of 6, 50%). Overall, 97.4% of all pesticide MS recovered within the QC limits. All four phorate samples and all five malathion MS and MSD samples recovered above the QC limit; in each batch all environmental samples were non detect and all other QC samples were within the acceptability criteria. All four paraquat MS and tow MSD samples outside of the acceptable limit (70-130%) recovered low; all associated environmental samples were non detect except in one batch. One hundred percent of LCS and LSCD samples recovered with the QC limits in all paraquat batches analyzed. In addition, paraquat readily binds to suspended particles making it a difficult analyte to characterize in the water column. Paraquat results are considered acceptable based on other QC performance within the batch. All three HCH delta MS samples recovered above the acceptance limit; however, 100% of HCH alpha, beta and gamma and all other MS samples within the organochlorine batches recovered within QC limits. All associated environmental samples were non detect.

One hundred percent of pesticide LCS samples analyzed met the acceptability criteria with the exception of dimethoate and phorate (11 of 12, 92%), malathion (10 of 12, 83%), and HCH, delta (1 of 3, 33%). All recoveries were above the QC limits, however all associated environmental sample results were non detect. Therefore, the results are considered useable. Overall, 98.6% of LCS pesticide samples recovered within QC limits and all environmental sample results were non detect.

Laboratory precision assessed by the RPD of laboratory duplicates met acceptability criteria in 100% of matrix spike duplicate samples with the exception of aldicarb, carbaryl, dicofol, dichlorvos, linuron methamidophos, methomyl, oxamyl, and diuron (11 of 12, 92%).

Total Dissolved Solids (TDS): Field and lab blanks met acceptability criteria for 100% of the samples analyzed. Field duplicates met acceptability criteria for 100% of the TDS samples analyzed. The LCS samples met acceptability criteria for at least 90% of the samples analyzed. One hundred percent of lab duplicates met the batch precision requirements, RPD $\leq$ 25%. Matrix spikes are not performed for total dissolved solid analysis. At least 90% of all TDS QC samples analyzed were within acceptability limits and all data are acceptable.

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

Total Suspended Solids (TSS): One hundred percent of field and lab blanks met acceptability criteria. Eighty-three percent of field duplicates (10 of 12) had RPDs less than 25%. The two field duplicates were collected in April, during a storm event and in September. Samples collected at the same time also were recorded with high turbidity and low DO results. The difference in TSS results is most likely due to heterogeneity of the water column. Total suspended solids laboratory duplicates met acceptance criteria for 100% of samples analyzed. All LCS samples recovered within the QC limits and therefore all data are useable.

Turbidity: One hundred percent of all QC samples were run with every batch and 100% met acceptability criteria; therefore turbidity results from the batches are acceptable. Matrix spikes are not performed for turbidity.

Sediment Pesticides: Sediment samples are only collected twice a year. Sediment pesticides were analyzed if the sample exhibited significant *Hyalella azteca* toxicity and the survival of *H. azteca* was 80% or less compared to the control; two sites were analyzed in March and one site in September. One hundred percent of laboratory blanks met acceptability criteria (< RL).

Field duplicates were analyzed in each sediment pesticide batch. Field duplicate RPDs for bifenthrin, chlorpyrifos and permethrin (1 of 2, 50%), cyhalothrin and esfenvalerate/fenvalerate (0 of 2) were less than 25%. All associated field duplicate and environmental results were above the respective RLs except cypermethrin. One pair of cyhalothrin and esfenvalerate/fenvalerate environmental and field duplicate results were below the reporting limit, making it difficult to calculate the exact percent difference since the concentrations are estimates. In addition, sediment samples are generally heterogeneous and therefore, more difficult to get a low RPD calculation.

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 and cyfluthrin (5 of 6, 86%); overall, 96% of all sediment pesticides MSs recovered within QC limits.

Laboratory precision met acceptability criteria for 100% of sediment pesticide samples. All LCS duplicates were within the acceptability criteria of $\leq$25 and all MS duplicate RPDs were acceptable with the exception of bifenthrin and cyfluthrin (2 of 3).

Surrogates were run for each sediment pesticide analysis. Surrogate recoveries were within specific acceptance criteria for 100% of all samples analyzed. Based on an overall batch assessment of precision and accuracy, all sediment pesticide results are useable.

Sediment Grain Size and Total Organic Carbon: Sediment grain size and total organic carbon were analyzed for both sets of sediment samples collected during 2013 (March 19 and September 17).

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 precision in grain size analysis. 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 lab duplicates and all data are useable (Table 33).

The criterion used in this report to assess precision for sediment total organic carbon is RPD ≤ 20% and MS and LCS 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 certified reference materials (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%.

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 where water column toxicity samples were collected. Samples were tested for toxicity to one or more of the following species: *C. dubia*, *S. capricornutum* and *P. promelas* (Table 31). All species had 100% of field duplicates within the acceptability criteria (RPD ≤25). All laboratory controls (CNEGs) met acceptability criteria (Table 31).

Sediment Toxicity: Sediment samples were collected on March 19 and September 17, 2013. Two field duplicates were collected and both had FD RPDs less than 25%. All laboratory controls (CNEGS) met acceptability criteria (Table 32).

CORRECTIVE ACTIONS

Corrective actions for QA/QC results that did not meet acceptance criteria were addressed in 2013 and performed by Coalition laboratories as outlined in the SJCDWQC Quality Assurance Project Plan (QAPP; approved on October 20, 2010) and explained in the above sections.

One phosphorus as P batch analyzed from samples collected in April 2013 did not contain a matrix spike. Due to laboratory error, the sample was not spiked prior to analysis. No corrective actions were taken. For samples collected during the February event, the laboratory split the carbamate batch into two batches and one batch, analyzed for diuron only, was run without a matrix spike; however, a matrix spike for diuron was run on samples collected from the same sampling event. No corrective action was necessary.

For the December event, a field duplicate was collected and analyzed for every analyte with the exception of carbamates and methamidophos. The field duplicate samples collected in December were not analyzed because sample bottles broke during transport and not enough volume was left for analysis. The laboratory contacted the Coalition and due to limited volume, the field duplicate analyses were cancelled and the remaining volume was used for matrix spike analysis.

Discharge in 2013 was only calculated for 48% of the events due to unsafe conditions that did not allow for samplers to wade the water to take flow measurements necessary to calculate discharge or no flow observed. No corrective action was necessary.

Water column toxicity samples collected in August 21, 2013 were not analyzed by the laboratory because they did not have the organisms ready. Samples were recollected the following day and tests were started within hold time. Since 2011, the Coalition has developed an email tracking system to communicate between the various parties involved when: 1) samples have been shipped, 2) samples have been delivered, and 3) 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 September sediment grain size samples. The samples were analyzed outside of the 28 day hold time due to a miscommunication with the subcontracted lab. The Coalition has ensured that the laboratory is aware of the 28 day hold time.

The laboratory re-extracted and re-analyzed samples for diuron (one batch) and paraquat (three batches) because the LCS and MS recovered below the QC limits, as per QAPP corrective action procedures. Due to the re-extraction and re-analysis, the results were out of hold time. The reanalysis outside of hold time resulted in all QC limits met and all environmental samples were non detect in both the original and re-analysis batches.

Table 17. SJCDWQC field and transport and analytical completeness: environmental sample counts and percentages.

Samples collected from January through December 2013; sorted by method and analyte.

Method	Analyte	Env. Samples Scheduled (A)	Dry Sites (B)	Env. Samples Not Collected [1] (C)	Env. Samples Collected (D)	Field and Transport Completeness [D/(A-B)%]	Env. Sample Analyzed (F)	Env. Sample Completeness [(F/D)%]
EPA 8321A CARB	Aldicarb	36	0	3	33	91.7%	33	100%
EPA 8321A CARB	Carbaryl	36	0	3	33	91.7%	33	100%
EPA 8321A CARB	Carbofuran	36	0	3	33	91.7%	33	100%
EPA 8321A CARB	Methiocarb	36	0	3	33	91.7%	33	100%
EPA 8321A CARB	Methomyl	36	0	3	33	91.7%	33	100%
EPA 8321A CARB	Oxamyl	36	0	3	33	91.7%	33	100%
EPA 8321A CARB	Diuron	41	1	3	38	94.4%	38	100%
EPA 8321A CARB	Linuron	36	0	3	33	91.7%	33	100%
EPA 547M	Glyphosate	36	0	3	33	91.7%	33	100%
EPA 549.2M	Paraquat	36	0	3	33	91.7%	33	100%
EPA 8081A	DDD(p,p')	36	0	3	33	91.7%	33	100%
EPA 8081A	DDE(p,p')	36	0	3	33	91.7%	33	100%
EPA 8081A	DDT(p,p')	36	0	3	33	91.7%	33	100%
EPA 8081A	Dicofol	36	0	3	33	91.7%	33	100%
EPA 8081A	Dieldrin	39	0	3	36	92.3%	36	100%
EPA 8081A	Endrin	36	0	3	33	91.7%	33	100%
EPA 8081A	Methoxychlor	36	0	3	33	91.7%	33	100%
EPA 8081A	HCH, alpha-	3	0	0	3	100.0%	3	100%
EPA 8081A	HCH, beta-	3	0	0	3	100.0%	3	100%
EPA 8081A	HCH, delta-	3	0	0	3	100.0%	3	100%
EPA 8081A	HCH, gamma-	3	0	0	3	100.0%	3	100%
EPA 8141A OP	Azinphos methyl	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Chlorpyrifos	106	1	4	102	97.1%	102	100%
EPA 8141A OP	Diazinon	67	0	3	64	95.5%	64	100%
EPA 8141A OP	Dichlorvos	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Dimethoate	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Demeton-s	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Disulfoton	39	0	3	36	92.3%	36	100%
EPA 8141A OP	Malathion	39	0	3	36	92.3%	36	100%
EPA 8141A OP	Methidathion	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Parathion, Methyl	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Phorate	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Phosmet	36	0	3	33	91.7%	33	100%
EPA 8141A OP	Trifluralin	36	0	3	33	91.7%	33	100%
EPA 8141A	Atrazine	36	0	3	33	91.7%	33	100%
EPA 8141A	Cyanazine	36	0	3	33	91.7%	33	100%
EPA 8141A	Simazine	36	0	3	33	91.7%	33	100%
EPA 8321A	Methamidophos	36	0	3	33	91.7%	33	100%
SM 2340 C	Hardness as CaCO3 (Dissolved)	47	0	3	44	93.6%	44	100%
SM 2540 C	Total Dissolved Solids	72	0	3	69	95.8%	69	100%
SM 2540 D	Total Suspended Solids	72	0	3	69	95.8%	69	100%
EPA 180.1	Turbidity	72	0	3	69	95.8%	69	100%
SM 4500-NH3 C v20	Ammonia as N	72	0	3	69	95.8%	69	100%
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	72	0	3	69	95.8%	69	100%

Method	Analyte	Env. Samples Scheduled (A)	Dry Sites (B)	Env. Samples Not Collected [1] (C)	Env. Samples Collected (D)	Field and Transport Completeness [D/(A-B)%]	Env. Sample Analyzed (F)	Env. Sample Completeness [(F/D)%]
EPA 353.2	Nitrate + Nitrite as N	72	0	3	69	95.8%	69	100%
SM 4500-P E	OrthoPhosphate as P	72	0	3	69	95.8%	69	100%
SM 4500-P E	Phosphorus as P	72	0	3	69	95.8%	69	100%
SM 5310 B	Total Organic Carbon	72	0	3	69	95.8%	69	100%
SM 9223B	*E. coli*	72	0	3	69	95.8%	69	100%
EPA 200.8	Arsenic	36	0	3	33	91.7%	33	100%
EPA 200.8	Boron	36	0	3	33	91.7%	33	100%
EPA 200.8	Cadmium	36	0	3	33	91.7%	33	100%
EPA 200.8	Copper	47	0	3	44	93.6%	44	100%
EPA 200.8	Lead	36	0	3	33	91.7%	33	100%
EPA 200.8	Molybdenum	36	0	3	33	91.7%	33	100%
EPA 200.8	Nickel	36	0	3	33	91.7%	33	100%
EPA 200.8	Selenium	36	0	3	33	91.7%	33	100%
EPA 200.8	Zinc	36	0	3	33	91.7%	33	100%
EPA 200.8	Cadmium (Dissolved)	36	0	3	33	91.7%	33	100%
EPA 200.8	Copper (Dissolved)	47	0	3	44	93.6%	44	100%
EPA 200.8	Lead (Dissolved)	36	0	3	33	91.7%	33	100%
EPA 200.8	Nickel (Dissolved)	36	0	3	33	91.7%	33	100%
EPA 200.8	Zinc (Dissolved)	36	0	3	33	91.7%	33	100%
Walkley-Black	Total Organic Carbon (sediment)	22	0	0	22	100.0%	22	100%
ASTM D4464M, ASTM D422	Sediment Grain Size	22	0	0	22	100%	22	100%
EPA 8270M_NCI	Bifenthrin	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Chlorpyrifos	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Cyfluthrin	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Cyhalothrin, lambda	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Cypermethrin	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Deltamethrin:Tralomethrin	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Esfenvalerate/Fenvalerate	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Fenpropathrin	3	0	0	3	100.0%	3	100%
EPA 8270M_NCI	Permethrin	3	0	0	3	100.0%	3	100%
EPA 600/R-99-064	*Hyalella azteca*	25	0	3	22	88.0%	22	100%
EPA 821/R-02-012	*Ceriodaphnia dubia*	49	0	4	45	91.8%	45	100%
EPA 821/R-02-012	*Pimephales promelas*	36	0	3	33	91.7%	33	100%
EPA 821/R-02-013	*Selenastrum capricornutum*	56	0	3	53	94.6%	53	100%
	TOTAL	**2881**	**2**	**191**	**2690**	**93.4%**	**2690**	**100%**

[1]Samples not collected due to no access to site.

Table 18. SJCDWQC field and transport completeness: field parameter counts and percentages.

Samples collected from January through December 2013; sorted by method and analyte.

Method	Analyte	Env. Samples Scheduled (A)	Dry Sites (B)	Env. Samples Not Collected[1] (C)	Env. Samples Collected (D)	Field and Transport Completeness [D/(A-B)%]
USGS R2Cross streamflow	Discharge, cfs	140	1	4	67	48.2%
SM 4500-O	Dissolved Oxygen, mg/L	164	1	4	162	99.4%
EPA 150.1	pH	164	1	4	162	99.4%
EPA 120.1	Specific Conductivity, uS/cm	164	1	4	162	99.4%
SM 2550	Temperature, Deg C	164	1	4	162	99.4%

[1]Samples not collected due to no access to site.

Table 19. SJCDWQC QC batch completeness: field quality, and field parameter counts and percentages.

Samples collected from January through December 2013, sorted by method and analyte.

Method	Analyte	Env. Samples Analyzed (#)	Env. and Field QC Samples (#)	Field Blank (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8321A CARB	Aldicarb	33	56	12	21.4%	11	19.6%		NA		NA
EPA 8321A CARB	Carbaryl	33	56	12	21.4%	11	19.6%		NA		NA
EPA 8321A CARB	Carbofuran	33	56	12	21.4%	11	19.6%		NA		NA
EPA 8321A CARB	Methiocarb	33	56	12	21.4%	11	19.6%		NA		NA
EPA 8321A CARB	Methomyl	33	56	12	21.4%	11	19.6%		NA		NA
EPA 8321A CARB	Oxamyl	33	56	12	21.4%	11	19.6%		NA		NA
EPA 8321A CARB	Diuron	38	62	12	19.4%	11	17.7%		NA		NA
EPA 8321A CARB	Linuron	33	56	12	21.4%	11	19.6%		NA		NA
EPA 547M	Glyphosate	33	57	12	21%	12	21%		NA		NA
EPA 549.2M	Paraquat	33	57	12	21%	12	21%		NA		NA
EPA 8081A	DDD(p,p')	33	57	12	21%	12	21%		NA		NA
EPA 8081A	DDE(p,p')	33	57	12	21%	12	21%		NA		NA
EPA 8081A	DDT(p,p')	33	57	12	21%	12	21%		NA		NA
EPA 8081A	Dicofol	33	57	12	21%	12	21%		NA		NA
EPA 8081A	Dieldrin	36	60	12	20%	12	20%		NA		NA
EPA 8081A	Endrin	33	57	12	21%	12	21%		NA		NA
EPA 8081A	Methoxychlor	33	57	12	21%	12	21%		NA		NA
EPA 8081A	HCH, alpha-	3	9	3	33.3%	3	33.3%		NA		NA
EPA 8081A	HCH, beta-	3	9	3	33.3%	3	33.3%		NA		NA
EPA 8081A	HCH, delta-	3	9	3	33.3%	3	33.3%		NA		NA
EPA 8081A	HCH, gamma-	3	9	3	33.3%	3	33.3%		NA		NA
EPA 8141A OP	Azinphos methyl	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Chlorpyrifos	102	127	12	9.4%	12	9.4%		NA		NA
EPA 8141A OP	Diazinon	64	88	12	13.6%	12	13.6%		NA		NA
EPA 8141A OP	Dichlorvos	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Dimethoate	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Demeton-s	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Disulfoton	36	60	12	20%	12	20%		NA		NA
EPA 8141A OP	Malathion	36	60	12	20%	12	20%		NA		NA
EPA 8141A OP	Methidathion	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Parathion, Methyl	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Phorate	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Phosmet	33	57	12	21%	12	21%		NA		NA
EPA 8141A OP	Trifluralin	33	57	12	21%	12	21%		NA		NA
EPA 8141A	Atrazine	33	57	12	21%	12	21%		NA		NA
EPA 8141A	Cyanazine	33	57	12	21%	12	21%		NA		NA
EPA 8141A	Simazine	33	57	12	21%	12	21%		NA		NA
EPA 8321A	Methamidophos	33	56	12	21.4%	11	21.4%		NA		NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	44	68	12	17.6%	12	17.6%		NA		NA
SM 2540 C	Total Dissolved Solids	69	93	12	12.9%	12	12.9%		NA		NA
SM 2540 D	Total Suspended Solids	69	93	12	12.9%	12	12.9%		NA		NA
EPA 180.1	Turbidity	69	93	12	12.9%	12	12.9%		NA		NA
SM 4500-NH3 C v20	Ammonia as N	69	93	12	12.9%	12	12.9%		NA		NA
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	69	93	12	12.9%	12	12.9%		NA		NA

Method	Analyte	Env. Samples Analyzed (#)	Env. and Field QC Samples (#)	Field Blank (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 353.2	Nitrate + Nitrite as N	69	93	12	12.9%	12	12.9%		NA		NA
SM 4500-P E	OrthoPhosphate as P	69	93	12	12.9%	12	12.9%		NA		NA
SM 4500-P E	Phosphorus as P	69	93	12	12.9%	12	12.9%	NA	NA	NA	NA
SM 5310 B	Total Organic Carbon	69	93	12	12.9%	12	12.9%	NA	NA	NA	NA
SM 9223B	E. coli	69	93	12	12.9%	12	12.9%	NA	NA	NA	NA
EPA 200.8	Arsenic	33	57	12	21%	12	21%	NA	NA	12	21%
EPA 200.8	Boron	33	57	12	21%	12	21%	NA	NA	12	21%
EPA 200.8	Cadmium	33	57	12	21%	12	21%	NA	NA	12	21.%
EPA 200.8	Copper	44	68	12	17.7%	12	17.7%	NA	NA	12	17.7%
EPA 200.8	Lead	33	57	12	21%	12	21%	NA	NA	12	21%
EPA 200.8	Molybdenum	33	57	12	21%	12	21%	NA	NA	12	21%
EPA 200.8	Nickel	33	57	12	21%	12	21%	NA	NA	12	21%
EPA 200.8	Selenium	33	57	12	21%	12	21%	NA	NA	12	21%
EPA 200.8	Zinc	33	57	12	21%	12	21%	NA	NA	12	21%
EPA 200.8	Cadmium (Dissolved)	33	69	12	17.4%	12	17.4%	12	17.4%	NA	NA
EPA 200.8	Copper (Dissolved)	44	80	12	15%	12	15%	12	15%	NA	NA
EPA 200.8	Lead (Dissolved)	33	69	12	17.4%	12	17.4%	12	17.4%	NA	NA
EPA 200.8	Nickel (Dissolved)	33	69	12	17.4%	12	17.4%	12	17.4%	NA	NA
EPA 200.8	Zinc (Dissolved)	33	69	12	17.4%	12	17.4%	12	17.4%	NA	NA
Walkley-Black	Total Organic Carbon (sediment)	22	24	NA	NA	2	8.3%	NA	NA	NA	NA
ASTM D4464M, ASTM D422	Sediment Grain Size	22	24	NA	NA	2	8.3%	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Chlorpyrifos	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Cyfluthrin	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Cyhalothrin, lambda	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Cypermethrin	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Deltamethrin: Tralomethrin	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Esfenvalerate/ Fenvalerate	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Fenpropathrin	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 8270M_NCI	Permethrin	3	5	NA	NA	2	40%	NA	NA	NA	NA
EPA 600/R-99-064	*Hyalella azteca*	22	24	NA	NA	2	8.3%	NA	NA	NA	NA
EPA 821/R-02-012	*Ceriodaphnia dubia*	45	57	NA	NA	12	21%	NA	NA	NA	NA
EPA 821/R-02-012	*Pimephales promelas*	33	24	NA	NA	12	50%	NA	NA	NA	NA
EPA 821/R-02-013	*Selenastrum capricornutum*	53	65	NA	NA	12	18.5%	NA	NA	NA	NA
	TOTAL	**2690**	**4222**	**720**	**16.2%**	**771**	**22.1%**	**60**	**17%**	**108**	**20.7%**

Table 20. SJCDWQC summary of holding time evaluations for environmental, field blank, field duplicate and matrix spike samples.

Samples collected from January through December 2013, 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	68	68	100.00
EPA 8321A CARB	Carbaryl	7 days	68	68	100.00
EPA 8321A CARB	Carbofuran	7 days	68	68	100.00
EPA 8321A CARB	Methiocarb	7 days	68	68	100.00
EPA 8321A CARB	Methomyl	7 days	68	68	100.00
EPA 8321A CARB	Oxamyl	7 days	68	68	100.00
EPA 8321A CARB	Diuron	7 days	73	73	100.00
EPA 8321A CARB	Linuron	7 days	68	68	100.00
EPA 8141A	Atrazine	7 days	69	69	100.00
EPA 8141A	Cyanazine	7 days	69	69	100.00
EPA 8141A	Simazine	7 days	69	69	100.00
EPA 547M	Glyphosate	14 days	69	69	100.00
EPA 549.2M	Paraquat	7 days	69	54	78.26
EPA 8081A	DDD(p,p')	7 days	69	69	100.00
EPA 8081A	DDE(p,p')	7 days	69	69	100.00
EPA 8081A	DDT(p,p')	7 days	69	69	100.00
EPA 8081A	Dicofol	7 days	69	69	100.00
EPA 8081A	Dieldrin	7 days	72	72	100.00
EPA 8081A	Endrin	7 days	69	69	100.00
EPA 8081A	Methoxychlor	7 days	69	69	100.00
EPA 8081A	HCH, alpha-	7 days	12	12	100.00
EPA 8081A	HCH, beta-	7 days	12	12	100.00
EPA 8081A	HCH, delta-	7 days	12	12	100.00
EPA 8081A	HCH, gamma-	7 days	12	12	100.00
EPA 8141A OP	Azinphos methyl	7 days	69	69	100.00
EPA 8141A OP	Chlorpyrifos	7 days	138	138	100.00
EPA 8141A OP	Diazinon	7 days	100	94	94.00
EPA 8141A OP	Dichlorvos	7 days	69	69	100.00
EPA 8141A OP	Dimethoate	7 days	69	69	100.00
EPA 8141A OP	Demeton-s	7 days	69	69	100.00
EPA 8141A OP	Disulfoton	7 days	72	72	100.00
EPA 8141A OP	Malathion	7 days	72	72	100.00
EPA 8141A OP	Methidathion	7 days	69	69	100.00
EPA 8141A OP	Parathion, Methyl	7 days	69	69	100.00
EPA 8141A OP	Phorate	7 days	69	69	100.00
EPA 8141A OP	Phosmet	7 days	69	69	100.00
EPA 8141A OP	Trifluralin	7 days	69	69	100.00
EPA 8321A	Methamidophos	7 days	68	68	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	6 months	80	80	100.00
SM 2540 C	Total Dissolved Solids	7 days	93	93	100.00
SM 2540 D	Total Suspended Solids	7 days	93	93	100.00
EPA 180.1	Turbidity	48 hours	93	93	100.00
SM 4500-NH3 C v20	Ammonia as N	Field acidify, 28 days	105	105	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	Field acidify, 28 days	105	105	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 353.2	Nitrate + Nitrite as N	Field acidify, 28 days	107	107	100.00
SM 4500-P E	OrthoPhosphate as P	48 hours	105	105	100.00
SM 4500-P E	Phosphorus as P	Field acidify, 28 days	104	104	100.00
SM 5310 B	Total Organic Carbon	28 days	106	106	100.00
SM 9223B	E. coli	24 hours	93	93	100.00
EPA 200.8	Arsenic	Field acidify, 6 months	81	81	100.00
EPA 200.8	Boron	Field acidify, 6 months	81	81	100.00
EPA 200.8	Cadmium	Field acidify, 6 months	81	81	100.00
EPA 200.8	Copper	Field acidify, 6 months	92	92	100.00
EPA 200.8	Lead	Field acidify, 6 months	81	81	100.00
EPA 200.8	Molybdenum	Field acidify, 6 months	81	81	100.00
EPA 200.8	Nickel	Field acidify, 6 months	81	81	100.00
EPA 200.8	Selenium	Field acidify, 6 months	81	81	100.00
EPA 200.8	Zinc	Field acidify, 6 months	81	81	100.00
EPA 200.8	Cadmium (Dissolved)	Field acidify, 6 months	82	82	100.00
EPA 200.8	Copper (Dissolved)	Field acidify, 6 months	93	93	100.00
EPA 200.8	Lead (Dissolved)	Field acidify, 6 months	82	82	100.00
EPA 200.8	Nickel (Dissolved)	Field acidify, 6 months	82	82	100.00
EPA 200.8	Zinc (Dissolved)	Field acidify, 6 months	82	82	100.00
Walkley-Black	Total Organic Carbon (sediment)	Freeze or analyze within 28 days	24	24	100.00
ASTM D4464M,ASTM D422	Sediment Grain Size	Analyze within 28 days	22	10	45.45
EPA 8270M_NCI	Bifenthrin (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 8270M_NCI	Permethrin (sediment)	Freeze within 48 hours; 12 months	8	8	100.00
EPA 600/R-99-064	*Hyalella azteca*	Store at ≤6°C do not freeze, 14 days	26	26	100.00
EPA 821/R-02-012	*Ceriodaphnia dubia*	Store at ≤6°C, 36 Hours	57	57	100.00
EPA 821/R-02-012	*Pimephales promelas*	Store at ≤6°C, 36 Hours	45	45	100.00
		TOTAL	**5055**	**5022**	**99.35%**

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

Samples collected from January through December 2013, 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 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	11	91.67
EPA 8081A	DDE(p,p')	<RL or < (env sample/5)	12	11	91.67
EPA 8081A	DDT(p,p')	<RL or < (env sample/5)	12	11	91.67
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	11	91.67
EPA 8081A	Methoxychlor	<RL or < (env sample/5)	12	12	100.00
EPA 8081A	HCH, alpha-	<RL or < (env sample/5)	3	3	100.00
EPA 8081A	HCH, beta-	<RL or < (env sample/5)	3	3	100.00
EPA 8081A	HCH, delta-	<RL or < (env sample/5)	3	3	100.00
EPA 8081A	HCH, gamma-	<RL or < (env sample/5)	3	3	100.00
EPA 8141A OP	Azinphos methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Diazinon	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dichlorvos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dimethoate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Demeton-s	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Disulfoton	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Malathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Methidathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phorate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phosmet	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Trifluralin	<RL or < (env sample/5)	12	12	100.00
EPA 8141A	Atrazine	<RL or < (env sample/5)	12	12	100.00
EPA 8141A	Cyanazine	<RL or < (env sample/5)	12	12	100.00
EPA 8141A	Simazine	<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	12	100.00
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	Phosphorus as P	<RL or < (env sample/5)	12	12	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	<RL or < (env sample/5)	12	12	100.00
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	11	91.67
EPA 200.8	Lead	<RL or < (env sample/5)	12	11	91.67
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	10	83.33
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	**720**	**712**	**98.9%**

NA- Not applicable

Table 22. SJCDWQC summary of equipment blank (dissolved metals) and travel blank (total metals) quality control sample evaluations.

Samples collected from January through December 2013, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 200.8	Arsenic	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	12	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	11	91.67
TOTAL			**108**	**107**	**99.07%**
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	10	83.33
		TOTAL	**60**	**58**	**96.67%**

Table 23. SJCDWQC summary of field duplicate quality control sample evaluations.

Samples collected from January through December 2013, 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	11	11	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	11	11	100.00
EPA 547M	Glyphosate	RPD ≤ 25	12	9	75.00
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 8081A	HCH, alpha-	RPD ≤ 25	3	3	100.00
EPA 8081A	HCH, beta-	RPD ≤ 25	3	3	100.00
EPA 8081A	HCH, delta-	RPD ≤ 25	3	3	100.00
EPA 8081A	HCH, gamma-	RPD ≤ 25	3	3	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 8141A	Atrazine	RPD ≤ 25	12	12	100.00
EPA 8141A	Cyanazine	RPD ≤ 25	12	12	100.00
EPA 8141A	Simazine	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	11	91.67
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	12	12	100.00
SM 2540 D	Total Suspended Solids	RPD ≤ 25	12	10	83.33
EPA 180.1	Turbidity	RPD ≤ 25	12	12	100.00
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 25	12	6	50.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 25	12	8	66.67
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	Phosphorus as P	RPD ≤ 25	12	11	91.67
SM 5310 B	Total Organic Carbon	RPD ≤ 25	12	12	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
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	12	100.00
EPA 200.8	Copper	RPD ≤ 25	12	12	100.00
EPA 200.8	Lead	RPD ≤ 25	12	12	100.00
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
EPA 200.8	Zinc	RPD ≤ 25	12	7	58.33
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	12	11	91.67
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	12	11	91.67
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	RPD <25	2	1	50.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD <25	2	1	50.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD <25	2	0	0.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD <25	2	0	0.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD <25	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD <25	2	1	50.00
		TOTAL	**731**	**698**	**95.49%**

NA- Not applicable

Table 24. SJCDWQC summary of method blank quality control sample evaluations.

Samples analyzed in batches with samples collected from January through December 2013, 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	13	13	100.00
EPA 8321A CARB	Linuron	<RL	12	12	100.00
EPA 547M	Glyphosate	<RL	12	12	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 8081A	HCH, alpha-	<RL	3	3	100.00
EPA 8081A	HCH, beta-	<RL	3	3	100.00
EPA 8081A	HCH, delta-	<RL	3	3	100.00
EPA 8081A	HCH, gamma-	<RL	3	3	100.00
EPA 8141A OP	Azinphos methyl	<RL	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL	12	12	100.00
EPA 8141A OP	Diazinon	<RL	12	12	100.00
EPA 8141A OP	Dichlorvos	<RL	12	12	100.00
EPA 8141A OP	Dimethoate	<RL	12	12	100.00
EPA 8141A OP	Demeton-s	<RL	12	12	100.00
EPA 8141A OP	Disulfoton	<RL	12	12	100.00
EPA 8141A OP	Malathion	<RL	12	12	100.00
EPA 8141A OP	Methidathion	<RL	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL	12	12	100.00
EPA 8141A OP	Phorate	<RL	12	12	100.00
EPA 8141A OP	Phosmet	<RL	12	12	100.00
EPA 8141A OP	Trifluralin	<RL	12	12	100.00
EPA 8141A	Atrazine	<RL	12	12	100.00
EPA 8141A	Cyanazine	<RL	12	12	100.00
EPA 8141A	Simazine	<RL	12	12	100.00
EPA 8321A	Methamidophos	<RL	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL	17	17	100.00
SM 2540 C	Total Dissolved Solids	<RL	14	14	100.00
SM 2540 D	Total Suspended Solids	<RL	14	14	100.00
EPA 180.1	Turbidity	<RL	12	12	100.00
SM 4500-NH3 C v20	Ammonia as N	<RL	13	13	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	<RL	13	13	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL	17	17	100.00
SM 4500-P E	OrthoPhosphate as P	<RL	12	12	100.00
SM 4500-P E	Phosphorus as P	<RL	17	17	100.00
SM 5310 B	Total Organic Carbon	<RL	19	19	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
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	14	14	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	14	14	100.00
EPA 200.8	Cadmium (Dissolved)	<RL	13	13	100.00
EPA 200.8	Copper (Dissolved)	<RL	13	13	100.00
EPA 200.8	Lead (Dissolved)	<RL	13	13	100.00
EPA 200.8	Nickel (Dissolved)	<RL	13	13	100.00
EPA 200.8	Zinc (Dissolved)	<RL	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	<RL	2	2	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	**787**	**787**	**100.00%**

NA- Not applicable

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

Laboratory control spikes and laboratory control spike duplicates analyzed in batches with samples collected from January through December 2013, 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	13	13	100.00
EPA 8321A CARB	Linuron	PR 49-144	12	12	100.00
EPA 547M	Glyphosate	PR 84-113	24	24	100.00
EPA 549.2M	Paraquat	PR 70-130	24	24	100.00
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 8081A	HCH, alpha-	PR 33-111	3	3	100.00
EPA 8081A	HCH, beta-	PR 49-119	3	3	100.00
EPA 8081A	HCH, delta-	PR 12-97	3	1	33.33
EPA 8081A	HCH, gamma-	PR 40-114	3	3	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	12	12	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	12	12	100.00
EPA 8141A OP	Diazinon	PR 57-130	12	12	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	12	12	100.00
EPA 8141A OP	Dimethoate	PR 68-202	12	11	91.67
EPA 8141A OP	Demeton-s	PR 40-125	12	12	100.00
EPA 8141A OP	Disulfoton	PR 47-117	12	12	100.00
EPA 8141A OP	Malathion	PR 47-125	12	10	83.33
EPA 8141A OP	Methidathion	PR 50-150	12	12	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	12	12	100.00
EPA 8141A OP	Phorate	PR 44-117	12	11	91.67
EPA 8141A OP	Phosmet	PR 50-150	12	12	100.00
EPA 8141A OP	Trifluralin	PR 40-148	12	12	100.00
EPA 8141A	Atrazine	PR 39-156	12	12	100.00
EPA 8141A	Cyanazine	PR 22-172	12	12	100.00
EPA 8141A	Simazine	PR 21-179	12	12	100.00
EPA 8321A	Methamidophos	PR 25-136	13	13	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	17	17	100.00
SM 2540 C	Total Dissolved Solids	PR 80-120	14	13	92.86
SM 2540 D	Total Suspended Solids	PR 80-120	14	14	100.00
EPA 180.1	Turbidity	PR 90-110	12	12	100.00
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	24	24	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	17	17	100.00
SM 4500-P E	OrthoPhosphate as P	PR 90-110	12	12	100.00
SM 4500-P E	Phosphorus as P	PR 90-110	17	17	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	PR 80-120	19	19	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	14	14	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
EPA 200.8	Zinc	PR 85-115	14	14	100.00
EPA 200.8	Cadmium (Dissolved)	PR 85-115	14	14	100.00
EPA 200.8	Copper (Dissolved)	PR 85-115	14	14	100.00
EPA 200.8	Lead (Dissolved)	PR 85-115	14	14	100.00
EPA 200.8	Nickel (Dissolved)	PR 85-115	14	14	100.00
EPA 200.8	Zinc (Dissolved)	PR 85-115	14	14	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	PR 30-180	6	6	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 30-180	6	6	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 30-200	6	6	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	PR 30-180	6	6	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	PR 30-180	6	6	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	PR 30-180	6	6	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	PR 30-180	6	6	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	PR 30-200	6	6	100.00
		TOTAL	**856**	**849**	**99.18%**

NA- Not applicable

Table 26. 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 2013, 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 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	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 8081A	HCH, alpha-	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, beta-	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, delta-	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, gamma-	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 8141A	Atrazine	RPD ≤ 25	NA	NA	NA
EPA 8141A	Cyanazine	RPD ≤ 25	NA	NA	NA
EPA 8141A	Simazine	RPD ≤ 25	NA	NA	NA
EPA 8321A	Methamidophos	RPD ≤ 25	1	1	100.00
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	13	13	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 20	11	11	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	Phosphorus as P	RPD ≤ 20	NA	NA	NA

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
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
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	1	1	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	1	1	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	1	1	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	1	1	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	1	1	100.00
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	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	3	3	100.00
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	3	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD ≤ 25	3	3	100.00
		TOTAL	**81**	**81**	**100.00%**

NA- Not applicable

Table 27. SJCDWQC summary of matrix spike quality control sample evaluations.

Matrix spikes and matrix spike duplicates collected from January through December 2013. 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 547M	Glyphosate	PR 84-113	24	24	100.00
EPA 549.2M	Paraquat	PR 70-130	24	18	75.00
EPA 8081A	DDD(p,p')	PR 38-135	24	24	100.00
EPA 8081A	DDE(p,p')	PR 21-134	24	24	100.00
EPA 8081A	DDT(p,p')	PR 18-145	24	24	100.00
EPA 8081A	Dicofol	PR 40-135	24	24	100.00
EPA 8081A	Dieldrin	PR 48-121	24	24	100.00
EPA 8081A	Endrin	PR 24-143	24	24	100.00
EPA 8081A	Methoxychlor	PR 30-163	24	24	100.00
EPA 8081A	HCH, alpha-	PR 33-111	6	6	100.00
EPA 8081A	HCH, beta-	PR 49-119	6	6	100.00
EPA 8081A	HCH, delta-	PR 12-97	6	3	50.00
EPA 8081A	HCH, gamma-	PR 40-114	6	6	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	24	24	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	24	24	100.00
EPA 8141A OP	Diazinon	PR 57-130	24	24	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	24	24	100.00
EPA 8141A OP	Dimethoate	PR 68-202	24	24	100.00
EPA 8141A OP	Demeton-s	PR 40-125	24	22	91.67
EPA 8141A OP	Disulfoton	PR 47-117	24	23	95.83
EPA 8141A OP	Malathion	PR 47-125	24	18	75.00
EPA 8141A OP	Methidathion	PR 50-150	24	24	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	24	24	100.00
EPA 8141A OP	Phorate	PR 44-117	24	20	83.33
EPA 8141A OP	Phosmet	PR 50-150	24	24	100.00
EPA 8141A OP	Trifluralin	PR 40-148	24	24	100.00
EPA 8141A	Atrazine	PR 39-156	24	24	100.00
EPA 8141A	Cyanazine	PR 22-172	24	24	100.00
EPA 8141A	Simazine	PR 21-179	24	24	100.00
EPA 8321A	Methamidophos	PR 25-136	24	24	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	34	19	55.88
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	20	76.92
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	34	26	76.47
SM 4500-P E	OrthoPhosphate as P	PR 90-110	24	24	100.00
SM 4500-P E	Phosphorus as P	PR 90-110	32	32	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	PR 80-120	40	40	100.00
SM 9223B	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	PR 70-130	24	24	100.00
EPA 200.8	Boron	PR 70-130	24	20	83.33
EPA 200.8	Cadmium	PR 70-130	24	24	100.00
EPA 200.8	Copper	PR 70-130	30	30	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	24	24	100.00
EPA 200.8	Selenium	PR 70-130	24	24	100.00
EPA 200.8	Zinc	PR 70-130	30	30	100.00
EPA 200.8	Cadmium (Dissolved)	PR 70-130	26	25	96.15
EPA 200.8	Copper (Dissolved)	PR 70-130	26	25	96.15
EPA 200.8	Lead (Dissolved)	PR 70-130	26	26	100.00
EPA 200.8	Nickel (Dissolved)	PR 70-130	26	26	100.00
EPA 200.8	Zinc (Dissolved)	PR 70-130	26	24	92.31
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	PR 50-150	6	5	83.33
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 50-150	6	6	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 50-150	6	5	83.33
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	6	6	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	**1468**	**1415**	**96.39%**

NA- Not applicable

Table 28. SJCDWQC summary of matrix spike duplicate quality control sample evaluations.

Matrix spike duplicates collected from January through December 2013. 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	11	91.67
EPA 8321A CARB	Carbaryl	RPD ≤ 25	12	11	91.67
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	11	91.67
EPA 8321A CARB	Oxamyl	RPD ≤ 25	12	11	91.67
EPA 8321A CARB	Diuron	RPD ≤ 25	12	11	91.67
EPA 8321A CARB	Linuron	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	11	91.67
EPA 8081A	Dieldrin	RPD ≤ 25	12	12	100.00
EPA 8081A	Endrin	RPD ≤ 25	12	12	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	12	12	100.00
EPA 8081A	HCH, alpha-	RPD ≤ 25	3	3	100.00
EPA 8081A	HCH, beta-	RPD ≤ 25	3	3	100.00
EPA 8081A	HCH, delta-	RPD ≤ 25	3	3	100.00
EPA 8081A	HCH, gamma-	RPD ≤ 25	3	3	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	11	91.67
EPA 8141A OP	Dimethoate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	12	100.00
EPA 8141A	Atrazine	RPD ≤ 25	12	12	100.00
EPA 8141A	Cyanazine	RPD ≤ 25	12	12	100.00
EPA 8141A	Simazine	RPD ≤ 25	12	12	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	12	11	91.67
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 20	17	17	100.00
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	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	17	17	100.00
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 20	12	12	100.00
SM 4500-P E	Phosphorus as P	RPD ≤ 20	16	16	100.00

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	RPD ≤ 20	20	20	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	15	15	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
EPA 200.8	Selenium	RPD ≤ 20	12	12	100.00
EPA 200.8	Zinc	RPD ≤ 20	15	15	100.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 20	13	13	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	13	13	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	13	13	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	13	13	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	RPD <25	3	2	66.67
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD <25	3	3	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD <25	3	2	66.67
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	3	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD <25	3	3	100.00
		TOTAL	**734**	**724**	**98.64%**

NA- Not applicable

Table 29. SJCDWQC summary of lab duplicate quality control sample evaluations.

Lab duplicates were analyzed in batches with samples collected January through December 2013. 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 547M	Glyphosate	RPD ≤ 25	NA	NA	NA
EPA 549.2M	Paraquat	RPD ≤ 30	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 8081A	HCH, alpha-	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, beta-	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, delta-	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, gamma-	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 8141A	Atrazine	RPD ≤ 25	NA	NA	NA
EPA 8141A	Cyanazine	RPD ≤ 25	NA	NA	NA
EPA 8141A	Simazine	RPD ≤ 25	NA	NA	NA
EPA 8321A	Methamidophos	RPD ≤ 25	NA	NA	NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	NA	NA	NA
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	17	17	100.00
SM 2540 D	Total Suspended Solids	RPD ≤ 25	14	14	100.00
EPA 180.1	Turbidity	RPD ≤ 25	12	12	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	Phosphorus as P	RPD ≤ 25	1	1	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
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
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	**58**	**58**	**100.00%**

NA- Not applicable

Table 30. 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 2013 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	Diphenamid(Surrogate)	RPD ≤ 25; PR 52-122	105	102	97.14
EPA 8321A	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 36-140	111	111	100.00
EPA 8081A	PCB 209(Surrogate)	RPD ≤ 25; PR 116-146	108	108	100.00
EPA 8081A	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	108	108	100.00
EPA 8141A	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 60-150	190	186	97.89
EPA 8141A	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 59-129	190	185	97.37
EPA 8270M_NCI	Esfenvalerate-d6-1(Surrogate)	RPD ≤ 25; PR 70-130	20	20	100.00
EPA 8270M_NCI	Esfenvalerate-d6-2(Surrogate)	RPD ≤ 25; PR 70-130	20	20	100.00
		TOTAL	**852**	**840**	**98.59%**

Table 31. SJCDWQC summary of toxicity field duplicate sample evaluations.

Samples collected from January through December 2013; sorted by method and species.

Method	Toxicity Species	Total Field Duplicate Samples	Data Quality Objective (DQO)	Total Field Duplicate Samples Within DQO	Percent Samples Within Acceptable Criteria
EPA 821/R-02-012	*Ceriodaphnia dubia*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-012	*Pimephales promelas*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	12	RPD ≤ 25	12	100.00
EPA 600/R-99-064	*Hyalella azteca*	2	RPD ≤ 25	1	100.00

Table 32. SJCDWQC summary of toxicity lab control sample evaluations.

Samples collected from January through December 2013; 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*	4	Survival in control samples ≥80%	4	100.00

Table 33. SJCDWQC summary of calculated sediment grain size RPD_{SD} 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 2013	2.1	2.88	7.51	8.96	2.2	-
Lab Duplicate	March 2013	1.66	2.6	7.26	8.89	2.26	3.04
Field Duplicate	March 2013	1.53	2.66	7.49	8.94	2.33	5.89
Environmental Sample	September 2013	0.38	1.66	6.26	8.06	2.31	-
Lab Duplicate	September 2013	0.41	1.68	6.08	7.74	2.21	1.48
Field Duplicate	September 2013	0.28	1.47	5.99	7.63	2.24	3.1

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

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 2013.

Current Pesticide Use Report (PUR) data were reviewed in an effort to determine sources of the applied pesticides with constituents causing WQTL exceedances. 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). The most recent data available from the CalPIP website are through December 2011. Table 34 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 late August 2014; therefore, an addendum to the 2014 AMR (Annual Monitoring Report) will be submitted on September 1, 2014.

Preliminary PUR data may include zero values 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 be made correctly, the proper units must 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 column. Zero values 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 pounds AI per acre derived from calculations are rounded.

Table 34. Obtained PUR data for January through December 2013 exceedances.

COUNTY	2013 PUR DATA OBTAINED	2013 PUR DATA OUTSTANDING
Contra Costa	January through October	November through December
San Joaquin	January through July	August through December
Stanislaus	January through September	October through December

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 from January through December 2013 met data quality objectives for completeness, precision, and accuracy. A discussion of all Quality Assurance/Quality Control can be found in the Precision, Accuracy and Completeness section of this report. Exceedances of WQTLs were reported to the Regional Board staff within five business days upon receipt of lab results; one exceedance report required an amendment. The August 27, 2013 Field Exceedance Report was amended on December 17, 2013 to exclude the exceedances of DO and SC that occurred at Grant Line Canal @ Clifton Court Rd during May and were misreported as August exceedances. A list of all WQTLs used to evaluate water quality results is included in Table 35.

Coalition monitoring from January through December 2013 resulted in exceedances of WQTLs for DO, pH, SC, *E. coli*, TDS, nitrate, arsenic, and chlorpyrifos (Tables 36-39). Water column toxicity to *S.*

capricornutum and sediment toxicity to *H. azteca* occurred during 2013 monitoring (Tables 39-41). The next section includes a summary of all exceedance data.

A TIE was performed on toxic water column samples when survival or growth of the respective target organisms was 50% or less compared to the control. For sediment samples, if survival of *H. azteca* was 80% or less compared to the control, the sample was tested for chlorpyrifos and pyrethroids. A TIE report which includes an evaluation of the results of all TIE's performed in 2013 and any available chemistry results, is located Appendix VI. During 2013, a single TIE was performed on samples collected on January 15, 2013 from Grant Line Canal near Calpack Rd for *S. capricornutum* toxicity; the TIE report is included in Appendix VI.

Table 35. 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				
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

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

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

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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
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 from January through December 2013 are listed by constituent group in Tables 36-40. Additional sediment chemistry results associated with sediment toxicity are included in Table 41. Where applicable, exceedances are tallied by the number of NM exceedances, non-contiguous waterbody (not connected to upstream or downstream waterbody) exceedances, 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 36. Exceedances of field parameter WQTLs (including DO, pH, and SC).

The WQTLs are listed below each constituent. Field parameters under a management plan are classified as Priority E constituents and are monitored only as a part of NM (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	pH	SC
			<7 mg/L	<6.5 or >8.5	>700 µS/cm
Drain to Bishop Cut @ North Rio Blanco Rd	1/15/2013	Winter1	6.17		880
Grant Line Canal near Calpack Rd	1/15/2013	Winter1			1720
Roberts Island @ Whiskey Slough Pump	1/15/2013	Winter1			1250
Sand Creek @ Hwy 4 Bypass	1/15/2013	Winter1			2099
Terminous Tract Drain @ Hwy 12	1/15/2013	Winter1			1246
Drain to Bishop Cut @ North Rio Blanco Rd	2/21/2013	Winter2			979
Grant Line Canal @ Clifton Court Rd	2/21/2013	Winter2			1890
Grant Line Canal near Calpack Rd	2/21/2013	Winter2			1670
Kellogg Creek along Hoffman Ln	2/21/2013	Winter2		8.91	
Roberts Island @ Whiskey Slough Pump	2/21/2013	Winter2			1028
Terminous Tract Drain @ Hwy 12	2/21/2013	Winter2			1597
Walthall Slough @ Woodward Ave	2/21/2013	Winter2	4.01		770
Drain to Bishop Cut @ North Rio Blanco Rd	3/19/2013	Winter3	3.53		807
Grant Line Canal @ Clifton Court Rd	3/19/2013	Winter3			903
Grant Line Canal near Calpack Rd	3/19/2013	Winter3			1030
Kellogg Creek along Hoffman Ln	3/19/2013	Winter3		9.12	
Mokelumne River @ Bruella Rd	3/19/2013	Winter3		8.8	
Roberts Island @ Whiskey Slough Pump	3/19/2013	Winter3			1306
Sand Creek @ Hwy 4 Bypass	3/19/2013	Winter3	6.12		1794
Terminous Tract Drain @ Hwy 12	3/19/2013	Winter3	4.96		1213
Drain @ Woodbridge Rd	4/2/2013	Storm1	4.21		
Duck Creek @ Hwy 4	4/2/2013	Storm1	6.68		
Grant Line Canal near Calpack Rd	4/2/2013	Storm1			1573
Kellogg Creek along Hoffman Ln	4/2/2013	Storm1		8.62	
Roberts Island @ Whiskey Slough Pump	4/2/2013	Storm1			1189
Sand Creek @ Hwy 4 Bypass	4/2/2013	Storm1	6.07		1028
Terminous Tract Drain @ Hwy 12	4/2/2013	Storm1	6.61		
Walthall Slough @ Woodward Ave	4/2/2013	Storm1	3.80		
Bear Creek @ North Alpine Rd	5/21/2013	Irrigation1	6.64		
Duck Creek @ Hwy 4	5/21/2013	Irrigation1	2.90		
Grant Line Canal @ Clifton Court Rd	5/21/2013	Irrigation1	1.40		909
Grant Line Canal near Calpack Rd	5/21/2013	Irrigation1	3.66		1299
Littlejohns Creek @ Jack Tone Rd	5/21/2013	Irrigation1	5.77		
Mormon Slough @ Jack Tone Rd	5/21/2013	Irrigation1	6.68		
Roberts Island @ Whiskey Slough Pump	5/21/2013	Irrigation1	2.66		1043
Sand Creek @ Hwy 4 Bypass	5/21/2013	Irrigation1	3.75		1702
Terminous Tract Drain @ Hwy 12	5/21/2013	Irrigation1	5.17		

Station Name	Sample Date	Season	DO	pH	SC
			<7 mg/L	<6.5 or >8.5	>700 µS/cm
Walthall Slough @ Woodward Ave	5/21/2013	Irrigation1	3.57		
Duck Creek @ Hwy 4	6/18/2013	Irrigation2	5.39		
Littlejohns Creek @ Jack Tone Rd	6/18/2013	Irrigation2	3.73		
Roberts Island @ Whiskey Slough Pump	6/18/2013	Irrigation2	4.96		862
Sand Creek @ Hwy 4 Bypass	6/18/2013	Irrigation2	4.60		1677
Terminous Tract Drain @ Hwy 12	6/18/2013	Irrigation2	4.98		
Walthall Slough @ Woodward Ave	6/18/2013	Irrigation2	6.60		
Duck Creek @ Hwy 4	7/16/2013	Irrigation3	2.64		
Empire Tract @ 8 Mile Rd	7/16/2013	Irrigation3	3.07		
French Camp Slough @ Airport Way	7/16/2013	Irrigation3	6.95		
Grant Line Canal near Calpack Rd	7/16/2013	Irrigation3	4.85		961
Littlejohns Creek @ Jack Tone Rd	7/16/2013	Irrigation3	4.45		
Lone Tree Creek @ Jack Tone Rd	7/16/2013	Irrigation3	5.82		
Mormon Slough @ Jack Tone Rd	7/16/2013	Irrigation3		9.12	
Roberts Island @ Whiskey Slough Pump	7/16/2013	Irrigation3			833
Terminous Tract Drain @ Hwy 12	7/16/2013	Irrigation3	6.77		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/16/2013	Irrigation3	6.85		
Walthall Slough @ Woodward Ave	7/16/2013	Irrigation3	3.33		
Duck Creek @ Hwy 4	8/20/2013	Irrigation4	1.08		
Empire Tract @ 8 Mile Rd	8/20/2013	Irrigation4	2.08		
French Camp Slough @ Airport Way	8/20/2013	Irrigation4	5.71		
Grant Line Canal near Calpack Rd	8/20/2013	Irrigation4	3.06		917
Mormon Slough @ Jack Tone Rd	8/20/2013	Irrigation4		9.01	
Roberts Island @ Whiskey Slough Pump	8/20/2013	Irrigation4	6.22		841
Sand Creek @ Hwy 4 Bypass	8/20/2013	Irrigation4	5.60		1757
Terminous Tract Drain @ Hwy 12	8/20/2013	Irrigation4	5.18		
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	8/20/2013	Irrigation4	5.85		
Walthall Slough @ Woodward Ave	8/20/2013	Irrigation4	5.56		
Empire Tract @ 8 Mile Rd	8/21/2013	Irrigation4	4.63		
Walthall Slough @ Woodward Ave	8/21/2013	Irrigation4	6.24		
Bear Creek @ North Alpine Rd	9/17/2013	Irrigation5	1.74		
Duck Creek @ Hwy 4	9/17/2013	Irrigation5	2.14		
Empire Tract @ 8 Mile Rd	9/17/2013	Irrigation5	1.04		
Grant Line Canal @ Clifton Court Rd	9/17/2013	Irrigation5	5.83		2235
Grant Line Canal near Calpack Rd	9/17/2013	Irrigation5	1.23		1096
Littlejohns Creek @ Jack Tone Rd	9/17/2013	Irrigation5	3.28		
Roberts Island @ Whiskey Slough Pump	9/17/2013	Irrigation5	6.47		1088
Sand Creek @ Hwy 4 Bypass	9/17/2013	Irrigation5	5.98		1856
Terminous Tract Drain @ Hwy 12	9/17/2013	Irrigation5	6.12		
Walthall Slough @ Woodward Ave	9/17/2013	Irrigation5	5.32		
Bear Creek @ North Alpine Rd	10/8/2013	Fall1	3.40		
Empire Tract @ 8 Mile Rd	10/8/2013	Fall1	1.87		
Roberts Island @ Whiskey Slough Pump	10/8/2013	Fall1	5.18		1445
Walthall Slough @ Woodward Ave	10/8/2013	Fall1	4.97		
Empire Tract @ 8 Mile Rd	11/19/2013	Fall2	2.19		
Roberts Island @ Whiskey Slough Pump	11/19/2013	Fall2			984
Terminous Tract Drain @ Hwy 12	11/19/2013	Fall2			780
Walthall Slough @ Woodward Ave	11/19/2013	Fall2			725
Empire Tract @ 8 Mile Rd	12/17/2013	Fall3	4.10		
Roberts Island @ Whiskey Slough Pump	12/17/2013	Fall3			769
Walthall Slough @ Woodward Ave	12/17/2013	Fall3			807.4
		Non-contiguous Waterbody Exceedances	**0**	**0**	**0**
		TOTAL Exceedances	**62**	**6**	**41**

Table 37. Exceedances of *E. coli*, nutrients, metals, and physical parameters WQTLs.

If a field duplicate and an environmental sample both resulted in exceedances of 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) by 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 NM and therefore 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	TDS	*E. coli*	Nitrate + Nitrite	Arsenic
			450 mg/L	235 MPN/100ml	10 mg/L	µg/L
Drain to Bishop Cut @ North Rio Blanco Rd	1/15/2013	Winter1	690			
Roberts Island @ Whiskey Slough Pump	1/15/2013	Winter1	890			
Terminous Tract Drain @ Hwy 12	1/15/2013	Winter1	830			
Walthall Slough @ Woodward Ave	1/15/2013	Winter1	490			
Drain to Bishop Cut @ North Rio Blanco Rd	2/21/2013	Winter2	720			12
Roberts Island @ Whiskey Slough Pump	2/21/2013	Winter2	790			
Terminous Tract Drain @ Hwy 12	2/21/2013	Winter2	1200			
Walthall Slough @ Woodward Ave	2/21/2013	Winter2	610		15	
Drain to Bishop Cut @ North Rio Blanco Rd	3/19/2013	Winter3	550			23
Roberts Island @ Whiskey Slough Pump	3/19/2013	Winter3	980			
Terminous Tract Drain @ Hwy 12	3/19/2013	Winter3	810			15
Roberts Island @ Whiskey Slough Pump	4/2/2013	Storm1	860			
Roberts Island @ Whiskey Slough Pump	5/21/2013	Irrigation1	600			
Roberts Island @ Whiskey Slough Pump	6/18/2013	Irrigation2	540			
Empire Tract @ 8 Mile Rd	7/16/2013	Irrigation3		648.8		14
Roberts Island @ Whiskey Slough Pump	7/16/2013	Irrigation3	500			
Empire Tract @ 8 Mile Rd	8/20/2013	Irrigation4				14
Roberts Island @ Whiskey Slough Pump	8/20/2013	Irrigation4	530			
Roberts Island @ Whiskey Slough Pump	9/17/2013	Irrigation5	660			
Terminous Tract Drain @ Hwy 12	9/17/2013	Irrigation5		325.5		
French Camp Slough @ Airport Way	10/8/2013	Fall1		344.8		
Empire Tract @ 8 Mile Rd	10/8/2013	Fall1	460			
Mokelumne River @ Bruella Rd	10/8/2013	Fall1		517.2		
Roberts Island @ Whiskey Slough Pump	10/8/2013	Fall1	800			
Empire Tract @ 8 Mile Rd	11/19/2013	Fall2	510			13
Roberts Island @ Whiskey Slough Pump	11/19/2013	Fall2	700			
Terminous Tract Drain @ Hwy 12	11/19/2013	Fall2	510			
Walthall Slough @ Woodward Ave	11/19/2013	Fall2	550		12	
Roberts Island @ Whiskey Slough Pump	12/17/2013	Fall3	480			
Walthall Slough @ Woodward Ave	12/17/2013	Fall3	560		16	
		Normal Monitoring Exceedances	**25**	**4**	**3**	**6**
		Non-contiguous Waterbody Exceedances	**0**	**0**	**0**	**0**
		Management Plan Monitoring Exceedances[1]	**0**	**0**	**0**	**0**
		TOTAL Exceedances	**25**	**4**	**3**	**6**

[1]Management Plan Monitoring not conducted for nutrients, *E. coli*, TDS, or arsenic even if they are under a management plan.

Table 38. Exceedances of pesticide WQTLs.

If a field duplicate and an environmental sample both resulted in exceedances of 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) by the station name. Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season	Monitoring Type[1]	Chlorpyrifos 0.015 µg/L
French Camp Slough @ Airport Way	7/16/2013	Irrigaiton3	MPM	**0.042**
Lone Tree Creek @ Jack Tone Rd	7/16/2013	Irrigation3	MPM	**0.026**
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	7/16/2013	Irrigation3	MPM	**0.041**
			Normal Monitoring Exceedances	**0**
			Non-contiguous Waterbody Exceedances[2]	**0**
			Management Plan Monitoring Exceedances[3]	**3**
			TOTAL Exceedances	**3**

MPM – Management Plan Monitoring

[1]Monitoring type refers to the type of monitoring the constituent with the exceedance of 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 39. Water column and sediment toxicity exceedance summary.

If a field duplicate and an environmental sample both resulted in exceedances of 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) by 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
Grant Line Canal near Calpack Rd	1/15/2013	Winter1 MPM	*S. capricornutum*	Total Cell Count (cells/mL)	182129	**37**	SL	The TIE indicated organics and cationic metals caused the toxicity.
Grant Line Canal near Calpack Rd	3/19/2013	Winter3 MPM, SED	*H. azteca*	Survival (%)	39	**41**	SL	Pyrethroids detected.
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	3/19/2013	Winter3 MPM, SED	*H. azteca*	Survival (%)	92	**94**	SG	
Sand Creek @ Hwy 4 Bypass	3/19/2013	Winter3 MPM, SED	*H. azteca*	Survival (%)	88	**90**	SG	
Duck Creek @ Hwy 4	3/19/2013	Winter3 MPM, SED	*H. azteca*	Survival (%)	89	**91**	SG	
Grant Line Canal @ Clifton Court Rd	3/19/2013	Winter3 MPM, SED	*H. azteca*	Survival (%)	34	**36**	SL	Pyrethroids and chlorpyrifos detected.
Terminous Tract Drain @ Hwy 12	9/17/2013	Irrigation5, MPM, SED	*H. azteca*	Survival (%)	46	**48**	SL	Pyrethroids and chlorpyrifos detected.

MPM – Management Plan Monitoring

SED – Sediment monitoring

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

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

[1]Season and Monitoring Type column includes the type of monitoring the toxic species was undergoing during the month of monitoring.

Table 40. Water column and sediment toxicity tally.

If a field duplicate and an environmental sample both resulted in exceedances of 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) by 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	0
Non-contiguous Waterbody Exceedances[1]	0	0	0	0
Management Plan Monitoring Exceedances[2]	**0**	**0**	**1**	**6**
Total	0	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 41. Sediment chemistry results for samples with 80% or less survival compared to control.

Station Name	Sample Date	Monitoring Type	*H. azteca* (%Control)	Sediment Pesticides									TOC (mg/Kg dw)	Percent TOC	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				
Grant Line Canal @ Clifton Court Rd	3/19/2013	MPM	36	J0.92	J0.91	ND	22	ND	ND	24	ND	ND	36,000	3.6	Silt[2]	0.024
Grant Line Canal near Calpack Rd	3/19/2013	MPM	41	3.2	ND	ND	J0.25	ND	ND	ND	ND	ND	20,000	2.0	Silt[2]	0.011
Terminous Tract Drain @ Hwy 12	9/17/2013	MPM	48	5.8	2.8	ND	J0.093	ND	ND	J0.34	ND	1.1	20,000	2.0	Fine Sand[1]	0.087

GS- Grain Size
J-Estimated value
MPM-Management Plan Monitoring
ND- Not Detected
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. 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 column toxicity occurs, pesticides with a relatively low K_{oc} (below 1900) are evaluated. The PUR database is queried for pesticides applied within 30 days prior to water sampling. When determining if pyrethroid pesticides could be responsible for toxicity, the PUR database is queried for applications within 180 days prior to the date of toxicity, due to the long half-life of pyrethroids. The database is queried for applications of metals 90 days prior to exceedances (Table 42). If there were no applications within the specified time period, the PUR database was queried an additional 30 days to determine which pesticides were applied within 60 days of the sample date. 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; any outstanding PUR data are submitted in an Addendum to the AMR. Information regarding available and outstanding PURs is included in Table 34. Any outstanding PUR data will be submitted in an addendum to the AMR on September 1, 2014.

If exceedances of WQTLs for aldrin, dieldrin, endrin, hexachlorocyclohexane (HCH), DDD, DDE, DDT, arsenic 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 2013, PUR data could not be associated or queried for arsenic because it is not a registered product and is not in the PUR database.

Table 42. 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 2013 are tabulated by zone in Tables 43-50. A discussion of exceedances (by zone) and subsequent assessments of agricultural pesticide applications that are potential sources of the exceedances are included in the following pages. All PUR data relevant to pesticide exceedances and toxicity are based on pounds (lbs) of AI applied upstream of the relevant monitoring site. Measures taken to address these exceedances are described in the Actions Taken to Address Exceedances of Water Quality Objectives 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 2013 (Table 43). During 2013, 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 they may 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. Photosynthesis and decomposition cause daily and seasonal variation in pH. Furthermore, the bioavailability of some constituents (e.g. copper) are affected by changes in pH. Three exceedances below the WQTL of 7 mg/L for DO occurred on at Bear Creek @ North Alpine Rd during May (6.64 mg/L), September (1.74 mg/L), and October (3.40 mg/L; Table 43). Flow was low in May (0.79 cfs), September (0.31 cfs), and October (0 cfs). These low flow conditions may have contributed to the low DO detected during monitoring. There was one detection of pH greater than the upper WQTL of 8.5 at Mokelumne River @ Bruella Rd in March (8.80) during 2013 monitoring (Table 43).

During the October 8, 2013 fall event, a single exceedance of the 235 MPN/100mL WQTL for *E. coli* occurred at Mokelumne River @ Bruella Rd (517.2 MPN/100 mL). A few dairies are located upstream of Mokelumne River @ Bruella Rd. Elevated levels of *E. coli* in the waterways could be due to 1) storm runoff carrying bacteria from dairy facilities in the subwatershed (past instances of direct dairy discharges have been noted in the Coalition region), 2) manure from dairies is sold to adjacent farms and if improperly composted and stored can contribute to elevated levels of bacteria in the waterway, and 4) naturally occurring *E. coli* bacteria in the waterways could be measured during sampling events. It is possible that the October exceedance of the WQTL for *E. coli* was associated with fall applications of manure in the subwatershed (Table 43).

Table 43. 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	5/21/2013	6.64		
Bear Creek @ North Alpine Rd	MPM	9/17/2013	1.74		
Bear Creek @ North Alpine Rd	MPM	10/8/2013	3.40		
Mokelumne River @ Bruella Rd	MPM, NM, SED	3/19/2013		8.80	
Mokelumne River @ Bruella Rd	NM	10/8/2013			517.2

MPM-Management Plan Monitoring
NM-Normal Monitoring
SED-Sediment 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 (16), pH (2), and *E. coli* (1) occurred from January through December 2013 (Table 44). All locations in Zone 2 were monitored for MPM constituents during months of past exceedances in 2013. French Camp Slough @ Airport Way was also monitored for Core constituents (Tables 5 and 6). In Zone 2, samples were collected from three non-contiguous waterbodies in November: French Camp Slough @ Airport Way, Littlejohns Creek @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek. Unnamed Drain to Lone Tree Creek was dry in February. Samples were not collected from Mormon Slough @ Jack Tone Rd for September MPM for chlorpyrifos and *C. dubia* toxicity due to site construction blocking access to the waterbody.

Of the 16 exceedances of the WQTL for DO, six were at Duck Creek @ Hwy 4, two at French Camp @ Airport Way, four at Littlejohns Creek @ Jack Tone Rd, one at Lone Tree Creek @ Jack Tone Rd, one at Mormon Slough @ Jack Tone Rd, and two at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Exceedances of DO in Zone 2 ranged from 1.08 to 6.95 mg/L. The concentration of DO (5.82 mg/L) at Lone Tree Creek @ Jack Tone Rd in July was reported as an exceedance based on the WQTL of 7.0 mg/L. However, the Coalition is in the process of reevaluating all exceedances of DO based on the upper (7 mg/L) and lower (5 mg/L) DO WQTLs outlined in the Basin Plan. In this instance, the DO concentration at Lone Tree Creek @ Jack Tone Rd would not be considered an exceedance based on the Basin Plan beneficial use requirements for warm waterbodies where the WQTL is 5 mg/L. The Coalition does not plan to reinstate a management plan for DO in the Lone Tree Creek @ Jack Tone Rd site subwatershed based on the 5.0 mg/L evaluation. Further explanation and details on the evaluation of DO WQTLs will be included in the 2014 MPUR (to be submitted April 1, 2014).

Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. All exceedances of the WQTL for DO in Zone 2 occurred during the irrigation season when temperatures were elevated (between 20-25^{o}C/68-77^{o}F) which could have contributed to the lower DO. Both exceedances of the WQTL for pH were above the upper limit of 8.5 and occurred at Mormon Slough @ Jack Tone Rd (July and August).

One exceedance of the WQTL for *E. coli* occurred at French Camp Slough @ Airport Way in October (344.8 MPN/100mL). During 2013, 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. It is possible that dairy discharge or fall manure applications upstream of French Camp Slough @ Airport Way could have contributed to the elevated levels of *E. coli* detected in October (Table 44).

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 6,070). The concentration at which 50% mortality (LC_{50}) to *C. dubia* occurs is 0.055 µg/L. In Zone 2, three exceedances of the WQTL for chlorpyrifos occurred in samples collected from French Camp Slough @ Airport Way and the upstream tributaries Lone Tree Creek @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Table 44). Toxicity samples were not collected at any of the three MPM sites during July.

Samples collected for MPM on July 16, 2013 resulted in detections of chlorpyrifos above the WQTL of 0.015 µg/L at French Camp @ Airport Way (0.042 µg/L), Lone Tree Creek @ Jack Tone Rd (0.026 µg/L), and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (0.041µg/L; Table 44). Applications of chlorpyrifos to walnuts are typical during the irrigation season to control coddling moth. July is an irrigation month and flow levels in these waterways tend to increase during the irrigation season. Discharge measurements recorded during the July monitoring event were 35.68 cfs at French Camp Slough @ Airport Way, 26.57 cfs at Lone Tree Creek @ Jack Tone Rd, and 16.39 at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Spray drift is most likely the cause of the July exceedances of the WQTL for chlorpyrifos in the subwatersheds, and increased flow conditions could have allowed runoff carrying chlorpyrifos to enter the waterways contributing to the exceedances. The PUR data associated with the July exceedance at French Camp Slough @ Airport Way indicate there were 22 applications of chlorpyrifos ranging from 9.40 to 344 lbs AI (1755 total lbs AI) across 996 acres of almonds and walnuts from June 22, 2013 through July 13, 2013 (Appendix IV). Of the 10 applications associated with the exceedance at French Camp Slough @ Airport Way, nine applications were on parcels not previously contacted due to not meeting the target criteria for high priority focused outreach and education. The PUR data associated with the July exceedance at Lone Tree Creek @ Jack Tone Rd indicate there were seven applications of chlorpyrifos ranging from 9.40 to 94 lbs AI (249 total lbs AI) across 186 acres of almonds and walnuts from June 25, 2013 through July 11, 2013 (Appendix IV). All parcels with applications associated with the exceedance in the Lone Tree Creek @ Jack Tone Rd site subwatershed were parcels not previously targeted for contact due to not meeting the criteria used for determining high priority focused outreach and education. The PUR data associated with the July exceedance at Unnamed Drain to Lone Tree Creek @ Jack Tone Rd include seven applications of chlorpyrifos ranging from 10 to 344 lbs AI (1404 total lbs AI) across 770 acres of almonds and walnuts from June 28, 2013 through July 13, 2013 (Appendix IV). Roughly 60% of the parcels with applications associated with the exceedance in the Unnamed Drain to Lone Tree Creek site subwatershed were parcels not previously contacted. All PUR data from 2013 are considered preliminary. During 2014, MPM for chlorpyrifos will continue at all three monitoring locations during months of past exceedances. The SJCDWQC 2014 MPUR includes further discussions and an evaluation of the chlorpyrifos use and documentation of management practices within these subwatersheds.

Toxicity

In Zone 2, two sediment samples were toxic to *H. azteca* during March 19, 2013 MPM, one from Duck Creek @ Hwy 4 and the other from Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Table 44).

Sediment samples collected during MPM on March 19, 2013 resulted in toxicity to *H. azteca* at Duck Creek @ Hwy 4 (91% survival compared to control) and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (94% survival compared to control; Table 44). Since survival was not 80% or less compared to the control in either sample, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was not required. Although the survival of *H. azteca* in the two samples were considered statistically different from the control, the percentages of survival were above 90% compared to the control in both samples. Therefore, the difference between the survival of the samples and control was not considered ecologically relevant. In fact, if these samples were used as the control for toxicity testing, both samples would have passed the test acceptability criteria. Sediment samples were collected at Duck Creek @ Hwy 4 and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd for September MPM; both were not toxic. Management Plan Monitoring will continue for sediment toxicity at Duck Creek @ Hwy 4 and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd in 2014.

Table 44. 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	*E. coli*, MPN/100 mL	Chlorpyrifos, µg/L	*H. azteca*, % control
Duck Creek @ Hwy 4	MPM, SED	3/19/2013					91
Duck Creek @ Hwy 4	MPM	4/2/2013	6.68				
Duck Creek @ Hwy 4	MPM	5/21/2013	2.90				
Duck Creek @ Hwy 4	MPM	6/18/2013	5.39				
Duck Creek @ Hwy 4	MPM	7/16/2013	2.64				
Duck Creek @ Hwy 4	MPM	8/20/2013	1.08				
Duck Creek @ Hwy 4	MPM	9/17/2013	2.14				
French Camp Slough @ Airport Way	MPM, NM	7/16/2013	6.95			0.042	
French Camp Slough @ Airport Way	MPM, NM	8/20/2013	5.71				
French Camp Slough @ Airport Way	MPM, NM	10/8/2013			344.8		
Littlejohns Creek @ Jack Tone Rd	MPM	5/21/2013	5.77				
Littlejohns Creek @ Jack Tone Rd	MPM	6/18/2013	3.73				
Littlejohns Creek @ Jack Tone Rd	MPM	7/16/2013	4.45				
Littlejohns Creek @ Jack Tone Rd	MPM	9/17/2013	3.28				
Lone Tree Creek @ Jack Tone Rd	MPM	7/16/2013	5.82			0.026	
Mormon Slough @ Jack Tone Rd	MPM	5/21/2013	6.68				
Mormon Slough @ Jack Tone Rd	MPM	7/16/2013		9.12			
Mormon Slough @ Jack Tone Rd	MPM	8/20/2013		9.01			
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM, SED	3/19/2013					94
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	7/16/2013	6.85			0.041	
Unnamed Drain to Lone Tree Creek @ Jack Tone Rd	MPM	8/20/2013	5.85				

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

Zone 3 (Drain @ Woodbridge Rd, Drain to Bishop Cut @ North Rio Blanco Rd, Empire Tract @ 8 Mile Rd, and Terminous Tract Drain @ Hwy 12)

Field Parameters, TDS, and E. coli

In Zone 3, exceedances of the WQTL for DO (17), SC (7), TDS (9), and *E. coli* (2) occurred in 2013. During 2013, MPM occurred during months of past exceedances at Drain @ Woodbridge Rd and Terminous Tract Drain @ Hwy 12. Assessment Monitoring occurred at Drain to Bishop Cut @ North Rio Blanco Rd, Empire Tract @ 8 Mile Rd, and Terminous Tract Drain @ Hwy 12 (Tables 5 and 6). Caltrans road construction upstream of Terminous Tract @ Hwy 12 occurred from July 2012 through August 2013 where culverts were replaced underneath the roadways; road construction did not restrict access to the monitoring location and all samples were collected as scheduled.

In Zone 3, 17 exceedances of the WQTL of 7 mg/L for DO occurred, one at Drain @ Woodbridge, two at Drain to Bishop Cut @ North Rio Blanco Rd, seven at Empire Tract Drain @ 8 Mile Rd and seven at Terminous Tract Drain @ Hwy 12 (Table 45). Exceedances of the WQTL for DO occurred during every month in Zone 3 except February with concentrations ranging from 1.04 to 6.77 mg/L (Table 45). Two exceedances of the WQTL for *E. coli* occurred, one at Empire Tract @ 8 Mile Rd in July (648.8 MPN/100 mL), and one at Terminous Tract Drain @ Hwy 12 in September (325.5 MPN/100 mL; Table 45).

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, and 2) hydrostatic pressure moving Delta water to the interior of the islands and/or the use of Delta water for irrigation. Levels of SC above the 700 µS/cm WQTL were detected from January through March and in November 2013. Exceedances of the WQTL for SC in Zone 3 coincided in large part with elevated levels of TDS.

Arsenic

In Zone 3, six exceedances of the WQTL for arsenic occurred in 2013 (Table 45). Products containing arsenic for agricultural purposes have been phased out since 1980s. However, arsenic acid, arsenic acid anhydride, arsenic trioxide, and chromate copper arsenate are currently registered for use as wood protectants, household ant killer, weed killer around ditches, nonagricultural areas, buildings, driveways, sidewalks, and fencerows. Moreover, the geology of the region is also known to have naturally occurring sources of arsenic. Consequently, exceedances of the arsenic WQTL may be due to naturally occurring instances.

Samples collected during February 21, 2013 and March 19, 2013 from Drain to Bishop Cut @ North Rio Blanco Rd contained levels of arsenic above of the WQTL of 10 µg/L (12 µg/L and 23 µg/L, respectively; Table 45). Exceedances of the WQTL for arsenic occurred in samples from Empire Tract @ 8 Mile Rd during July 16, 2013 (14 µg/L), August 20, 2013 (14 µg/L), and November 19, 2013 (14 µg/L; Table 45). One exceedance of the WQTL for arsenic occurred in samples from Terminous Tract Drain @ Hwy 12 during March 19, 2013 (15 µg/L). Elevated levels of arsenic appear to be common in Zone 3; sites in Zone 3 naturally contain higher levels of arsenic in the soil (Burow et al., 2004; Moran et al., 2009;

Westcot et al., 1990). Since there are no registered products containing arsenic, the PUR database could not be queried for these exceedances.

Toxicity

In Zone 3, one sediment sample was toxic to *H. azteca* during September 17, 2013 MPM (Table 45).

Sediment samples collected from Terminous Tract Drain @ Hwy 12 on September 17, 2013 were toxic to *H. azteca* with 48% survival compared to the control. The Coalition analyzes for pyrethroids and chlorpyrifos in sediment samples when toxicity to *H. azteca* occurs and survival is 80% or less compared to the control. The samples collected on September 17 required additional sediment chemistry analyses for pyrethroids and chlorpyrifos. The additional chemistry results indicate detections of bifenthrin (5.8 µg/kg dw), chlorpyrifos (2.8 µg/kg dw), cyhalothrin (J0.093 µg/kg dw), esfenvalerate/fenvalerate (J0.34 µg/kg dw), and permethrin (1.1 µg/kg dw) occurred (Table 41). Total organic carbon concentration was 20,000 mg/kg (2.0%) for this sample with a median grain size of 0.087 mm (fine sand). Pyrethroids readily bind to sediment and a small portion of what binds to sediment partitions off into pore water becoming bioavailable to *H. azteca*. The sediment toxicity results indicate sediment-bound pyrethroids and chlorpyrifos were bioavailable for *H. azteca* and detected at concentrations that could cause toxicity. The amount of pyrethroids contributing to sediment toxicity can be evaluated using the toxic units (TUs) calculation based on the LC50s for pyrethroids determined to cause acute toxicity and growth impairment to *H. azteca* (Amweg et al., 2005). There were enough TUs (5.84 total TUs of pyrethroids) in the September sediment sample to account for the Terminous Tract @ Hwy 12 sediment toxicity (Table 46). The PUR data associated with the September sediment toxicity at Terminous Tract Drain @ Hwy 12 were not available for review at the time of this report and will be submitted in the September 1, 2014 Addendum to the 2014 AMR. Management Plan Monitoring for *H. azteca* toxicity in sediment will continue at Terminous Tract Drain @ Hwy 12 in 2014.

Table 45. Zone 3 (Drain @ Woodbridge Rd, Drain to Bishop Cut @ North Rio Blanco Rd, and 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	Arsenic, µg/L	*H. azteca*, % control
Drain @ Woodbridge Rd	MPM	4/2/2013	4.21					
Drain to Bishop Cut @ North Rio Blanco Rd	NM	1/15/2013	6.17	880	690			
Drain to Bishop Cut @ North Rio Blanco Rd	NM	2/21/2013		979	720		12	
Drain to Bishop Cut @ North Rio Blanco Rd	NM, SED	3/19/2013	3.53	807	550		23	
Empire Tract Drain @ 8 Mile Rd	NM	7/16/2013	3.07			648.8	14	
Empire Tract Drain @ 8 Mile Rd	NM	8/20/2013	2.08				14	
Empire Tract Drain @ 8 Mile Rd	NM	8/21/2013*	4.63					
Empire Tract Drain @ 8 Mile Rd	NM	9/17/2013	1.04					
Empire Tract Drain @ 8 Mile Rd	NM	10/8/2013	1.87		460			
Empire Tract Drain @ 8 Mile Rd	NM	11/19/2013	2.19		510		13	
Empire Tract Drain @ 8 Mile Rd	NM	12/17/2013	4.10					
Terminous Tract Drain @ Hwy 12	NM	1/15/2013		1246	830			
Terminous Tract Drain @ Hwy 12	NM	2/21/2013		1597	1200			
Terminous Tract Drain @ Hwy 12	MPM, NM, SED	3/19/2013	4.96	1213	810		15	
Terminous Tract Drain @ Hwy 12	NM	4/2/2013	6.61					

Zone 3 Station Name	Monitoring Type	Sample Date	DO, mg/L	SC, µS/cm	TDS, mg/L	*E. coli*, MPN/100 mL	Arsenic, µg/L	*H. azteca*, % control
Terminous Tract Drain @ Hwy 12	NM	5/21/2013	5.17					
Terminous Tract Drain @ Hwy 12	NM	6/18/2013	4.98					
Terminous Tract Drain @ Hwy 12	NM	7/16/2013	6.77					
Terminous Tract Drain @ Hwy 12	MPM, NM	8/20/2013	5.18					
Terminous Tract Drain @ Hwy 12	MPM, NM, SED	9/17/2013	6.12			325.5		48
Terminous Tract Drain @ Hwy 12	NM	11/19/2013		780	510			

*Samples were recollected on 8/21/2013 for toxicity to *P. promelas* due to laboratory error.
MPM- Management Plan Monitoring
NM-Normal Monitoring
SED-Sediment monitoring

Table 46. Terminous Tract Drain @ Hwy 12 total TUs of sediment pyrethroids.

Station Name	Sediment Pesticide	Concentration (µg/kg dw)	LC50[1] µg/g OC	Sample TOC (mg/kg dw)	Percent TOC	Calculated TU
Terminous Tract Drain @ Hwy 12	Bifenthrin	5.8	0.52	20,000	2.0	5.58
	Cyhalothrin	J0.093	0.45			0.11
	Esfenvalerate	J0.34	1.54			0.10
	Permethrin	1.1	10.83			0.05
					Total TUs of Pyrethroids	**5.84**

J-Estimated value
[1]- Normalized to TOC measurements in sediments collected for research (Amweg, et al., 2005).

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 and TDS

In Zone 4, exceedances of the WQTLs for DO (11), pH (3), SC (24), and TDS (12) occurred from January through December 2013 (Table 47). All sites in Zone 4 were monitored for MPM constituents during months of past exceedances. Core Monitoring occurred at Roberts Island @ Whiskey Slough Pump and samples were collected and analyzed monthly for chlorpyrifos and diazinon.

Site subwatersheds in Zone 4 are comprised of agricultural drains within the Delta islands and pumping is required to remove water from the drains. In most cases there is no flow in the drains unless the pumps are activated. Therefore, exceedances of the WQTL for DO and salts (SC and TDS) are common in Zone 4 due to a lack of flow. Exceedances of the WQTL for DO occurred at every site in Zone 4 except Kellogg Creek along Hoffman Ln with concentrations ranging from 1.23 to 6.47 mg/L (Table 47). Water at Roberts Island @ Whiskey Slough Pump and Grant Line Canal near Calpack Rd only moves when the pumps are activated resulting in little to no flow when the pumps are deactivated. Warm water with little or no flow typically coincides with exceedances of the WQTL for DO during the summer months. Furthermore, algal production and decay along with stagnant, warm water at these sites can contribute to low DO detections. Three measurements of pH above the WQTL of 8.5 occurred in February through April at Kellogg Creek @ Hoffman Ln with pH ranging from 8.62 to 9.12 (Table 47). Detections above the 700 µmhos/cm WQTL for SC occurred at all sites in Zone 4, except Kellogg Creek along Hoffman Ln; the detections of SC ranged from 769 to 2235 µS/cm. All exceedances of the WQTL for SC coincided with exceedances of the WQTL for TDS at Robert Island @ Whiskey Slough Pump. Roberts Island @ Whiskey Slough Pump was the only site with elevated levels of TDS.

Toxicity

In Zone 4, water column toxicity occurred once to *S. capricornutum* and sediment toxicity occurred twice to *H. azteca* (Table 47). All sampling for toxicity in Zone 4 was conducted as part of the MPM schedule outlined in the SJCDWQC MPUR.

Sediment collected during MPM on March 19, 2013 from Grant Line Canal @ Clifton Court Rd was toxic to *H. azteca* (36% survival compared to the control; Table 47). Since survival was 80% or less compared to the control, additional sediment chemistry analysis for chlorpyrifos and pyrethroid pesticides was required. Bifenthrin (J0.92 µg/kg dw), chlorpyrifos (J0.91 µg/kg dw), lambda-cyhalothrin (22 µg/kg dw), and esfenvalerate/fenvalerate (24 µg/kg dw) were detected (Table 41). The median grain size was 0.024 mm (silt) and TOC was 36,000 mg/kg (3.6%). Only one ground application of lambda-cyhalothrin (0.030 lbs AI) was reported on March 14, 2013 to 48 acres of alfalfa. This application was to the parcel closest to the sample site. According to PUR data, there were no applications of bifenthrin, chlorpyrifos or esfenvalerate/fenvalerate reported from January 4, 2013 through March 14, 2013. The PUR data indicate that between January 2, 2013 and March 14, 2013 a total of 14 applications (lambda-cyhalothrin, paraquat dichloride and trifluralin) ranging between 1.44 and 152 lbs AI (749 lbs AI total)

occurred across 591 acres of alfalfa and asparagus (Appendix IV). Since these pesticides can be persistent in the environment, it is likely that the detections of bifenthrin, chlorpyrifos, and esfenvalerate/fenvalerate could be a result of applications that occurred prior to January 2013. The half-life of bifenthrin has been reported to range between 78-345 days depending on environmental conditions (e.g. exposure to light, DO, etc.). It is possible that the concentration of bifenthrin could be a result of the high TOC of the sediment and environmental conditions which extended the half-life of bifenthrin. There were enough TUs (18.2 total TUs of pyrethroids) in the March sediment sample to account for the Grant Line Canal @ Clifton Court Rd sediment toxicity (Table 48). Sediment samples collected during September 2013 MPM from Grant Line Canal @ Clifton Court Rd were not toxic (Table 47). In 2014, MPM for sediment toxicity will continue at Grant Line Canal @ Clifton Court Rd.

Samples collected on January 15, 2013 during MPM at Grant Line Canal near Calpack Rd were toxic to *S. capricornutum* (37% growth compared to the control; Table 47). Algal growth was less than 50% compared to the control and therefore a TIE was initiated. The TIE indicated that nonpolar organics and cationic metals were the cause of toxicity; no other constituents were analyzed as part of the January MPM at Grant Line Canal near Calpack Rd. The PUR data indicate there were 24 applications of products ranging between 0.45 and 75 lbs AI associated with this toxicity. A total of 460.83 lbs AI of clethodium, diuron, flumioxazin, haxazinine, metribuzin, and paraquot dichloride were applied between January 4 and January 14, 2013 across 849 acres of alfalfa.

Sediment samples collected during MPM on March 19, 2013 from Grant Line Canal near Calpack Rd were toxic to *H. azteca* (41% survival compared to the control; Table 47). Since survival was 80% or less compared to the control, additional sediment chemistry analysis for chlorpyrifos and pyrethroid pesticides was required. Bifenthrin (3.2 µg/kg dw) and lambda-cyhalothrin (J0.25 µg/kg dw) were detected (Table 41). The median grain size was 0.011 mm (silt) and TOC was 20,000 mg/kg (2.0%). The PUR data from January 4, 2013 through March 15, 2013 indicated a total of 29 applications (indoxacarb, lambda-cyhalothrin, paraquat dichloride and trifluralin) ranging between 0.15 and 54 lbs AI (247 lbs AI total) occurred across 1017 acres of alfalfa and safflower (Appendix IV). Only 0.373 lbs AI of lambda-cyhalothrin per acre were applied (12 total applications) within this time period (562 total acres), which may explain the relatively low concentration measured in the sediment. There was no reported pesticide use of bifenthrin between January 4, 2013 and March 15, 2013. The last reported application of bifenthrin in the subwatershed was on August 27, 2012. However, based on the TU calculation, there were enough TUs (3.35 total TUs of pyrethroids) in the March sediment sample to account for the Grant Line Canal near Calpack Rd sediment toxicity (Table 48). Sediment samples collected during September MPM from Grant Line Canal near Calpack Rd were not toxic (Table 47). In 2014, MPM for sediment toxicity will continue at Grant Line Canal near Calpack Rd.

Table 47. 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	TDS, mg/L	*S. capricornutum*, % Control	*H. azteca*, % control
Grant Line Canal @ Clifton Court Rd	MPM	2/21/2013			1890			
Grant Line Canal @ Clifton Court Rd	MPM, SED	3/19/2013			903			36
Grant Line Canal @ Clifton Court Rd	MPM	5/21/2013	1.40		909			
Grant Line Canal @ Clifton Court Rd	MPM, SED	9/172013	5.83		2235			
Grant Line Canal near Calpack Rd	MPM	1/15/2013			1720		37	
Grant Line Canal near Calpack Rd	MPM	2/21/2013			1670			
Grant Line Canal near Calpack Rd	MPM, SED	3/19/2013			1030			41
Grant Line Canal near Calpack Rd	MPM	4/2/2013			1573			
Grant Line Canal near Calpack Rd	MPM	5/21/2013	3.66		1299			
Grant Line Canal near Calpack Rd	MPM	7/16/2013	4.85		961			
Grant Line Canal near Calpack Rd	MPM	8/20/2013	3.06		917			
Grant Line Canal near Calpack Rd	MPM, SED	9/17/2013	1.23		1096			
Kellogg Creek along Hoffman Ln	MPM	2/21/2013		8.91				
Kellogg Creek along Hoffman Ln	MPM, SED	3/19/2013		9.12				
Kellogg Creek along Hoffman Ln	MPM	4/2/2013		8.62				
Roberts Island @ Whiskey Slough Pump	MPM, NM	1/15/2013			1250	890		
Roberts Island @ Whiskey Slough Pump	MPM, NM	2/21/2013			1028	790		
Roberts Island @ Whiskey Slough Pump	MPM, NM, SED	3/19/2013			1306	980		
Roberts Island @ Whiskey Slough Pump	MPM, NM	4/2/2013			1189	860		
Roberts Island @ Whiskey Slough Pump	MPM, NM	5/21/2013	2.66		1043	600		
Roberts Island @ Whiskey Slough Pump	NM	6/18/2013	4.96		862	540		
Roberts Island @ Whiskey Slough Pump	MPM, NM	7/16/2013			833	500		
Roberts Island @ Whiskey Slough Pump	MPM, NM	8/20/2013	6.22		841	530		
Roberts Island @ Whiskey Slough Pump	MPM, NM, SED	9/17/2013	6.47		1088	660		
Roberts Island @ Whiskey Slough Pump	NM	10/8/2013	5.18		1445	800		
Roberts Island @ Whiskey Slough Pump	NM	11/19/2013			984	700		
Roberts Island @ Whiskey Slough Pump	NM	12/17/2013			769	480		

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

Table 48. Total TUs of sediment pyrethroids in Zone 4 samples.

Station Name	Sediment Pesticide	Concentration (µg/kg dw)	LC50[1] µg/g OC	Sample TOC (mg/kg dw)	Percent TOC	Calculated TU
Grant Line Canal @ Clifton Court Rd	Bifenthrin	J0.92	0.52	36,000	3.6	0.49
	Cyhalothrin	22.00	0.45			13.58
	Esfenvalerate	24.00	1.54			4.33
					Total TUs of Pyrethroids	**18.20**
Grant Line Canal near Calpack Rd	Bifenthrin	3.20	0.52	20,000	2.0	3.08
	Cyhalothrin	J0.25	0.45			0.27
					Total TUs of Pyrethroids	**3.35**

J-Estimated value
[1]- Normalized to TOC measurements in sediments collected for research (Amweg, et al., 2005).

Zone 5 (Walthall Slough @ Woodward Ave)

Field Parameters

In Zone 5, exceedances of the WQTLs for DO (9), SC (3), and TDS (8) occurred (Table 49). Walthall Slough @ Woodward Ave is the Core Monitoring location in Zone 5 and the only sampling location suitable for Coalition monitoring within the zone. Walthall Slough @ Woodward Ave was monitored for Assessment Monitoring all 12 months and MPM constituents during months of past exceedances (Tables 5 and 6).

Exceedances of the WQTL for DO occurred in February, and April through October. Three exceedances of the WQTL for SC occurred during the February, November, and December monitoring events. Exceedances of TDS occurred in both the environmental and field duplicate samples in January, February, and November (Table 49).

Nitrates

In Zone 5, six exceedances of the WQTL for nitrates occurred (Table 49). Potential sources of nitrate in surface waters include fertilizer, leaking septic systems, waste-treatment facility effluent, and inputs from animal waste. Nitrogen from 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, nitrate in fertilizer would enter surface water immediately after application. Exceedances of the WQTL for nitrates occurred in the environmental and field duplicate samples at Walthall Slough @ Woodward Ave in February, November and December. It is unlikely that fertilizer applications would result in exceedances of the WQTL for nitrates in February, November or December.

Table 49. 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	MPM, NM	1/15/2013			490	
Walthall Slough @ Woodward Ave (FD)	MPM, NM	1/15/2013			480	
Walthall Slough @ Woodward Ave	NM	2/21/2013	4.01	770	610	15
Walthall Slough @ Woodward Ave (FD)	NM	2/21/2013			580	14
Walthall Slough @ Woodward Ave	NM	4/2/2013	3.80			
Walthall Slough @ Woodward Ave	NM	5/21/2013	3.57			
Walthall Slough @ Woodward Ave	NM	6/18/2013	6.60			
Walthall Slough @ Woodward Ave	NM	7/16/2013	3.33			
Walthall Slough @ Woodward Ave	NM	8/20/2013	5.56			
Walthall Slough @ Woodward Ave	NM	8/21/2013*	6.24			
Walthall Slough @ Woodward Ave	MPM, NM, SED	9/17/2013	5.32			
Walthall Slough @ Woodward Ave	MPM, NM	10/8/2013	4.97			
Walthall Slough @ Woodward Ave	MPM, NM	11/19/2013		725	550	12
Walthall Slough @ Woodward Ave (FD)	MPM, NM	11/19/2013			550	13
Walthall Slough @ Woodward Ave	MPM, NM	12/17/2013		807.4	560	16
Walthall Slough @ Woodward Ave (FD)	MPM, NM	12/17/2013			550	15

*Samples recollected on 8/21/2013 for toxicity to *P. promelas*.
FD-Field Duplicate
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 (6) and SC (7) occurred. During 2013, monitoring in Zone 6 was scheduled at a single MPM location, Sand Creek @ Hwy 4 Bypass.

During 2013, six exceedances of the WQTL for DO occurred with concentrations ranging from 3.75 to 6.12 mg/L (Table 50). Discharge at Sand Creek @ Hwy 4 Bypass was less than 1 cfs during all months it was recorded; these low flow conditions most likely contributed to the low DO detected during most monitoring events. Exceedances of the WQTL for SC occurred during every MPM event. It's common for SC to be above 1400 µS/cm at Sand Creek @ Hwy 4 Bypass; detections of SC ranged from 1028 to 2099 µS/cm. Sand Creek @ Hwy 4 Bypass is located in a growing urban community. Water for municipal and industrial use within the subwatershed area is supplied by Los Vaqueros Reservoir, and a large portion of the water used to irrigate suburban lawns and gardens is returned to the creek upstream of the Sand Creek @ Hwy 4 Bypass sample location. The high levels of SC that are typical in the site subwatershed could be a result of recycling salty water from the Delta to the reservoir and back to the creek.

Toxicity

In Zone 6, one instance of sediment toxicity to *H. azteca* occurred during MPM at Sand Creek @ Hwy 4 Bypass on March 19, 2013 (90% survival compared to the control; Table 50). Since survival was not 80% or less compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was not required. Although survival in the sample was considered statistically different from the control, the percent survival was 90% compared to the control and therefore the difference between the sample and the control survival was not considered ecologically relevant. Samples collect for sediment toxicity in September were not toxic. During 2014, MPM for sediment toxicity will continue at Sand Creek @ Hwy 4 Bypass.

Table 50. Zone 6 (Sand Creek @ Hwy 4 Bypass) exceedances.

ZONE 6 STATION NAME	MONITORING TYPE	SAMPLE DATE	DO, MG/L	SC, µS/CM	*H. AZTECA*, % CONTROL
Sand Creek @ Hwy 4 Bypass	MPM	1/15/2013		2099	
Sand Creek @ Hwy 4 Bypass	MPM, SED	3/19/2013	6.12	1794	90
Sand Creek @ Hwy 4 Bypass	MPM	4/2/2013	6.07	1028	
Sand Creek @ Hwy 4 Bypass	MPM	5/21/2013	3.75	1702	
Sand Creek @ Hwy 4 Bypass	MPM	6/18/2013	4.60	1677	
Sand Creek @ Hwy 4 Bypass	MPM	8/20/2013	5.60	1757	
Sand Creek @ Hwy 4 Bypass	MPM, SED	9/17/2013	5.98	1856	

MPM-Management Plan Monitoring
SED- Sediment monitoring

ACTIONS TAKEN TO ADDRESS EXCEEDANCES OF WATER QUALITY OBJECTIVES

The Coalition conducts monitoring of ambient surface waters to characterize discharges from irrigated agriculture. Monitoring results are analyzed to identify constituents, agricultural lands, crops, and/or specific pesticides that need to be managed to reduce or eliminate discharges 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 of this report.

The Coalition also notifies members farming in site subwatersheds where exceedances of WQTLs have occurred 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 copies 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 growers are aware and taking actions to address water and sediment quality concerns.

MANAGEMENT PRACTICES

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

The Coalition obtains management practice information by conducting focused outreach with growers in subwatersheds with active management plans. The Coalition's Management Plan includes a schedule for years of focused outreach in prioritized subwatersheds and details regarding the prioritization strategy (last updated in the 2013 MPUR, Table 6, and Page 25). The purpose of Coalition outreach is to review current management practices, determine if additional management practices are applicable,

and document implementation of any new practices. The information provided in the Coalition MPURs, submitted annually on April 1, summarizes management practices in priority subwatersheds including current, recommended and additional practices implemented after Coalition outreach.

During 2013, the Coalition continued focused outreach and management practice tracking 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. The Coalition completed initial contact meetings in 2012. All follow up surveys were completed with 100% of target growers in 2013; a complete analysis of results will be reported in the 2014 MPUR.

The Coalition began focused outreach in 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 targeted growers in the Bear Creek @ North Alpine Rd (7), Roberts Island @ Whiskey Slough Pump (7) and Walthall Slough @ Woodward Ave (8) site subwatersheds (Table 51). Meetings with targeted growers were held on January 22, 2013 and 100% of initial contacts in the fifth priority subwatersheds are complete. Follow up mailings were sent on February 14, 2014 to 17 growers in the fifth priority site subwatersheds to document implementation of new practices. The Coalition will report on the results of the fifth priority initial contact meetings in the 2014 MPUR.

The Coalition began focused outreach in the sixth high priority subwatershed Drain @ Woodbridge Rd (2014-2016). The Coalition mailed letters on January 27, 2014 to four targeted growers in the site subwatershed announcing the required initial contact meeting date of February 5, 2014 (Table 51). Targeted growers were asked to complete surveys documenting current practices and to indicate which recommended practices they anticipated implementing in the upcoming year. An information sheet on chlorpyrifos and effective management practices was mailed to all seven members in the subwatershed. The Coalition will report on the results of the sixth priority initial contact meeting in the 2014 MPUR.

OUTREACH, EDUCATION AND COLLABORATION ACTIVITIES

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, as part of meetings conducted by the County Agricultural Commissioner, and by personal contact. During 2013 grower meetings, the Coalition presented information to members concerning progress in achieving water quality goals, site subwatershed specific monitoring results, and management practices effective at reducing discharge of pesticides to waterbodies. All outreach and education activities are documented in Table 51.

To keep growers informed of relevant Coalition news, the Coalition distributes a newsletter which was mailed to all members in the Coalition in May 2013. Articles highlighted the new regulations and reporting requirements in the upcoming, long term ILRP. Articles outlined new nutrient regulations,

continued pesticide impairments in surface waterways, and management practices to reduce the amount of pesticides found in waterways causing water quality impairments.

Overall, Coalition representatives conducted or participated in 20 meetings or mailings from January through December 2013 and three from January through February 2014. Meeting discussions often include topics on irrigation water quality, storm water quality, and sediment runoff. Seven meetings included discussions of specific site subwatershed management plans and management practices.

The Coalition continues to coordinate with other entities to educate broader grower audiences, including growers who are not Coalition members. On February 20, 2013, 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. A total of 312 growers attended the Spray Safe Meeting. Coalition representatives presented at two continuing education classes hosted by the Contra Costa County Agricultural Commissioner on November 20 and December 7, 2013 (Appendix VII).

The Coalition participated in the annual San Joaquin County Agricultural Commissioner's meetings that occur each fall. Coalition representatives gave presentations at the six San Joaquin County meetings that occurred from November 26 through December 12, 2013 (Appendix VII). Presentations included information on monitoring results/exceedances, management plan strategy and status, the long term ILRP, and grower responsibilities. Over 1,200 growers attended the six meetings.

The Coalition held five meetings from July 29 through August 8, 2013 to discuss the proposed SJCDWQC waste discharge requirements with growers in the Coalition region.

The Coalition hosts a website which serves as a clearing house for information on 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 of WQTLs in site subwatersheds, management plans, links to websites describing management practices, 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 with information on effective management practices. As mentioned above, the Coalition participated in the February 20, 2013 meeting hosted by Spray Safe and presented at two grower continuing education classes hosted by the Contra Costa County Agricultural Commissioner on November 20 and December 7, 2013. Coalition representatives also participated in the six San Joaquin County Agricultural Commissioner meetings held in November and December 2013 (Table 51).

Table 51. SJCDWQC 2013 outreach and education activities.

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

Area	Date	Category	Details	Who
Bear Creek, Roberts Island, and Walthall Slough subwatersheds (5th P)	1/8/2013	Grower Notification / Management Practice Tracking	5th Priority Initial Contact Grower Meeting Announcement Mailing: sent to 7 Bear Creek members, 7 Roberts Island members, and 8 Walthall Slough targeted 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
Bear Creek, Roberts Island, and Walthall Slough subwatersheds (5th P)	1/22/2013	BMP Outreach and Education / Management Practice Tracking	5th Priority Initial Contact Grower Meeting: 14 of the 22 members attended the meeting (5 from Bear Creek, 5 from Roberts Island and 4 from Walthall Slough). Past exceedances of Chlorpyrifos (Lorsban) and malathion were discussed. Growers that used these products in the past couple of years were required to attend the grower meeting. Survey questions were also addressed at the meeting.	Terry Prichard, Mike Wackman
Kellogg Creek and Mormon Slough subwatersheds (4th P)	1/25/2013	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
Kellogg Creek and Mormon Slough subwatersheds (4th P)	2/1/2013	Grower Notification / Management Practice Tracking	4th Priority Follow Up Mailing: sent to 10 Kellogg Creek members, 23 Mormon Slough members, and 1 Sand Creek members. Mailing included follow up survey with instructions to complete and return the survey to the Coalition.	Mike Wackman
Stockton	2/20/2013	BMP Outreach and Education	Spray Safe Grower Meeting: 312 growers attended. Meeting topics included management practices and water quality, applicable laws and regulations, and new technologies.	Terry Prichard
Entire Coalition Region	May	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
Entire Coalition Region	7/29/2013	Grower Notification	Proposed SJCDWQC Waste Discharge Requirements Meeting Announcement mailed to growers and posted on the RDC website: Manteca Library, Grape Festival Grounds, Linden Library and Roberts Union Island Center (Around 400 attendees).	Mike Wackman, John Broadie
Tracy, Manteca and Southwest Region of Coalition	8/5/2013	Grower Notification	Proposed SJCDWQC Waste Discharge Requirements Meeting: Manteca Library.	Mike Wackman, Jennifer Spaletta
Lodi	8/6/2013	Grower Notification	Proposed SJCDWQC Waste Discharge Requirements Meeting: Grape Festival Grounds.	Mike Wackman, Jennifer Spaletta
Eastern San Joaquin County Region of Coalition	8/7/2013	Grower Notification	Proposed SJCDWQC Waste Discharge Requirements Meeting: Linden Library.	Mike Wackman, Jennifer Spaletta
The Delta and Contra Costa County	8/8/2013	Grower Notification	Proposed SJCDWQC Waste Discharge Requirements Meeting: Roberts Union Island Center.	Mike Wackman, Jennifer Spaletta
Bear Creek, Roberts Island, and Walthall Slough subwatersheds (5th P)	10/3/2013	Grower Notification	5th Priority Initial Contact Grower Surveys Final Mailing: sent to 9 growers (1 Bear Creek member, 4 Roberts Island members and 4 Walthall Slough members) in the 5th p subwatersheds 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 October 25, 2013.	Mike Wackman
San Joaquin County (Simms Staff)	11/19/2013	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meetings: 331 attendees at daytime meeting and 117 at night 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	11/20/2013	BMP Outreach and Education	Contra Costa County Agricultural Commissioner Continuing Education Course: ~25 attendees at meeting. Reviewed water quality and exceedances, grower responsibilities, management practices and management practice funding.	Mike Wackman

Area	Date	Category	Details	Who
San Joaquin County (Lodi Staff)	11/26/2013	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 164 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)	11/27/2013	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
San Joaquin County (Simms Staff)	12/4/2013	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 181 attendees at daytime meeting and 59 at night 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	12/7/2013	BMP Outreach and Education	Contra Costa County Agricultural Commissioner Continuing Education Course: 72 attendees at meeting. Reviewed water quality and exceedances, grower responsibilities, management practices and management practice funding.	John Brodie
San Joaquin County (Lodi Staff)	12/11/2013	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 117 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)	12/12/2013	BMP Outreach and Education	San Joaquin County Agricultural Commissioner Meeting: 125 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
Drain @ Woodbridge Rd	1/27/2014	Grower Notification/Management Practice Tracking	6th Priority Initial Contact Grower Meeting Announcement Mailing: sent to 4 Drain @ Woodbridge members, and additional information sent to all 7 members about chlorpyrifos and BMPS. 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
Drain @ Woodbridge Rd	2/5/2014	BMP Outreach and Education / Management Practice Tracking	6th Priority Initial Contact Grower Meeting: 1 of the 4 targeted members attended the meeting. Past exceedances of Chlorpyrifos (Lorsban) were discussed. Growers that used these products in the past couple of years were required to attend the grower meeting. Survey questions were also addressed at the meeting.	Terry Prichard, Mike Wackman
Bear Creek, Roberts Island, and Walthall Slough subwatersheds (5th P)	2/18/2014	Grower Notification/Management Practice Tracking	5th Priority Follow Up Mailing: sent to 6 Bear Creek members, 6 Roberts Island members, and 5 Walthall Slough members. Mailing included follow up survey with instructions to complete and return the survey to the Coalition.	Mike Wackman

MP – Management Practice
MVP – Mid Valley Pesticide
P – Priority
UCCE – University of California County Extension

STATUS OF MANAGEMENT PLANS AND SPECIAL PROJECTS

The SJCDWQC developed its monitoring program 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 monitoring and reporting requirements, and dischargers must comply with the monitoring and management criteria specified per each TMDL. If a single exceedance of the WQTL for a constituent under an EPA approved TMDL (TMDL constituents include chlorpyrifos, diazinon, DO, salinity/boron and methyl mercury) occurs, a management plan will be required for that constituent in the 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 WQTL of the same parameter at the same location occurs within a three year period.

A management plan requires additional focused effort within the subwatershed. Coalition efforts include but are not limited to: 1) continued Assessment and Core 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 as well as exceedances involving pesticides and sediment bound analytes by conducting outreach to growers and providing them with information needed to implement specific management practices whether or not a TMDL is 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, 2014 documents all management plan related activities that occurred during 2013.

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

The Coalition received approval on February 27, 2013 to remove 20 specific site/constituent pairs from eight site subwatershed active management plans. Table 52 lists all of the specific site/constituent pairs approved for removal from active management plans (approvals occurred in 2012 and 2013). Two consecutive years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality which is the result of grower implemented management practices.

Table 52. Status of SJCDWQC management plan constituents per site subwatershed.

Active – X, and removed – dark grey cell.

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						X			X											X		
Grant Line Canal @ Clifton Court	2008†	after 2035	X		X	X				X		X	X	X										X		X
Grant Line Canal near Calpack Rd	2008†	after 2035	X		X	X				X		X												X		X
Kellogg Creek along Hoffman Ln	2008†	after 2035		X	X					X		X		X	X									X		X
Littlejohns Creek @ Jack Tone Rd	2008†	2021	X				X			X			X													
Lone Tree Creek @ Jack Tone Rd	2008†	2026		X					X	X		X	X												X	
Mokelumne River @ Bruella Rd	2011	2014		X						X																
Mormon Slough @ Jack Tone Rd	2008†	2017	X	X									X										X			X
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		X	X		X		X					X		X
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 Management Plan Completion (Grey Cells)			**3**	**2**	**1**	**0**	**5**	**2**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**5**	**1**	**2**	**0**	**0**	**0**	**1**	**5**	**1**	**1**	**7**
Total Management Plan Constituents Remaining Active (X)			**14**	**7**	**10**	**5**	**2**	**1**	**1**	**16**	**1**	**11**	**12**	**4**	**2**	**0**	**1**	**2**	**1**	**1**	**1**	**0**	**3**	**10**	**1**	**6**

*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.

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 effects of agricultural practices on water quality. As illustrated in the Actions Taken to Address Exceedances of Water Quality Objectives 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 2014 MPUR.

The 2014 MPUR will include an update on the following items:

1. Status of performance goals in high priority subwatersheds,
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: APPROVED TMDLS

In 2013, TMDL monitoring occurred to evaluate compliance with EPA approved TMDL discharge limitations. Approved TMDLs within the SJCDWQC region are for chlorpyrifos and diazinon, DO, *E. coli,* methyl mercury, salt, and boron.

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 the Delta subareas and 303d listed waterbodies through representative monitoring. In addition to analyzing for chlorpyrifos and diazinon in samples collected at Core and Assessment sites, the Coalition began monitoring for chlorpyrifos and diazinon at four compliance locations (approved March 15, 2013) on April 2, 2013: Light House Restaurant @ West Brannon Island Rd, Old River @ West End of Clifton Court Rd, San Joaquin River @ West Neugerbauer Rd, and Walthall Slough @ Woodward Ave. The results of 2013 monitoring and outreach as they relate to the seven monitoring objectives will be discussed in the 2014 MPUR.

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 studies 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 during all scheduled monitoring events. The Coalition will continue to participate in meetings and review technical documents as they are made available.

E. coli

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

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*. A methyl mercury meeting was held as part of the stakeholder process on April 8, 2013. 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 assist growers in the Delta in meeting the assigned regional load allocations. 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.

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(s) for salt, nutrients, and boron. The Coalition 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. The Coalition includes discussions of these constituents in conversations with growers about water quality impairments and applicable management practices.

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 2013. The Coalition utilizes monitoring data as well as data from focused outreach results (submitted annually in the MPUR 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 CVRWQCB 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 53 lists the constituents monitored by the Coalition and the beneficial uses impaired by exceedances of the WQTLs of the constituents during the 2013 reporting period. Figure 14 includes percentages of impaired beneficial uses based on 2013 Coalition wide monitoring results. Table 54 includes a summary of the years when overall water quality was protective of beneficial uses from 2008 through 2013.

Results of the monitoring program from January through December 2013 indicate improvement in water quality in the Coalition region. The number of exceedances of pesticides stayed the same between 2012 (3) and 2013 (3). However, a reduction in exceedances occurred compared to 2012 with zero exceedances of copper during the 2013 reporting period. The most common exceedances in 2013 involved physical parameters (DO and SC) which resulted in impaired Agricultural and Aquatic Life beneficial uses (Table 53, Figure 14). The only constituent monitored that causes impairment to the Water Contact Recreational beneficial use is *E. coli* (Table 54). Even though some improvements are evident from 2013 monitoring results, water quality is still not completely protective of all beneficial uses across the Coalition region.

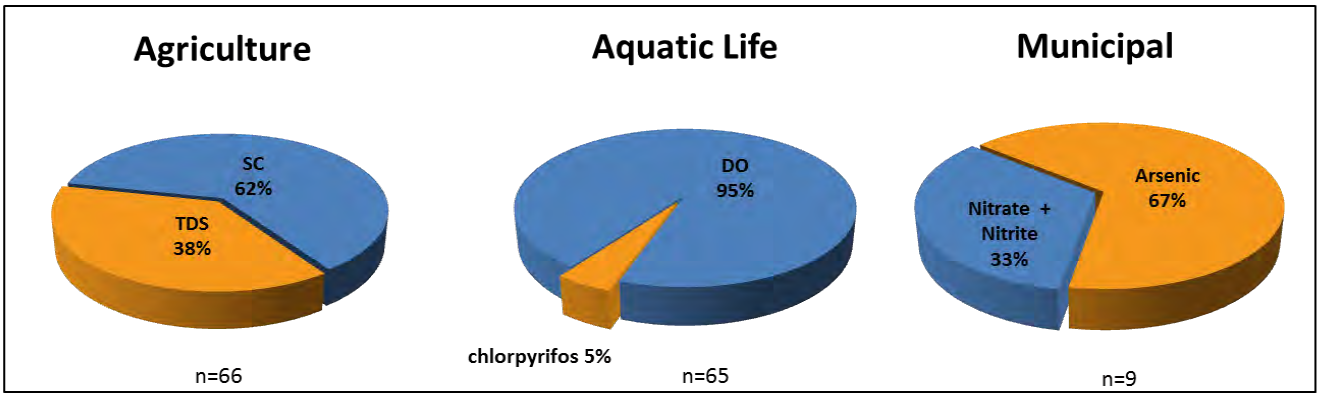
Table 53. Number of times constituents impaired beneficial uses in 2013.

Beneficial Use	DO	SC	TDS	*E. coli*	Nitrates	Total Metals (Arsenic)	Pesticides (Chlorpyrifos)	Total
AQ Life	62						3	**65**
AG		41	25					**66**
MUN					3	6		**9**
REC 1				4				**4**

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

Figure 14. Percentages of impairments of beneficial uses due to exceedances of constituent specific WQTLs in 2013.

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



n-Total number of exceedances per each beneficial use.

Monitoring results from 2013 indicate that elevated levels of SC and TDS were the only parameters resulting in impairments to Agricultural beneficial use (Table 53, Figure 14). High salinity levels resulting in exceedances of WQTLs for SC and TDS are common in Delta islands (Zones 3 and 4) due to 1) tidal influence, and 2) hydrostatic pressure moving Delta water to the interior of the islands and/or the use of Delta water for irrigation. Parameters such as SC and TDS can increase or decrease as water moves downstream, concentrations of these parameters vary seasonally with the source water in the waterbodies. 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.

In 2013, exceedances of the WQTLs for DO and chlorpyrifos resulted in impairments to Aquatic Life beneficial uses (Table 53, Figure 14). Ninety-five percent of the exceedances causing impairments to Aquatic Life beneficial uses were due to DO exceedances (Figure 14). During 2013, exceedances of the WQTL for DO occurred at least once at every site with the exception of Kellogg Creek along Hoffman Ln and Mokelumne River @ Bruella Rd (Table 54). Non-conserved parameters such as DO can increase or decrease in concentration as water moves downstream. 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, fluctuations in temperature, loss of vegetation around streams, geography (region, morphology of stream channels and land surface, 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 waterways, 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 affects flow and potentially reduces the DO concentrations in the water.

Three exceedances of WQTL for chlorpyrifos (0.015 µg/L) occurred during MPM in July at French Camp Slough @ Airport Way, Lone Tree Creek @ Jack Tone Rd, and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Table 44). Other than DO, chlorpyrifos was the only constituent monitored that resulted in

impairments to Aquatic Life Beneficial use (5%; Figure 14). All of the exceedances of the WQTL for chlorpyrifos occurred at sites located in Zone 2 during MPM in July. July is an irrigation month and flow can increase, resulting in irrigation tailwater runoff transporting concentrations of chlorpyrifos to waterways. Both Lone Tree Creek @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd are first priority sites; focused and general outreach have been ongoing in these site subwatersheds since 2008. In 2012, additional focused outreach was provided to targeted growers due to reported use and continued exceedances in the subwatersheds. Although targeted growers implemented management practices to reduce irrigation runoff and/or no longer apply chlorpyrifos, it is possible for chlorpyrifos to enter the site subwatersheds by non-members who have not implemented adequate management practices. As mentioned in the Discussion of Results section, applications associated with these exceedances were in large part made to grower parcels not previously targeted for focused outreach and education contact.

Exceedances of the WQTLs for arsenic (67%) and nitrate/nitrite (33%) caused impairment to Municipal and Domestic Supply beneficial use in 2013 (Figure 14). Exceedances of the WQTL for arsenic occurred in samples collected from Drain to Bishop Cut @ North Rio Blanco Rd, Empire Tract @ 8 Mile Rd, and Terminous Tract @ Hwy 12. All of the samples that contained elevated levels of arsenic came from sites located in Zone 3. The region naturally contains higher levels of arsenic in the soil (Burow et al., 2004; Moran et al., 2009; Westcot et al., 1990). Therefore, any processes moving sediment into the water or simply the movement of water through the surface soils could have contributed in the exceedances that occurred in Zone 3. During the February, November and December monitoring events, samples collected from Walthall Slough @ Woodward Ave contained elevated levels of nitrates. Walthall Slough @ Woodward Ave is located downstream of several dairy operations and elevated concentrations of nitrates are potentially linked to dairy discharges.

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 (tributary rule). However, the tributary rule does not apply to constructed agricultural drains such as those found in the Delta islands. Table 54 includes a summary of when Coalition water quality monitoring at specific sites was protective of beneficial uses from 2008 through 2013.

A trend of improving water quality in the Coalition region is evident from 2008 through 2013, where monitoring data indicate a significant decrease in frequency of exceedances of WQTLs of high priority constituents. For applied pesticides, exceedances have decreased from 2.2% (40 exceedances) in 2008 to 0.6% (three exceedances) in 2013 (Table 57). 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 Bear Creek @ North Alpine Rd, Duck Creek @ Hwy 4,

Lone Tree Creek @ Jack Tone Rd, Littlejohns Creek @ Jack Tone Rd, French Camp Slough @ Airport Way, both Grant Line Canal locations, Kellogg Creek along Hoffman Ln, Mokelumne River @ Bruella Rd, and Mormon Slough @ Jack Tone Rd (Table 54). Duck Creek @ Hwy 4 is one of the first high priority site subwatersheds where the Coalition has completed its focused outreach strategy. Even when detected, constituents measured at these sites have been protective of Agriculture and Municipal beneficial uses over the last four years (since additional outreach began). Similarly, water quality in the second set of high priority subwatersheds also is improved. Monitoring results at both Grant Line Canal locations indicate Municipal beneficial uses have been protected since outreach began. Even before focused outreach began at the third high priority site, Mokelumne River @ Bruella Rd, water quality has been consistently protective of Agriculture, Aquatic Life and Municipal beneficial uses (Table 54). Mormon Slough @ Jack Tone Rd and Kellogg Creek along Hoffman Ln are fourth high priority site subwatersheds where the Coalition has documented new management practices. Monitoring data from this set of high priority site subwatersheds indicate improvements in water quality at Mormon Slough @ Jack Tone Rd (Municipal) and Kellogg Creek along Hoffman Ln (Agriculture) since new management practices have been implemented (Table 54).

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 impairments in waterways monitored by the Coalition. Water quality protective of beneficial uses within Coalition 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 common, resulting in exceedances of the WQTLs for SC and TDS and, subsequently, causing impairments to Agriculture beneficial use (Table 54). These geological and geographical factors are outside the scope of what the Coalition is capable of improving through modified agricultural practices.

Table 54. Evaluation of beneficial uses for 2008-2013 monitoring locations (alphabetical by Zone).

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

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

Zone	Monitoring Site (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?	Status 2013 Meets BUs?
3	Drain @ Woodbridge Rd (2014-2016)	Sacramento San Joaquin Delta	MUN	No	No	No	X	X	Yes
			AG	No	No	No	X	X	Yes
			REC 1	No	Yes	No	X	X	X
			AQ Life	No	No	No	X	X	No
3	Drain to Bishop Cut @ North Rio Blanco Rd (2015-2017)	Sacramento San Joaquin Delta	MUN	X	X	X	X	X	No
			AG	X	X	X	X	X	No
			REC 1	X	X	X	X	X	Yes
			AQ Life	X	X	X	X	X	No
3	Empire Tract @ 8 Mile Rd (2015-2017)	Sacramento San Joaquin Delta	MUN	X	X	X	X	X	No
			AG	X	X	X	X	X	No
			REC 1	X	X	X	X	X	No
			AQ Life	X	X	X	X	X	No
3	Terminous Tract Drain @ Hwy 12 (2011-2013)	Sacramento San Joaquin Delta	MUN	No	Yes	No	Yes	No	No
			AG	No	No	No	No	No	No
			REC 1	No	No	No	No	No	No
			AQ Life	No	No	No	No	No	No
4	Grant Line Canal @ Clifton Court Rd (2010-2012)	San Joaquin Delta	MUN	No	X	Yes	Yes	Yes	Yes
			AG	No	X	No	No	No	No
			REC 1	No	X	X	X	X	X
			AQ Life	No	X	No	No	No	No
4	Grant Line Canal near Calpack Rd (2010-2012)	San Joaquin Delta	MUN	No	X	Yes	Yes	Yes	Yes
			AG	No	X	No	No	No	No
			REC 1	No	X	X	X	X	X
			AQ Life	No	X	No	No	No	No
4	Kellogg Creek along Hoffman Ln (2012-2014)	Sacramento San Joaquin Delta	MUN	No	X	X	Yes	Yes	Yes
			AG	Yes	X	X	No	Yes	Yes
			REC 1	Yes	X	X	X	X	X
			AQ Life	No	X	X	No*	No	Yes
4	Roberts Island @ Whiskey Slough Pump (2013-2015)	Sacramento San Joaquin Delta	MUN	X	X	X	X	No	Yes
			AG	X	X	X	X	No	No
			REC 1	X	X	X	X	No	Yes
			AQ Life	X	X	X	X	No	No
5	Walthall Slough @ Woodward Ave (2013-2015)	Sacramento San Joaquin Delta	MUN	X	No	No	No	No	No
			AG	X	No	No	No	No	No

Zone	Monitoring Site (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?	Status 2013 Meets BUs?
			REC 1	X	No	No	No	Yes	Yes
			AQ Life	X	No	No	No	No	No
6	Sand Creek @ Hwy 4 Bypass (2012-2014)	Sacramento San Joaquin Delta	MUN	No	X	X	No	No	Yes
			AG	No	X	X	No	No	No
			REC 1	No	X	X	X	X	X
			AQ Life	No	X	X	No	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 2013. Exceedances occurred in every zone during 2013 (Table 55). To address magnitude, Table 55 includes the number and percentage of exceedances compared to the number of samples collected by zone across the Coalition region.

In 2013, three exceedances within the organophosphate pesticide group occurred, all of which were from samples collected at MPM sites in Zone 2 (Table 55). Six exceedances within the metals group occurred, making up 1% of the samples collected. Sediment toxicity to *H. azteca* occurred in 27% (six out of 22) of samples collected during monitoring. Exceedances of WQTLs for physical parameters (134 of 477 samples, 28%) were more common than exceedances of pesticides (3 of 956 samples, <1%) or metals (6 of 484 samples, 1%; Table 55). Some exceedances in physical parameters were more common during summer months, where 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, exceedances of the WQTLs for SC and TDS are frequent as would be expected where irrigation water is brought in directly from the Delta. Exceedances of the WQTL for nitrates occurred three times in Zone 5; all from samples collected at Walthall Slough @ Woodward Ave. The six metal exceedances occurred in samples collected from sites in Zone 3 and all were arsenic which is common due to the geology of the region as described in the Discussion of Results section of this report. There were no exceedances of applied metals during 2013 monitoring compared to the single dissolved copper exceedance that occurred in 2012.

A total of three exceedances of the WQTL for chlorpyrifos (organophosphate pesticide group) occurred during 2013 MPM in July from French Camp Slough @ Airport Way, Lone Tree Creek @ Jack Tone Rd, and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd (Table 55). Chlorpyrifos was the only registered pesticide detected at levels above the WQTL in 2013. This is an increase in organophosphate exceedances from last year; however, the percentage of exceedances for the organophosphate pesticide group remain the same at <1% between the 2012 and 2013 monitoring years. 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 leave fields bound to sediment. Lone Tree Creek @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek are first priority subwatersheds and additional focused outreach occurred during 2012 in the subwatersheds to growers that reported chlorpyrifos use (2013 MPUR, Pages 140 and 143). The Coalition has considered the possibility that the elevated levels of chlorpyrifos detected in the waterways could be coming from a non-member. The 2013 exceedances of the WQTL for chlorpyrifos 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. The Coalition is continuing to focus its management plan efforts in Zone 2 toward reducing discharge of chlorpyrifos to the waterways.

From 2010 through 2012, water column toxicity occurred one time each for *C. dubia* and *S. capricornutum* in samples collected from the Coalition area (2013 AMR, Pages 150-151). In 2013, there was in improvement in the number of water column toxicity occurrences; only one instance of toxicity to *S. capricornutum* occurred out of the 131 toxicity samples collected (<1%; Table 55). The toxic sample resulted in less than 50% growth compared to the control and therefore a TIE was conducted; results are provided in the Discussion of Results section of this report.

For the past two years the occurrence of sediment toxicity to *H. azteca* has remained consistent. In both 2012 and 2013, sediment samples tested toxic to *H. azteca* during March and September sediment monitoring. In both of these years, Coalition monitoring resulted in six out of 21 (29%) toxic sediment samples. There appears to be little improvement in the quality of sediments in the Coalition region. Many growers have started using pyrethroids over organophosphate pesticides since the Coalition has publicized the exceedances of chlorpyrifos in the Coalition region. 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. As of September 2010, the Coalition began to conducted sediment analyses for chlorpyrifos and pyrethroids on toxic sediment samples that generated survival of 80% or less compared to the control in an effort to better characterize sources of sediment toxicity. Consequently, characterizing sources of sediment toxicity has improved since implementing additional testing for sediment chemistry. The Coalition is continuing efforts to educate growers on the importance of managing both water and sediment runoff and the potential to affect downstream beneficial uses.

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

Table 55. Exceedances of WQTLs vs samples collected in 2013 (by constituent group and zone).

Analyte Group	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Zone 6[1]		Total Exceed.	Total Samples Collected	Pct. Exceed.
	Exceed. Count	Samples Collected	Exceed. Count	Samples Collected	Exceed. Count	Samples Collected	Exceed. Count	Samples Collected	Exceed. Count	Samples Collected	Exceed. Count	Samples Collected			
Carbamates	0	0	0	0	0	126	0	0	0	72	0	0	0	198	0%
E. coli	1	12	1	12	2	21	0	12	0	12	0	0	4	69	6%
Herbicides	0	0	0	4	0	168	0	2	0	96	0	0	0	270	0%
Metals	0	0	0	20	6	294	0	2	0	168	0	0	6	484	1%
Nutrients	0	24	0	24	0	42	0	24	3	24	0	0	3	138	2%
Organochlorines	0	0	0	0	0	126	0	0	0	84	0	3	0	213	0%
Organophosphates	0	6	3	37	0	253	0	29	0	144	0	4	3	473	<1%
Physical parameters	4	60	18	147	33	93	50	105	16	51	13	21	134	477	28%
Sediment toxicity	0	0	2	6	1	4	2	8	0	2	1	2	6	22	27%
Water column toxicity	0	1	0	9	0	63	1	20	0	36	0	2	1	131	<1%
Count per Zone	**5**	**103**	**24**	**259**	**42**	**1190**	**53**	**202**	**19**	**689**	**14**	**32**	**Grand Total**		
Pct. Exceed. per Zone	**5%**		**9%**		**4%**		**26%**		**3%**		**44%**		**157**	**2475**	**6%**

[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 exceedances of WQTLs are related to agricultural activities that could 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 from numerous sources in addition to irrigated agriculture. Source identification is difficult, especially for non-conserved constituents and constituents with numerous potential sources. There are many non-conserved constituents that cannot be traced upstream, e.g. DO and pH. Even in pristine watersheds, exceedances of the WQTLs of these constituents may occur during normal, diurnal stream processes. Monitoring results from locations within the Delta (Zones 3 and 4) indicate numerous exceedances of the WQTLs for SC and TDS. The presence of elevated levels of SC and TDS in samples comes from 1) tidal influence, and 2) hydrostatic pressure moving Delta water to the interior of Delta islands and/or the use of Delta water for irrigation. Many of the exceedances in the Delta occur as a result of the type of water management that must be employed on the islands. 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 SC values at many Delta locations (e.g. Grant Line Canal sites) reaching over 2000 µS/cm. Finally, groundwater is very shallow. In order for the water table to be lowered sufficiently to allow farming, water must be discharged back to the Delta. This water is not recirculated and must be discharged leading to the potential for exceedances of WQTLs for SC and pesticides. Consequently, monitoring in Delta locations may result in exceedances of WQTLs from normal farming practices. Those practices will have to be managed and modified to reduce the potential for discharges which may impair beneficial uses.

Agricultural applications of pesticides may result in pesticides entering surface waters due to drift or runoff in storm water or irrigation return flows. During 2013, there were three exceedances of the WQTL for chlorpyrifos. All the exceedances occurred in Zone 2 during July MPM at French Camp Slough @ Airport Way, Lone Tree Creek @ Jack Tone Rd, and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd. Lone Tree Cree @ Jack Tone Rd and Unnamed Drain to Lone Tree Creek @ Jack Tone Rd are first priority site subwatersheds, whereas French Camp Slough @ Airport Way is a third priority site subwatershed. No other exceedances of the WQTL for registered pesticides or registered metals occurred during 2013 monitoring.

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 growers in the first, second, third, and fourth 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 (all pressurized) 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 the acres associated with those specific management practices. The Coalition conducted meetings with targeted growers to document current management practices in the first, second, third, and fourth priority subwatersheds. Follow up contacts with targeted growers to document newly implemented management practices occurred in the first, second, third, and fourth priority subwatersheds. The 2013 MPUR included summaries for the first and second priority subwatershed additional contacts as well as a full analysis of the third high priority subwatersheds including summaries of current and newly implemented management practices. The 2014 MPUR will include the full analysis of the fourth high priority subwatersheds including summaries of current and newly implemented management practices. Fifth priority subwatershed grower meetings were scheduled on January 22, 2013 and all grower surveys were returned. Follow up contacts were initiated in the fifth priority subwatersheds on February 14, 2014. The sixth priority site subwatershed grower meeting occurred on February 5, 2014 and one grower attended. The Coalition will report information obtained from fourth priority follow ups as well as fifth and sixth 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 waters of the State in the SJCDWQC for the first, second, third, and fourth priority subwatersheds (Table 56). When evaluating management practices and the associated acreage, a parcel may be included under multiple management practices. Therefore, the acreages in Table 56 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 drainage acreage of the subwatershed.

Growers in the first, second, third, and fourth priority subwatersheds implemented additional management practices as a result of Coalition outreach and education. In some cases multiple practices were implemented across the same acreage (Table 56). Of the acreage within first, second, third, and fourth priority subwatersheds targeted for outreach, newly implemented management practices associated with the most targeted acres are 1) reducing or eliminating the use of pesticides such as

chlorpyrifos, that have caused exceedances of WQTL (73%), 2) reducing runoff volumes by using irrigation management (64%), 3) reducing irrigation tailwater by installing sprinkler/micro irrigation (36%), 4) using grass rows/waterways/filter strips (25%), 5) treating runoff water with PAM (6%), and 6) installing a retention pond, holding basin and/or return system (5%). All of these management practices are effective at reducing the impacts of irrigated agriculture on adjacent waterways (Table 56).

Table 56. First, second, third, and fourth 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)	Fourth Priority (2012-2014)			Sum of Management Practice Acreage	Percent of Targeted Acreage
	15,967 Targeted Acres	4,042 Targeted Acres	6,482 Targeted Acres	Kellogg Creek[4] (402 Targeted Acres)	Mormon Slough @ Jack Tone Rd (1,789 targeted Acres)	Sand Creek @ Hwy 4 Bypass (116 Targeted Acres)		
Installation of retention pond / holding basin / return systems	704	87	205	0	329	0	1,325	5%
Installation of sprinkler or micro irrigation when an option	4,999	1,643	3,509	239	0	116	10,506	36%
Reduce runoff water volumes using irrigation management	4,376	6,948	5,892	356	773	116	18,461	64%
Reduce use of pesticides causing exceedances	8,398	6,521	4,460	142	1,255	116	20,892	73%
Use of center grass rows, grass waterways, or grass filter strips	2,311	2,572	2,130	32	81	0	7,126	25%
Treat runoff water with PAM or other materials	0	1,748	0	0	0	0	1,748	6%

[1]Member parcel acres in Duck Creek @ Hwy 4 include 2,053 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]Member parcel acres in Littlejohns Creek @ Jack Tone Rd include 2,369 acres with newly reported management practices following additional outreach in 2012.
[3]Parcels owned by targeted members in Grant Line Canal @ Clifton Court Rd and Grant Line Canal near Calpack Rd subwatersheds extend beyond subwatershed boundaries.
[4]Kellogg Creek includes members who have potential for direct drainage from both Kellogg Creek along Hoffman Ln and Kellogg Creek @ Hwy 4 site subwatersheds.

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 results indicate water quality is improving in the region and the number of exceedances of applied pesticides and metals is decreasing. The percentage of exceedances of applied pesticides did not change in 2013 compared to 2012 (Table 57). In 2013, there were no exceedances of the WQTL for metals applied by agriculture (Table 57). 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 15 includes the percentages of exceedances from 2008 through 2013 by constituent category. Toxicity resampling events and exceedances from 2008 upstream MPM conducted as part of source evaluation were not included in the calculation. From 2008 through 2013, the majority (57%) of exceedances were from field parameters (DO, pH, and SC) in the Coalition region (Figure 15). The second highest category with exceedances is nutrients, physical parameters, and *E. coli* (bacteria), accounting for 22% of all exceedances from 2008 through 2013 (Figure 15). The percentages of exceedances of all pesticides (9%), toxicity (8%), and all metals (4%) are relatively low in comparison to field parameters and nutrients (Figure 15).

The percentage calculations of exceedances of constituents in Table 57 include only the exceedances of pesticides and metals currently applied by agriculture. Metals applied by agriculture are copper and zinc; however, Figure 15 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 from January 1, 2008 through December 31, 2013. The most notable decline in metals exceedances occurred from 2008 through 2009. Before October 2008, the concentration of dissolved metals was determined by performing a calculation based on total metals concentrations. In October 2008, the Coalition initiated focused grower outreach and education, management practice implementation, and began analyzing for both the total and hardness based dissolved fractions of metals to better characterize contamination in the water column. Dissolved metals more adequately reflect the bioavailable, and therefore the toxic fraction in the water column. Since the Coalition adopted this method for analyzing dissolved metals, exceedances of the hardness based WQTLs of metals have declined. This decline in exceedances of metals demonstrates that the analysis of dissolved metals improved the capabilities of the Coalition to effectively address water quality impairments associated with metals in the water column.

The source of the copper causing the exceedances of the WQTL is not known but the relatively restricted geographic areas of exceedances, and 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 the exceedances of the hardness based WQTL for copper are indeed the result of applications of pesticides containing copper. Similar discussions with growers have been successful in reducing exceedances of the WQTL for various pesticides. Since focused outreach began in 2008, exceedances of the hardness based WQTL for copper declined and remained relatively low through the years, despite a consistency in applications over time at some locations. There were no exceedances of the hardness

based WQTL for copper in 2013 (88 samples analyzed) which is a decline from 2012 when one exceedance occurred out of 84 samples analyzed (Table 57).

The most significant decline in exceedances of the WQTLs for applied pesticides occurred directly after initial outreach and education began between 2008 and 2009 (Figure 15; Table 57). Overall, it is evident that exceedances of the WQTLs for applied pesticides since 2009 are declining. In 2013, only 0.6% of the samples analyzed for applied pesticides contained concentrations exceeding the WQTLs (Table 57). This is a substantial improvement over previous years, where 2.0% (2011) and 1.4% (2010) of the samples collected resulted in exceedances of the WQTLs for applied pesticides (Table 57).

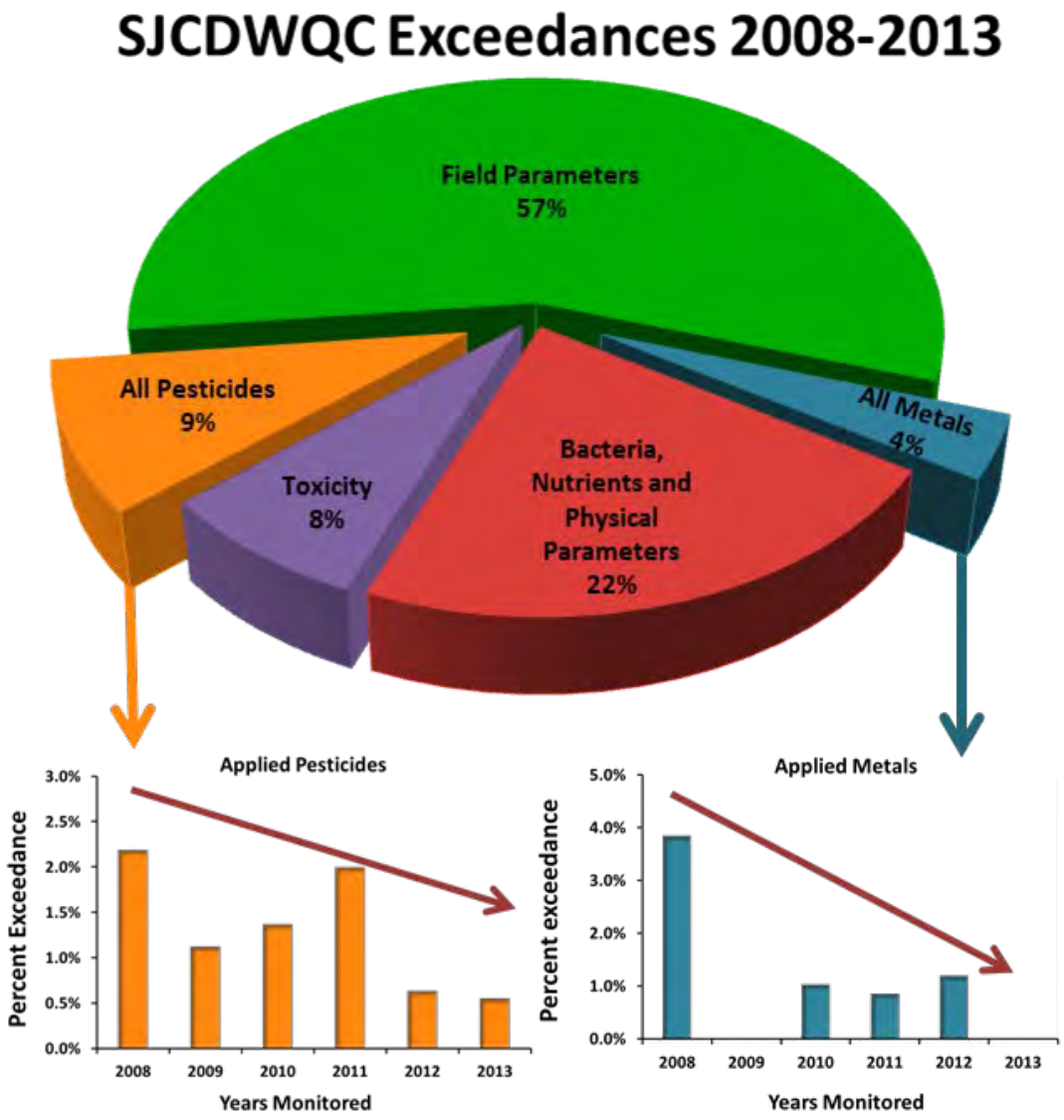
Coalition general outreach and education are ongoing. High priority focused outreach is now complete in the first, second, third, and fourth high priority subwatersheds. Additional grower outreach occurred in the first and second priority subwatersheds in 2010 and 2012 to educate growers on water quality impairments within the subwatersheds. Growers in priority subwatersheds implemented management practices and water quality has improved substantially in these subwatersheds. Not only have exceedances of high priority constituents been reduced since outreach was initiated, but exceedances of other constituents and water column toxicity have declined as well.

Table 57. Percentages of exceedances of WQTLs for applied metals and applied pesticides from 2008-2013.

	Applied Metals			Applied Pesticides		
Years	Total Exceedances	Total Samples	Percent Exceedances	Total Exceedances	Total Sampled	Percent 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%
2013	0	88	0.0%	3	545	0.6%

Figure 15. Percentages of exceedances of WQTLs from 2008-2013.

Pie chart includes percentages of all exceedances from 2008 through 2013 by constituent group. Samples collected during toxicity resampling and 2008 upstream MPM are excluded. The bar graph includes percentages of exceedances of constituents grouped as 'applied pesticides' or 'applied metals' which are ag applied constituents only.



Based on the information provided in the report below, the Coalition will pursue the following in 2014:

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 to further improve water quality.

The Coalition identified several areas 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 constituents that are difficult to source such as contamination of surface waters with *E. coli*, causes of elevated pH, and low DO.
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 identify potential practices that can be effective in preventing exceedances.

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