East San Joaquin
WATER QUALITY COALITION
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March 1, 2013

Pamela Creedon
Susan Fregien
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 East San Joaquin Water Quality Coalition (ESJWQC) is submitting the 2013 Annual Monitoring Report (AMR) and Quarterly Monitoring Data Report (fourth quarter 2012) for review by the Central Valley Regional Water Quality Control Board (CVRWQCB) as required by the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Resolution Order No. R5-2006-0053, Monitoring and Reporting Program Order No. R5-2008-0005 (MRP).

The attached document reports on the Coalition's monitoring program for the period of January 1, 2012 through December 31, 2012 and covers monitoring, reporting, outreach and education activities that occurred during this time. Accompanying this letter are the following:

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

In every aspect, the Coalition seeks the best quality in its monitoring program by using the most scientifically reliable field and laboratory protocols, ensuring complete quality control and quality assurance of the data received from laboratories, and reporting on these data accurately and punctually to both the CVRWQCB and to the members of the

Coalition. The Coalition and its technical staff process and review an immense quantity of data and provide a large number of reports in a timely manner to the CVRWQCB.

The Coalition's monitoring program met MRP requirements as described in the attached AMR. Sampling occurred during all twelve months (including two storm events and two sediment events) and all data generated are an accurate reflection of conditions in the Coalition region. Overall, there was compliance with completeness, accuracy, and precision requirements for data collected from January through December 2012. Each of the five MRP programmatic questions is addressed in the Conclusions and Recommendations section of the AMR.

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

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

Submitted respectfully,

Parry Klassen
Executive Director
East San Joaquin Water Quality Coalition

Cc:
Susan Fregien, CVRWQCB
Michael Johnson, MLJ-LLC
Melissa Turner, MLJ-LLC

Annual Monitoring Report

East San Joaquin
WATER QUALITY COALITION

January 2012 – December 2012

March 1, 2013

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LIST OF ACRONYMS

A	Assessment
AG	Agriculture
AI	Active Ingredient
AMR	Annual Monitoring Report
AWEP	Agricultural Water Enhancement Program
BMP	Best Management Practice
BU	Beneficial Use
C	Core
CalPIP	California Pesticide Information Portal
CDEC	California Data Exchange Center
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
DQO	Data Quality Objective
DWR	(California) Department of Water Resources
DWSC	Deep Water Ship Channel
EC_{50}	Effective Concentration of 50% of the measured endpoint
EPA	(United States) Environmental Protection Agency
ESJWQC	East San Joaquin Water Quality Coalition
FD	Field Duplicate
HCH	Hexachlorocyclohexane
ILRP	Irrigated Lands 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
NA	Not Applicable
ND	Not Detected
NM	Normal Monitoring
NRCS	Natural Resources Conservation Service
OP	Organophosphate Pesticides
PAM	Polyacrylamide
PCA	Pest 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
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
TID	Turlock Irrigation District
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
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 –East San Joaquin Water Quality Coalition
Coalition/ESJWQC region – The region within the Central Valley that is monitored by the East San Joaquin Water Quality Coalition
Drainage –Water that moves horizontally across the surface or vertically into the subsurface from land
General Order –Waste Discharge General Order R5-2012-0116
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 MRPP
Regional Board – Central Valley Regional Water Quality Control Board
Site subwatershed – Starting from the sampling site, all waterbodies that drain, directly or indirectly, into the waterbody before the point where sampling occurs.
Special study – A study conducted outside of Normal Monitoring activities that involves monitoring specific constituents in an effort to determine the mechanism responsible for the exceedances; also includes Total Maximum Daily Load (TMDL) monitoring.
Subwatershed – The topographic perimeter of the catchment area of a stream tributary (Environmental Protection Agency (EPA) terms of environment: http://www.epa.gov/OCEPAterms/sterms.html).
Waiver – Central Valley Regional Water Quality Control Board Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands, Order No. R5-2008-0005 amending Order No. R5-2006-0053.
Waterbody –Standing or flowing water of any size that may or may not move into a larger body of water, including lakes, reservoirs, ponds, rivers, streams, tributaries, creeks, sloughs, canals, laterals and drainage ditches.
Watershed – The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point (EPA terms of environment: http://www.epa.gov/OCEPAterms/wterms.html).

ANNUAL MONITORING REPORT (AMR) REQUIREMENTS – SECTION KEY

REQUIRED SECTION – MONITORING AND REPORTING PROGRAM (MRP)	SECTION NAME/LOCATION - AMR
1. Signed Transmittal Letter;	Cover Letter
2. Title page;	East San Joaquin Water Quality Coalition AMR
3. Table of contents;	Table of Contents, List of Tables, List of Figures, List Appendices
4. Executive Summary;	Executive Summary
5. Description of the Coalition Group geographical area;	Geographical Area
6. Monitoring objectives and design;	Monitoring Objectives and Design
7. Sampling site descriptions and rainfall records for the time period covered under the AMR;	Sampling Site Descriptions and Rainfall Records
8. Location map(s) of sampling sites, crops and land uses;	Sampling Site Descriptions and Rainfall Records, Appendix VIII (Land Use Maps and 2012 Annual Site Photos)
9. Tabulated results of all analyses arranged in tabular form so that the required information is readily discernible (example table is included in (MRP Order Attachment C);	Appendix II (Monitoring Results)
10. Discussion of data to clearly illustrate compliance with the Coalition Group Conditional Waiver, water quality standards, and trigger limits;	Monitoring Results and Sample Details, Discussion of Results, Conclusions and Recommendations
11. Electronic data submitted in a SWAMP comparable format;	SWAMP Comparability Access Database and Electronic Data Deliverables (attached CDs)
12. Sampling and analytical methods used;	Sampling and Analytical Methods
13. Copy of chain-of-custody forms;	Appendix I (Chain of Custody Forms)
14. Field data sheets, signed laboratory reports, laboratory raw data (as identified in Attachment C);	Appendix IX (Field Sheets), Quarterly Data Submittal (attached CD, attached printed hard copies), Appendix VI (Toxicity Identification Evaluation Report)
15. Associated laboratory and field Quality Control samples results;	Appendix III (Lab and Field QC Results)
16. Summary of Quality Assurance Evaluation results (as identified in Attachment C for Precision, Accuracy and Completeness) ;	Precision, Accuracy and Completeness
17. Specify the method used to obtain flow at each monitoring site during each monitoring event;	Sampling and Analytical Methods

Required Section – Monitoring and Reporting Program (MRP)	Section Name/Location - AMR
18. Electronic or hard copies of photos obtained from all monitoring sites, clearly labeled with site identification and date.	Appendix VIII (Land Use Maps and 2012 Annual Site Photos)
19. Summary of Exceedance Reports submitted during the reporting period and related pesticide use information;	Discussion of Results, Appendix IV (Pesticide Use Reports), Appendix V (Exceedance Reports) Pesticide Use Report (PUR) Access Database (attached CD)
20. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;	Actions Taken To Address Water Quality Exceedances, Appendix VII (Meetings, Agendas and Handouts)
21. Status update on preparation and implementation of all management plans and other special projects; and	Management Plan Status and Special Projects
22. Conclusions and recommendations.	Conclusions and Recommendations

QC- Quality Control
SWAMP- Surface Water Ambient Monitoring Program

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

Table 1. ESJWQC MRPP and QAPP amendments summary.

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

Item #	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
1	Request to exchange sites: Exchanged Mootz Drain @ Langworth Rd for Mootz Drain downstream of Langworth Pond.	September 4, 2009	Table 4, page 30 Figure 11, page 32 Table 5, page 37 Figure 12, page 40 Verbiage, pages 44-45 Table 7, page 47 Table 10, page 52 Table 11, page 55 Table 13, page 61 Attachment II	November 18, 2009
2	Request to submit quarterly monitoring results in electronic format[1]	May 6, 2010	Table 16, page 73 Verbiage, page 72	May 17, 2010
3	Request to stop monitoring at South Slough @ Quinley Rd.	June 5, 2009	Table 4, page 30 Figure 11, page 32 Table 5, page 37 Figure 12, page 40 Verbiage, pages 44-45 Table 7, page 47 Table 10, page 52 Table 11, page 55 Table 13, page 61 Attachment II	June 3, 2010
4	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 10, page 52 Table 12, page 58 Table 13, page 61 Table 14, page 66 Verbiage, page 59	February 23, 2011
5	Modification to Monitoring Strategy- Request to stop monitoring for certain Assessment constituents except during high Total Suspended Solids (TSS) events	Originally sent: May 14, 2009 Resent: November 11, 2010	Table 13, page 63 Table 13B	May 6, 2011

Item #	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
6	Modification to Monitoring Schedule-Request to remove Yori Grove Drain @ East Taylor Rd from the monitoring plan and replace site with Levee Drain @ Carpenter Rd.	December 28, 2011	Table 4, page 31 Table 5, page 37 Verbiage, page 46 Table 7, page 49 Table 10, page 52	February 7, 2012
7	Modification to Monitoring Schedule-Request to remove Duck Slough @ Hwy 99 from the monitoring plan due to highway construction.	April 12, 2012	Table A Table 4, pages 30-31 Table 5, page 37 Verbiage, page 42 Table 7, pages 46-48 Table 10, pages 53-54	April 26, 2012
8	Updated associated tables to reflect the suspension of Core and Management Plan Monitoring and the reduction of Assessment Monitoring constituents.	April 30, 2012	Table 8, page 50 Table 9, page 51 Table 10, pages 52-53 Table 12, pages 60-62	April 17, 2012
9	Modification to Monitoring Schedule and associated tables-Request to remove Peaslee Creek @ Lake Rd from the monitoring plan due to no access. Added 'C' to Core sites being monitored in 2013 (Table 10), updated footnote to read "Core Monitoring was suspended April 17, 2012 and resumes in 2013. Updated typo in the site name for Highline Canal @ Lombardy Rd (Table 10). Revised Table 9 for 2013 monitoring.	December 5, 2012	Table 4, pages 30-31 Table 5, page 37 Table 7, pages 46-48 Table 9, page 50 Table 10, pages 53-54	January 4, 2013
Modifications to Original ESJWQC 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 Verbiage, page 8 Figure 1, page 11 Verbiage, page 26 Table 5, page 22 Table 8, page 26 Table 15, page 44 Table 16, page 45 Verbiage, page 49 Table 17, page 51 Table 18, page 53 Table 19, page 55 Verbiage, page 56 Figure 4, page 59 Appendices: XI-XXXII and, XXXV-XXXVII	February 23, 2011

Item #	Amendments Descriptions	Date Submitted	MRP Plan 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 40 Table 15, page 44 Table 16, page 45	February 18, 2011
3	Request to update QAPP sampling collection methods and quality control.	November 26, 2012	Verbiage, page 62 Table 14, pages 66-69	January 15, 2013

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

EXECUTIVE SUMMARY

The East San Joaquin Water Quality Coalition (ESJWQC) area includes the portions of Stanislaus and Merced Counties east of the San Joaquin River, Madera, Tuolumne, and Mariposa Counties and the portion of Calaveras County that drains into the Stanislaus River. In addition to the San Joaquin River, which forms the south and west boundary of the Coalition region, there are five major rivers in the watershed: the Fresno River, the Chowchilla River, the Merced River, the Tuolumne River and the Stanislaus River. The Fresno River and the Chowchilla River typically flow only for a short time each year. In addition, the Eastside Bypass is considered a major waterbody but also only contains water during a short period of time, if at all, each year. These eastern tributaries of the San Joaquin River drain the Sierra Nevada range from east to west.

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) Dry Creek @ Wellsford Zone, 2) Prairie Flower Drain @ Crows Landing Zone, 3) Highline Canal @ Hwy 99 Zone, 4) Merced River @ Santa Fe Zone, 5) Duck Slough @ Gurr Rd Zone, and 6) Cottonwood Creek @ Rd 20 Zone. Descriptions of zone-specific climate, soil characteristics, land use, as well as water drainage and flow are included in the Coalition's Monitoring and Reporting Plan (submitted August 25, 2008 and approved September 15, 2008).

In the ESJWQC monitoring program, each zone includes a Core site and rotating Assessment Monitoring locations. 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 the full suite of constituents. Assessment sites are rotated every third year to a new site. Core sites receive Assessment Monitoring every third year according to the schedule outlined in the Monitoring and Reporting Program Plan (MRPP) Table 10, pages 52-53.

Monitoring Program Objectives

The Coalition's water quality monitoring program is outlined in the ESJWQC MRPP (approved September 15, 2008, amended and approved February 23, 2011). Changes to the monitoring program in 2012 include the removal of two monitoring sites (Yori Grove @ East Taylor Rd and Duck Slough @ Hwy 99), temporary suspension of Management Plan Monitoring (MPM) and Core Monitoring, reduced constituent monitoring at Assessment sites, and removal of active management plans for specific constituents.

The Coalition was approved on February 7, 2012 to modify the ESJWQC MRPP and replace Yori Grove @ East Taylor Rd (sampled as Lateral 3 along East Taylor Rd in 2011) with Levee Drain @ Carpenter Rd as the Assessment Monitoring location in Zone 2 for 2012. Monitoring occurred at Levee Drain @ Carpenter from January through December 2012.

On April 26, 2012 the Coalition was approved to modify the ESJWQC MRPP to remove Duck Slough @ Hwy 99 from its monitoring plan due to highway construction at the sample site. Duck Slough will be represented by monitoring at the downstream Core Monitoring location Duck Slough @ Gurr Rd.

On April 17, 2012 the Coalition was approved to temporarily suspend monitoring at Core and MPM sites (with the exception of Bear Creek @ Kibby Rd where MPM continued as part of a cost-share for a project funded by Proposition 84 funding) as well as reduce monitoring (for Group A, paraquat, glyphosate, total Kjeldahl nitrogen, total phosphorus (as P), *E. coli* and all metals except copper and zinc) at Assessment Monitoring sites for the remainder of 2012. Coalition monitoring occurred as scheduled from January through March; schedules were modified in April according to the approved reduced monitoring outline.

The Coalition was approved on May 30, 2012 to remove specific site/constituent pairs from active management plans. Based on 2012 monitoring, the Coalition submitted a second letter petitioning to remove specific site/constituent pairs from active management plans to the Regional Board on November 7, 2012; this letter is still pending approval. Table 49 lists all of the specific site/constituent pairs approved for removal from active management plans including when the site was last monitored for Assessment Monitoring constituents and when the site will rotate into Assessment Monitoring again. Two consecutive years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality due to improved grower cognizance of the offsite movement of agricultural constituents and/or newly implemented management practices. The Coalition will monitor the locations listed in Table 48 when the sites rotate into Assessment Monitoring.

The primary objectives of the monitoring program are to characterize discharge from irrigated agriculture and to determine if the implementation of management practices is effective in reducing or eliminating discharge and impairments of beneficial uses. The ESJWQC monitored 18 sites in 2012. Of the 18, MPM took place at 14 sites between January and March 2012 as outlined in the ESJWQC Management Plan Update Report (MPUR). From January through March 2012, six of the 14 sites were monitored for MPM only (Bear Creek @ Kibby Rd, Deadman Creek @ Gurr Rd, Duck Slough @ Hwy 99, Dry Creek @ Rd 18, Hilmar Drain @ Central Ave and Livingston Drain @ Robin Ave), five were monitored for Core and MPM (Dry Creek @ Wellsford Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd) and three were monitored for Assessment Monitoring where management plan constituents were analyzed on a monthly basis (Berenda Slough along Ave 18 ½, Deadman Creek @ Hwy 59 and McCoy Lateral @ Hwy 140). Due to the April 17, 2012 approval to reduce Assessment Monitoring and suspend MPM and Core Monitoring, all monitoring for management plan constituents ceased at sites scheduled for MPM from April through December 2012 (except Bear Creek @ Kibby Rd and Assessment Monitoring sites).

Monitoring constituents are established by the Irrigated Lands Regulatory Program (ILRP) Monitoring and Reporting Program (MRP) Order No. R5-2008-0005 (Appendix A). From January through March, the Coalition sampled for numerous water quality parameters and constituents including 45 organic pesticides, *E. coli*, physical parameters (total dissolved solids (TDS), total suspended solids (TSS) and turbidity), nine metals, total organic carbon, five nutrients, field parameters (Dissolved Oxygen (DO), pH, and Specific Conductivity (SC), water column toxicity to three test species (*C. dubia*, *P. promelas* and *S. capricornutum*). The Coalition also sampled for sediment physical parameters (grain size and total organic carbon (TOC), sediment toxicity to *H. azteca,* and nine sediment pesticides as needed (Tables 4 and 6). Monitoring constituents are established by ILRP Monitoring and Reporting Program (MRP) Order No.R5-2008-0005 (Table 12, page 59).

On April 12, 2012 the Coalition collected samples during one high TSS event as outlined in the May 6, 2011 approval to modify the ESJWQC MRPP and its monitoring strategy to reduce water column sampling for organochlorines (including Group A pesticides), sediment bound pesticides (glyphosate, paraquat), and metals not applied by agriculture (arsenic, cadmium, lead, and molybdenum). The Coalition began monitoring according to this outline in July 2011. On April 17, 2012 the Coalition was approved to reduce monitoring at Assessment sites and therefore no other high TSS event was captured during 2012.

Monitoring Program Compliance

For 2012, the Coalition was able to meet its monitoring program objectives by 1) determining the concentration and load of specific contaminants in discharges to surface waters, 2) evaluating compliance with existing narrative and numeric water quality limit triggers to determine if implementation of additional management practices is necessary to improve and/or protect water quality, and 3) assessing the impact of storm water discharges from irrigated agriculture to surface water. The Coalition uses management practice survey results to determine which practices to implement in order to reduce discharge of specific wastes that impact water quality in receiving waters of the Coalition region. Although monitoring during 2012 was reduced for certain Assessment Monitoring constituents, MPM and Core Monitoring results from January through March, April high TSS, and January through December Assessment Monitoring indicate improved water quality.

Coalition monitoring in 2012 resulted in exceedances of Water Quality Trigger Limits (WQTLs) for DO, pH, SC, *E. coli*, TDS, ammonia, nitrate, arsenic and copper. Water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca* occurred.

The physical parameter exceedances were for DO (11), pH (16), SC (16), TDS (15) and *E. coli* (10). Exceedances of the WQTL also occurred for nitrate (14) and ammonia (3). Of the metals analyzed, exceedances of the hardness based WQTL for dissolved copper (9) and arsenic (1) occurred. Zero exceedances of pesticides occurred during 2012 monitoring. Overall, exceedances of physical parameters and *E. coli* were more common than exceedances of pesticides or metals.

Water column toxicity to *S. capricornutum* occurred in a single Normal Monitoring sample out of the 375 samples analyzed for toxicity during 2012. The water column toxicity had endpoints less than 50% compared to the control. A Toxicity Identification Evaluation (TIE) was initiated to determine the cause of toxicity. No toxicity was detected during the TIE process and therefore the cause of the initial toxicity could not be identified.

Sediment toxicity to *H. azteca* occurred in a single sediment sample of 24 collected during storm and irrigation sediment monitoring. The toxic sediment sample was collected during March 2012 Normal Monitoring. Since survival was less than 80% compared to the control, the sample was considered ecologically significant. Additional chemistry analysis was conducted for chlorpyrifos and pyrethroids on the sample (survival was 45% compared to the control); both chlorpyrifos and pyrethroids were detected.

The series of actions taken to determine the potential sources of exceedances include: 1) the use of Pesticide Use Reports (PURs) to identify relevant applications that occurred upstream of the sample site and within a specified time period prior to the sampling event, and 2) an analysis of monitoring data and toxicity results to better understand the potential sources and toxicity of detected constituents.

The Coalition prioritizes subwatersheds in order to conduct focused outreach with individual members. The purpose of grower outreach is to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices. The first and second priority subwatersheds Performance Goals 1-5 are complete. Focused outreach began during late 2010 and early 2011 in the third priority site subwatersheds: Berenda Slough along Ave 18 1/2, Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd and Livingston Drain @ Robin Ave. 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. In 2012, follow up contacts occurred with growers from the third priority subwatersheds to document implementation of new practices. Interim results from follow up with growers from the third priority subwatersheds were included in the April 1, 2012 MPUR. A complete analysis of the third priority results will be submitted in the MPUR on April 1, 2013.

Focused outreach began during the irrigation season of 2012 in the fourth priority site subwatersheds: Black Rascal Creek @ Yosemite Rd, Deadman Creek @ Hwy 59, Deadman Creek @ Gurr Rd and Hilmar Drain @ Central Ave. Growers were contacted and asked to complete surveys documenting current practices and were required to indicate which recommended practices they anticipated implementing. Results from contacts will be reported in the MPUR to be submitted on April 1, 2013.

The ESJWQC collaborates with outside entities to achieve its goal of reducing the impact of agricultural discharge on water quality. Funding was made available to the Coalition in an award of ten million dollars to be dispersed annually over five years ($2 million per year) from the United States Department of Agriculture (USDA) Agricultural Water Enhancement Program (AWEP) to be used in Stanislaus and Merced counties (2010 Annual Monitoring Report, page 150 and Table 42, page 154). The funding is available for the installation of structural management practices on farms and dairies with operations bordering waterways within subwatersheds covered by management plans. The Coalition sent out emails and mailings to growers in high priority subwatersheds on available funding during 2012 to inform growers of available Coalition for Urban and Rural Environmental Stewardship (CURES) and AWEP funding with application instructions and deadline dates. The NRCS districts managing the allocations of funds are in the process of working with fifth year applicants on their projects and anticipate funded projects will be selected at the start of the 2013 irrigation season. In addition, eight million dollars in Prop 84 funding were made available for management practice installations for growers in the Duck Slough, Bear Creek, and Prairie Flower Drain subwatersheds and details were mailed to growers in 2011.

Conclusions

The results of the monitoring program for 2012 indicate that although there are substantial improvements in water quality in many areas, water quality is still not protective of beneficial uses across the entire Coalition region. The most common exceedances of WQTLs were physical parameters such as DO, TDS, and SC which resulted in impaired Agricultural and Aquatic Life beneficial uses. Other parameters such as *E. coli* also resulted in exceedances which have contributed to impaired Recreational and Aquatic Life beneficial uses Causes of impairment to Municipal beneficial use (drinking water) were elevated concentrations of nitrate/nitrite and ammonia.

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 result of current agricultural activities. Source identification is difficult especially for non-conserved constituents. There are numerous non-conserved constituents that cannot be traced upstream, e.g. DO. Many, although not all pesticide detections are the result of agricultural applications that enter surface waters from spray drift or runoff from storm or irrigation water return flows. In the event of exceedances of pesticides or toxicity, the Coalition identifies sources of WQTL exceedances through the analysis of preliminary PUR data, assessment of water quality data and evaluation of current management practices of targeted growers. The Coalition's sourcing strategy is further described in the Coalition's Management Plan.

The Coalition's outreach program is focused on general meetings for growers across the Coalition region. Information on management practices is provided by the Coalition in several forums that range from meetings with one or two growers to large annual meetings sponsored by the Coalition.

Conclusions from the 2012 data indicate 1) individual grower visits continue to be an effective method of communicating with members, 2) implementation of management practices is improving water quality in the Coalition region, 3) continued improvement in water quality is expected based on past grower outreach efforts and upcoming focused outreach in new priority subwatersheds, and 4) further conclusions in water quality improvements are anticipated from 2013 monitoring results (Assessment, Core, High TSS and MPM). Furthermore, based on monitoring data from the past several years, the Coalition was able to send another letter on November 7, 2012 to the Regional Board petitioning to remove specific site/constituent pairs from active management plans based on two years of monitoring with no exceedances.

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

1. Continue to monitor under the current approved MRPP until a new Monitoring Plan is approved based on the new ESJWQC WDR Order requirements.

2. Continue to monitor according to the ESJWQC Management Plan to evaluate water quality improvements and impairments.
3. Continue to document and assess management practices implemented by Coalition growers.
4. Continue to focus outreach and education efforts around high priority constituents while also educating growers about lower prioritized constituents such as dissolved oxygen and salinity.

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

1. Identify and regulate dairies within priority subwatersheds that are using chlorpyrifos and/or copper which may 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.
3. Continue enforcement actions against non-members who have the potential to discharge.
4. Move forward with the processes to develop plans to study difficult issues such as contamination of surface waters by *E. coli*, causes of elevated pH, and low dissolved oxygen.
5. Continue to work with the CV-SALTS process to develop a better understanding of the sources and sinks of salt in surface and groundwater and potential practices that can be effective in preventing exceedances.

ESJWQC GEOGRAPHICAL AREA

The East San Joaquin Water Quality Coalition (ESJWQC) area includes the portions of Stanislaus and Merced Counties east of the San Joaquin River, Madera, Tuolumne, and Mariposa Counties and the portion of Calaveras County that drains into the Stanislaus River. The region that drains into the Coalition area is bordered by the crest of the Sierra Nevada on the east, the San Joaquin River on the west, the Stanislaus River on the north, and the San Joaquin River on the south. Landholdings in the vicinity of the Lone Willow Slough drainage area (west of the Eastside Bypass) are included in the Westside Water Quality Coalition.

IRRIGATED LAND

Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains approximately 5,079,639 acres of which 940,884 acres (18.5%) are considered irrigated (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 (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 was 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 Stanislaus, Merced, and Calaveras Counties, the Coalition utilized DWR Land Use Survey data to determine irrigated land area as only portions of these counties are included in the Coalition boundary. For Tuolumne, Madera, and Mariposa Counties, data from Agricultural Land and Water Use was used since these counties are included in their entirety within the Coalition boundary (Table 2).

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

County	Irrigated Land Area (acres)	Data Source Year (Agricultural Land and Water Use)[1]	Data Source Year (Land Use Survey)[2]
Calaveras	868		2000
Madera*	327,693		2001*
Mariposa	1,300	2001	
Merced	335,125		2002
Stanislaus	274,482		2004
Tuolumne	1,416	2001	
Total	**940,884**		

[1]DWR Agricultural Land Use: http://www.water.ca.gov/landwateruse/anaglwu.cfm
[2]DWR Land Use Survey: http://www.water.ca.gov/landwateruse/lusrvymain.cfm
*Land use for Madera County is only described for 501,056 acres, 37% of the county.

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 determined using Land Use Survey Data (Table 3). The zones are named for the Core Monitoring location within that area: 1) Dry Creek @ Wellsford Zone, 2) Prairie Flower Drain @ Crows Landing Zone, 3) Highline Canal @ Hwy 99 Zone, 4) Merced River @ Santa Fe Zone, 5) Duck Slough @ Gurr Rd Zone, and 6) Cottonwood Creek @ Rd 20 Zone. Descriptions of zone-specific climate, water drainage and flow, soil characteristics and land use are included in the Coalition's MRPP (MRPP pages 9-27). Land use maps for each zone are included in Figures 2-7.

Figure 1. ESJWQC zone boundaries and Core sites.

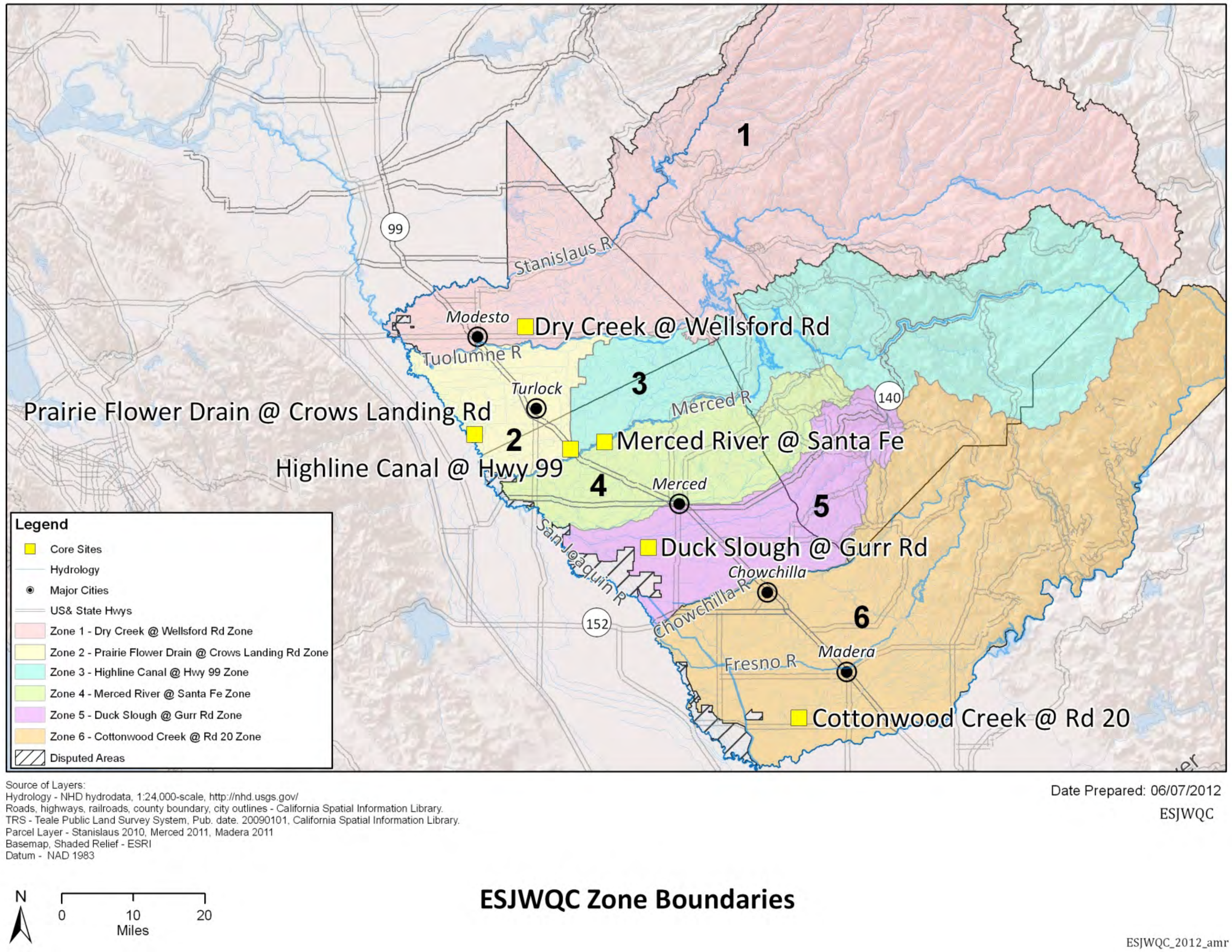


Table 3. ESJWQC 2012 total and irrigated acreages for Zones 1-6.

	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6
	Dry Creek @ Wellsford Zone	Prairie Flower Drain @ Crows Landing Zone	Highline Canal @ Hwy 99 Zone	Merced River @ Santa Fe Zone	Duck Slough @ Gurr Rd Zone	Cottonwood Creek @ Rd 20 Zone
Total Acres[1]	1,944,177	196,486	857,615	333,858	365,754	1,381,768
Irrigated Acres[2]	130,248	144,280	83,247	115,314	136,886	329,328

[1]Total acres for ESJWQC Zones have been calculated using DWR Land Use Survey data which are reported for an entire county (Madera is described for only 37% of the county). ArcGIS measurement processing on data was used to estimate the acreage for the portion of the county that is within each zone. Therefore there are minor differences in the amount of total acres reported in Table 3 versus the amount reported elsewhere.

[2]Irrigated acreage for each zone does not equal the sum of irrigated acres for all ESJWQC 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. Dry Creek @ Wellsford Rd Zone (Zone 1) Land Use.

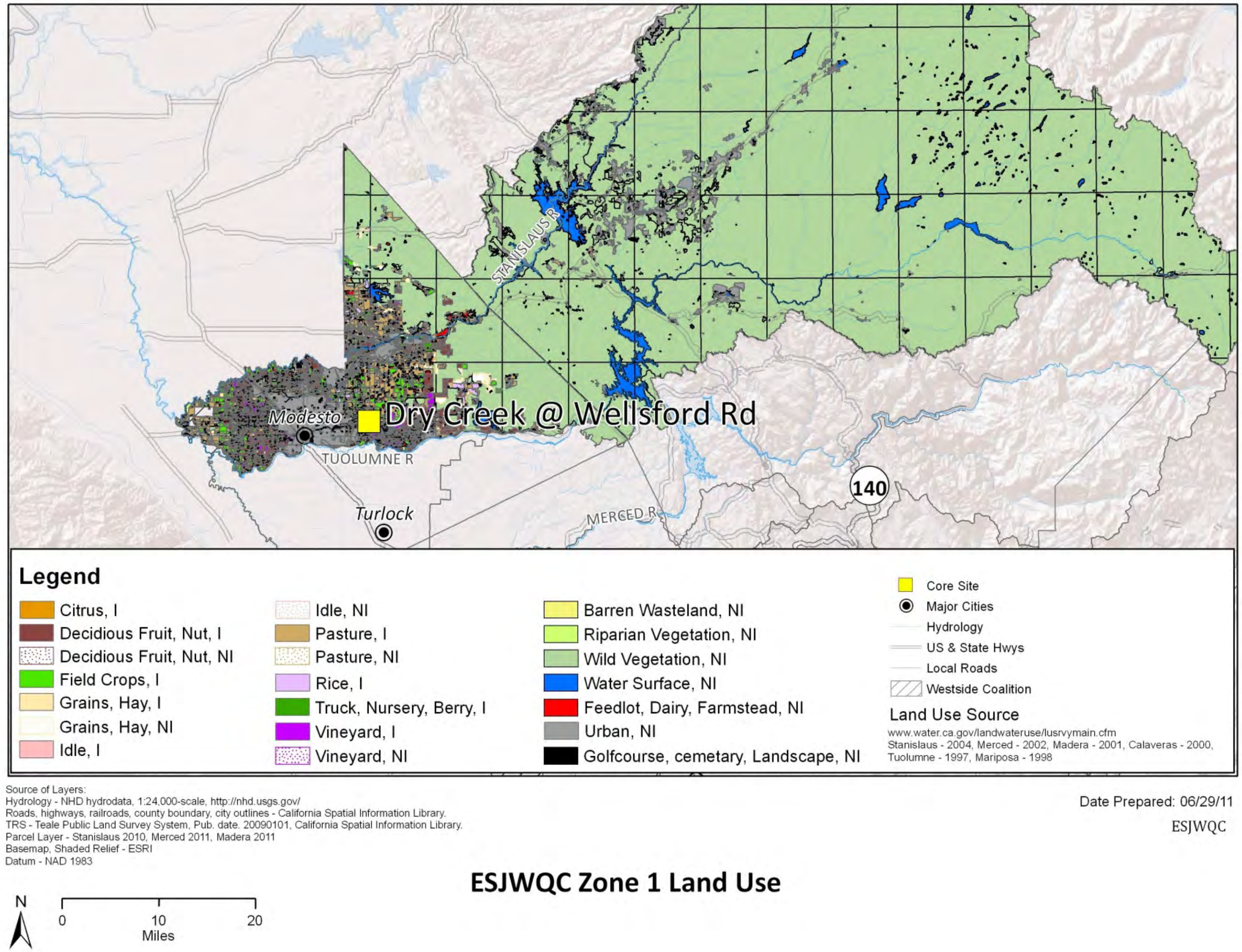


Figure 3. Prairie Flower Drain @ Crows Landing Zone (Zone 2) Land Use.

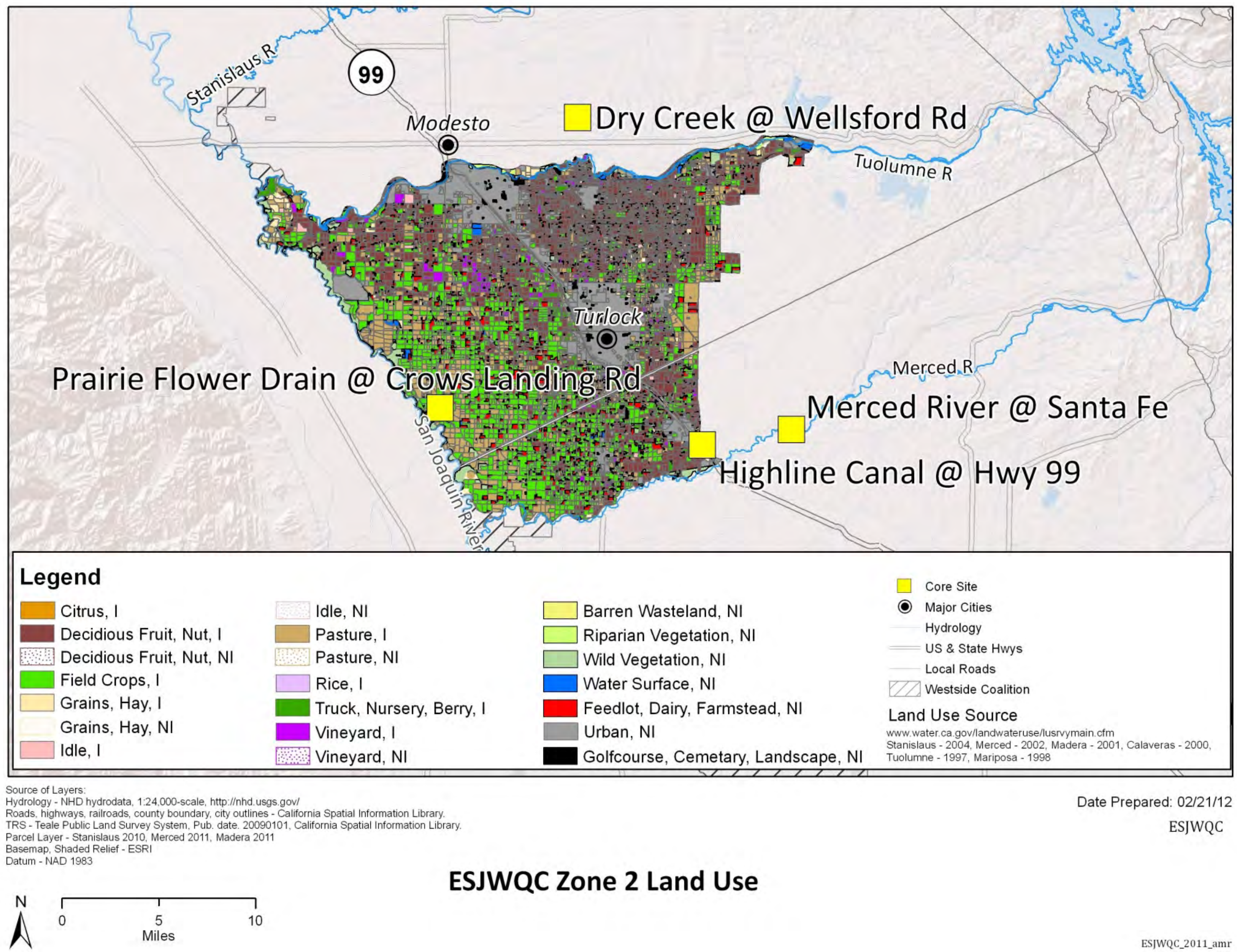


Figure 4. Highline Canal @ Hwy 99 Zone (Zone 3) Land Use.

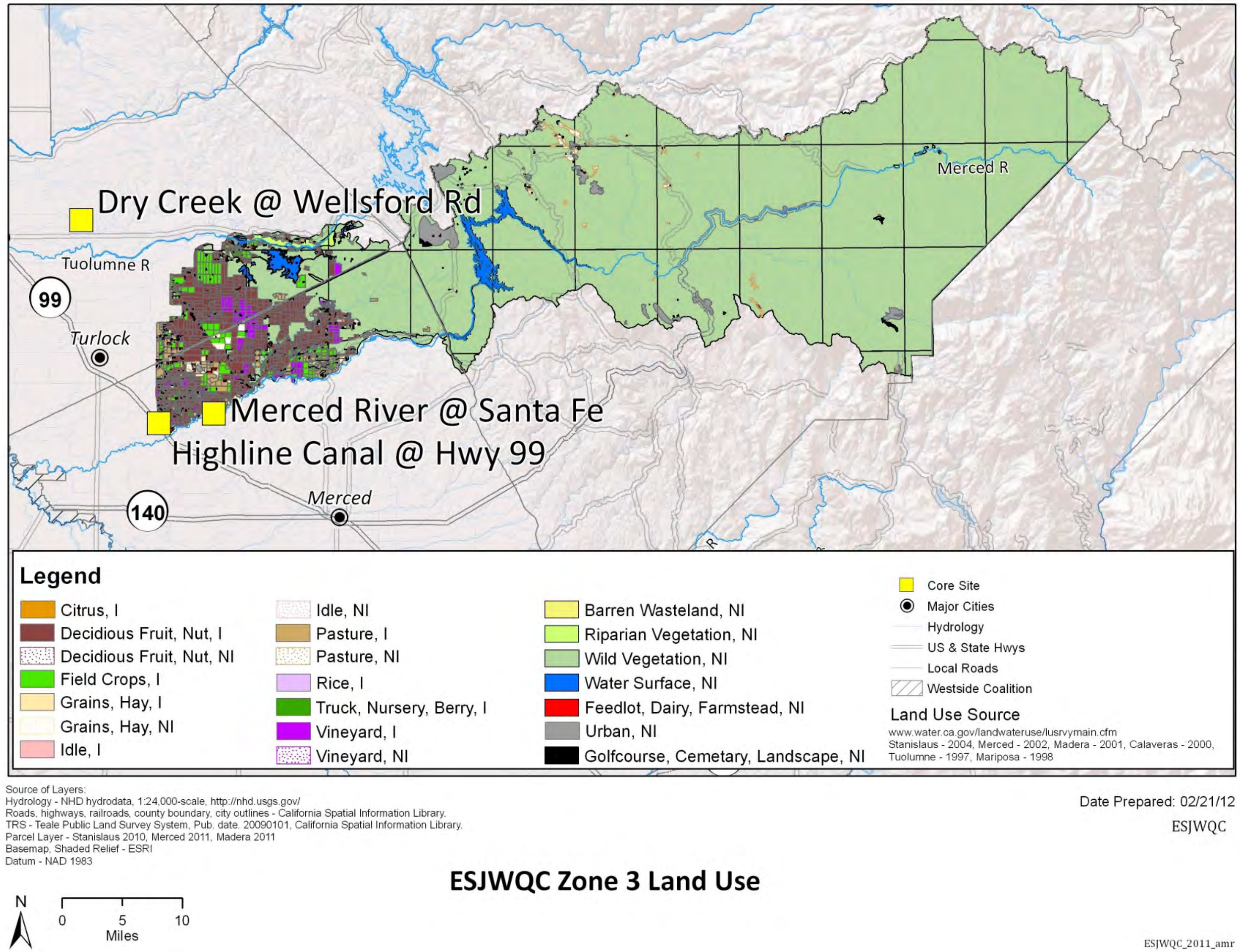


Figure 5. Merced River @ Santa Fe Zone (Zone 4) Land Use.

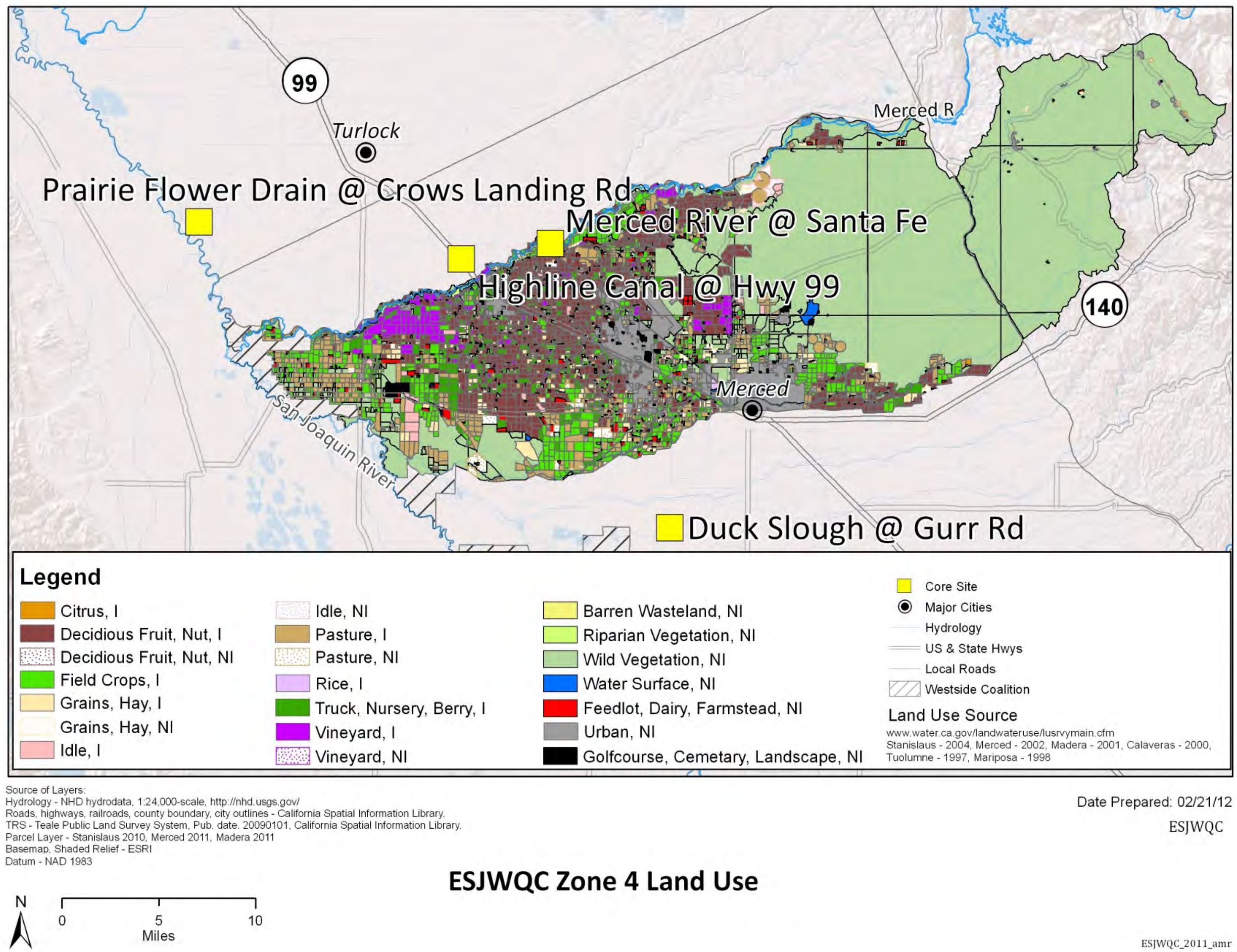


Figure 6. Duck Slough @ Gurr Rd Zone (Zone 5) Land Use.

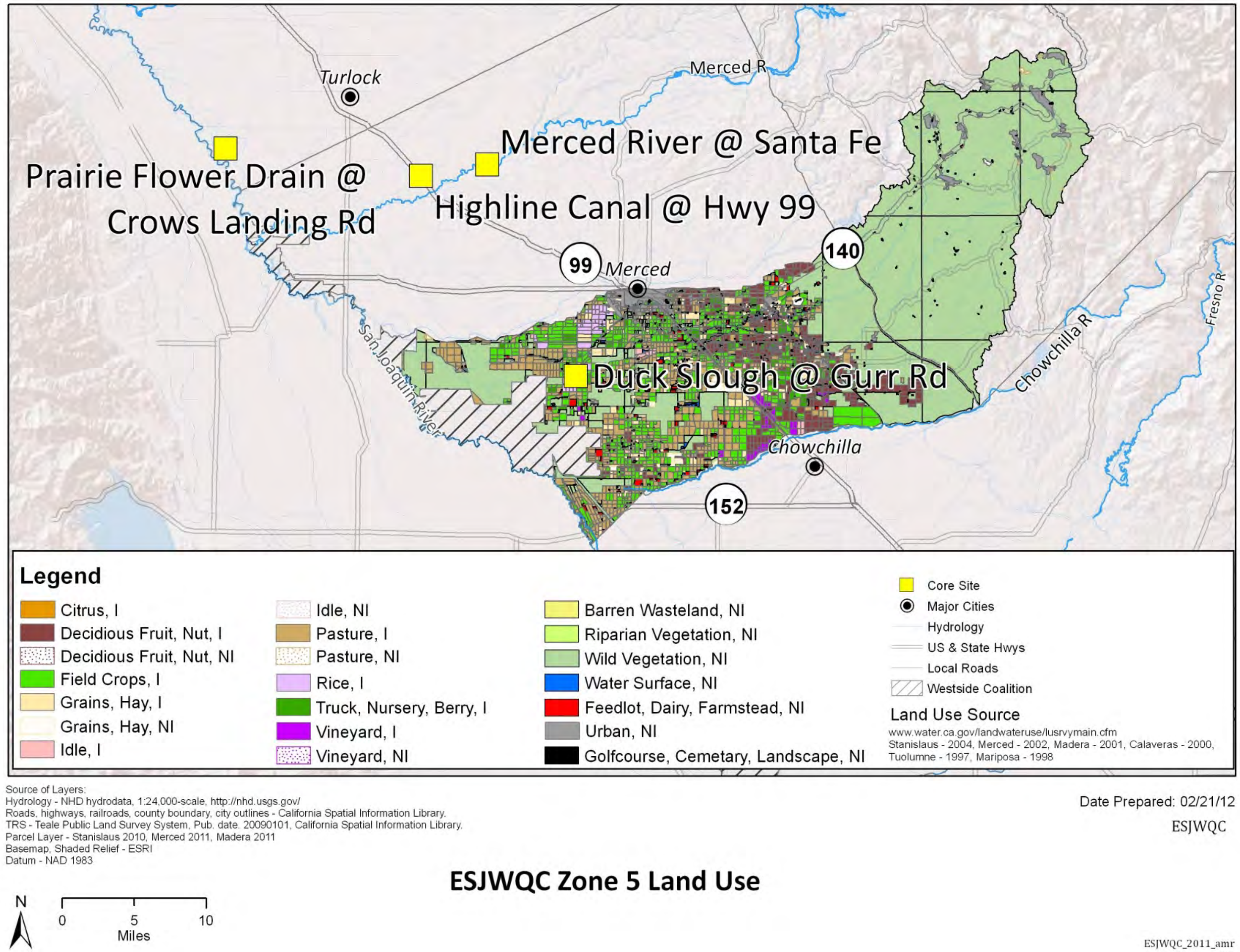
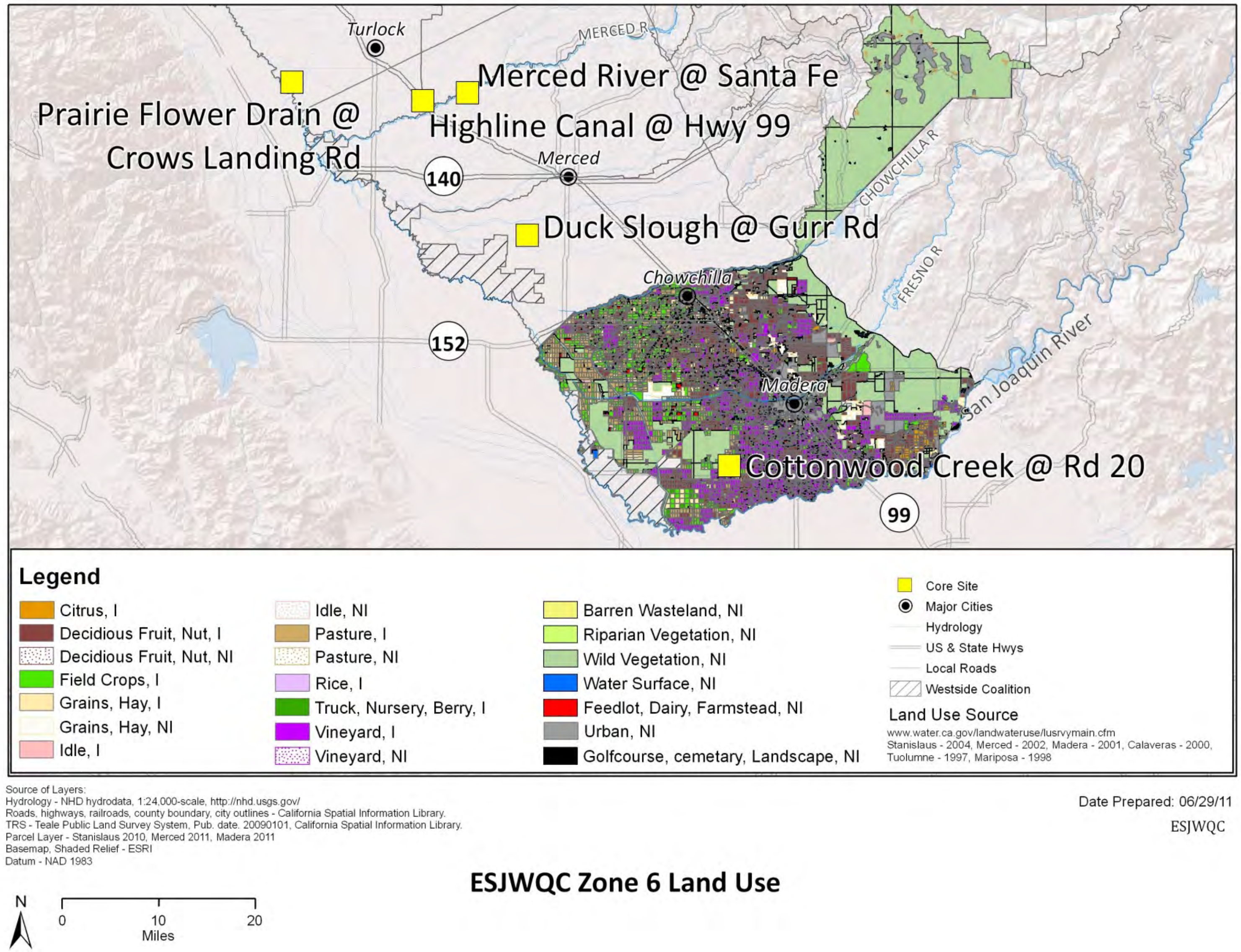


Figure 7. Cottonwood Creek @ Rd 20 Zone (Zone 6) Land Use.

Land use for Madera County is only described for 501,056 acres, 37% of the county; therefore a portion of the county is missing from the map.



MONITORING OBJECTIVES AND DESIGN

MONITORING JANUARY THROUGH DECEMBER 2012

The Coalition conducts Normal Monitoring (NM) to characterize discharge from irrigated agriculture, and Management Plan Monitoring (MPM) to monitor constituents that require a management plan. Management plans are required as a result of a single exceedance of the Water Quality Trigger Limit (WQTL) of a TMDL constituent, or more than one exceedance of a WQTL of a constituent without a TMDL. From January through March 2012 the Coalition conducted both NM and MPM based on the monitoring strategy outlined in the MRPP (MRPP pages 33-35) and Management Plan approved November 25, 2008 (annual updates are submitted on April 1 of each year). In April 2012, the NM strategy was modified to include a smaller set of monitoring locations and fewer constituents (approved by the Executive Officer on April 26, 2012).

As part of NM during the 2012 monitoring year, the Coalition sampled both Core and Assessment Monitoring locations including two storm events and two sediment monitoring events. The following section briefly describes any changes to the Coalition's monitoring plan and the objectives of NM (Core (C), Assessment (A) and Sediment Monitoring) as well as MPM and Total Maximum Daily Load (TMDL) monitoring. This section also describes the overall Coalition sampling design, including sampling seasons and storm triggers.

The Coalition was approved on February 7, 2012 to modify the ESJWQC MRPP and replace Yori Grove @ East Taylor Rd (sampled as Lateral 3 along East Taylor Rd in 2011) with Levee Drain @ Carpenter Rd as the Assessment Monitoring location in Zone 2 for 2012. Monitoring occurred at Levee Drain @ Carpenter from January through December 2012.

Effective April 17, 2012, the Coalition was approved to temporarily update its monitoring program to reflect the following changes for the 2012 monitoring year: 1) suspended monitoring at Core sites, 2) suspended MPM with the exception of Bear Creek @ Kibby Rd, and 3) reduced Assessment Monitoring constituents (organochlorines including Group A pesticides, paraquat, glyphosate, all metals except copper and zinc, Total Kjeldahl Nitrogen (TKN), total phosphorus, and *E. coli*). The Coalition monitored Assessment sites on April 12, 2012 to capture a storm / high TSS event (included additional samples for organochlorines, glyphosate, paraquat, arsenic, cadmium, lead and molybdenum analysis). The Coalition received approval to reduce monitoring before Core Monitoring and MPM was scheduled in April and therefore the April monitoring followed the updated monitoring schedule approved on April 17, 2012.

On April 26, 2012 the Coalition was approved to modify the ESJWQC MRPP to remove Duck Slough @ Hwy 99 from its monitoring plan due to highway construction at the sample site. Duck Slough will be represented by monitoring at the downstream Core Monitoring location Duck Slough @ Gurr Rd.

After two or more consecutive years of monitoring with zero exceedances, the Coalition was approved on May 30, 2012 to remove specific site/constituent pairs from an active management plan. On November 7, 2012 the Coalition sent a second request to remove specific site/constituent pairs from an active management plan for 14 site specific constituents at 10 high priority subwatershed locations. This request included summaries of improved water quality and no exceedances of WQTL for the specific site/constituent pairs for at least two years. Table 49 in the Status of Management Plans and Special Projects section of this report lists all of the specific site/constituent pairs approved for removal from active management plans and MPM.

MONITORING OBJECTIVES

The objectives of the ESJWQC monitoring program are to:

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

In order to achieve the objectives listed above, the Coalition monitored 18 sites in 2012. Of these 18 sites, MPM took place at 14 sites between January and March 2012 as outlined in the ESJWQC Management Plan Update Report (MPUR). From January through March 2012, six of the 14 sites were monitored for MPM only (Bear Creek @ Kibby Rd, Deadman Creek @ Gurr Rd, Duck Slough @ Hwy 99, Dry Creek @ Rd 18, Hilmar Drain @ Central Ave and Livingston Drain @ Robin Ave), five were monitored for Core and MPM (Dry Creek @ Wellsford Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99 and Prairie Flower Drain @ Crows Landing Rd) and three were monitored for Assessment Monitoring where management plan constituents were analyzed on a monthly basis (Berenda Slough along Ave 18 ½, Deadman Creek @ Hwy 59 and McCoy Lateral @ Hwy 140). Due to the April 17, 2012 approval to reduce Assessment Monitoring and suspend MPM and Core Monitoring, all MPM was suspended at sites scheduled for MPM from April through December 2012 (with the exception of Bear Creek @ Kibby Rd and Assessment Monitoring locations).

Monitoring constituents are established by the Irrigated Lands Regulatory Program (ILRP) Monitoring and Reporting Program (MRP) Order No. R5-2008-0005 (Appendix A). From January through March, the Coalition sampled for numerous water quality parameters and constituents including 45 organic pesticides, *E. coli*, physical parameters (total dissolved solids (TDS), total suspended solids (TSS) and turbidity), nine metals, total organic carbon, five nutrients, field parameters (Dissolved Oxygen (DO), pH, and Specific Conductivity (SC)), water column toxicity to three test species (*C. dubia*, *P. promelas* and *S. capricornutum*). The Coalition also sampled for sediment physical parameters (grain size and total organic carbon (TOC)), sediment toxicity to *H. azteca,* and nine sediment pesticides as needed (Tables 4 and 6).

On the May 6, 2011 the ESJWQC was approved to modify its MRPP and its monitoring strategy to reduce water column sampling for organochlorines (including Group A pesticides), sediment bound pesticides (glyphosate, paraquat), and metals not applied by agriculture (arsenic, cadmium, lead, and molybdenum). The Coalition began monitoring with the reduced set of constituents in July 2011 where Assessment Monitoring for organochlorines, glyphosate, and paraquat was reduced to two monitoring events per year (one storm and one irrigation event) and monitoring for metals not applied by agriculture was reduced to two storm and two irrigation events (Tables 4, 5 and 6). On April 12, 2012 the Coalition collected samples during one high TSS event. On April 17, 2012 the Coalition was approved to reduce monitoring at Assessment sites which superseded the May 2011 modification to the ESJWQC MRPP monitoring constituents.

From May through December 2012 the Coalition monitored sites based on the strategy developed and approved on April 17, 2012.

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[3]	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)[1]	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

Constituents, Parameters, and Tests	Monitoring Type
Organochlorines[2]	
Dichlorodiphenyldichloroethane (DDD)	Assessment
Dichlorodiphenyldichloroethylene (DDE)	Assessment
Dichlorodiphenyltrichloroethane (DDT)	Assessment
Dicofol	Assessment
Dieldrin	Assessment
Endrin	Assessment
Methoxychlor	Assessment
Group A[2]	
Aldrin	As needed to characterize 303d listed waterbodies
Chlordane	As needed to characterize 303d listed waterbodies
Heptachlor	As needed to characterize 303d listed waterbodies
Heptachlor Epoxide	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (including Lindane) (gamma-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (alpha-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (beta-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (delta-HCH)	As needed to characterize 303d listed waterbodies
Endosulfan I	As needed to characterize 303d listed waterbodies
Endosulfan II	As needed to characterize 303d listed waterbodies
Toxaphene	As needed to characterize 303d listed waterbodies
Organophosphates	
Azinphos-methyl	Assessment
Chlorpyrifos	Assessment
Diazinon	Assessment
Dichlorvos	Assessment
Dimethoate	Assessment
Demeton-s	Assessment
Disulfoton (Disyton)	Assessment
Malathion	Assessment
Methamidophos	Assessment
Methidathion	Assessment
Parathion-methyl	Assessment
Phorate	Assessment
Phosmet	Assessment
Herbicides	
Atrazine	Assessment
Cyanazine	Assessment
Diuron	Assessment
Glyphosate[2]	Assessment
Linuron	Assessment
Paraquat[2]	Assessment
Simazine	Assessment
Trifluralin	Assessment
Metals	
Arsenic (total)[2]	Assessment
Boron (total)[3]	Assessment
Cadmium (total and dissolved)[2]	Assessment
Copper (total and dissolved)	Assessment
Lead (total and dissolved)[2]	Assessment
Nickel (total and dissolved)[3]	Assessment
Molybdenum (total)[2]	Assessment
Selenium (total)[3]	Assessment

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
Zinc (total and dissolved)	Assessment
Nutrients	
Total Kjeldahl Nitrogen (TKN) [3]	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) [3]	Assessment and Core
Soluble Orthophosphate	Assessment and Core
SEDIMENT SAMPLING	
Sediment Toxicity	
Hyalella azteca	Assessment
Pesticides (as needed based on criteria described in MRP Part II.E.2)	
Bifenthrin	As needed based on criteria described in MRP Part II.E
Cyfluthrin	As needed based on criteria described in MRP Part II.E
Cypermethrin	As needed based on criteria described in MRP Part II.E
Deltamethrin: Tralomethrin	As needed based on criteria described in MRP Part II.E
Esfenvalerate	As needed based on criteria described in MRP Part II.E
Lambda-Cyhalothrin	As needed based on criteria described in MRP Part II.E
Permethrin	As needed based on criteria described in MRP Part II.E
Fenpropathrin	As needed based on criteria described in MRP Part II.E
Chlorpyrifos	As needed based on criteria described in MRP Part II.E
Other sediment parameters	
Total Organic Carbon	Assessment
Grain Size	Assessment

[1] Specific TIE manipulations utilized in each test will be reported.
[2] Beginning in July 2011 through April 2012, monitoring for organochlorines (including Group A pesticides), glyphosate, and paraquat was reduced to two monitoring events per year (one storm and one irrigation event); monitoring for metals not applied by agriculture was reduced to two storm and two irrigation events per year. On April 17, 2012 monitoring for these constituents was suspended for the remainder of 2012; however, these constituents were sampled during one high TSS event on April 12, 2012. .
[3] Assessment Monitoring constituents suspended on April 17, 2012; these constituents were monitored during a high TTS event April 12, 2012.

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

ESJWQC January-December 2012 Monitoring Schedule		Nutrients					Bacteria	Field Parameters				Physical Parameters				Metals										Pesticides: Organophosphates												
Zone	Site Name	Total Ammonia	Nitrate + Nitrite (as N)	Soluble Orthophosphate	Total Kjeldahl Nitrogen	Total Phosphorous	*E. coli*	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity	TOC	Total Dissolved Solids	Suspended Solids	Arsenic (Total)	Boron (Total)	Cadmium (Dissolved/Total)	Copper (Dissolved/Total)	Lead (Dissolved/Total)	Molybdenum (Total)	Nickel (Dissolved/Total)	Selenium (Total)	Zinc (Dissolved/Total)	Hardness (Dissolved)	Azinphos-methyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Demeton-s	Disulfoton	Malathion	Methamidophos	Methidathion	Parathion, methyl	Phorate	Phosmet
1	Dry Creek @ Wellsford Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M[†]																			
	Rodden Creek @ Rodden Rd	A	A	A	A[3]	A[3]	A[3]	A	A	A	A	A	A	A	A	A[2]	A[3]	A[2]	A	A[2]	A[2]	A[3]	A[3]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2	Levee Drain @ Carpenter Rd	A	A	A	A[3]	A[3]	A[3]	A	A	A	A	A	A	A	A	A[2]	A[3]	A[2]	A	A[2]	A[2]	A[3]	A[3]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Prairie Flower Drain @ Crows Landing Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C																							
	Hilmar Drain @ Central Ave							F	F	F	F								M																			
3	Highline Canal @ Hwy 99	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M	M							M[†]											
	Highline Canal @ Lombardy Rd	A	A	A	A[3]	A[3]	A[3]	A	A	A	A	A	A	A	A	A[2]	A[3]	A[2]	A	A[2]	A[2]	A[3]	A[3]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4	Bear Creek @ Kibby Rd							F	F	F	F								M								M[†]											
	Livingston Drain @ Robin Ave							F	F	F	F								M	M							M											
	McCoy Lateral @ Hwy 140	A	A	A	A[3]	A[3]	A[3]	A	A	A	A	A	A	A	A	A[2]	A[3]	A[2]	M[1]	A[2]	A[2]	A[3]	A[3]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Merced River @ Santa Fe	C	C	C	C	C	C	C	C	C	C	C	C	C	C																							
5	Deadman Creek @ Hwy 59	A	A	A	A[3]	A[3]	A[3]	A	A	A	A	A	A	A	A	A[2]	A[3]	A[2]	A	A[2]	A[2]	A[3]	A[3]	A	A	A	M[1]	A	A	A	A	A	A	A	A	A	A	A
	Deadman Creek @ Gurr Rd							F	F	F	F								M[†]								M											
	Duck Slough @ Gurr Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M																			
	Duck Slough @ Hwy 99							F	F	F	F								M																			
6	Berenda Slough along Ave 18 1/2	A	A	A	A[3]	A[3]	A[3]	A	A	A	A	A	A	A	A	A[2]	A[3]	A[2]	M[1]	A[2]	A[2]	A[3]	A[3]	A	A	A	M[1]	A	A	A	A	A	A	A	A	A	A	A
	Dry Creek @ Rd 18							F	F	F	F								M								M	M										
	Cottonwood Creek @ Rd 20	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M								M	M[†]										

A - Assessment Monitoring constituent

C - Core Monitoring constituent. Core monitoring took place from January through March 2012. On April 17, 2012 Core Monitoring was suspended for the remainder of 2012.

F – Field parameters are collected during every sampling event including MPM.

M - MPM for Priority A-D constituents during months of past exceedances, suspended on April 17, 2012 for all sites not currently undergoing Assessment Monitoring, except at Bear Creek @ Kibby Rd.

[1] MPM at 2012 Assessment Monitoring sites.

[2] Constituents approved for reduced monitoring on May 6, 2011 (monitored during high TSS events only) were monitored once on April 12, 2012 during a storm event. On April 17, 2012 monitoring for these constituents was suspended for the remainder of 2012.

[3] Assessment Monitoring constituents suspended for all sites on April 17, 2012; however, these constituents were sampled during a storm event on April 12, 2012.

[†] MPM occurred for these constituents before May 30, 2012 approval for removal from active management plan. Bear Creek @ Kibby Rd MPM continued through 2012 as part of Prop 84 monitoring.

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

		Pesticides																																		Water Column Toxicity			Sediment		
ESJWQC January-December 2012 Monitoring Schedule		Organochlorines[4]							Carbamates								Herbicides						Group A[4]														Toxicity	Physical Parameters	
Zone	Site Name	DDD	DDE	DDT	Dicofol	Dieldrin	Endrin	Methoxychlor	Aldicarb	Carbaryl	Carbofuran	Diuron	Linuron	Methiocarb	Methomyl	Oxamyl	Atrazine	Cyanazine	Simazine	Trifluralin	Paraquat[4]	Glyphosate[4]	Aldrin	Chlordane	Heptachlor	Heptachlor Epoxide	HCH, alpha	HCH, beta	HCH, delta	HCH, gamma	Endosulfan I	Endosulfan II	Toxaphene	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*[3]	TOC	Grain Size
1	Dry Creek @ Wellsford Rd											M[†]																								M[†]	M	M	M
	Rodden Creek @ Rodden Rd	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A	A	A	A	A	A	A	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A
2	Levee Drain @ Carpenter Rd	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A	A	A	A	A	A	A	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A
	Prairie Flower Drain @ Crows Landing Rd																																	M		M	M	M	M
	Hilmar Drain @ Central Ave																																				M	M	M
3	Highline Canal @ Hwy 99											M[†]																						M		M	M	M	M
	Highline Canal @ Lombardy Rd	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A	A	A	A	A	A	A	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A
4	Bear Creek @ Kibby Rd																																	M[†]					
	Livingston Drain @ Robin Ave																																			M			
	McCoy Lateral @ Hwy 140	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A	A	A	A	A	A	A	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A
	Merced River @ Santa Fe																																						
5	Deadman Creek @ Hwy 59	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A	A	A	A	A	A	A	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	M[1]	A	A	A
	Deadman Creek @ Gurr Rd																																	M	M	M			
	Duck Slough @ Gurr Rd																																	M					
	Duck Slough @ Hwy 99																																						
6	Berenda Slough along Ave 18 1/2	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	A	A	A	A	A	A	A	A	A	A	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A[2]	A	A	M[1]	A	A	A
	Dry Creek @ Rd 18											M																								M	M	M	M
	Cottonwood Creek @ Rd 20											M[†]																											

A - Assessment Monitoring constituent

M - MPM for Priority A-D constituents during months of past exceedances, suspended on April 17, 2012 for all sites not currently undergoing Assessment Monitoring, except at Bear Creek @ Kibby Rd.

[1] MPM at 2012 Assessment Monitoring sites.

[2] Constituents approved for reduced monitoring on May 6, 2011 (monitored during high TSS events only) were monitored once on April 12, 2012 during a storm event. On April 17, 2012 monitoring for these constituents was suspended for the remainder of 2012.

[3] If *H. azteca* survival is less than 80% compared to the control, the following pesticides will be analyzed for pesticides (Table 4 lists specific pesticides).

[4] Assessment Monitoring constituents suspended for all sites on April 17, 2012; however, these constituents were sampled during a storm event on April 12, 2012.

[†] MPM occurred for these constituents before May 30, 2012 approval for removal from active management plan. Bear Creek @ Kibby Rd MPM continued through 2012 as part of Prop 84 monitoring.

MONITORING SEASONS

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

Table 7. Description of monitoring seasons.

SEASON	MONTH RANGE	DESCRIPTION
Fall	October through December	No irrigation.
Winter	January through March	No irrigation, possible dormant sprays.
Storm	Anytime	Storm is triggered by > 0.25 inches of rain within 24 hours; may occur during any month but generally occurs from January through March.
Irrigation	April through September	Summer months with possible irrigation.

MONITORING DESIGN

Normal Monitoring

Starting October 2008, the Coalition initiated monitoring under the current approved MRPP that includes a schedule of Core and Assessment Monitoring locations to be monitored on a monthly basis (MRPP Table 10, pages 51-52). 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 ("fall" season) was in 2008 and at that time the 24 hour rainfall trigger was reduced to 0.25 inches. Table 8 provides the locations and seasons of Coalition monitoring from 2004 through 2012.

Normal Monitoring refers to the monitoring strategy that is outlined in the most current MRPP. Each zone contains a Core Monitoring location that undergoes Assessment Monitoring once every third year. In each zone there are numerous Assessment sites. A single Assessment site is monitored for two years, and then monitoring rotates to a new site within the zone. The monitoring schedule outlined in the ESJWQC MRPP (MRPP Table 10, pages 52-53) dictates the rotation of Assessment Monitoring locations in each zone. Normal Monitoring occurred monthly six Core and six Assessment sites from January through March 2012, then the Coalition was approved on April 17, 2012 to temporarily suspend monitoring at Core and MPM sites (with the exception of Bear Creek @ Kibby Rd where MPM continued as part of a cost-share for a project funded by Proposition 84) as well as reduce monitoring at Assessment Monitoring sites for the remainder of 2012.

The Coalition attempts to sample two storm events per year. A storm monitoring event is defined as monitoring within three days of a rainfall event that exceeds 0.25 inches within 24 hours. Storm samples were collected at sites in the ESJWQC on April 12 and December 3, 2012. A description of the rainfall that occurred in 2012 including when samples were collected relative to the amount of precipitation is included in the section “Sample Site Descriptions and Rainfall Records” under the subheading “Rainfall Records”.

Core Monitoring

Core Monitoring occurs at Core sites within each of the ESJWQC zones and is designed to track water quality trends over extended periods of time. There are fewer constituents (primarily physical parameters and nutrients) monitored at Core sites during Core Monitoring years (Table 4). Data from Core sites are used to establish trends in water quality that in turn are used to evaluate the effectiveness of the Coalition’s efforts to reduce or eliminate the impact of irrigated agriculture on surface waters. Core sites in each zone rotate into Assessment Monitoring every three years.

Assessment Monitoring

Assessment Monitoring occurs at Assessment sites as scheduled in the MRPP and at Core sites every third year. Assessment Monitoring includes a diversity of monitoring sites that are representative of each individual zone. Assessment sites are selected to characterize water quality within each zone. Assessment Monitoring includes the analysis of samples for a large suite of constituents to effectively characterize water quality (Table 4).

Sediment Monitoring

Sediment samples are collected twice each year at sites that are undergoing Assessment Monitoring. 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 2012, sediment samples were collected on March 6 and September 11, 2012.

Table 8. Sample sites and years monitored.

Station Name	2004	2005		2006		2007		2008			2009				2010				2011				2012[2]			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Ash Slough @ Ave 21			x	x	x	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	x	Dry								
August Road Drain upstream of Crows Landing Bridge (Hogin Rd)	x																									
Bear Creek @ Kibby Rd		x	x	x	x	x	x	x	x								x		x	x	x		x		x	
Berenda Slough along Ave 18 1/2					x	Dry	x	x	Dry										x	x	x	x	Dry	Dry	Dry	Dry
Black Rascal Creek @ Yosemite Rd					x	x	x	x	x																	
Cottonwood Creek @ Rd 20		x	x	x	x	Dry	x	x	x	Dry	Dry	x	Dry	x	Dry	x	x	x	x	x	x	Dry	Dry			
Cottonwood Creek @ Hwy 145[1]									x																	
Deadman Creek @ Hwy 59					x	x	x	x	x				Dry			Dry			x	x	x	x	x	x	Dry	x
Deadman Creek @ Gurr Rd	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x					x			
Dry Creek @ Rd 18			x	Dry	x	x	x	x	x										x	x	x		x			
Dry Creek @ Rd 22[1]									x																	
Dry Creek @ Rd 28½[1]									x																	
Dry Creek @ Oakdale Rd												Dry		Dry		x										
Dry Creek @ Waterford Rd[1]									x				x													
Dry Creek @ Wellsford Rd		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Duck Slough @ Gurr Rd	x	x	x	x	x	x	x	x	x	Dry	x	x	x	x	x	x	x	x	x	x	x	Dry	Dry			
Duck Slough @ Hwy 59[1]									x																	
Duck Slough @ Hwy 99		x	x	x	x	x	x	x	x				x				x			x	x		x			
Duck Slough @ Whealan Rd[1]									x																	
Hatch Drain @ Tuolumne Rd							x	x	x																	
Highline Canal @ Hwy 99			x	x	x	x	x	x	x	Dry	Dry	x	x	x	x	x	x	x	Dry	Dry	x	Dry	x			
Highline Canal @ Lombardy Rd		x	x	x	x	x	x	x	x				x		x	x			x	x	x	Dry	x	x	x	x
Hilmar Drain @ Central Ave		x	x	x	x	x	x	x	x				x										x			
Hilmar Drain @ Mitchell Rd[1]									x																	
Howard Lateral @ Hwy 140										x	Dry	Dry	x	x	Dry	Dry	x	x			x	x				
Jones Drain @ Oakdale Rd		x	x	x	x	x	x																			
Lateral 2 ½ near Keyes Rd										x	Dry	Dry	x	x	x	Dry	x	x			x					
Levee Drain @ Carpenter Rd																							x	x	x	x
Livingston Drain @ Robin Ave							x	x	x										Dry	Dry	x		x			
Lone Willow Slough @ Madera Ave		x	x																							
McCoy Lateral @ Hwy 140																			Dry	Dry	x	Dry	Dry	x	x	Dry
Merced River @ Santa Fe	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Miles Creek @ Reilly Rd							x	x	x				x			x										
Mootz Drain @ Langworth Rd										x	x	x	x	x												

Station Name	2004	2005		2006		2007		2008			2009				2010				2011				2012[2]			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Mootz Drain downstream of Langworth Pond												x			x	x	x	Dry								
Mustang Creek @ East Ave					x	x	x	x	Dry	Dry	x	x	Dry	x	x	x	Dry	Dry								
North Slough @ Hwy 59[1]									Dry																	
Prairie Flower Drain @ Crows Landing Rd		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
Prairie Flower Drain @ Morgan Rd[1]									x																	
Reclamation Drain @ Williams Ave[1]									x																	
Rodden Creek @ Rodden Rd																			x	x	x	x	x	x	x	Dry
Silva Drain @ Meadow Dr					x	x	x	x	x																	
South Slough @ Quinley Rd					x	Dry	x	x	x																	
Westport Drain @ Vivian Rd							x	x	x																	

[1]Upstream sampling of Normal Monitoring locations conducted for source identification.

[2]Due to the April 17, 2012 approval, the Coalition reduced Assessment Monitoring for certain constituents and suspended monitoring for Core and MPM sites; therefore MPM did not occur at every site during every month scheduled in 2012.

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

On April 17, 2012 the Coalition was approved to suspend MPM at all sites except Bear Creek @ Kibby Rd for the remainder of 2012. Bear Creek @ Kibby Rd MPM continued in 2012 to ensure compliance with Proposition 84 funding requirements. Table 9 includes the MPM schedule for sites and constituents that were monitored during 2012. Table 10 includes the MPM schedule for sites and constituents that were suspended from April through December 2012. Sites where MPM was suspended in 2012 are scheduled for MPM during months of past exceedances in 2013 (Table 10).

Management Plan Monitoring is conducted as part of the Coalition's management plan strategy to identify contaminant sources 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.

From January through March 2012, MPM occurred at 14 sites: Bear Creek @ Kibby Rd, Berenda Slough along Ave 18 ½, Cottonwood Creek @ Rd 20, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Dry Creek @ Rd 18, Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, Hilmar Drain @ Central Ave, Livingston Drain @ Robin Ave, McCoy Lateral @ Hwy 140 and Prairie Flower Drain @ Crows Landing Rd (Table 9).

Management Plan Monitoring was conducted for water column toxicity (*C. dubia* and *S. capricornutum*), sediment toxicity (*H. azteca)*, copper, lead, chlorpyrifos, diazinon, and diuron (Table 9). Details on the process and the schedule of MPM are available in the ESJWQC 2008 Management Plan approved November 25, 2008. The MPM schedule is updated annually in the ESJWQC MPUR, which is submitted on April 1.

The Coalition was approved to remove specific site/constituent pairs from an active management plan on May 30, 2012. Table 49 in the Status of Management Plans and Special Projects section lists sites and constituents approved for removal from active management plans.

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

Site Name	High Priority Subwatershed[1]	Month	Copper	Lead	Chlorpyrifos	Diazinon	Diuron	*C. dubia*	*H. azteca*	*P. promelas*	*S. capricornutum*
Bear Creek @ Kibby Rd	2nd	January	X								
Berenda Slough along Ave 18 1/2	3rd	January	X								
Cottonwood Creek @ Rd 20	2nd	January	X		X		X				
Deadman Creek @ Gurr Rd	4th	January	X							X	
Deadman Creek @ Hwy 59	4th	January									X
Dry Creek @ Rd 18	3rd	January	X				X				X
Duck Slough @ Gurr Rd	2nd	January	X								
Highline Canal @ Hwy 99	2nd	January	X		X		X				
Livingston Drain @ Robin Ave	3rd	January	X	X	X						
McCoy Lateral @ Hwy 140	8th	January	X								
Prairie Flower Drain @ Crows Landing Rd	1st	January									X
Bear Creek @ Kibby Rd	2nd	February	X								
Berenda Slough along Ave 18 1/2	3rd	February	X								
Cottonwood Creek @ Rd 20	2nd	February	X		X	X	X				
Deadman Creek @ Gurr Rd	4th	February	X					X		X	X
Dry Creek @ Rd 18	3rd	February	X		X	X	X				X
Dry Creek @ Wellsford Rd	1st	February	X				X				X
Duck Slough @ Gurr Rd	2nd	February	X					X			
Duck Slough @ Hwy 99	1st	February	X								
Highline Canal @ Hwy 99	2nd	February	X	X	X		X				X
Hilmar Drain @ Central Ave	4th	February	X								
Livingston Drain @ Robin Ave	3rd	February	X	X							X
Prairie Flower Drain @ Crows Landing Rd	1st	February									X
Deadman Creek @ Gurr Rd	4th	March			X			X		X	
Dry Creek @ Rd 18	3rd	March							X		
Dry Creek @ Wellsford Rd	1st	March							X		X
Duck Slough @ Gurr Rd	2nd	March						X			
Highline Canal @ Hwy 99	2nd	March						X	X		X
Hilmar Drain @ Central Ave	4th	March							X		
Prairie Flower Drain @ Crows Landing Rd	1st	March						X	X		
Berenda Slough along Ave 18 1/2	3rd	April	X		X						
Deadman Creek @ Hwy 59	4th	April			X						X
Bear Creek @ Kibby Rd	2nd	May			X			X			
Berenda Slough along Ave 18 1/2	3rd	May	X								X
Berenda Slough along Ave 18 1/2	3rd	June	X								
Bear Creek @ Kibby Rd	2nd	July			X			X			
Berenda Slough along Ave 18 1/2	3rd	July	X		X						X
Bear Creek @ Kibby Rd	2nd	August	X								
Berenda Slough along Ave 18 1/2	3rd	August	X								
Deadman Creek @ Hwy 59	4th	August			X						
Berenda Slough along Ave 18 1/2	3rd	September	X		X						
Deadman Creek @ Hwy 59	4th	September			X						
McCoy Lateral @ Hwy 140	8th	September	X								
McCoy Lateral @ Hwy 140	8th	October	X								
Berenda Slough along Ave 18 1/2	3rd	October	X								
Berenda Slough along Ave 18 1/2	3rd	November	X								
Berenda Slough along Ave 18 1/2	3rd	December	X								

Table 10. April through December MPM sites and constituents that were scheduled for MPM in 2012 and have been postponed until 2013 (April 17, 2012 approval).

Site Name	High Priority Subwatershed[1]	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*C. dubia*	*H. azteca*	*P. promelas*	*S. capricornutum*
Black Rascal Creek @ Yosemite Rd	4th	April		X								
Cottonwood Creek @ Rd 20	2nd	April	X									
Deadman Creek @ Gurr Rd	4th	April	X		X							
Dry Creek @ Rd 18	3rd	April	X		X							
Dry Creek @ Wellsford Rd	1st	April	X									
Duck Slough @ Hwy 99	1st	April	X	X								X
Highline Canal @ Hwy 99	2nd	April	X	X								X
Hilmar Drain @ Central Ave	4th	April						X				X
Howard Lateral @ Hwy 140	7th	April	X									
Lateral 2 1/2 near Keyes Rd	3rd	April			X							
Livingston Drain @ Robin Ave	3rd	April										X
Prairie Flower Drain @ Crows Landing Rd	1st	April									X	X
Black Rascal Creek @ Yosemite Rd	4th	May			X				X			
Cottonwood Creek @ Rd 20	2nd	May	X									
Deadman Creek @ Gurr Rd	4th	May	X								X	
Dry Creek @ Rd 18	3rd	May	X	X								X
Duck Slough @ Gurr Rd	2nd	May	X									
Duck Slough @ Hwy 99	1st	May		X	X							
Highline Canal @ Hwy 99	2nd	May		X					X			X
Livingston Drain @ Robin Ave	3rd	May	X									X
Prairie Flower Drain @ Crows Landing Rd	1st	May										X
Cottonwood Creek @ Rd 20	2nd	June	X									
Deadman Creek @ Gurr Rd	4th	June									X	
Dry Creek @ Rd 18	3rd	June	X	X								
Duck Slough @ Gurr Rd	2nd	June	X									
Duck Slough @ Hwy 99	1st	June	X	X								
Highline Canal @ Hwy 99	2nd	June	X	X								
Hilmar Drain @ Central Ave	4th	June						X				
Howard Lateral @ Hwy 140	7th	June			X							
Livingston Drain @ Robin Ave	3rd	June	X		X							
Black Rascal Creek @ Yosemite Rd	4th	July			X				X			
Cottonwood Creek @ Rd 20	2nd	July	X									
Deadman Creek @ Gurr Rd	4th	July										X
Dry Creek @ Rd 18	3rd	July	X		X							
Dry Creek @ Wellsford Rd	1st	July			X							
Duck Slough @ Gurr Rd	2nd	July	X									
Duck Slough @ Hwy 99	1st	July	X	X								
Highline Canal @ Hwy 99	2nd	July	X	X								
Hilmar Drain @ Central Ave	4th	July	X									X
Howard Lateral @ Hwy 140	7th	July	X									
Lateral 2 1/2 near Keyes Rd	3rd	July			X							
Livingston Drain @ Robin Ave	3rd	July	X		X							
Prairie Flower Drain @ Crows Landing Rd	1st	July					X				X	
Black Rascal Creek @ Yosemite Rd	4th	August			X				X			
Cottonwood Creek @ Rd 20	2nd	August	X									
Deadman Creek @ Gurr Rd	4th	August			X							
Dry Creek @ Rd 18	3rd	August	X	X								
Dry Creek @ Wellsford Rd	1st	August			X							
Duck Slough @ Hwy 99	1st	August	X	X								
Highline Canal @ Hwy 99	2nd	August	X	X								
Livingston Drain @ Robin Ave	3rd	August			X							

Site Name	High Priority Subwatershed[1]	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*C. dubia*	*H. azteca*	*P. promelas*	*S. capricornutum*
Prairie Flower Drain @ Crows Landing Rd	1st	August					X		X			
Black Rascal Creek @ Yosemite Rd	4th	September		X	X							
Cottonwood Creek @ Rd 20	2nd	September	X									
Deadman Creek @ Gurr Rd	4th	September			X							
Dry Creek @ Rd 18	3rd	September	X	X						X		
Dry Creek @ Wellsford Rd	1st	September			X					X		
Duck Slough @ Gurr Rd	2nd	September								X		
Duck Slough @ Hwy 99	1st	September	X	X								
Highline Canal @ Hwy 99	2nd	September							X	X		
Hilmar Drain @ Central Ave	4th	September								X		X
Livingston Drain @ Robin Ave	3rd	September	X									
Prairie Flower Drain @ Crows Landing Rd	1st	September					X		X	X		
Cottonwood Creek @ Rd 20	2nd	October	X									
Howard Lateral @ Hwy 140	7th	October	X									
Prairie Flower Drain @ Crows Landing Rd	1st	October										X
Deadman Creek @ Gurr Rd	4th	November							X		X	
Deadman Creek @ Gurr Rd	4th	December									X	
Prairie Flower Drain @ Crows Landing Rd	1st	December										X

Total Maximum Daily Load Monitoring

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

In October 2005, 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 Lower San Joaquin River (hereafter Basin Plan Amendment) establishing a TMDL for the organophosphate pesticides (OP) chlorpyrifos and diazinon in the lower reaches of the San Joaquin River outside of the Delta. The Lower San Joaquin River is divided into seven subareas, which include agricultural drainages monitored by the ESJWQC and the Westside San Joaquin River Watershed Coalition (Westside Coalition) under the ILRP.

As dictated by the Basin Plan Amendment, a surveillance and monitoring program was developed in 2010 to collect information necessary to assess compliance with the seven monitoring objectives. The monitoring objectives are 1) determine load capacity compliance, 2) determine load allocation compliance, 3) determine degree of implemented management practices, 4) determine effectiveness of implemented management practices, 5) determine if alternative pesticides are impairing water quality, 6) determine if additive or synergistic effects of multiple pollutants are causing toxicity, and 7) demonstrate management practices achieve the lowest pesticide levels technically and economically achievable. The ESJWQC and the Westside Coalition collaborated to develop a monitoring plan for assessing compliance of the Lower San Joaquin River concentration based loads at the six compliance points identified in the Basin Plan Amendment (Monitoring Objective 1). Sampling occurs on a monthly basis at three of the six compliance points (Sack Dam, Lander Ave, and Las Palmas Ave) and in 2012 sampling occurred at the other three compliance points (Hills Ferry Rd, Maze Blvd, and Airport Way) during March and from May through August. Both Coalitions independently assess compliance with Monitoring Objectives 2 -7 by reviewing the results of the San Joaquin River monitoring relative to the monitoring conducted in the upstream tributaries within each of the Coalition regions. The results of monitoring from the 2012 water year (October 2011 through September 2012) as well as an assessment of each Coalition's compliance with Monitoring Objectives 1- 7 will be reported in the San Joaquin River Chlorpyrifos and Diazinon TMDL 2013 AMR (to be submitted May 1, 2013).

MONITORING CONSTITUENTS

All 2012 monitoring constituents and locations are provided in Tables 4, 5 and 6. The following section describes agricultural sources of the constituent groups analyzed by the Coalition.

Pesticides and Toxicity

Pesticides may be found in the water column or sediment as a result of applications to fields that are subsequently irrigated, have runoff from rainfall events, or from spray drift to surface waters. Irrigation return flows from fields or storm water runoff can move sediment and chemicals to surface waters. The concentrations of chemicals in surface waters are compared to water quality trigger limits to determine if concentrations in the water exceed the trigger limit (termed an exceedance). Toxicity testing is complementary to chemical analyses and can provide an independent and more direct assessment of the level of impairment in the waterbody. The objective of the Coalition is to use the results of toxicity testing along with water chemistry analysis to assess the impact of discharges from irrigated agriculture.

On May 6, 2011 the Coalition was approved to modify its MRPP and monitoring strategy to reduce water column sampling for organochlorines, glyphosate and paraquat. Glyphosate and paraquat are pesticides that have an extremely high affinity for sediments and organic material and therefore are rarely detected in the water column except for times when sediment runoff is a concern (i.e. a high TSS event following a large rain storm). Starting July 2011, monitoring for organochlorines, glyphosate and paraquat was reduced to one storm and one irrigation event per year. In 2012, these constituents were monitored at Assessment Monitoring sites during one high TSS event on April 12, 2012. Monitoring was reduced further when, on April 17, 2012, the Coalition was approved to temporarily suspend monitoring for organochlorines (including Group A pesticides), paraquat and glyphosate at Assessment Monitoring sites for the remainder of 2012.

Nutrients and Physical Parameters

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

On April 17, 2012 the Coalition was approved to temporarily suspend monitoring at Core Monitoring sites and reduce monitoring for TKN and total phosphorus as P at Assessment Monitoring sites for the remainder of 2012. These constituents were monitored as scheduled at designated sites from January through March 2012 and during one high TSS event on April 12, 2012.

Field Parameters

Much like physical parameters, exceedances of water quality objectives for pH, DO, and SC are difficult to track to sources. All of these parameters are non-conserved meaning that they can increase or decrease as water moves downstream. Changes in the value of these parameters are the result of processes that occur on the land surface, and in the water column and sediment. Processes affecting DO in waterways include stream flow patterns, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. These processes can vary diurnally. As with nutrients and physical parameters, the Coalition's objective is to determine if exceedances are occurring and to investigate potential sources through analysis of monitoring data and special studies (if cost effective). By understanding the sources of constituents that influence field parameters, the Coalition can properly recommend management practices to address the exceedances.

E. coli

E. coli are a natural component of ecosystems and also occur in the intestinal tracts of animals. Coliform bacteria are voided in fecal material which can enter surface waters. *E. coli* may persist in the presence of oxygen in the environment for periods of time after being voided, and are known to reproduce and proliferate in the environment. Any species of vertebrate that voids feces can contribute *E. coli* to surface waters, including humans, companion animals such as dogs and cats, cows, chickens, waterfowl (ducks and geese), raccoons, otters, ground squirrels, feral pigs, and in some locations deer. Furthermore, manure is applied to crops as a fertilizer and can contribute to the presence of *E. coli* bacteria if composting is not conducted appropriately. Manure application practices are intended to keep manure from reaching waterways and proliferating pathogens. Even though landowners and operators are required to follow crop specific manure application practices and guidelines, contamination may occur.

On April 17, 2012 the Coalition was approved to temporarily suspend monitoring for *E. coli* at Core Monitoring and Assessment Monitoring for the remainder of 2012. This constituent was monitored as scheduled at designated sites from January through April 2012.

Metals

Nine metals are analyzed in Coalition monitoring: arsenic, boron, cadmium, copper, lead, molybdenum, nickel, selenium and zinc. Five of these metals are analyzed for both dissolved and total concentrations, and four metals are analyzed for total recoverable metal only. Dissolved metals were added to the Coalition monitoring plan in 2008 as a result of a new provision in the MRP Order R5-2008-0005. The

Environmental Protection Agency (EPA) recommends "the use of dissolved metal to set and measure compliance with aquatic life water quality standards." The EPA states that dissolved metal "more closely approximates the bioavailable fraction of the metal in the water column than total recoverable metal." In order to assess compliance with water quality standards the Coalition analyzes for dissolved fractions of cadmium, copper, lead, nickel and zinc. The remaining metals are analyzed for total concentrations only.

On May 6, 2011 the Coalition was approved to modify the MRPP and its monitoring strategy to reduce water column sampling for metals not applied by agriculture including arsenic, cadmium, lead and molybdenum. Starting July 2011, Assessment Monitoring for metals not applied by agriculture was reduced to two storm and two irrigation events a year; monitoring for metals under current management plans continues with the original approved management plan monitoring strategy. These constituents were monitored at Assessment Monitoring sites during one storm event on April 12, 2012.

On April 17, 2012 the Coalition was approved to temporarily suspend monitoring at Core sites and suspend monitoring for all metals (except copper and zinc) at Assessment Monitoring sites for the remainder of 2012. These constituents were monitored as scheduled at designated sites from January through March 2012 and during one storm/high TSS event on April 12, 2012. Starting in May, the Coalition reduced monitoring for metals occurred at Assessment Monitoring locations and included only copper (total and dissolved fractions) and zinc (total and dissolved fractions).

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.

SAMPLE SITE DESCRIPTIONS AND RAINFALL RECORDS

The site names, zones, sample types, station codes and locations of all sites monitored from January through December 2012 are provided in Tables 11 and 12. Table 11 and Figure 8 reflect the monitoring locations monitored from January through March. Table 12 and Figure 9 reflect the reduced monitoring schedule that was followed from April through December 2012. Land use for each subwatershed monitored in 2012 is listed in Table 11.

A narrative description of each site subwatershed with respect to hydrology and agricultural production follows below. Location maps of sampling sites, crops and land uses are provided in the Land Use Maps and 2012 Annual Site Photos in Appendix VIII.

ESJWQC region rainfall data for the months January through December 2012 are described in the section "Rainfall Records".

SAMPLE SITE LOCATIONS

Figures 8 and 9 are maps of all site subwatersheds (Assessment, Core and MPM) monitored from January through March and April through December 2012. Zone boundaries are also provided for reference.

Figure 8. ESJWQC January through March 2012 monitoring sites relative to zone boundaries.

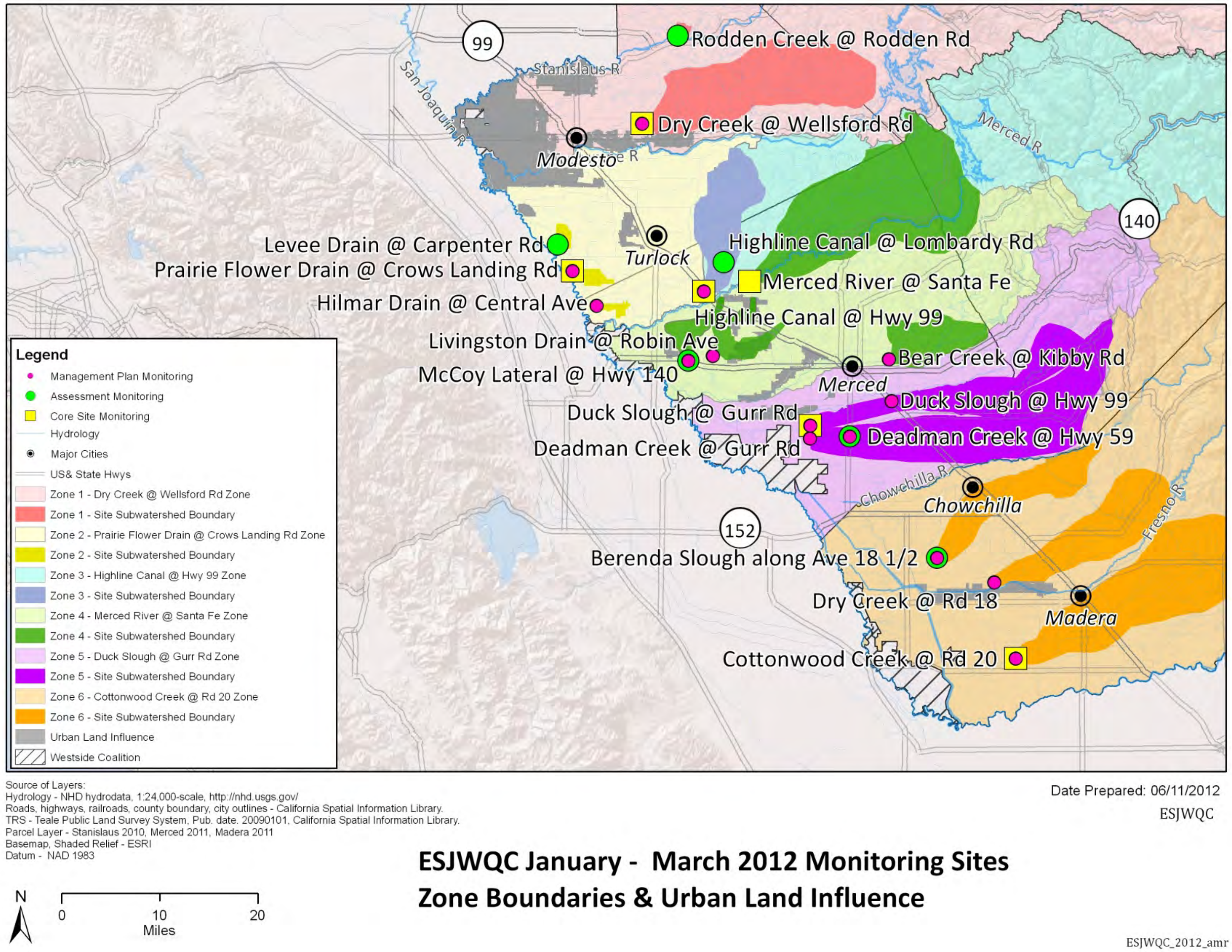
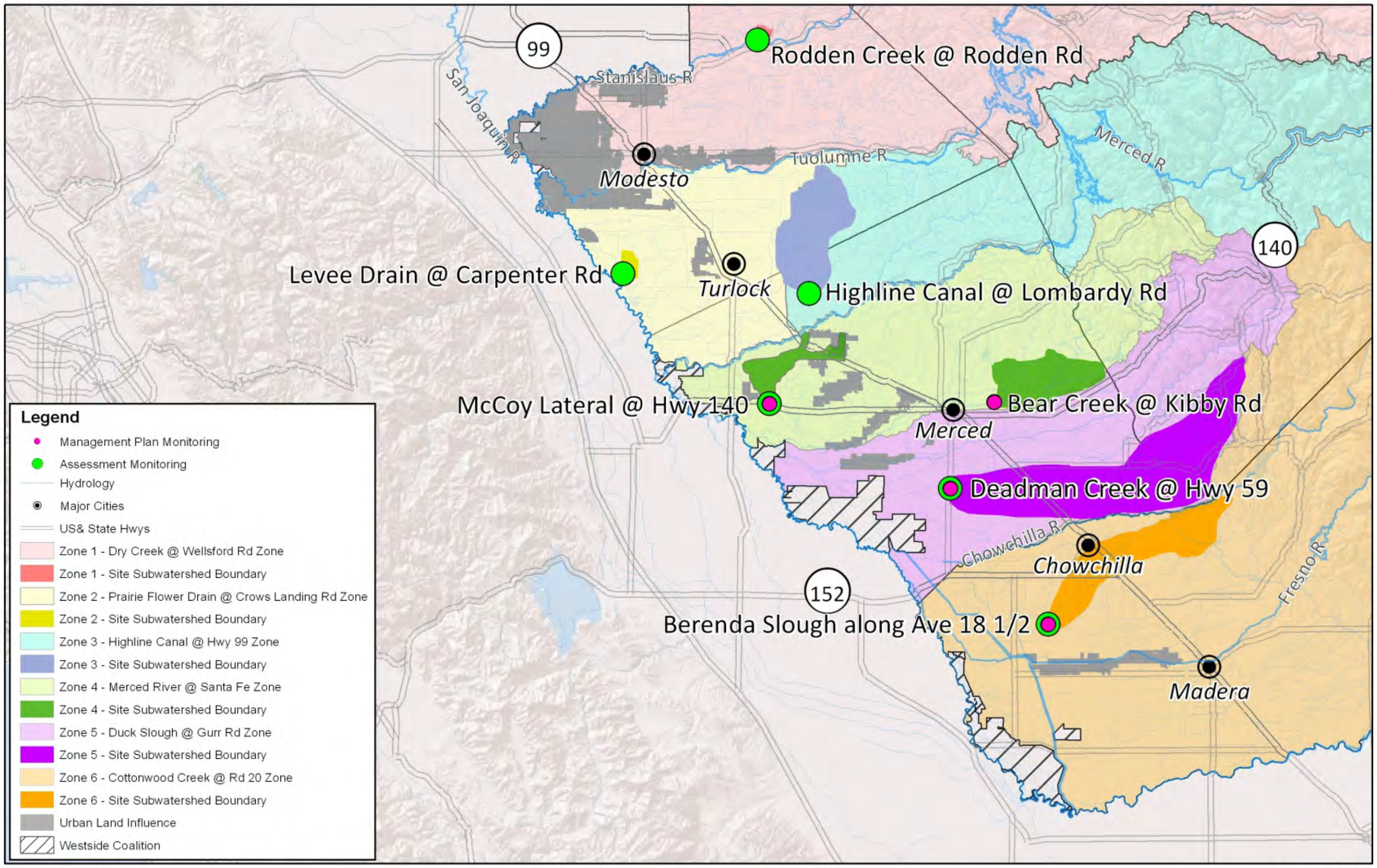


Table 11. ESJWQC January through March 2012 (by zone and site name) sample locations.

Zone	Site Type[1]	January-March 2012 Monitoring[2]	Site Name	Station Code	Latitude	Longitude
1	Core	C, MPM	Dry Creek @ Wellsford Rd	535XDCAWR	37.66000	-120.87526
1	Assessment	A	Rodden Creek @ Rodden Rd	535XRCARD	37.79053	-120.80886
2	Assessment	MPM	Hilmar Drain @ Central Ave	535XHDACA	37.39058	-120.95820
2	Core	C, MPM	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.44187	-121.00331
2	Assessment	A	Levee Drain @ Carpenter Rd	535XLDACR	37.48062	-121.03106
3	Core	C, MPM	Highline Canal @ Hwy 99	535XHCHNN	37.41254	-120.75941
3	Assessment	A	Highline Canal @ Lombardy Rd	535XHCALR	37.45547	-120.72181
4	Assessment	MPM	Bear Creek @ Kibby Rd	535XBCAKR	37.31230	-120.41535
4	Assessment	MPM	Livingston Drain @ Robin Ave	535XLDARA	37.31693	-120.74229
4	Core	C	Merced River @ Santa Fe	535XMRSFD	37.42705	-120.67353
4	Assessment	A, MPM	McCoy Lateral @ Hwy 140	535XMLAHO	37.30968	-120.78771
5	Assessment	MPM	Deadman Creek @ Gurr Rd	535XDCAGR	37.19514	-120.56147
5	Assessment	A, MPM	Deadman Creek @ Hwy 59	535DMCAHF	37.19755	-120.48763
5	Core	C, MPM	Duck Slough @ Gurr Rd	535XDSAGR	37.21408	-120.56126
5	Assessment	MPM	Duck Slough @ Hwy 99	535XDSAHN	37.25031	-120.41043
6	Assessment	A, MPM	Berenda Slough along Ave 18 1/2	545XBSAAE	37.01820	-120.32650
6	Core	C, MPM	Cottonwood Creek @ Rd 20	545XCCART	36.86860	-120.18180
6	Assessment	MPM	Dry Creek @ Rd 18	545XDCARE	36.98180	-120.22056

A – Assessment Monitoring
C – Core Monitoring
MPM – Management Plan Monitoring
[1] Site types are either Assessment or Core based on the ESJWQC MRPP (page 33). The type of monitoring conducted at sample locations depends on the rotation schedule outlined in the ESJWQC MRPP (Table 10, pages 52-53) where Core Monitoring locations rotate into Assessment Monitoring locations every third year.
[2] Core Monitoring and MPM (with the exception of Bear Creek @ Kibby Rd and Assessment sites) were suspended April through December 2012 (approved April 17, 2012).

Figure 9. ESJWQC April through December 2012 monitoring sites relative to zone boundaries.



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 - Stanislaus 2010, Merced 2011, Madera 2011
Basemap, Shaded Relief - ESRI
Datum - NAD 1983

Date Prepared: 06/11/2012
ESJWQC

ESJWQC April - December 2012 Monitoring Sites
Zone Boundaries & Urban Land Influence

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Miles

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Table 12. ESJWQC April through December 2012 (by zone and site name) sample locations.

Zone	Site Type[1]	April-December 2012 Monitoring[2]	Site Name	Station Code	Latitude	Longitude
1	Assessment	A	Rodden Creek @ Rodden Rd	535XRCARD	37.79053	-120.80886
2	Assessment	A	Levee Drain @ Carpenter Rd	535XLDACR	37.48062	-121.03106
3	Assessment	A	Highline Canal @ Lombardy Rd	535XHCALR	37.45547	-120.72181
4	Assessment	MPM	Bear Creek @ Kibby Rd	535XBCAKR	37.31230	-120.41535
4	Assessment	A, MPM	McCoy Lateral @ Hwy 140	535XMLAHO	37.30968	-120.78771
5	Assessment	A, MPM	Deadman Creek @ Hwy 59	535DMCAHF	37.19755	-120.48763
6	Assessment	A, MPM	Berenda Slough along Ave 18 1/2	545XBSAAE	37.01820	-120.32650

A – Assessment Monitoring

MPM – Management Plan Monitoring

[1] Site types are either Assessment or Core based on the ESJWQC MRPP (page 33).

[2] Core Monitoring and MPM (with the exception of Bear Creek @ Kibby Rd and Assessment sites) were suspended April through December 2012 (approved April 17, 2012).

Table 13. ESJWQC land use acreage of site subwatersheds, January through December 2012.

Land uses designated as irrigated/non-irrigated (I/NI), sites listed alphabetically from Bear Creek @ Kibby Rd to Rodden Creek @ Rodden Rd and numbers rounded to nearest whole number.

Land Use	I/NI	Bear Creek @ Kibby Rd	Berenda Slough along Ave 18 1/2	Cottonwood Creek @ Rd 20	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Dry Creek @ Rd 18	Dry Creek @ Wellsford Rd	Duck Slough @ Gurr Rd	Duck Slough @ Hwy 99	Highline Canal @ Hwy 99	Highline Canal @ Lombardy Rd	Hilmar Drain @ Central Ave	Levee Drain @ Carpenter Rd	Livingston drain @ Robin Ave	McCoy Lateral @ Hwy 140	Merced River @ Santa Fe	Prairie Flower Drain @ Crows Landing Rd	Rodden Creek @ Rodden Rd
Citrus	I	48	58	580	7	7	418				76	76					45		
Citrus	NI							7							4	4			
Deciduous nut and fruit	I	3424	13937	9222	10609	10598	11084	8118	7010	5030	20941	17091			7647	3670	20681		130
Field crop	I	1943	3046	3516	11876	10400	954	4674	4799	1689	7152	6899	1288	1362	773	1573	5527	1951	8
Field crop	NI			314													140		
Grain and hay	I	233	1855	837	2622	2425	439	215	603	290	583	583			484	524	701		
Grain and hay	NI	195	1414	1893	1166	1161	1212	2169	226	219	11	11				35	226		38
Idle	I		237	1259	587	587	512	238	807	264	181	80			112	251	141		5
Idle	NI																292		
Riparian Vegetation	NI		322	22				704											13
Wild vegetation	NI	16142	8979	35881	55864	52589	12569	57835	27490	25561	572	499		23	559	378	87838		761
Water surface	NI	70	272	717	359	335	264	316	158	93	184	184	22	31	13	34	671	30	32
Pasture	I	1501	1549	954	9958	8714	552	7599	5155	1949	4949	4892	398	621	298	335	4543	763	167
Pasture	NI				39	18		1142	53	43	353	353			106	9	69		0.2
Rice	I				8			1186	340						25	25			
Feedlot, dairy, farmstead	NI	93	1018	559	839	655	412	1479	728	248	1391	1273	147	219	316	375	1042	383	11
Truck, nursery, berry	I	636	141	73	3371	3348	119		1699	926	283	107			2082	1525	291		
Urban	NI		2191	10307	596	544	4538	530	406	283	678	423		5	1330	806	3498		42
Golf Course, cemetery, landscape	NI		233	29			280				1	1			90	42	203		
Vineyard	I		3630	20465	1379	1321	6702	1764			1311	975			249	2206	3002		
Total acres		**24283**	**38881**	**86630**	**99282**	**92702**	**40054**	**87976**	**49475**	**36594**	**38667**	**33447**	**1855**	**2260**	**14088**	**11792**	**128911**	**3126**	**1207**
Irrigated acres		**7784**	**24452**	**36906**	**40418**	**37400**	**20779**	**23794**	**20414**	**10149**	**35476**	**30704**	**1686**	**1983**	**11670**	**10109**	**34931**	**2714**	**311**

* Land use information obtained from data provided by DWR, http://www.water.ca.gov/landwateruse/anaglwu.cfm. Data were compiled in 2001 and land use in some areas of the ESJWQC may have changed since that time.

SITE SUBWATERSHED DESCRIPTIONS

The Coalition sampled 18 site subwatersheds as part of NM and MPM from January through December 2012. Descriptions and irrigated acreages of site subwatersheds monitored in 2012 are alphabetically listed below. Water was not present at all sites during every event and some sites were not scheduled to be sampled every month. Irrigated acres are included in the site subwatershed descriptions; however, these acreages are subject to change due to updated GIS layers and subwatershed boundary modifications. Maps of land use in each site subwatershed are included in Appendix VIII (Land Use Maps and 2012 Annual Site Photos).

- Bear Creek @ Kibby Rd (7,784 irrigated acres) – This site subwatershed drains an eastern portion of the Coalition region in Merced County. Bear Creek originates in the foothills of the Sierras with Burn's Creek as one of the major tributaries. Bear Creek drains to the east just north of the town of Planada, through Merced and eventually to the San Joaquin River. The primary irrigated agriculture in the site subwatershed includes deciduous fruits and nuts, field crops, truck crops, and irrigated pasture.
- Berenda Slough along Ave 18 ½ (24,452 irrigated acres) – This site subwatershed flows from Berenda Reservoir southwest through northern Madera County and is located southwest of the city of Chowchilla. When flows are sufficient, Berenda Slough empties into the Eastside Bypass. However, this waterway does not normally connect with the Bypass due to insufficient flow. The primary agriculture consists of orchards, vineyards, pasture and field crops.
- Cottonwood Creek @ Rd 20 (36,906 irrigated acres) – This site subwatershed is at the very southern edge of the Coalition region in Madera County and drains into the Eastside Bypass. The immediate upstream agriculture is vineyards with deciduous nuts farther to the east. The eastern portion of the subwatershed is dominated by wild vegetation as the subwatershed extends into the foothills.
- Deadman Creek @ Gurr Rd (40,418 irrigated acres) – This site subwatershed is a downstream site from Deadman Creek @ Hwy 59. The primary agriculture in the site subwatershed includes deciduous nuts and fruits, field crops and irrigated pastureland.
- Deadman Creek @ Hwy 59 (37,400 irrigated acres) – Deadman Creek flows out of the Sierra foothills and confluences with Dutchman's Creek in the vicinity of Highway 59. The primary agriculture in the site subwatershed includes orchards, irrigated pasture and field crops. A large portion of the subwatershed is wild vegetation.
- Dry Creek @ Rd 18 (20,779 irrigated acres) – This site subwatershed originates in the Sierra foothills and flows just north of the city of Madera eventually draining into the San Joaquin River through various channels and irrigation ditches. The primary irrigated agriculture within the subwatershed is deciduous orchards and vineyards with some scattered field crops.
- Dry Creek @ Wellsford Rd (23,794 irrigated acres) – This site subwatershed is in the northern part of the Coalition region and drains field crops, deciduous nuts, mixed pasture, and vineyards. Dry Creek originates to the east of Modesto, flows through Modesto and eventually confluences

with the Tuolumne River. The monitoring location for this site subwatershed allows samples to be collected from Dry Creek at the furthest downstream location that collects agricultural drainage prior to flowing through Modesto. Dairies are located upstream of this site and the town of Waterford may contribute an urban signal. The subwatershed extends into the foothills and is dominated in the east by wild vegetation with some rice, row crops and irrigated pasture.

- Duck Slough @ Gurr Rd (20,414 irrigated acres) – This site subwatershed is located downstream from the Duck Slough @ Hwy 99 site subwatershed. Duck Slough originates in the Sierra foothills and flows west (becoming the Duck Slough @ Gurr Rd site subwatershed) eventually joining with Deadman Creek in the western portion of the Coalition region. The slough eventually flows into the San Joaquin River via Deadman Creek and Deep Slough. Located to the southwest of Merced, this site drains field crops immediately upstream and deciduous nuts further upstream as well as some irrigated pasture. Treated wastewater from the city of Madera enters Duck Slough a few miles upstream of the Gurr Rd site.
- Duck Slough @ Hwy 99 (10,149 irrigated acres) – This site subwatershed is located upstream of the Duck Slough @ Gurr Rd site subwatershed and it was selected to determine relative contribution to water quality impairments from the upstream portion of the Duck Slough subwatershed. Duck Slough originates in the Sierra foothills and flows west (becoming the Duck Slough @ Gurr Rd site subwatershed) eventually joining with Deadman Creek in the western portion of the Coalition region. The monitoring site is located just east of Highway 99 and south of Planada and Merced. Irrigated agriculture in this site subwatershed is primarily deciduous nuts with some truck crops, field crops, and irrigated pastureland. On April 26, 2012 the Coalition was approved to modify the ESJWQC MRPP to remove Duck Slough @ Hwy 99 from the monitoring plan due to Highway 99 road construction at the sample site.
- Highline Canal @ Hwy 99 (35,476 irrigated acres) – The Highline Canal is a conveyance structure of the Turlock Irrigation District (TID) and carries both clean irrigation water and irrigation return flow during the summer in addition to urban and agricultural storm water runoff during the winter. This site was selected as a downstream companion site to the Highline Canal @ Lombardy Rd site. This site subwatershed is monitored to determine the relative contribution of the upstream and downstream site subwatersheds to water quality impairments. The sampling site is located just south of Delhi as the canal crosses Highway 99. Irrigated agriculture at this location is primarily deciduous nuts. Small amounts of field crops, irrigated pasture, and vineyards are also present.
- Highline Canal @ Lombardy Rd (30,704 irrigated acres) – The Highline Canal is a conveyance structure of the TID and carries both clean irrigation water and irrigation return flow during the summer, and storm water runoff during the winter. The Highline Canal flows west and eventually drains into the Merced River. The main upstream tributary of the Highline Canal is Mustang Creek which is a major tributary during the dormant season and passes immediately to the southeast of the Turlock Airport. The predominant crop in this site subwatershed is deciduous nuts with some dairies located upstream.
- Hilmar Drain @ Central Ave (1,686 irrigated acres) – This site subwatershed is located toward the western edge of the Coalition region near the San Joaquin River. This is a small site

subwatershed containing primarily field crops and a large number of dairies with irrigated pasture. Hilmar Drain originates at Williams Ave and Washington Rd and eventually drains into the San Joaquin River. At this location TID refers to the waterbody as "Reclamation Drain."

- Levee Drain @ Carpenter Rd (1,983 irrigated acres) – This site subwatershed is located north of Prairie Flower and originates at West Fulkerth Rd and South Carpenter Rd and drains into San Joaquin River. This is a small subwatershed containing mainly field crops with some irrigated pastureland.
- Livingston Drain @ Robin Ave (11,670 irrigated acres) – This site subwatershed is located in the west central portion of the Coalition region in Merced County and east of Howard Lateral. It is located west of Atwater and Livingston. Water from Hammatt Lateral and Arena Canal drain into Livingston Drain. Arena Canal receives storm water from the city of Livingston as well as water from the Livingston Canal. The agriculture is almost entirely orchards with some truck crops. Several dairies are also present in the watershed.
- McCoy Lateral @ Hwy 140 (10,109 irrigated acres) – This site subwatershed is located immediately west of Howard Lateral. Water from Hammatt Lateral and Arena Canal drain into McCoy Lateral. Arena Canal receives storm water from the city of Livingston as well as water from Livingston Canal. The agriculture is a mixture of deciduous fruits and nuts, vineyards, field crops, truck/nursery and berries.
- Merced River @ Santa Fe (34,931 irrigated acres) – This site subwatershed is designated as a major waterbody and is 303d listed. It was selected as an integrator site for several of the drains and tributaries in the vicinity. The Merced River originates in the high Sierra encountering several dams and impoundments as it flows west eventually draining into the San Joaquin River near Hatfield State Park. Upstream agriculture in the immediate vicinity of the river includes some field crops and deciduous nuts (primarily almonds). Irrigated pasture and vineyards are also present within the subwatershed.
- Prairie Flower Drain @ Crows Landing Rd (2,714 irrigated acres) – Relative to other drains in the western portion of the Coalition region, Prairie Flower Drain is longer and drains mostly irrigated agriculture. Dairies and feedlots are common in this part of the Coalition region and this drain receives runoff from farmland managed by dairies immediately upstream. Agriculture in the upstream vicinity is field crops and pasture. The water table in this site subwatershed is very shallow and the groundwater is high in salinity; as Prairie Flower Drain intercepts this groundwater supply it moves it to Harding Drain.
- Rodden Creek @ Rodden Rd (311 irrigated acres) – Rodden Creek, fed by Rodden Lake, is located in the northern portion of Stanislaus County and drains into the Stanislaus River. It is a small subwatershed dominated with wild vegetation but includes deciduous nut trees (mostly walnuts), irrigated and non-irrigated pasture and a few row crops. There is a small group of houses (urban area) to the east of the sampling location along Rodden Road.

RAINFALL RECORDS

The ESJWQC considers a sampling event a "storm sampling event" when there is at least 0.25 inches of rain recorded in the Coalition region within a 24 hour period. Monthly sampling is pre-scheduled; therefore if a storm is forecasted within a week before a scheduled sampling event or predicted within two days after the scheduled sampling event, the Coalition moves its sampling date to capture the storm. The Coalition sampled two storms from January through December 2012: April 12 and December 3, 2012. Below is a description of all the storms that occurred during the 2012 monitoring year, including whether or not they were sampled (further described in the Monitoring Results and Sample Details section of this report).

Daily rainfall records are provided for the three major cities in the Coalition region: Modesto, Merced, and Madera (Figure 10, April – June 2012; Figure 11, October – December 2012).

January through March 2012

There were no storm events meeting the trigger limit that were monitored from January through March 2012.

The first substantial storm system occurred over a five day period lasting from January 20 through January 24, 2012. During this period, 0.73 inches of precipitation was reported in Merced, 0.66 inches in Modesto and 0.85 inches in Madera (Figure 9). Even though this storm did meet the trigger limit in all three cities, sampling had already occurred on January 10, 2012; Coalition does not have the resources available to sample a second event within the same month.

Sampling took place on February 7, 2012 with light showers occurring. However, the trigger limit was not met with 0.05 inches recorded in Merced, 0.16 inches in Modesto and zero inches in Madera (Figure 9). Rainfall on February 13, 2012 was recorded at 0.37 inches in Merced and 0.21 inches or less in Modesto and Madera. No other storms in February resulted in enough precipitation to reach the trigger limit.

A substantial six day storm occurred from March 13 through March 18, 2012; during this time Merced reported 1.5 inches of precipitation, Modesto 1.96 inches and Madera 2.78 inches (Figure 9). While this storm did meet the trigger limit of 0.25 inches of rain within a 24 hour period, sampling had already been conducted on March 6, 2012. Another storm on March 25, 2012 produced enough rainfall to meet the trigger limit with 0.25 inches in Merced and 0.35 inches in Modesto, however; Madera only reported 0.11 inches of precipitation. The last week of March had three days with precipitation, but did not result in enough rainfall to reach the trigger limit (Figure 9).

April through June 2012

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

Three storm systems brought measureable precipitation to the ESJWQC area in April. The first day of the month had recorded precipitation of 0.01 inches in Merced and 0.09 inches in Madera, while Modesto reported 0.0 inches (Figure 10). The second storm system began on April 11, 2012 and lasted four days; the system was predicted to bring a substantial amount of precipitation for the month of April. The Coalition postponed April monitoring to capture the forecasted storm. The trigger limit was reached on the first day of the storm on April 11, 2012 when Merced reported 0.35 inches of precipitation, 0.8 inches in Modesto and 0.57 inches in Madera. Therefore, the first storm sampling event was monitored on April 12, 2012 with 0.11 inches in Merced, 0.26 inches in Modesto and 0.14 inches in Madera in the previous 24 hours. Assessment Monitoring locations were monitored on April 12, 2012 to capture runoff for a storm, high TSS event. Core Monitoring and MPM could not be sampled on the same day due to the number of sites. The Coalition received approval to reduce monitoring (omit Core Monitoring and MPM) before the Coalition could monitor Core Monitoring sites and MPM sites in April.

From April 13, 2012 through April 14, 2012 Merced received another 0.91 inches of precipitation while Modesto recorded 0.6 inches and Madera reported 0.68 inches (Figure 10).

A small system on May 25, 2012 produced 0.01 inches of precipitation in Merced, 0.15 inches in Modesto, and 0.0 inches in Madera (Figure 10). This was the only precipitation recorded for the month of May.

June received one day of rainfall, June 25, 2012, where Merced reported 0.01 inches of precipitation, Modesto reported 0.15 inches, and Madera measured 0.0 inches (Figure 10). This was the only rainfall recorded for the month of June.

July through September 2012

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

The East San Joaquin area had typical Mediterranean climate conditions in July through September with hot and dry weather and no precipitation. The only day to receive measureable precipitation was September 5, 2012 with 0.02 inches reported in Merced. No graph is included for July through September due to the lack of measurable precipitation.

October through December 2012

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

October received five days of measurable precipitation. The highest amount of rainfall occurred on October 22, 2012 when Merced reported 0.17 inches of precipitation, Modesto reported 0.03 inches and Madera reported 0.09 inches (Figure 11). The other four days received less than a tenth of an inch of precipitation.

During November there were thirteen days of recorded rainfall. Most of the storms in November were small systems that produced very little measureable precipitation. The first day the trigger limit was met was on November 17, 2012 when Merced reported 0.58 inches of precipitation, Modesto had 0.07 inches and Madera reported 0.48 inches. This system did not meet the trigger limit uniformly across the Coalition area and sampling had already taken place on November 13, 2012. On November 28, 2012 another storm system deposited enough precipitation in Modesto to exceed the trigger limit in part of the Coalition with 0.34 inches and only 0.18 inches in Merced and 0.14 inches in Madera.

On November 30, 2012 a large storm was predicted across the valley, and it deposited 0.51 inches of precipitation in Merced, 0.8 inches in Modesto and 1.15 inches in Madera. With this storm system on Friday and another being predicted during the weekend, the laboratories were contacted and arrangements were made to monitor the forecasted storm.

December began with a storm system which continued from the end of November, with 0.88 inches of precipitation in Merced, 0.81 inches in Modesto and 0.58 inches in Madera from December 1, 2012 through December 2, 2012. With such high amounts of precipitation December monitoring was postponed to capture the large storm event. The second storm sampling event occurred on December 3, 2012 as the last monitoring event of 2012 (Figure 11). December had 16 more days with precipitation following this storm event. On December 5, 2012 Merced reported 0.22 inches of precipitation, 0.47 inches in Modesto and 0.0.12 inches in Madera (Figure 11). Since this was only 2 days after sampling the second storm event, no additional monitoring was conducted. On December 17, 2012 Merced reported 0.28 inches of precipitation and the other cities reported less than the trigger limit. From December 21, 2012 through December 26, 2012 rainfall totals reported for the 5 day period were 1.02 inches of precipitation in Merced, 1.29 inches in Modesto and 1.28 inches in Madera (Figure 11). The Coalition does not have the resources to monitor twice in one month for multiple storm events and the first flush runoff had already occurred during the storm event captured in early December.

Figure 10. Precipitation history for Modesto, Merced and Madera, January through March 2012.

The shaded gray area represents the trigger to initiate sampling: 0.25”- 0.5” rain in 24 hours. All data reported on weatherunderground.com.

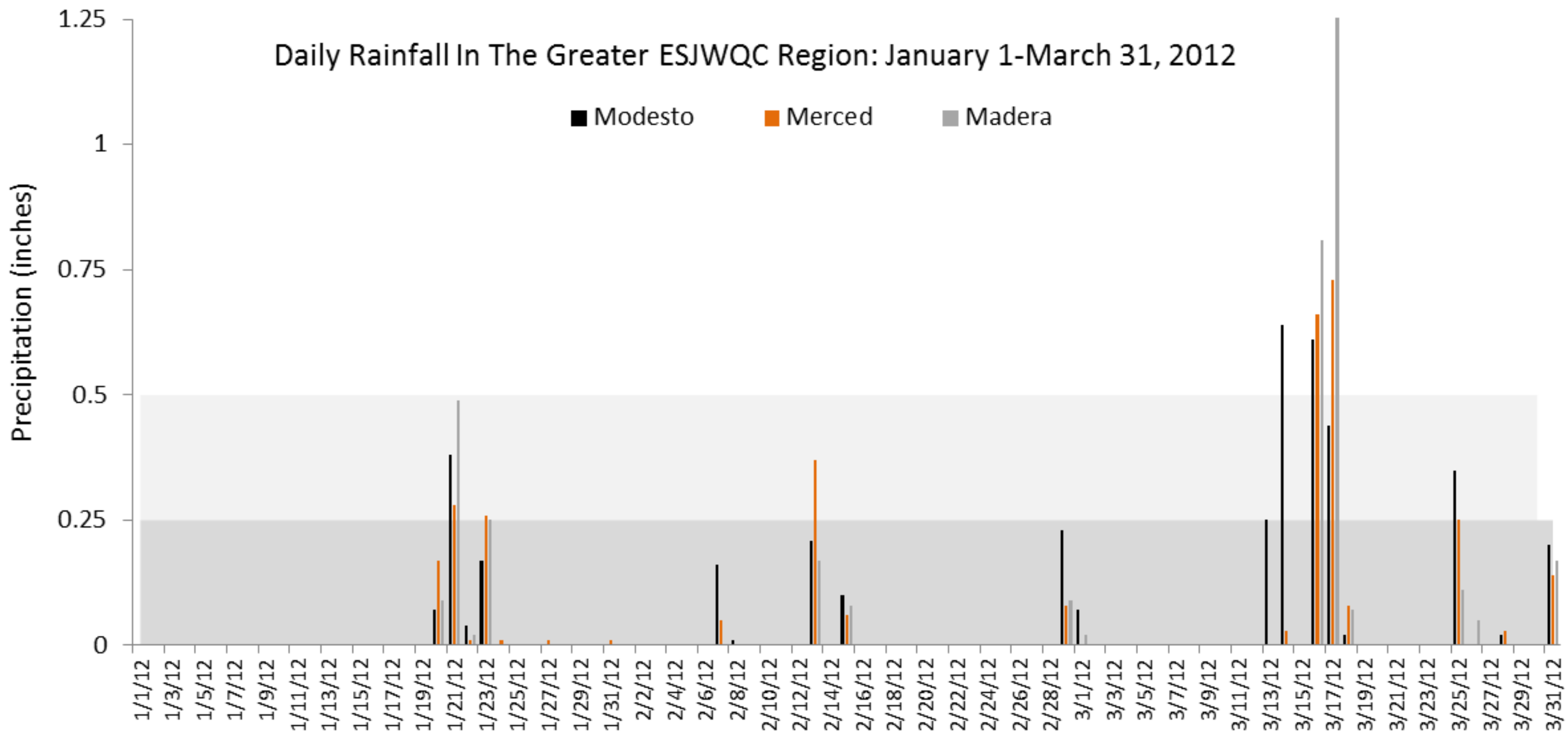


Figure 11. Precipitation history for Modesto, Merced and Madera, April through June 2012.

The shaded gray area represents the trigger to initiate sampling: 0.25" - 0.5" rain in 24 hours. All data reported on weatherunderground.com.

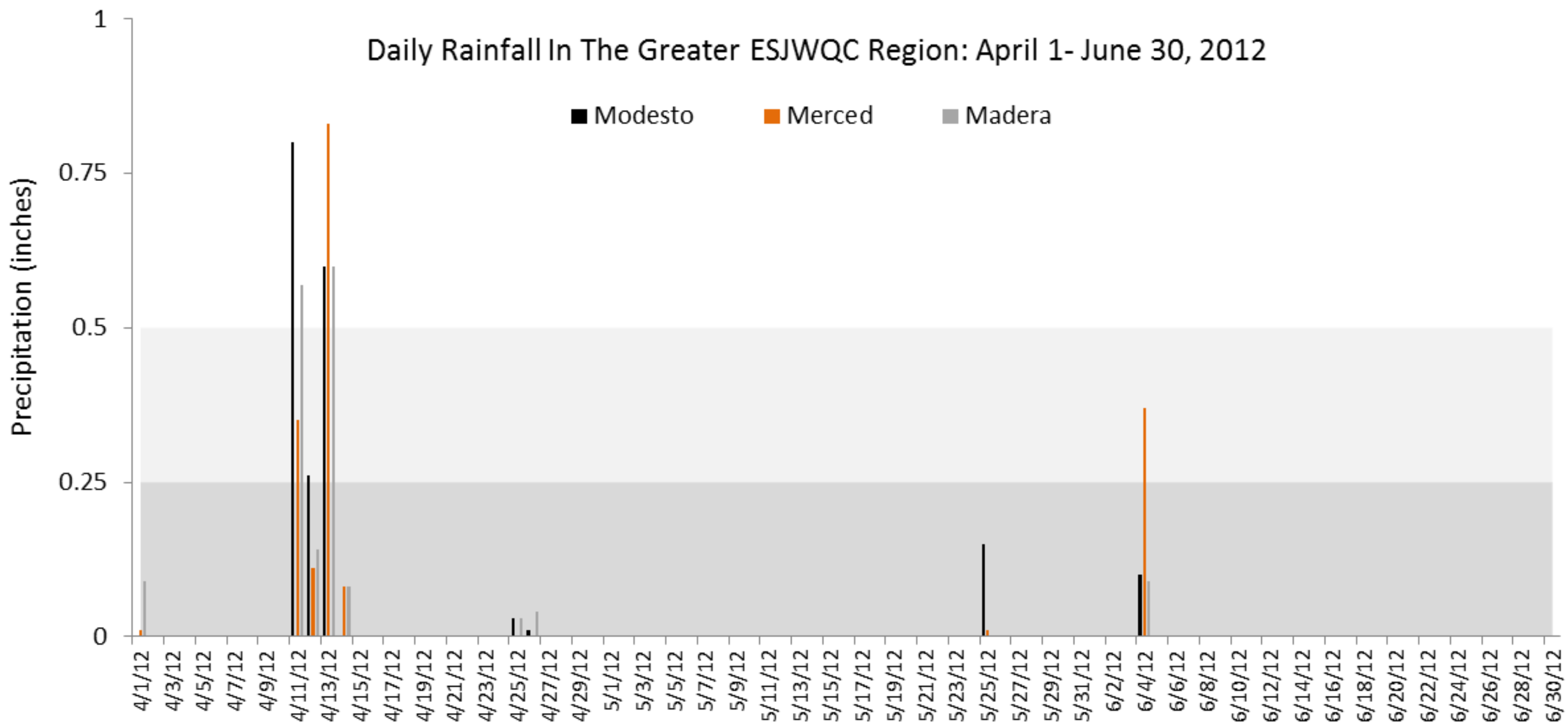
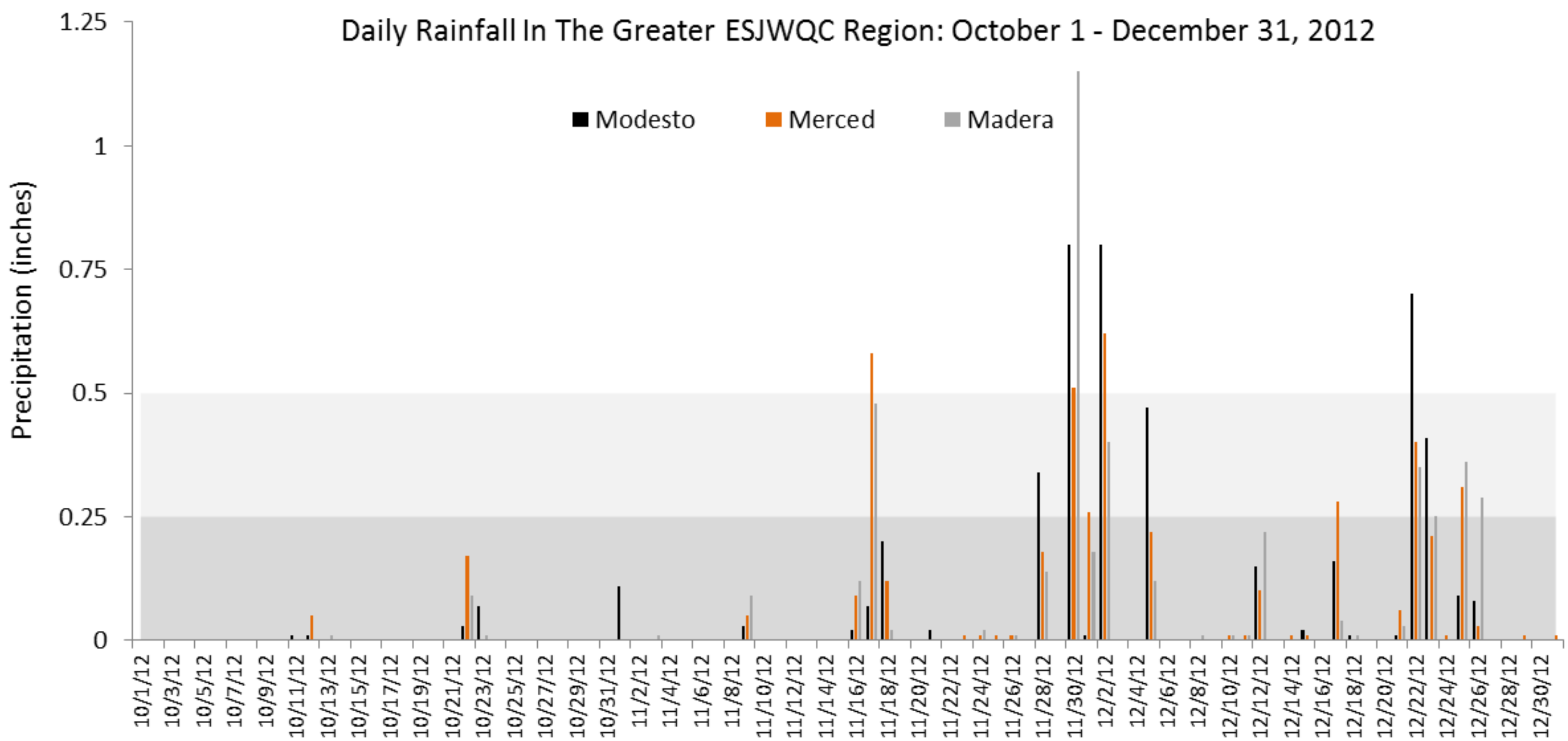


Figure 12. Precipitation history for Modesto, Merced and Madera, October through December 2012.

The shaded gray area represents the trigger to initiate sampling: 0.25" - 0.5" rain in 24 hours. All data reported on weatherunderground.com.



MONITORING RESULTS AND SAMPLE DETAILS

Monitoring occurred at sites in the ESJWQC from January through December 2012 (Tables 11 and 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 by the laboratories 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 amended ESJWQC Quality Assurance Project Plan (QAPP; page 33) approved on February 23, 2011. If there were any discrepancies between the COC and sample delivery, the issues were resolved and documented either directly on the COC or on an anomaly form filled out by the laboratory. Documentation of COC anomalies can be found on page 2 in Appendix I.

Instantaneous loads are calculated for all detections (Appendix II, Table II-7) according to the following formula:

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

The load values calculated for pesticides or other constituents represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected. Instantaneous load calculation for Total Maximum Daily Load (TMDL) compliance will be included in the MPUR to be submitted on April 1, 2013.

Complete monitoring results from sampling that occurred from January through December 2012 are included in Appendix II and Appendix 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 taken for NM, MPM and sediment monitoring events. Each sampling location, sampling date, sampling time and type of monitoring is listed in Tables 11 and 12 and all field data sheets can be found in Appendix IX. All laboratory reports including electronic Level III data packages for 2012 are submitted with this report.

During 2012, the following sites were not sampled due to lack of water on the specified sample date:

- Berenda Slough along Ave 18 ½ (Dry: 2/7/12, 4/12/12, 5/9/12, 9/11/12, 10/9/12, 11/13/12, 12/3/12)
- Cottonwood Creek @ Rd 20 (Dry: 1/10/12, 2/7/12, 3/6/12)
- Duck Slough @ Gurr Rd (Dry: 1/10/12)
- Deadman Creek @ Hwy 59 (Dry: 5/9/12, 8/14/12)
- Highline Canal @ Hwy 99 (Dry: 3/6/12)
- McCoy Lateral @Hwy 140 (Dry: 1/10/12, 2/7/12, 10/9/12, 11/13/12)

- Rodden Creek @ Rodden Rd (Dry: 11/13/12)

The Coalition followed sample collection procedures as outlined in the Monitoring and Reporting Program (MRP) Order No R5-2008-005 (Attachment C, Page 17). Sampling occurred for both sediment and water under both no flow and low flow conditions. If a site had no flow, discharge was recorded as zero if a waterbody had "puddle-like conditions" the entire sample was grouped as "non-contiguous". All results, including field parameters, chemistry and toxicity, are therefore associated with the non-contiguous flag and any water quality exceedances should be evaluated with the understanding that the water was not connected to a downstream waterbody.

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

- Bear Creek @ Kibby Rd (1/10/12)
- Berenda Slough along Ave 18 ½ (1/10/12, 3/6/12)
- Deadman Creek @ Gurr Rd (1/10/12)
- Deadman Creek @ Hwy 59 (7/10/12)
- Dry Creek @ Rd 18 (1/10/12, 2/7/12, 3/6/12)
- Duck Slough @ Hwy 99 (2/7/12)
- Highline Canal @ Lombardy Rd (11/13/12)
- Livingston Drain @ Robin Ave (1/10/12)

Table 14. Sample details for January through December 2012 (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 @ Kibby Rd	535XBCAKR	MPM	Management Plan Monitoring, Non-contiguous, Winter1	01/10/12	8:40	None	January Management Plan Monitoring for copper. Discharge recorded as zero due to non-contiguous waterbody.
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Management Plan Monitoring, Winter2	02/07/12	8:50	None	February Management Plan Monitoring for copper.
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Irrigation1, Management Plan Monitoring	05/09/12	10:20	None	May Management Plan Monitoring for chlorpyrifos and *Ceriodaphnia* toxicity. Too deep to measure discharge.
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Irrigation3, Management Plan Monitoring	07/10/12	13:00	None	July Management Plan Monitoring for chlorpyrifos and *Ceriodaphnia* toxicity. Too deep to measure discharge.
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Irrigation4, Management Plan Monitoring	08/14/12	14:20	None	August Management Plan Monitoring for copper. Too deep to measure discharge.
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM, NM	Management Plan Monitoring, Non-contiguous, Winter1	01/10/12	12:10	None	January Management Plan Monitoring for copper. Discharge recorded as zero due to non-contiguous waterbody.
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM, NM	Management Plan Monitoring, Winter2	02/07/12	11:33	Dry	Dry site, no samples collected. February Management Plan Monitoring for copper.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, Sediment	Non-contiguous, Winter3	03/06/12	10:30	Dry	Too shallow to collect water samples. Pesticides analyzed for in toxic sediment only. Discharge recorded as zero due to non-contiguous waterbody.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	High TSS 1-M , High TSS 1-P, Management Plan Monitoring, Storm1	04/12/12	12:32	Dry	Dry site, no samples collected. April Management Plan Monitoring for copper and chlorpyrifos.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	Irrigation1, Management Plan Monitoring	05/09/12	9:05	Dry	Dry site, no samples collected. May Management Plan Monitoring for copper and *Selenastrum* toxicity.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	Irrigation2, Management Plan Monitoring	06/12/12	12:00	None	June Management Plan Monitoring for copper. Discharge recorded as zero due to no measurable flow.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	Irrigation3, Management Plan Monitoring	07/10/12	11:40	None	July Management Plan Monitoring for chlorpyrifos, copper, and *Selenastrum* toxicity. Too deep to measure discharge.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	Irrigation4, Management Plan Monitoring	08/14/12	12:00	None	August Management Plan Monitoring for copper. Discharge recorded as zero, due to no measurable flow.
Berenda Slough along Ave 18 1/2	545XBSAAE	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/11/12	9:10	Dry	September Management Plan Monitoring for copper and chlorpyrifos. Dry site, no water samples collected. Sediment collected only.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	Fall1, Management Plan Monitoring	10/09/12	11:27	Dry	Dry site, no samples collected. October Management Plan Monitoring for copper.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	Fall2, Management Plan Monitoring	11/13/12	11:54	Dry	November Management Plan Monitoring for copper. Dry site, no samples collected.
Berenda Slough along Ave 18 1/2	545XBSAAE	NM, MPM	Management Plan Monitoring, Storm2	12/03/12	12:25	Dry	Dry site, no samples collected. December Management Plan Monitoring for copper.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Management Plan Monitoring, Winter1	01/10/12	9:46	Dry	Dry site, no samples collected. January Management Plan Monitoring for diuron, chlorpyrifos, and copper.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Management Plan Monitoring, Winter2	02/07/12	10:28	Dry	Dry site, no samples collected. February Management Plan Monitoring for diuron, chlorpyrifos, diazinon, and copper.
Cottonwood Creek @ Rd 20	545XCCART	NM	Winter3	03/06/12	9:20	Dry	Dry site, no samples collected.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	MPM	Management Plan Monitoring, Non-contiguous, Winter1	01/10/12	14:30	None	January Management Plan Monitoring for copper and *Pimephales* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	MPM	Management Plan Monitoring, Winter2	02/07/12	13:20	None	February Management Plan Monitoring for copper, *Ceriodaphnia*, *Selenastrum*, and *Pimephales* toxicity.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	MPM	Management Plan Monitoring, Winter3	03/06/12	13:00	None	March Management Plan Monitoring for chlorpyrifos, *Ceriodaphnia* and *Pimephales* toxicity.
Deadman Creek @ Hwy 59	535DMCAHF	MPM, NM	Management Plan Monitoring, Winter1	01/10/12	13:40	None	January Management Plan Monitoring *Selenastrum* toxicity. Discharge not measured due to no measurable flow.
Deadman Creek @ Hwy 59	535DMCAHF	NM	Winter2	02/07/12	12:30	None	
Deadman Creek @ Hwy 59	535DMCAHF	NM, Sediment	Winter3	03/06/12	11:40	None	Pesticides analyzed for in toxic sediment only.
Deadman Creek @ Hwy 59	535DMCAHF	NM, MPM	High TSS 1-M , High TSS 1-P, Management Plan Monitoring, Storm1	04/12/12	13:20	None	April Management Plan Monitoring for chlorpyrifos and *Selenastrum* toxicity.
Deadman Creek @ Hwy 59	535DMCAHF	NM	Irrigation1	05/09/12	9:40	Dry	Dry site, no samples collected.
Deadman Creek @ Hwy 59	535DMCAHF	NM	Irrigation2	06/12/12	10:40	None	Discharge recorded as zero due to no measurable flow.
Deadman Creek @ Hwy 59	535DMCAHF	NM	Irrigation3, Non-contiguous	07/10/12	10:30	None	Non-contiguous waterbody. Discharge recorded as zero due to non-contiguous waterbody.
Deadman Creek @ Hwy 59	535DMCAHF	NM, MPM	Irrigation4, Management Plan Monitoring	08/14/12	11:07	Dry	Dry site, no samples collected. August Management Plan Monitoring for chlorpyrifos.
Deadman Creek @ Hwy 59	535DMCAHF	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/11/12	10:00	None	September Management Plan Monitoring for chlorpyrifos.
Deadman Creek @ Hwy 59	535DMCAHF	NM	Fall1	10/09/12	10:30	None	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
Deadman Creek @ Hwy 59	535DMCAHF	NM	Fall2	11/13/12	10:50	None	
Deadman Creek @ Hwy 59	535DMCAHF	NM	Storm2	12/03/12	13:20	None	
Dry Creek @ Rd 18	545XDCARE	MPM	Management Plan Monitoring, Non-contiguous, Winter1	01/10/12	10:20	None	January Management Plan Monitoring for diuron, copper, and *Selenastrum* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Dry Creek @ Rd 18	545XDCARE	MPM	Management Plan Monitoring, Non-contiguous, Winter2	02/07/12	11:00	None	February Management Plan Monitoring for chlorpyrifos, diazinon, diuron, copper, and *Selenastrum* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Dry Creek @ Rd 18	545XDCARE	MPM, Sediment	Management Plan Monitoring, Non-contiguous, Winter3	03/06/12	9:50	None	March Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge recorded as zero due to non-contiguous waterbody.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Winter1	01/10/12	9:50	None	Discharge recorded as zero due to no measurable flow.
Dry Creek @ Wellsford Rd	535XDCAWR	MPM, NM	Management Plan Monitoring, Winter2	02/07/12	11:20	None	February Management Plan Monitoring for diuron, copper, and *Selenastrum* toxicity.
Dry Creek @ Wellsford Rd	535XDCAWR	MPM, NM, Sediment	Management Plan Monitoring, Winter3	03/06/12	11:50	None	March Management Plan Monitoring for *Selenastrum* and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge recorded as zero due to no measurable flow.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Management Plan Monitoring, Winter1	01/10/12	14:57	Dry	Dry site, no samples collected. January Management Plan Monitoring for copper.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Management Plan Monitoring, Winter2	02/07/12	14:00	None	February Management Plan Monitoring for copper and *Ceriodaphnia* toxicity.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Management Plan Monitoring, Winter3	03/06/12	13:50	None	March Management Plan Monitoring for *Ceriodaphnia* toxicity.
Duck Slough @ Hwy 99	535XDSAHN	MPM	Management Plan Monitoring, Non-contiguous, Winter2	02/07/12	9:40	None	February Management Plan Monitoring for copper. Discharge recorded as zero due to non-contiguous waterbody.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Management Plan Monitoring, Winter1	01/10/12	14:00	None	January Management Plan Monitoring for diuron, chlorpyrifos, and copper. Discharge recorded as zero due to no measurable flow.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Management Plan Monitoring, Winter2	02/07/12	16:20	None	February Management Plan Monitoring for diuron, chlorpyrifos, copper, lead, and *Selenastrum* toxicity. Too shallow to measure discharge.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM, Sediment	Management Plan Monitoring, Winter3	03/06/12	16:10	Dry	March Management Plan Monitoring for *Selenastrum, Ceriodaphnia* and *Hyalella* toxicity. Dry site, no samples collected.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Winter1	01/10/12	14:40	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Winter2	02/07/12	16:30	None	Discharge recorded as zero due to no measurable flow.
Highline Canal @ Lombardy Rd	535XHCALR	NM, Sediment	Winter3	03/06/12	16:40	None	Pesticides analyzed for in toxic sediment only. Discharge not measured due to no measurable flow.
Highline Canal @ Lombardy Rd	535XHCALR	NM	High TSS 1-M , High TSS 1-P, Storm1	04/12/12	11:10	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Irrigation1	05/09/12	13:00	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Irrigation2	06/12/12	8:20	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Irrigation3	07/10/12	8:30	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Irrigation4	08/14/12	8:20	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	Sediment	Irrigation5	09/11/12	13:20	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Fall1	10/09/12	8:40	None	Too deep to measure discharge.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Fall2, Non-contiguous	11/13/12	13:10	None	Discharge recorded as zero due to non-contiguous waterbody.
Highline Canal @ Lombardy Rd	535XHCALR	NM	Storm2	12/03/12	10:50	None	
Hilmar Drain @ Central Ave	535XHDACA	MPM	Management Plan Monitoring, Winter2	02/07/12	15:20	None	February Management Plan Monitoring for copper.
Hilmar Drain @ Central Ave	535XHDACA	MPM, Sediment	Management Plan Monitoring, Winter3	03/06/12	15:40	None	March Management Plan Monitoring for *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge not measured due to sediment toxicity monitoring only.
Levee Drain @ Carpenter Rd	535XLDACR	NM	Winter1	01/10/12	11:50	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM	Winter2	02/07/12	13:40	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM, Sediment	Winter3	03/06/12	13:30	None	Pesticides analyzed for in toxic sediment only.
Levee Drain @ Carpenter Rd	535XLDACR	NM	High TSS 1-M , High TSS 1-P, Storm1	04/12/12	15:50	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM	Irrigation1	05/09/12	14:30	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM	Irrigation2	06/12/12	13:40	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM	Irrigation3	07/10/12	13:40	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM	Irrigation4	08/14/12	14:40	None	
Levee Drain @ Carpenter Rd	535XLDACR	Sediment	Irrigation5	09/11/12	13:00	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM	Fall1	10/09/12	11:50	None	

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Levee Drain @ Carpenter Rd	535XLDACR	NM	Fall2	11/13/12	11:00	None	
Levee Drain @ Carpenter Rd	535XLDACR	NM	Storm2	12/03/12	9:30	None	
Livingston Drain @ Robin Ave	535XLDARA	MPM	Management Plan Monitoring, Non-contiguous, Winter1	01/10/12	15:30	None	January Management Plan Monitoring for copper, lead, and chlorpyrifos. Discharge recorded as zero due to non-contiguous waterbody.
Livingston Drain @ Robin Ave	535XLDARA	MPM	Management Plan Monitoring, Winter2	02/07/12	15:10	None	February Management Plan Monitoring for lead, copper, and *Selenastrum* toxicity.
McCoy Lateral @ Hwy 140	535XMLAHO	MPM, NM	Management Plan Monitoring, Winter1	01/10/12	15:56	Dry	Dry site, no samples collected. January Management Plan Monitoring for copper.
McCoy Lateral @ Hwy 140	535XMLAHO	NM	Winter2	02/07/12	14:51	Dry	Dry site, no samples collected.
McCoy Lateral @ Hwy 140	535XMLAHO	NM, Sediment	Winter3	03/06/12	15:10	None	Pesticides analyzed for in toxic sediment only. Discharge not taken due to extremely windy and dusty weather conditions.
McCoy Lateral @ Hwy 140	535XMLAHO	NM	High TSS 1-M , High TSS 1-P, Storm1	04/12/12	14:40	None	
McCoy Lateral @ Hwy 140	535XMLAHO	NM	Irrigation1	05/09/12	11:40	None	
McCoy Lateral @ Hwy 140	535XMLAHO	NM	Irrigation2	06/12/12	9:20	None	
McCoy Lateral @ Hwy 140	535XMLAHO	NM	Irrigation3	07/10/12	9:30	None	Discharge recorded as zero due to no measurable flow.
McCoy Lateral @ Hwy 140	535XMLAHO	NM	Irrigation4	08/14/12	10:00	None	
McCoy Lateral @ Hwy 140	535XMLAHO	Sediment, MPM	Irrigation5, Management Plan Monitoring	09/11/12	11:40	None	September Management Plan Monitoring for copper.
McCoy Lateral @ Hwy 140	535XMLAHO	NM, MPM	Fall1, Management Plan Monitoring	10/09/12	9:25	Dry	Dry site, no samples collected. October Management Plan Monitoring for copper.
McCoy Lateral @ Hwy 140	535XMLAHO	NM	Fall2	11/13/12	9:57	Dry	Dry site, no samples collected.
McCoy Lateral @ Hwy 140	535XMLAHO	NM	Storm2	12/03/12	14:30	None	
Merced River @ Santa Fe	535XMRSFD	NM	Winter1	01/10/12	15:20	None	
Merced River @ Santa Fe	535XMRSFD	NM	Winter2	02/07/12	17:10	None	
Merced River @ Santa Fe	535XMRSFD	NM	Winter3	03/06/12	16:40	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Management Plan Monitoring, Winter1	01/10/12	12:50	None	January Management Plan Monitoring for *Selenastrum* toxicity.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Management Plan Monitoring, Winter2	02/07/12	14:40	None	February Management Plan Monitoring for *Selenastrum* toxicity. Discharge recorded as zero due to no measurable flow.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, Sediment	Management Plan Monitoring, Winter3	03/06/12	15:00	None	March Management Plan Monitoring for *Ceriodaphnia* and *Hyalella* toxicity. Pesticides analyzed for in toxic sediment only. Discharge recorded at zero due to no measurable flow.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Rodden Creek @ Rodden Rd	535XRCARD	NM	Winter1	01/10/12	8:20	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM	Winter2	02/07/12	9:30	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM, Sediment	Winter3	03/06/12	9:20	None	Pesticides analyzed for in toxic sediment only.
Rodden Creek @ Rodden Rd	535XRCARD	NM	High TSS 1-M , High TSS 1-P, Storm1	04/12/12	9:00	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM	Irrigation1	05/09/12	9:20	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM	Irrigation2	06/12/12	9:00	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM	Irrigation3	07/10/12	9:00	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM	Irrigation4	08/14/12	9:30	None	
Rodden Creek @ Rodden Rd	535XRCARD	Sediment	Irrigation5	09/11/12	9:30	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM	Fall1	10/09/12	9:00	None	
Rodden Creek @ Rodden Rd	535XRCARD	NM	Fall2	11/13/12	8:57	Dry	Dry site, no samples collected.
Rodden Creek @ Rodden Rd	535XRCARD	NM	Storm2	12/03/12	12:20	None	

High TSS 1-P - First high TSS monitoring event for organochlorine pesticides.
High TSS 1-M - First high TSS monitoring event for metals no longer applied by agriculture.
MPM-Management Plan Monitoring
NM-Normal Monitoring
TSS- Total suspended solids

SAMPLING AND ANALYTICAL METHODS

Sample collection procedures and descriptions of the field instruments are provided in Tables 15 and 16 respectively. Site-specific discharge methods are provided in Table 17. Analytical methods and reporting limits (RLs) are provided in Table 18.

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

Table 15. Sampling procedures.

Analytical Parameter	Sample Volume[1]	Sample Container	Initial Preservation/Holding Requirements	Holding Time[2]
Physical Parameters[3]				
Total Dissolved Solids	500 mL	1x 2000 mL Polyethylene	Store at ≤6°C	7 Days
Total Suspended Solids	500 mL			7 Days
Turbidity	500 mL			48 Hours
Nutrients				
Soluble Orthophosphate[3]	500 mL	1x 2000 mL Polyethylene	Store at ≤6°C	48 Hours
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	2x 500 mL Polyethylene	Filter as necessary; preserve to ≤pH 2 with HNO_3, store at ≤6°C	180 Days
Drinking Water				
E. coli (pathogens)	100 mL	1x 100 mL Polyethylene	Preserved with $Na_2S_2O_3$, store at <8 °C	24 Hours[4]
Total Organic Carbon	120 mL	3x 40 mL Amber glass VOA with PTFE-lined cap	Preserve with HCl, store at ≤6°C	28 Days
Pesticides				
Carbamates	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Organochlorines	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Organophosphates	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Herbicides (general)	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
Herbicides (paraquat)	1 L	1x L Brown Polyethylene	Store at ≤6°C; extract within 7 days	21 days
Herbicides (glyphosate)	80 mL	2x 40 mL Glass VOA	Store at ≤6°C; freeze (-20°C) within 2 weeks	6 Months
Water Column Toxicity				
Aquatic Toxicity	5 Gallons	5x 1 Gallon Amber Glass	Store at ≤6°C	36 Hours
Sediment				
Sediment Toxicity	2 L	2x L Glass	Store at ≤6°C, do not freeze	14 Days
Sediment Grain Size[5]	230 mL	2x 8oz. Polyethylene	Store at ≤6°C, do not freeze	28 days
Sediment Total Organic Carbon[5]	230 mL	2x 8oz. Polyethylene	Store at ≤6°C (not frozen), analyze or freeze (-20C) within 28 days	28 days (not frozen) 12 Months (frozen)
Sediment Chemistry	750 mL	2x 8oz. Polyethylene	Store at ≤6°C (not frozen), extract within 14 days or freeze (-20C) within 48 hours	14 days (not frozen) 12 Months (frozen)

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

Table 16. 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
Discharge	Marsh-McBirney Flow Mate 2000

YSI- Yellow Springs Instruments

Table 17. Site specific discharge methods for 2012.

SITE	DISCHARGE METHOD[1]	METER/ GAUGE
Bear Creek @ Kibby Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Berenda Slough along Ave 18 1/2	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Cottonwood Creek @ Rd 20	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Deadman Creek @ Gurr Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Deadman Creek @ Hwy 59	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Dry Creek @ Rd 18	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Dry Creek @ Wellsford Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Duck Slough @ Gurr Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Duck Slough @ Hwy 99	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Highline Canal @ Hwy 99	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Highline Canal @ Lombardy Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Hilmar Drain @ Central Ave	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Levee Drain @ Carpenter Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Livingston Drain @ Robin Ave	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
McCoy Lateral @ Hwy 140	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Merced River @ Santa Fe Rd	DWR Gauge	California Data Exchange Center (CDEC) Merced River at Cressy (CRS)
Prairie Flower Drain @ Crows Landing Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Rodden Creek @ Rodden 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 18. Field and laboratory analytical methods.

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Physical Parameters					
Flow	Fresh Water	Field Measure	1 cfs	NA	USGS R2Cross Streamflow Method
pH	Fresh Water	Field Measure	0.1 pH units	NA	EPA 150.1
Electrical Conductivity	Fresh Water	Field Measure	100 µmhos/cm	NA	EPA 120.1
Dissolved oxygen	Fresh Water	Field Measure	0.1 mg/L	NA	SM 4500-O
Temperature	Fresh Water	Field Measure	0.1 °C	NA	SM 2550
Turbidity	Fresh Water	Caltest	0.05 NTU	0.030 NTU	EPA 180.1
Total Dissolved Solids	Fresh Water	Caltest	10 mg/L	4 mg/L	SM 2540 C
Total Suspended Solids	Fresh Water	Caltest	3 mg/L	1 mg/L	SM 2540 D
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
Pathogens					
Escherichia coli	Fresh Water	Caltest	1 MPN/ 100 mL	1 MPN/ 100 mL	SM 9223
Toxicity					
Water Column Toxicity	Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-012
	Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-013
Sediment Toxicity	Sediment	AQUA-Science	NA	NA	EPA 600/R-99-064
Carbamates					
Aldicarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Carbaryl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Carbofuran	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Methiocarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Methomyl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Oxamyl	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Organochlorines					
DDD	Fresh Water	APPL Inc	0.01 µg/L	0.003 µg/L	EPA 8081A
DDE	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
DDT	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Dicofol	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8081A
Dieldrin	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endrin	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Methoxychlor	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Group A Pesticides					
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

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Demeton-s	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8141A
Disulfoton	Fresh Water	APPL Inc	0.05 µg/L	0.02 µg/L	EPA 8141A
Malathion	Fresh Water	APPL Inc	0.1 µg/L	0.05 µg/L	EPA 8141A
Methamidiphos	Fresh Water	APPL Inc	0.2 µg/L	0.1 µg/L	EPA 8321A
Methidathion	Fresh Water	APPL Inc	0.1 µg/L	0.04 µg/L	EPA 8141A
Parathion, methyl	Fresh Water	APPL Inc	0.1 µg/L	0.075 µg/L	EPA 8141A
Phorate	Fresh Water	APPL Inc	0.1 µg/L	0.07 µg/L	EPA 8141A
Phosmet	Fresh Water	APPL Inc	0.2 µg/L	0.06 µg/L	EPA 8141A
Herbicides					
Atrazine	Fresh Water	APPL Inc	0.5 µg/L	0.08 µg/L	EPA 8141A
Cyanazine	Fresh Water	APPL Inc	0.5 µg/L	0.12 µg/L	EPA 8141A
Diuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Glyphosate	Fresh Water	NCL Ltd	5 µg/L	1.7 µg/L	EPA 547M
Linuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Paraquat	Fresh Water	NCL Ltd	0.4 µg/L	0.19 µg/L	EPA 549.2M
Simazine	Fresh Water	APPL Inc	0.5 µg/L	0.11 µg/L	EPA 8141A
Trifluralin	Fresh Water	APPL Inc	0.05 µg/L	0.036 µg/L	EPA 8141A
Metals					
Arsenic	Fresh Water	Caltest	0.5 µg/L	0.02 µg/L	EPA 200.8 (ICPMS Collision Cell)
Boron	Fresh Water	Caltest	10 µg/L	0.7 µg/L	EPA 200.8 (ICPMS Collision Cell)
Cadmium	Fresh Water	Caltest	0.1 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
Copper	Fresh Water	Caltest	0.5 µg/L	0.07 µg/L	EPA 200.8 (ICPMS Collision Cell)
Lead	Fresh Water	Caltest	0.25 µg/L	0.03 µg/L	EPA 200.8 (ICPMS Collision Cell)
Molybdenum	Fresh Water	Caltest	0.25 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nickel	Fresh Water	Caltest	0.5 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
Selenium	Fresh Water	Caltest	1 µg/L	0.06 µg/L	EPA 200.8 (ICPMS Reaction Cell)
Zinc	Fresh Water	Caltest	1 µg/L	0.7 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nutrients					
Total Kjeldahl Nitrogen	Fresh Water	Caltest	0.1mg/L	0.07 mg/L	SM 4500-NH3 C v20
Nitrate + Nitrite (as N)	Fresh Water	Caltest	0.05 mg/L	0.02 mg/L	EPA 353.2
Total Ammonia	Fresh Water	Caltest	0.1 mg/L	0.040 mg/L	SM 4500-NH3 C v20
Total Phosphorus	Fresh Water	Caltest	0.01 mg/L	0.007 mg/L	SM 4500-P E
Soluble Orthophosphate	Fresh Water	Caltest	0.01 mg/L	0.006 mg/L	SM 4500-P E
Sediment					
Bifenthrin	Sediment	Caltest	0.33 ng/g dw	0.1 ng/g dw	GCIS/NCI/SIM
Cyfluthrin	Sediment	Caltest	0.33 ng/g dw	0.11 ng/g dw	GCIS/NCI/SIM
Cypermethrin	Sediment	Caltest	0.33 ng/g dw	0.1 ng/g dw	GCIS/NCI/SIM
Deltamethrin: Tralomethrin	Sediment	Caltest	0.33 ng/g dw	0.12 ng/g dw	GCIS/NCI/SIM
Esfenvalerate	Sediment	Caltest	0.33 ng/g dw	0.13 ng/g dw	GCIS/NCI/SIM
Lambda-Cyhalothrin	Sediment	Caltest	0.33 ng/g dw	0.06 ng/g dw	GCIS/NCI/SIM
Permethrin	Sediment	Caltest	0.33 ng/g dw	0.11 ng/g dw	GCIS/NCI/SIM
Fenpropathrin	Sediment	Caltest	0.33 ng/g dw	0.07 ng/g dw	GCIS/NCI/SIM
Chlorpyrifos	Sediment	Caltest	0.33 ng/g dw	0.12 ng/g dw	GCIS/NCI/SIM
Total Organic Carbon	Sediment	Caltest[1]	200 mg/kg dw	100 mg/kg dw	Walkley Black
Grain Size	Sediment	Caltest[1]	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] Subcontracted to PTS Laboratories.

PRECISION, ACCURACY AND COMPLETENESS

An assessment of precision, accuracy, and completeness is tabulated in Tables 19-33. All data are acceptable and useable. In a few instances, some data quality objectives were not met, but this does not affect the usability of data.

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

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

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

COMPLETENESS

Completeness is assessed on three levels: field and transport completeness, analytical completeness and batch completeness. Field and transport completeness assesses how many of the scheduled samples were collected and sent for analysis. Completeness may be less than 100% for field and transport for reasons such as bottle breakage during transportation or inability to access a site. Dry sites are considered "collected" and do not count against completeness for field and transport. Analytical completeness assesses the number of samples that arrived at a laboratory and were analyzed. Completeness may be less than 100% for analytical completeness for various reasons including bottle breakage while the sample was stored at the laboratory or laboratory error resulting in an analysis not being performed. Batch completeness assesses whether chemistry and toxicity batches have all of the required laboratory quality control. For batch completeness, the number of batches with complete laboratory quality control is compared to the overall number of batches. Table 19 includes an evaluation of completeness for the various levels.

Field and Transport Completeness

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

The constituents sampled from January through December 2012 are listed by site in Tables 5 and 6. Table 19 includes the specific analyte, the expected number of environmental samples scheduled to be collected, the number of total samples collected (including environmental and field quality control samples) a breakdown of the number and percentages of samples that were field blanks, field duplicates, equipment blanks, travel blanks and an overall assessment of completeness. Overall, field blanks, field duplicates, equipment blanks and travel blanks comprised more than 5% of samples collected for each analyte and field quality control samples were collected every event (Table 19).

Field parameter measurements, including DO, discharge, pH, SC, and temperature were taken at each site for all sampling events. Dissolved oxygen, pH, SC and temperature were each measured 89 times compared to the scheduled 108 times due to dry sites (100% completeness). Discharge was measured at 62% of site visits and was not measured for one or more of the following reasons: 1) sediment and toxicity monitoring only event, 2) the water was too deep to safely measure discharge, or 3) the water was too shallow to measure discharge. Documentation of why discharge was not taken is included in the sample details table (Table 12).

Analytical Completeness

All samples collected (including field quality control) were preserved and analyzed, resulting in 100% analytical completeness (Table 19).

Batch Completeness

All chemistry batches were reviewed for Quality Assurance/Control (QA/QC) completeness. A complete batch must have a minimum of one laboratory blank (method blank), laboratory duplicate, laboratory control spike (LCS) and matrix spike (MS) with the exception of turbidity, *E. coli*, Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) which do not require a MS. Batch completeness for all 2012 chemistry data is 99%. A field blank collected in April 2012 and analyzed for glyphosate recovered with suspect results and therefore the laboratory re-prepped and re-analyzed the sample within hold time; the field blank re-analysis recovered within acceptable limits. The batch containing the re-analyzed glyphosate field blank and associated environmental samples did not include a MS due to insufficient volume for re-analysis. A laboratory duplicate from one sediment grain size batch from the March 2012 sampling event was not analyzed due to laboratory miscommunication.

Batches are determined by the laboratory, and for chemistry analysis generally do not include more than 20 samples (environmental and QC samples). Therefore, although the Coalition may collect extra sample volume for a matrix spike and matrix spike duplicate, the laboratory may not be able to use that sample for every batch associated with that event. For example, depending on other projects and other samples being analyzed, Coalition samples from an event may be split into two or more batches.

However, the matrix spike water collected by the Coalition is only enough for analysis in one batch. A matrix spike associated with an environmental sample collected as part of another project, a non-project (NONPJ) matrix spike, can be used for laboratory quality assurance purposes. The use of NONPJ samples allows the Coalition to evaluate the accuracy and/or precision of the batches and ensures that the laboratory can achieve batch completeness. When a NONPJ matrix spike is used, the batch is flagged accordingly. Matrix interference can be determined by both project and NONPJ samples.

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

Hold Time Compliance

Hold times for all chemistry water and sediment analyses were met; hold time compliance for all chemistry analysis is 100% (Table 30).

All toxicity water and sediment tests met holding time requirements, with the exception of one *H. azteca* batch containing seven samples (7 of 18; 40%, Table 30). The samples were collected in March 2012 and analyzed 7 days outside of the 14 day hold time due to a miscommunication with the subcontracted laboratory. The sediment toxicity laboratory generally initiates toxicity testing within 28 days of sampling per EPA guidance in EPA 600/R-99/064. The EPA manual suggests a hold time of less than two weeks for samples with high concentrations of labile chemicals (e.g., ammonia, volatile organics). For samples with low to moderate toxicity, studies have found that it is best to wait two weeks before initiating sediment toxicity tests. Waiting two weeks was found to reduce variability between samples that may have been due to indigenous predators in the sediment. One of the 11 samples tested was toxic despite being run 7 days outside of the 14 day hold time requirement. Based on the number of days that the samples exceeded the hold time, EPA method recommendations and discussions with the toxicity laboratory, data analyzed 7 days outside of the 14 day hold time are considered usable. It has been clarified with the sediment toxicity laboratory that all future samples will be run within the 14 day hold time and tests will be initiated as soon as possible. All sediment toxicity samples collected in September were analyzed within 14 days.

PRECISION AND ACCURACY

A review of the number of samples analyzed and the percentage of samples per analyte that meets acceptability criteria are listed in the tables following this section (Tables 20 through 33); data quality objectives are addressed as follows:

- Field and laboratory blank quality control sample evaluations (Tables 20,23, 31,32)
- Equipment and travel blank quality control sample evaluations (Table 21)
- Field precision met by analyzing field duplicates (Table 22)
- Laboratory accuracy met by analyzing LCS and MS percent recoveries (Tables 24,26)
- Laboratory precision met by analyzing LCS and MS and laboratory duplicates (Tables 25,27,28)
- Surrogate recoveries to evaluate LABQA (Table 29)

- Summary of holding time evaluations (Table 30)
- Laboratory and field precision met when analyzing sediment grain size (Table 33)

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

Chemistry

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

Per batch:

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

Per new media lot:

- negative/negative non-coliform controls

Since August 2012, the laboratory has been performing all controls and a laboratory blank with every batch. Level III data packages document this information and are submitted electronically with the quarterly data submittal and with the Annual Monitoring Report. One hundred percent of laboratory blanks met acceptability criteria. One hundred percent of field blanks collected had *E. coli* counts less than the reporting limit of 1. Due to the nature of the analysis method and *E. coli* distribution within the water column, precision of *E. coli* analysis is conducted by evaluating R_{log} values of environmental and duplicate samples with the R_{log} criterion developed by the laboratory using similar samples. The mean R_{log} for the laboratory was calculated to be 0.40. This value multiplied by 3.27 resulted in a precision criterion of 1.30. One hundred percent of *E. coli* laboratory and field duplicates had R_{log} values below the criteria acceptance level. All *E. coli* data are accepted and usable.

Hardness: One hundred percent of hardness field blanks had concentrations below the reporting limit. One hundred percent of hardness field duplicates met acceptability criteria. All laboratory blanks and LCSs met laboratory QC criteria. Eighty-six percent (24 of 28) of MS samples met the acceptability criteria. One pair of project MS/MSD samples and one pair of NONPJ MS/MSD samples were recovered below the acceptable limits, percent recovery (PR) 80-120, due to possible matrix interference. Batch QC data were based on LCS and relative percent difference (RPD) data. One hundred percent of MSDs met acceptability criteria (RPD $\leq$25) for precision. All hardness data are accepted and usable.

Inorganic analyses in sediment (grain size and Total Organic Carbon): Sediment grain size and TOC were analyzed for both sets of sediment samples collected during 2012 (March 6 and September 11).

The Coalition QAPP lists the acceptable limit criterion for grain size duplicates as RSD ≤ 20% where RSD is the relative standard deviation (RSD). 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 of 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 laboratory duplicates.

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

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

Overall, dissolved metal field duplicate samples met acceptability criteria (RPD ≤ 25%) for 98% of the samples analyzed (30 of 31 samples). One of the dissolved zinc field duplicates did not meet acceptability criteria. The LCSs were within acceptable recovery limits for 100% of dissolved metals. One hundred percent of dissolved metal MS samples were acceptable. All dissolved metal LCSDs and MSDs met acceptance criteria for precision. All dissolved metal results are accepted and useable.

Metals (total): One hundred percent of field and travel blanks for total metals met acceptability criteria. Laboratory blanks were run with each total metals batch and 100% met acceptability criteria.

One field duplicate RPD was greater than 25% for each of the following analytes: total lead, total nickel and total zinc. This resulted in 50%, 75% and 92% of the lead, nickel and zinc samples meeting acceptability criteria. Overall, total metals met acceptability criteria for field duplicates in 93% of the samples (38 of 41). One site sampled in January 2012 that resulted in a high lead, nickel and zinc field duplicate RPDs also had high turbidity values (70-85 with a dilution factor of 10) and the water was recorded as brown and murky. Discharge was not taken due to a non-contiguous waterbody.

The total metals LCS and MS samples were within acceptable recovery limits for 100% of samples. One hundred percent of the MS/MSD pairs met the acceptability criteria for precision. All total metal results are accepted and useable.

Nutrients: One hundred percent of Ammonia as N field blanks met acceptability criteria. Ninety-two percent of field duplicates had an RPD equal to or below 25% (11 of 12). One hundred percent of laboratory blanks, LCS and MS samples met acceptability criteria. Matrix spike and MSD samples were run with each batch and 100% met acceptability criteria for accuracy and precision. All Ammonia as N LCS and MS duplicate samples met the precision 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 are found in Table 6 in Appendix II and Table 9 in Appendix III.

One hundred percent of nitrate + nitrite as N field and laboratory blanks met acceptability criteria (< RL). Ninety-two percent of field duplicates had RPDs equal to or below 25% (11 of 12). LCS and MS samples were run with each batch and 100% of the samples met acceptance criteria (PR 90-110). One hundred percent of MSD samples met the acceptability requirement for precision.

One hundred percent of all Total Kjeldahl Nitrogen (TKN) field blanks, field duplicates, laboratory blanks, LCSs, MS and MSDs analyzed met acceptance criteria in 2012.

One hundred percent of orthophosphate as P field blanks and field duplicates met acceptance criteria. Laboratory blanks were run with every batch and 100% were less than the RL. The LCS samples were within acceptability criteria for all batches. The MS samples were performed in each batch; 93% (28 of 30) met acceptability criteria. All MSD samples met the requirements of precision.

Phosphate as P field blanks met acceptance criteria in 100% of the samples analyzed. Seventy-five percent of field duplicates had RPDs less than 25% (3 of 4). The field duplicate and environmental sample concentrations associated with the high RPD ranged from 0.25 mg/L to 0.14 mg/L and were sampled in January 2012. The field sheets describe the sample site as generally having murky, brown colored water and high turbidity was also reported. Discharge was not taken due to a non-contiguous waterbody. It is likely that the non-contiguous waterbody was not homogenous resulting in the samples having a high RPD. One hundred percent of laboratory blanks and LCS samples were within acceptability criteria for all batches. Ninety-three percent of the MS samples met the criteria for accuracy (PR 90-110) and 100% of MSD samples met the acceptability criteria for precision.

All nutrient data are accepted and useable.

Pesticides: Pesticides were analyzed in eight different groups: organochlorines (EPA 8081A), Group A pesticides (EPA 8081A), organophosphates (EPA 8141A), carbamates (EPA 8321A), methamidophos (EPA 8321A), paraquat (EPA 549.2M), glyphosate (EPA 547M) and triazines (EPA 619). Field and laboratory blanks were run with each batch and 100% met acceptability criteria. All field duplicates had RPDs ≤25%.

Surrogates were run for each applicable pesticide analysis (surrogates are not performed for glyphosate and paraquat analysis). Surrogate recoveries were within specific acceptance criteria for 97.3% of all samples analyzed. When a surrogate is recovered outside of the acceptability criteria, the associated environmental sample is flagged as well.

The MS and LCS samples were analyzed in each batch to assess accuracy as well as possible matrix interference. Either a MSD and/or a LCSD were performed in each batch to assess precision. Ninety-eight percent of MS samples run were within acceptability criteria. The individual pesticides with less than 90% of MS samples within acceptable recoveries include paraquat (0 of 2; 0%) and phosmet (20 of 24; 83.3%). One pair of paraquat MS/MSD samples were below the control limit for paraquat (PR 70-130) and the associated LCS/LCSD pair recovered below QC limits as well. Environmental and laboratory QC samples were re-extracted past hold time and re-analyzed. Recoveries were better, but still below the lower limits except for the LCS which recovered at 72%. Paraquat readily binds to suspended particles making it a difficult analyte to characterize in the water column. Paraquat is a difficult chemical to analyze due to its high partitioning coefficient and is difficult to recover in both laboratory and sample water. All paraquat results were non-detects and based on the chromatograms, re-analysis, laboratory technician interpretation and batch quality control data, environmental results are accepted and useable. One pair of phosmet MS/MSD samples recovered below the QC limits and one pair of MS/MSD recovered above the QC limits. However, 100% of phosmet LCS/LCSD samples were within acceptable limits. All other pesticide LCS/LCSD samples met the acceptability criteria.

The Coalition supplies the laboratory with sufficient sample water to perform MS and MSDs for every 20 environmental samples. Both LCSs and MSDs can be used to assess precision. Ninety-nine percent of all pesticide MS duplicates met acceptability criteria. Glyphosate, paraquat, organophosphates and triazines batches also included an LCS duplicate; LCSDs met acceptability criteria in 100% of the samples analyzed.

Sediment Pesticides: Sediment pesticides were analyzed for any sediment sample that exhibited significant *H. azteca* toxicity when the survival compared to the control is less than 80%. One sediment sample in March 2012 was analyzed for additional pesticides (chlorpyrifos and pyrethroids).

A field duplicate sample was analyzed and all pesticides had an RPD less than 25%. One hundred percent of sediment chlorpyrifos and pyrethroid laboratory blanks met the acceptance criteria. A MS and LCS were performed to assess accuracy for each pesticide analyzed. Seventy-eight percent of MS/MSD sediment pesticide samples met the acceptance criteria. Bifenthrin MS/MSD recoveries recorded as zero due to a high native sample concentration (12.8 ng/g dw, dilution factor of 5).

Chlorpyrifos MS/MSD recovered above the acceptable limit. However, all LCS sediment pesticide samples met the acceptability criteria. Laboratory precision met acceptability criteria in 100% of LCSD and MSD samples. Surrogates were run for each sediment pesticide analysis. Surrogate recoveries for the 2012 data were evaluated using an MS PR range of 50-150 and an LCS PR of 76-172. Surrogate recoveries were within specific acceptance criteria for 100% of all samples analyzed.

All sediment pesticide data are accepted and useable.

Total Dissolved Solids (TDS): Field blanks met acceptability criteria in 92% (11 of 12) of the samples analyzed. Lab blanks were run with every batch and met acceptance criteria for all samples.

Ninety-two percent of field duplicates had RPDs ≤ 25% (11 of 12). The LCS samples met acceptability criteria in 100% of the samples analyzed and 100% of the laboratory duplicates met the batch precision requirements. Matrix spikes are not performed for TDS analysis. At least 90% of all TDS QC analyzed were within acceptable limits and all data are acceptable.

Total Organic Carbon (TOC): Ninety-two percent of field blanks met acceptability criteria. The single field blank not meeting acceptability criteria (0.75 mg/L in the blank result) had an associated environmental sample result above the reporting limit (2.5 mg/L in the environmental result). The associated lab blank in the batch was non-detect. Contamination in the field may be due to contamination of the field blank water, the field blank storage container, the field blank bottle, or contamination from the sampler. All sampling SOPs, which include the steps to prevent contamination, were followed and no other blanks collected at that time had detections above the reporting limits of any other constituents. Other sources of contamination may have occurred during transport from the field to the laboratory (all bottles were closed tightly and only touched when being put in the cooler by the sampler and taken from the cooler by the laboratory with gloved hands).

One hundred percent of field duplicates had RPDs less than 25%. Laboratory blanks and LCSs met acceptance criteria for 100% of the samples. Eighty-seven percent (26 of 30) of TOC MS/MSD samples met acceptability limits (PR 80-120). Two pairs of MS/MSD samples recovered above QC limits. For one batch, A NONPJ MS/MSD pair was included for reference and recovered within QC limits and, for both batches, all LCS samples recovered within acceptable limits. One hundred percent of MSD samples analyzed met acceptability requirements. All TOC data are acceptable and useable.

Total Suspended Solids (TSS): One hundred percent of field blanks met acceptability. Sixty-seven percent of field duplicates (8 of 12) had RPDs ≤25%. The four field duplicate RPDs greater than 25% ranged from 28.6% - 100%. One field duplicate sample result was below the reporting limit (3 mg/L), making it difficult to maintain precision due to the limitation of the instrument quantification and estimation of the result. All sampling SOPs were followed to ensure that field duplicates were collected at the same time and manner as the associated environmental sample. It is likely that the differences in TSS results are due to heterogeneity of the water column and the concentrations being near the detection limitations of the analysis.

One hundred percent of laboratory blanks and LCS samples met acceptance criteria. Ninety-three percent of laboratory duplicates met acceptance criteria. A NONPJ environmental sample and laboratory duplicate were run with the batch and the associated RPD was less than 25%. Matrix spikes are not performed for analysis of TSS. All TSS data are accepted and useable.

Turbidity: One hundred percent of field blanks and 92% (11 of 12) of field duplicates met acceptability criteria. Laboratory blanks were run with every batch and 100% were less than the RL. The LCS and laboratory duplicates were analyzed with each batch and all of the samples met acceptance criteria. Matrix spike are not performed for turbidity. All turbidity data are accepted and useable.

Toxicity

For aquatic toxicity testing, the acceptability of test results is determined primarily by performance-based criteria for test organisms, culture and test conditions, and the results of control bioassays. Control bioassays include monthly reference toxicant testing and negative and solvent controls for Toxicity Identification Evaluations (TIEs). Test acceptability requirements are documented in the method documents for each bioassay method and are included in the ESJWQC QAPP.

Water Column Toxicity: Field duplicates were collected during each monitoring event and were tested for toxicity to *C. dubia*, *S. capricornutum* and *P. promelas*. One hundred percent of field duplicates were within the acceptability criteria (Table 31). Negative controls (CNEGs) were performed with each toxicity batch for each species and met acceptability criteria (Table 32). All water column toxicity tests are acceptable and useable.

Sediment Toxicity: Sediment toxicity samples were collected on March 6 and September 11, 2012. Two field duplicates were collected and both had RPDs less than 25%. One hundred percent of the sediment samples had laboratory control negatives within acceptability criteria. All sediment toxicity tests are acceptable and useable.

CORRECTIVE ACTIONS

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

The field blank collected in April 2012 and analyzed for glyphosate recovered with suspect results and therefore the laboratory re-prepped and re-analyzed within hold time; the field blank re-analysis recovered within acceptable limits. The batch containing the re-analyzed glyphosate field blank and associated environmental samples did not include a MS due to insufficient volume for re-analysis. The original batch included a MS that was within acceptable criteria. No additional corrective actions were taken.

A laboratory duplicate from one sediment grain size batch was not performed due to laboratory miscommunication. The laboratory is aware that each batch requires a laboratory duplicate. No additional corrective actions were taken.

Discharge in 2012 was only calculated for 62% of the events due to either 1) unsafe conditions that did not allow for samplers to wade the water to take flow measurements necessary to calculate discharge or 2) no flow observed. Samplers recorded an observed flow during all sampling events and recorded this information on field sheets. No corrective action was necessary.

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

Table 19. ESJWQC environmental sample, field quality, and field parameter counts and percentages.

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

Method	Analyte	Env. Samples Scheduled (#)[1]	Dry Sites (#)	Env. Samples Collected (#)[1]	Field and Transport Completeness (%)[1]	Env. Samples Analyzed (#)[1]	Env. Samples Completeness (%)[1]	Env. and Field QC Samples Analyzed (#)	Field Blank (#)	Field Blank (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8321A CARB	Aldicarb	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8321A CARB	Carbaryl	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8321A CARB	Carbofuran	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8321A CARB	Methiocarb	81	17	64	100.0%	64	100.0%	88	12	13.6%	12	13.6%		NA		NA
EPA 8321A CARB	Methomyl	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8321A CARB	Oxamyl	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8321A CARB	Diuron	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8321A CARB	Linuron	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 619	Atrazine	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 619	Cyanazine	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 619	Simazine	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 547M	Glyphosate	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 549.2M	Paraquat	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	DDD(p,p')	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	DDE(p,p')	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	DDT(p,p')	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Dicofol	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Dieldrin	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Endrin	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Methoxychlor	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Aldin	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Chlordane	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Heptachlor	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Heptachlor epoxide	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	HCH, alpha	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	HCH, beta	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	HCH, delta	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	HCH, gamma	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Endosulfan I	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Endosulfan II	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8081A	Toxaphene	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA		NA
EPA 8141A OP	Azinphos methyl	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Chlorpyrifos	83	17	66	100.0%	66	100.0%	90	12	13.3%	12	13.3%		NA		NA
EPA 8141A OP	Diazinon	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Dichlorvos	74	16	58	100.0%	58	100.0%	82	12	14.6%	12	14.6%		NA		NA

Method	Analyte	Env. Samples Scheduled (#)[1]	Dry Sites (#)	Env. Samples Collected (#)[1]	Field and Transport Completeness (%)[1]	Env. Samples Analyzed (#)[1]	Env. Samples Completeness (%)[1]	Env. and Field QC Samples Analyzed (#)	Field Blank (#)	Field Blank (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8141A OP	Dimethoate	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Demeton-s	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Disulfoton	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Malathion	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Methidathion	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Parathion, Methyl	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Phorate	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Phosmet	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8141A OP	Trifluralin	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
EPA 8321A	Methamidophos	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA		NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	91	17	74	100.0%	74	100.0%	98	12	12.2%	12	12.2%		NA		NA
SM 2540 C	Total Dissolved Solids	92	20	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 2540 D	Total Suspended Solids	92	20	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
EPA 180.1	Turbidity	92	20	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 4500-NH3 C v20	Ammonia as N	92	20	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	44	10	34	100.0%	34	100.0%	42	4	9.5%	4	9.5%		NA		NA
EPA 353.2	Nitrate + Nitrite as N	92	20	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 4500-P E	OrthoPhosphate as P	92	20	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 4500-P E	Phosphate as P	44	10	34	100.0%	34	100.0%	42	4	9.5%	4	9.5%		NA		NA
SM 5310 B	Total Organic Carbon	92	20	72	100.0%	72	100.0%	96	12	12.5%	12	12.5%		NA		NA
SM 9223B	E. coli	44	10	34	100.0%	34	100.0%	42	4	9.5%	4	9.5%		NA		NA
EPA 200.8	Arsenic	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA	1	14.3%
EPA 200.8	Boron	24	5	19	100.0%	19	100.0%	27	4	14.8%	4	14.8%		NA	4	14.8%
EPA 200.8	Cadmium	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA	1	14.3%
EPA 200.8	Copper	91	17	74	100.0%	74	100.0%	98	12	12.2%	12	12.2%		NA	12	12.2%
EPA 200.8	Lead	11	1	10	100.0%	10	100.0%	15	3	20.0%	2	13.3%		NA	3	20.0%
EPA 200.8	Molybdenum	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%		NA	1	14.3%
EPA 200.8	Nickel	24	5	19	100.0%	19	100.0%	27	4	14.8%	4	14.8%		NA	4	14.8%
EPA 200.8	Selenium	24	5	19	100.0%	19	100.0%	27	4	14.8%	4	14.8%		NA	4	14.8%
EPA 200.8	Zinc	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%		NA	12	14.8%
EPA 200.8	Cadmium (Dissolved)	6	1	5	100.0%	5	100.0%	7	1	14.3%	1	14.3%	1	18.2%		NA
EPA 200.8	Copper (Dissolved)	91	17	74	100.0%	74	100.0%	98	12	12.2%	12	12.2%	12	18.2%		NA
EPA 200.8	Lead (Dissolved)	11	1	10	100.0%	10	100.0%	15	3	20.0%	2	13.3%	3	18.2%		NA
EPA 200.8	Nickel (Dissolved)	24	5	19	100.0%	19	100.0%	27	4	14.8%	4	14.8%	4	18.2%		NA
EPA 200.8	Zinc (Dissolved)	72	15	57	100.0%	57	100.0%	81	12	14.8%	12	14.8%	12	18.2%		NA

METHOD	ANALYTE	ENV. SAMPLES SCHEDULED (#)[1]	DRY SITES (#)	ENV. SAMPLES COLLECTED (#)[1]	FIELD AND TRANSPORT COMPLETENESS (%)[1]	ENV. SAMPLES ANALYZED (#)[1]	ENV. SAMPLES COMPLETENESS (%)[1]	ENV. AND FIELD QC SAMPLES ANALYZED (#)	FIELD BLANK (#)	FIELD BLANK (%)	FIELD DUP. (#)	FIELD DUP. (%)	EQUIP. BLANK (#)	EQUIP. BLANK (%)	TRAVEL BLANK (#)	TRAVEL BLANK (%)
Walkley-Black	Total Organic Carbon (sediment)	17	1	16	100.0%	16	100.0%	18	NA	NA	2	11.1%		NA		NA
ASTM D4464M,ASTM D422	Sediment Grain Size	17	1	16	100.0%	16	100.0%	20	2	10.0%	2	10.0%		NA		NA
EPA 8270M_NCI	Bifenthrin	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Chlorpyrifos	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Cyfluthrin	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Cyhalothrin, lambda	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Cypermethrin	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Deltamethrin:Tralomethrin	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Esfenvalerate/Fenvalerate	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Fenpropathrin	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 8270M_NCI	Permethrin	1	0	1	100.0%	1	100.0%	2	NA	NA	1	50.0%		NA		NA
EPA 821/R-02-012	*Ceriodaphnia dubia*	80	16	64	100.0%	64	100.0%	76	NA	NA	12	15.8%		NA		NA
EPA 821/R-02-012	*Pimephales promelas*	75	15	60	100.0%	60	100.0%	72	NA	NA	12	16.7%		NA		NA
EPA 821/R-02-013	*Selenastrum capricornutum*	82	16	66	100.0%	66	100.0%	78	NA	NA	12	15.4%		NA		NA
EPA 600/R-99-064	*Hyalella azteca*	17	1	16	100.0%	16	100.0%	18	NA	NA	2	11.1%		NA		NA
USGS R2Cross streamflow	Discharge, cfs	108	19	48	62.0%	NA	NA	NA	NA	NA	NA	NA		NA		NA
SM 4500-O	Dissolved Oxygen, mg/L	108	19	89	100.0%	NA	NA	NA	NA	NA	NA	NA		NA		NA
EPA 150.1	pH	108	19	89	100.0%	NA	NA	NA	NA	NA	NA	NA		NA		NA
EPA 120.1	Specific Conductivity, uS/cm	108	19	89	100.0%	NA	NA	NA	NA	NA	NA	NA		NA		NA
SM 2550	Temperature, Deg C	108	19	89	100.0%	NA	NA	NA	NA	NA	NA	NA		NA		NA
	TOTAL	**4114**	**NA**	**3251**	**100%**	**2847**	**100%**	**3902**	**504**	**14.1%**	**551**	**17.8%**	**32**	**18.2%**	**42**	**14.9%**

[1] Environmental samples from Lateral 3 along East Taylor Rd are not included (see Appendix X).

NA- Not applicable

Table 20. ESJWQC summary of field blank Quality Control sample evaluations.

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Carbaryl	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Carbofuran	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Methiocarb	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Methomyl	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Oxamyl	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Diuron	<RL or < (env sample/5)	12	12	100.00
EPA 8321A CARB	Linuron	<RL or < (env sample/5)	12	12	100.00
EPA 619	Atrazine	<RL or < (env sample/5)	12	12	100.00
EPA 619	Cyanazine	<RL or < (env sample/5)	12	12	100.00
EPA 619	Simazine	<RL or < (env sample/5)	12	12	100.00
EPA 547M	Glyphosate	<RL or < (env sample/5)	1	1	100.00
EPA 549.2M	Paraquat	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	DDD(p,p')	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	DDE(p,p')	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	DDT(p,p')	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Dicofol	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Dieldrin	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Endrin	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Methoxychlor	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Aldrin	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Chlordane	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Heptachlor	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Heptachlor epoxide	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	HCH, alpha	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	HCH, beta	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	HCH, delta	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	HCH, gamma	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Endosulfan I	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Endosulfan II	<RL or < (env sample/5)	1	1	100.00
EPA 8081A	Toxaphene	<RL or < (env sample/5)	1	1	100.00
EPA 8141A OP	Azinphos methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Diazinon	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dichlorvos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dimethoate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Demeton-s	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Disulfoton	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Malathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Methidathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phorate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phosmet	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Trifluralin	<RL or < (env sample/5)	12	12	100.00
EPA 8321A	Methamidophos	<RL or < (env sample/5)	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 160.1	Total Dissolved Solids	<RL or < (env sample/5)	12	11	91.67
EPA 160.2	Total Suspended Solids	<RL or < (env sample/5)	12	12	100.00
EPA 180.1	Turbidity	<RL or < (env sample/5)	12	12	100.00
EPA 350.2	Ammonia as N	<RL or < (env sample/5)	12	12	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL or < (env sample/5)	4	4	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL or < (env sample/5)	12	12	100.00
EPA 365.2	OrthoPhosphate as P	<RL or < (env sample/5)	12	12	100.00
EPA 365.2	Phosphate as P	<RL or < (env sample/5)	4	4	100.00
EPA 415.1	Total Organic Carbon	<RL or < (env sample/5)	12	11	91.67

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 9223B	E. coli	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Arsenic	<RL or < (env sample/5)	1	1	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	1	1	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	3	3	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	1	1	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	1	1	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)	3	3	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	4	4	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	**502**	**500**	**99.6**

NA-Not applicable

Table 21. ESJWQC summary of equipment blank (dissolved metals) and travel blank (total metals) Quality Control sample evaluations.

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

Method	Analyte	Data Quality Objective	Number of Samples	Blanks Within Control Limits	Percent Samples Acceptable
EPA 200.8	Arsenic	<RL or < (env sample/5)	1	1	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	1	1	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	3	3	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	1	1	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	12	12	100.00
		TRAVEL BLANK TOTAL	**42**	**42**	**100.00**
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	1	1	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)	3	3	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	12	12	100.00
		EQUIPMENT BLANK TOTAL	**32**	**32**	**100.00**

Table 22. ESJWQC summary of field duplicate Quality Control sample evaluations.
Samples collected from January through December 2012, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	12	12	100.00
EPA 619	Atrazine	RPD ≤ 25	12	12	100.00
EPA 619	Cyanazine	RPD ≤ 25	12	12	100.00
EPA 619	Simazine	RPD ≤ 25	12	12	100.00
EPA 547M	Glyphosate	RPD ≤ 25	1	1	100.00
EPA 549.2M	Paraquat	RPD ≤ 25	1	1	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	Dicofol	RPD ≤ 25	1	1	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Endrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	1	1	100.00
EPA 8081A	Aldrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Chlordane	RPD ≤ 25	1	1	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	1	1	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	1	1	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	1	1	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	1	1	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	12	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	12	11	91.67
EPA 160.2	Total Suspended Solids	RPD ≤ 25	12	8	66.67
EPA 180.1	Turbidity	RPD ≤ 25	12	11	91.67
EPA 350.2	Ammonia as N	RPD ≤ 25	12	11	91.67
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	4	4	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	12	11	91.67
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	12	12	100.00
EPA 365.2	Phosphate as P	RPD ≤ 25	4	3	75.00
EPA 415.1	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	4	4	100.00
EPA 200.8	Arsenic	RPD ≤ 25	1	1	100.00
EPA 200.8	Boron	RPD ≤ 25	4	4	100.00
EPA 200.8	Cadmium	RPD ≤ 25	1	1	100.00
EPA 200.8	Copper	RPD ≤ 25	12	12	100.00
EPA 200.8	Lead	RPD ≤ 25	2	1	50.00
EPA 200.8	Molybdenum	RPD ≤ 25	1	1	100.00
EPA 200.8	Nickel	RPD ≤ 25	4	3	75.00
EPA 200.8	Selenium	RPD ≤ 25	4	4	100.00
EPA 200.8	Zinc	RPD ≤ 25	12	11	91.67
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	1	1	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	2	2	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	4	4	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	12	11	91.67
Walkley-Black	Total Organic Carbon (sediment)	RPD ≤ 20	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD <25	1	1	100.00
		TOTAL	**511**	**498**	**97.46**

Table 23. ESJWQC summary of method blank Quality Control sample evaluations.

Samples analyzed in batches with samples collected from January through December 2012, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	<RL	12	12	100.00
EPA 8321A CARB	Carbaryl	<RL	12	11	91.67
EPA 8321A CARB	Carbofuran	<RL	12	12	100.00
EPA 8321A CARB	Methiocarb	<RL	12	12	100.00
EPA 8321A CARB	Methomyl	<RL	12	12	100.00
EPA 8321A CARB	Oxamyl	<RL	12	12	100.00
EPA 8321A CARB	Diuron	<RL	12	12	100.00
EPA 8321A CARB	Linuron	<RL	12	12	100.00
EPA 619	Atrazine	<RL	12	12	100.00
EPA 619	Cyanazine	<RL	12	12	100.00
EPA 619	Simazine	<RL	12	12	100.00
EPA 547M	Glyphosate	<RL	3	3	100.00
EPA 549.2M	Paraquat	<RL	1	1	100.00
EPA 8081A	DDD(p,p')	<RL	1	1	100.00
EPA 8081A	DDE(p,p')	<RL	1	1	100.00
EPA 8081A	DDT(p,p')	<RL	1	1	100.00
EPA 8081A	Dicofol	<RL	1	1	100.00
EPA 8081A	Dieldrin	<RL	1	1	100.00
EPA 8081A	Endrin	<RL	1	1	100.00
EPA 8081A	Methoxychlor	<RL	1	1	100.00
EPA 8081A	Aldrin	<RL	1	1	100.00
EPA 8081A	Chlordane	<RL	1	1	100.00
EPA 8081A	Heptachlor	<RL	1	1	100.00
EPA 8081A	Heptachlor epoxide	<RL	1	1	100.00
EPA 8081A	HCH, alpha	<RL	1	1	100.00
EPA 8081A	HCH, beta	<RL	1	1	100.00
EPA 8081A	HCH, delta	<RL	1	1	100.00
EPA 8081A	HCH, gamma	<RL	1	1	100.00
EPA 8081A	Endosulfan I	<RL	1	1	100.00
EPA 8081A	Endosulfan II	<RL	1	1	100.00
EPA 8081A	Toxaphene	<RL	1	1	100.00
EPA 8141A OP	Azinphos methyl	<RL	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL	13	13	100.00
EPA 8141A OP	Diazinon	<RL	13	13	100.00
EPA 8141A OP	Dichlorvos	<RL	12	12	100.00
EPA 8141A OP	Dimethoate	<RL	12	12	100.00
EPA 8141A OP	Demeton-s	<RL	12	12	100.00
EPA 8141A OP	Disulfoton	<RL	12	12	100.00
EPA 8141A OP	Malathion	<RL	12	12	100.00
EPA 8141A OP	Methidathion	<RL	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL	12	12	100.00
EPA 8141A OP	Phorate	<RL	12	12	100.00
EPA 8141A OP	Phosmet	<RL	12	12	100.00
EPA 8141A OP	Trifluralin	<RL	12	12	100.00
EPA 8321A	Methamidophos	<RL	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL	14	14	100.00
EPA 160.1	Total Dissolved Solids	<RL	12	12	100.00
EPA 160.2	Total Suspended Solids	<RL	14	14	100.00
EPA 180.1	Turbidity	<RL	12	12	100.00
EPA 350.2	Ammonia as N	<RL	14	14	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL	5	5	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL	15	15	100.00
EPA 365.2	OrthoPhosphate as P	<RL	15	15	100.00
EPA 365.2	Phosphate as P	<RL	4	4	100.00
EPA 415.1	Total Organic Carbon	<RL	14	14	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 9223B	E. coli	<RL	4	4	100.00
EPA 200.8	Arsenic	<RL	1	1	100.00
EPA 200.8	Boron	<RL	4	4	100.00
EPA 200.8	Cadmium	<RL	1	1	100.00
EPA 200.8	Copper	<RL	13	13	100.00
EPA 200.8	Lead	<RL	3	3	100.00
EPA 200.8	Molybdenum	<RL	1	1	100.00
EPA 200.8	Nickel	<RL	4	4	100.00
EPA 200.8	Selenium	<RL	4	4	100.00
EPA 200.8	Zinc	<RL	13	13	100.00
EPA 200.8	Cadmium (Dissolved)	<RL	1	1	100.00
EPA 200.8	Copper (Dissolved)	<RL	11	11	100.00
EPA 200.8	Lead (Dissolved)	<RL	3	3	100.00
EPA 200.8	Nickel (Dissolved)	<RL	4	4	100.00
EPA 200.8	Zinc (Dissolved)	<RL	12	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI	Permethrin (sediment)	<RL	1	1	100.00
		TOTAL	**533**	**532**	**99.81**

Table 24. ESJWQC summary of LCS Quality Control sample evaluations.

Laboratory control spikes and laboratory control spike duplicates analyzed in batches with samples collected from January through December 2012, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	PR 31-133	12	12	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	12	12	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	12	12	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	12	12	100.00
EPA 8321A CARB	Methomyl	PR 23-152	12	12	100.00
EPA 8321A CARB	Oxamyl	PR 10-117	12	12	100.00
EPA 8321A CARB	Diuron	PR 52-136	12	12	100.00
EPA 8321A CARB	Linuron	PR 49-144	12	12	100.00
EPA 619	Atrazine	PR 39-156	13	13	100.00
EPA 619	Cyanazine	PR 22-172	13	13	100.00
EPA 619	Simazine	PR 21-179	13	13	100.00
EPA 547M	Glyphosate	PR 84-113	6	6	100.00
EPA 549.2M	Paraquat	PR 70-130	2	0	0.00
EPA 8081A	DDD(p,p')	PR 38-135	1	1	100.00
EPA 8081A	DDE(p,p')	PR 21-134	1	1	100.00
EPA 8081A	DDT(p,p')	PR 18-145	1	1	100.00
EPA 8081A	Dicofol	PR 40-135	1	1	100.00
EPA 8081A	Dieldrin	PR 48-121	1	1	100.00
EPA 8081A	Endrin	PR 24-143	1	1	100.00
EPA 8081A	Methoxychlor	PR 30-163	1	1	100.00
EPA 8081A	Aldrin	PR 11-138	1	1	100.00
EPA 8081A	Chlordane	PR 44-152	1	1	100.00
EPA 8081A	Heptachlor	PR 24-124	1	1	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	1	1	100.00
EPA 8081A	HCH, alpha	PR 33-111	1	1	100.00
EPA 8081A	HCH, beta	PR 49-119	1	1	100.00
EPA 8081A	HCH, delta	PR 12-97	1	1	100.00
EPA 8081A	HCH, gamma	PR 40-114	1	1	100.00
EPA 8081A	Endosulfan I	PR 50-131	1	1	100.00
EPA 8081A	Endosulfan II	PR 55-128	1	1	100.00
EPA 8081A	Toxaphene	PR 23-140	1	1	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	13	13	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	15	15	100.00
EPA 8141A OP	Diazinon	PR 57-130	15	15	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	13	13	100.00
EPA 8141A OP	Dimethoate	PR 68-202	13	13	100.00
EPA 8141A OP	Demeton-s	PR 40-125	13	13	100.00
EPA 8141A OP	Disulfoton	PR 47-117	13	13	100.00
EPA 8141A OP	Malathion	PR 47-125	13	13	100.00
EPA 8141A OP	Methidathion	PR 50-150	13	13	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	13	13	100.00
EPA 8141A OP	Phorate	PR 44-117	13	13	100.00
EPA 8141A OP	Phosmet	PR 50-150	13	13	100.00
EPA 8141A OP	Trifluralin	PR 40-148	13	13	100.00
EPA 8321A	Methamidophos	PR 25-136	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	14	14	100.00
EPA 160.1	Total Dissolved Solids	PR 80-120	12	12	100.00
EPA 160.2	Total Suspended Solids	PR 80-120	14	14	100.00
EPA 180.1	Turbidity	PR 90-110	12	12	100.00
EPA 350.2	Ammonia as N	PR 90-110	21	21	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	PR 90-110	5	5	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	15	15	100.00
EPA 365.2	OrthoPhosphate as P	PR 90-110	15	15	100.00
EPA 365.2	Phosphate as P	PR 90-110	4	4	100.00

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 415.1	Total Organic Carbon	PR 80-120	14	14	100.00
SM 9223	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	PR 85-115	1	1	100.00
EPA 200.8	Boron	PR 85-115	4	4	100.00
EPA 200.8	Cadmium	PR 85-115	1	1	100.00
EPA 200.8	Copper	PR 85-115	13	13	100.00
EPA 200.8	Lead	PR 85-115	3	3	100.00
EPA 200.8	Molybdenum	PR 85-115	1	1	100.00
EPA 200.8	Nickel	PR 85-115	4	4	100.00
EPA 200.8	Selenium	PR 85-115	4	4	100.00
EPA 200.8	Zinc	PR 85-115	13	13	100.00
EPA 200.8	Cadmium (Dissolved)	PR 85-115	1	1	100.00
EPA 200.8	Copper (Dissolved)	PR 85-115	11	11	100.00
EPA 200.8	Lead (Dissolved)	PR 85-115	3	3	100.00
EPA 200.8	Nickel (Dissolved)	PR 85-115	4	4	100.00
EPA 200.8	Zinc (Dissolved)	PR 85-115	12	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	PR 50-200	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	PR 50-150	2	2	100.00
		TOTAL	**567**	**565**	**99.65**

NA-Not applicable

Table 25. ESJWQC summary of LCSD Quality Control sample evaluations.

Laboratory control spike duplicates analyzed in batches with samples collected from January through December 2012, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbaryl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbofuran	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methiocarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methomyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Oxamyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Diuron	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Linuron	RPD ≤ 25	NA	NA	NA
EPA 619	Atrazine	RPD ≤ 25	1	1	100.00
EPA 619	Cyanazine	RPD ≤ 25	1	1	100.00
EPA 619	Simazine	RPD ≤ 25	1	1	100.00
EPA 547M	Glyphosate	RPD ≤ 25	3	3	100.00
EPA 549.2M	Paraquat	RPD ≤ 25	1	1	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	Aldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Chlordane	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor epoxide	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 8081A	Endosulfan I	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endosulfan II	RPD ≤ 25	NA	NA	NA
EPA 8081A	Toxaphene	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	1	1	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	NA	NA	NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	NA	NA	NA
EPA 160.2	Total Suspended Solids	RPD ≤ 20	NA	NA	NA
EPA 180.1	Turbidity	RPD ≤ 20	NA	NA	NA
EPA 350.2	Ammonia as N	RPD ≤ 20	7	7	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 20	NA	NA	NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 20	NA	NA	NA
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	NA	NA	NA
EPA 365.2	Phosphate as P	RPD ≤ 20	NA	NA	NA

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF PAIRS	PAIRS WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 415.1	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	NA	NA	NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	NA	NA	NA
Walkley-Black	Total Organic Carbon (sediment)	RPD ≤ 20	1	1	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD ≤ 25	1	1	100.00
		TOTAL	**39**	**39**	**100.00**

NA-Not applicable

Table 26. ESJWQC summary of matrix spike Quality Control sample evaluations.

Matrix spikes and matrix spike duplicates collected from January through December 2012. Non project matrix spikes are included for batch Quality Assurance completeness purposes. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	PR 31-133	24	24	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	24	24	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	24	24	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	24	24	100.00
EPA 8321A CARB	Methomyl	PR 23-152	24	24	100.00
EPA 8321A CARB	Oxamyl	PR 10-117	24	24	100.00
EPA 8321A CARB	Diuron	PR 52-136	24	24	100.00
EPA 8321A CARB	Linuron	PR 49-144	24	24	100.00
EPA 619	Atrazine	PR 39-156	24	24	100.00
EPA 619	Cyanazine	PR 22-172	24	24	100.00
EPA 619	Simazine	PR 21-179	24	24	100.00
EPA 547M	Glyphosate	PR 84-113	2	2	100.00
EPA 549.2M	Paraquat	PR 70-130	2	0	0.00
EPA 8081A	DDD(p,p')	PR 38-135	2	2	100.00
EPA 8081A	DDE(p,p')	PR 21-134	2	2	100.00
EPA 8081A	DDT(p,p')	PR 18-145	2	2	100.00
EPA 8081A	Dicofol	PR 40-135	2	2	100.00
EPA 8081A	Dieldrin	PR 48-121	2	2	100.00
EPA 8081A	Endrin	PR 24-143	2	2	100.00
EPA 8081A	Methoxychlor	PR 30-163	2	2	100.00
EPA 8081A	Aldin	PR 11-138	2	2	100.00
EPA 8081A	Chlordane	PR 44-152	2	2	100.00
EPA 8081A	Heptachlor	PR 24-124	2	2	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	2	2	100.00
EPA 8081A	HCH, alpha	PR 33-111	2	2	100.00
EPA 8081A	HCH, beta	PR 49-119	2	2	100.00
EPA 8081A	HCH, delta	PR 12-97	2	2	100.00
EPA 8081A	HCH, gamma	PR 40-114	2	2	100.00
EPA 8081A	Endosulfan I	PR 50-131	2	2	100.00
EPA 8081A	Endosulfan II	PR 55-128	2	2	100.00
EPA 8081A	Toxaphene	PR 23-140	2	2	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	24	22	91.67
EPA 8141A OP	Chlorpyrifos	PR 61-125	26	25	96.15
EPA 8141A OP	Diazinon	PR 57-130	26	26	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	24	100.00
EPA 8141A OP	Disulfoton	PR 47-117	24	23	95.83
EPA 8141A OP	Malathion	PR 47-125	24	23	95.83
EPA 8141A OP	Methidathion	PR 50-150	24	24	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	24	24	100.00
EPA 8141A OP	Phorate	PR 44-117	24	22	91.67
EPA 8141A OP	Phosmet	PR 50-150	24	20	83.33
EPA 8141A OP	Trifluralin	PR 40-148	24	24	100.00
EPA 8321A	Methamidophos	PR 25-136	24	24	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	28	24	85.71
EPA 160.1	Total Dissolved Solids	PR 80-120	NA	NA	NA
EPA 160.2	Total Suspended Solids	PR 80-120	NA	NA	NA
EPA 180.1	Turbidity	PR 90-110	NA	NA	NA
EPA 350.2	Ammonia as N	PR 90-110	28	28	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	PR 90-110	10	10	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	30	30	100.00
EPA 365.2	OrthoPhosphate as P	PR 90-110	30	28	93.33
EPA 365.2	Phosphate as P	PR 90-110	8	8	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 415.1	Total Organic Carbon	PR 80-120	30	26	86.67
SM 9223B	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	PR 70-130	2	2	100.00
EPA 200.8	Boron	PR 70-130	8	8	100.00
EPA 200.8	Cadmium	PR 70-130	2	2	100.00
EPA 200.8	Copper	PR 70-130	24	24	100.00
EPA 200.8	Lead	PR 70-130	6	6	100.00
EPA 200.8	Molybdenum	PR 70-130	2	2	100.00
EPA 200.8	Nickel	PR 70-130	8	8	100.00
EPA 200.8	Selenium	PR 70-130	8	8	100.00
EPA 200.8	Zinc	PR 70-130	24	24	100.00
EPA 200.8	Cadmium (Dissolved)	PR 70-130	2	2	100.00
EPA 200.8	Copper (Dissolved)	PR 70-130	24	24	100.00
EPA 200.8	Lead (Dissolved)	PR 70-130	6	6	100.00
EPA 200.8	Nickel (Dissolved)	PR 70-130	8	8	100.00
EPA 200.8	Zinc (Dissolved)	PR 70-130	26	26	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	PR 25-200	2	0	0.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 40-130	2	0	0.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	PR 30-160	2	2	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	PR 50-150	2	2	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	PR 35-150	2	2	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	PR 50-175	2	2	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	PR 50-200	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	PR 40-200	2	2	100.00
		TOTAL	**976**	**949**	**97.23**

NA-Not applicable

Table 27. ESJWQC summary of matrix spike duplicate Quality Control sample evaluations.

Matrix spike duplicates collected from January through December 2012. Non project matrix spike duplicates are included for batch Quality Assurance completeness purposes. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	12	12	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	12	12	100.00
EPA 619	Atrazine	RPD ≤ 25	12	12	100.00
EPA 619	Cyanazine	RPD ≤ 25	12	12	100.00
EPA 619	Simazine	RPD ≤ 25	12	12	100.00
EPA 547M	Glyphosate	RPD ≤ 25	1	1	100.00
EPA 549.2M	Paraquat	RPD ≤ 25	1	1	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	1	1	100.00
EPA 8081A	Dicofol	RPD ≤ 25	1	1	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Endrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	1	1	100.00
EPA 8081A	Aldrin	RPD ≤ 25	1	1	100.00
EPA 8081A	Chlordane	RPD ≤ 25	1	1	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	1	1	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	1	1	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	1	1	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	1	1	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	1	1	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	1	1	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	13	13	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	13	13	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	11	91.67
EPA 8141A OP	Disulfoton	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	12	11	91.67
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	11	91.67
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	12	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	12	12	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 20	14	14	100.00
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	NA	NA	NA
EPA 160.2	Total Suspended Solids	RPD ≤ 20	NA	NA	NA
EPA 180.1	Turbidity	RPD ≤ 20	NA	NA	NA
EPA 350.2	Ammonia as N	RPD ≤ 20	14	14	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 20	5	5	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 20	15	15	100.00
EPA 365.2	OrthoPhosphate as P	RPD ≤ 20	15	15	100.00
EPA 365.2	Phosphate as P	RPD ≤ 20	4	4	100.00

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 415.1	Total Organic Carbon	RPD ≤ 20	15	15	100.00
SM 9223B	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	RPD ≤ 20	1	1	100.00
EPA 200.8	Boron	RPD ≤ 20	4	4	100.00
EPA 200.8	Cadmium	RPD ≤ 20	1	1	100.00
EPA 200.8	Copper	RPD ≤ 20	12	12	100.00
EPA 200.8	Lead	RPD ≤ 20	3	3	100.00
EPA 200.8	Molybdenum	RPD ≤ 20	1	1	100.00
EPA 200.8	Nickel	RPD ≤ 20	4	4	100.00
EPA 200.8	Selenium	RPD ≤ 20	4	4	100.00
EPA 200.8	Zinc	RPD ≤ 20	12	12	100.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 20	1	1	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	12	12	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	3	3	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	4	4	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD <25	1	1	100.00
		TOTAL	**488**	**485**	**99.39**

NA-Not applicable

Table 28. ESJWQC summary of laboratory duplicate Quality Control sample evaluations.

Laboratory duplicates were analyzed in batches with samples collected January through December 2012. Non project samples are included for batch Quality Assurance completeness purposes. Evaluations sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbaryl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbofuran	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methiocarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methomyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Oxamyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Diuron	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Linuron	RPD ≤ 25	NA	NA	NA
EPA 619	Atrazine	RPD ≤ 25	NA	NA	NA
EPA 619	Cyanazine	RPD ≤ 25	NA	NA	NA
EPA 619	Simazine	RPD ≤ 25	NA	NA	NA
EPA 547M	Glyphosate	RPD ≤ 25	NA	NA	NA
EPA 549.2M	Paraquat	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDD(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDE(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDT(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dicofol	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dieldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Methoxychlor	RPD ≤ 25	NA	NA	NA
EPA 8081A	Aldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Chlordane	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor epoxide	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 8081A	Endosulfan I	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endosulfan II	RPD ≤ 25	NA	NA	NA
EPA 8081A	Toxaphene	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Diazinon	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Dichlorvos	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Dimethoate	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Demeton-s	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Disulfoton	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Malathion	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Methidathion	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Phorate	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Phosmet	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Trifluralin	RPD ≤ 25	NA	NA	NA
EPA 8321A	Methamidophos	RPD ≤ 25	NA	NA	NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	12	12	100.00
EPA 160.2	Total Suspended Solids	RPD ≤ 25	14	13	92.86
EPA 180.1	Turbidity	RPD ≤ 25	12	12	100.00
EPA 350.2	Ammonia as N	RPD ≤ 25	NA	NA	NA
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	NA	NA	NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	NA	NA	NA
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	NA	NA	NA
EPA 365.2	Phosphate as P	RPD ≤ 25	NA	NA	NA

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 415.1	Total Organic Carbon	RPD ≤ 25	NA	NA	NA
SM 9223B	E. coli	Rlog ≤ 1.3	4	4	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	**44**	**43**	**97.73**

NA-Not applicable

Table 29. ESJWQC summary of surrogate recovery Quality Control sample evaluations.

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 36-140	136	136	100.00
EPA 8321A	Diphenamid(Surrogate)	RPD ≤ 25; PR 52-122	129	126	97.67
EPA 619	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 62-145	130	127	97.69
EPA 619	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 54-144	130	126	96.92
EPA 8081A	Decachlorobiphenyl(Surrogate)	RPD ≤ 25; PR 16-146	11	11	100.00
EPA 8081A	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	11	11	100.00
EPA 8141A OP	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 60-150	145	143	98.62
EPA 8141A OP	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 56-129	145	134	92.41
EPA 8270M_NCI	Decachlorobiphenyl(Surrogate) sediment	RPD ≤ 25; PR 50-150 (MS), PR 76-172 (LCS)	7	7	100.00
TOTAL			**844**	**821**	**97.27**

Table 30. ESJWQC summary of holding time evaluations for environmental, field blank, field duplicate and matrix spike samples.

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	7 days	93	93	100.00
EPA 8321A CARB	Carbaryl	7 days	93	93	100.00
EPA 8321A CARB	Carbofuran	7 days	93	93	100.00
EPA 8321A CARB	Methiocarb	7 days	93	93	100.00
EPA 8321A CARB	Methomyl	7 days	93	93	100.00
EPA 8321A CARB	Oxamyl	7 days	93	93	100.00
EPA 8321A CARB	Diuron	7 days	100	100	100.00
EPA 8321A CARB	Linuron	7 days	93	93	100.00
EPA 619	Atrazine	7 days	93	93	100.00
EPA 619	Cyanazine	7 days	93	93	100.00
EPA 619	Simazine	7 days	93	93	100.00
EPA 547M	Glyphosate	7 days	8	8	100.00
EPA 549.2M	Paraquat	7 days	8	8	100.00
EPA 8081A	DDD(p,p')	7 days	8	8	100.00
EPA 8081A	DDE(p,p')	7 days	8	8	100.00
EPA 8081A	DDT(p,p')	7 days	8	8	100.00
EPA 8081A	Dicofol	7 days	8	8	100.00
EPA 8081A	Dieldrin	7 days	8	8	100.00
EPA 8081A	Endrin	7 days	8	8	100.00
EPA 8081A	Methoxychlor	7 days	8	8	100.00
EPA 8081A	Aldrin	7 days	8	8	100.00
EPA 8081A	Chlordane	7 days	8	8	100.00
EPA 8081A	Heptachlor	7 days	8	8	100.00
EPA 8081A	Heptachlor epoxide	7 days	8	8	100.00
EPA 8081A	HCH, alpha	7 days	8	8	100.00
EPA 8081A	HCH, beta	7 days	8	8	100.00
EPA 8081A	HCH, delta	7 days	8	8	100.00
EPA 8081A	HCH, gamma	7 days	8	8	100.00
EPA 8081A	Endosulfan I	7 days	8	8	100.00
EPA 8081A	Endosulfan II	7 days	8	8	100.00
EPA 8081A	Toxaphene	7 days	8	8	100.00
EPA 8141A OP	Azinphos methyl	7 days	93	93	100.00
EPA 8141A OP	Chlorpyrifos	7 days	102	102	100.00
EPA 8141A OP	Diazinon	7 days	94	94	100.00
EPA 8141A OP	Dichlorvos	7 days	93	93	100.00
EPA 8141A OP	Dimethoate	7 days	93	93	100.00
EPA 8141A OP	Demeton-s	7 days	93	93	100.00
EPA 8141A OP	Disulfoton	7 days	93	93	100.00
EPA 8141A OP	Malathion	7 days	93	93	100.00
EPA 8141A OP	Methidathion	7 days	93	93	100.00
EPA 8141A OP	Parathion, Methyl	7 days	93	93	100.00
EPA 8141A OP	Phorate	7 days	93	93	100.00
EPA 8141A OP	Phosmet	7 days	93	93	100.00
EPA 8141A OP	Trifluralin	7 days	93	93	100.00
EPA 8321A	Methamidophos	7 days	93	93	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	6 months	109	109	100.00
EPA 160.1	Total Dissolved Solids	7 days	96	96	100.00
EPA 160.2	Total Suspended Solids	7 days	96	96	100.00
EPA 180.1	Turbidity	48 hours	96	96	100.00
EPA 350.2	Ammonia as N	Field acidify, 28 days	108	108	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	Field acidify, 28 days	46	46	100.00
EPA 353.2	Nitrate + Nitrite as N	Field acidify, 28 days	108	108	100.00
EPA 365.2	OrthoPhosphate as P	48 hours	108	108	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 365.2	Phosphate as P	Field acidify, 28 days	46	46	100.00
EPA 415.1	Total Organic Carbon	28 days	108	108	100.00
SM 9223B	E. coli	24 hours	42	42	100.00
EPA 200.8	Arsenic	Field acidify, 6 months	9	9	100.00
EPA 200.8	Boron	Field acidify, 6 months	35	35	100.00
EPA 200.8	Cadmium	Field acidify, 6 months	9	9	100.00
EPA 200.8	Copper	Field acidify, 6 months	122	122	100.00
EPA 200.8	Lead	Field acidify, 6 months	21	21	100.00
EPA 200.8	Molybdenum	Field acidify, 6 months	9	9	100.00
EPA 200.8	Nickel	Field acidify, 6 months	35	35	100.00
EPA 200.8	Selenium	Field acidify, 6 months	35	35	100.00
EPA 200.8	Zinc	Field acidify, 6 months	105	105	100.00
EPA 200.8	Cadmium (Dissolved)	Field acidify, 6 months	9	9	100.00
EPA 200.8	Copper (Dissolved)	Field acidify, 6 months	122	122	100.00
EPA 200.8	Lead (Dissolved)	Field acidify, 6 months	21	21	100.00
EPA 200.8	Nickel (Dissolved)	Field acidify, 6 months	35	35	100.00
EPA 200.8	Zinc (Dissolved)	Field acidify, 6 months	105	105	100.00
Walkley-Black	Total Organic Carbon (sediment)	Freeze or analyze within 28 days	18	18	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 8270M_NCI	Permethrin (sediment)	Freeze within 48 hours or extract within 14 days	3	3	100.00
EPA 600/R-99-064	*Hyalella azteca*	Store at $\leq$6°C do not freeze, 14 days	18	7	38.89
EPA 821/R-02-012	*Ceriodaphnia dubia*	Store at $\leq$6°C, 36 Hours	76	76	100.00
EPA 821/R-02-012	*Pimephales promelas*	Store at $\leq$6°C, 36 Hours	72	72	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	Store at $\leq$6°C, 36 Hours	78	78	100.00
TOTAL			**4426**	**4415**	**99.75**

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

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

METHOD	TOXICITY SPECIES	TOTAL FIELD DUPLICATE SAMPLES	DATA QUALITY OBJECTIVE (DQO)	TOTAL FIELD DUPLICATE SAMPLES WITHIN DQO	PERCENT SAMPLES WITHIN ACCEPTABLE CRITERIA
EPA 821/R-02-012	*Ceriodaphnia dubia*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-012	*Pimephales promelas*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	12	RPD ≤ 25	12	100.00
EPA 600/R-99-064	*Hyalella azteca*	2	RPD ≤ 25	2	100.00

Table 32. ESJWQC summary of toxicity laboratory control sample evaluations.

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

METHOD	TOXICITY SPECIES	TOTAL LAB CONTROL SAMPLES	DATA QUALITY OBJECTIVE (DQO)	TOTAL LAB CONTROLS WITHIN DQO	PERCENT SAMPLES WITHIN ACCEPTABLE CRITERIA
EPA 821/R-02-012	*Ceriodaphnia dubia*	12	Survival in control samples ≥90%	12	100.00
EPA 821/R-02-012	*Pimephales promelas*	12	Survival in control samples ≥80%	12	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	12	> 200,000 cells/mL, variability of controls <20%	12	100.00
EPA 600/R-99-064	*Hyalella azteca*	2	Survival in control samples ≥80%	2	100.00

Table 33. ESJWQC summary of calculated sediment grain size RPD_{SD} results.

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

SAMPLE TYPE	ANALYSIS MONTH	Φ5	Φ16	Φ84	Φ95	SD	RPD_{SD}
Environmental Sample	March 2012	-0.04	0.79	4.4	6.79	1.94	-
Lab Duplicate	March 2012	-0.48	0.2	3.7	6.32	1.91	1.80
Field Duplicate	March 2012	-0.29	0.37	3.99	6.54	1.94	0.13
Environmental Sample	September 2012	0.2	1.44	7.59	8.88	2.85	-
Lab Duplicate	September 2012	0.85	2.45	7.71	8.91	2.54	1.28
Field Duplicate	September 2012	0.75	2.37	7.7	8.91	2.57	10.47

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

DISCUSSION OF RESULTS

Sites monitored during the reporting period are listed in Tables 11 and 12 of this report. Tables 4, 5 and 6 outline the constituents monitored from January through December 2012.

Effective April 17, 2012, the Coalition was approved to temporarily update its monitoring program to reflect the following changes for the 2012 monitoring year: 1) suspended monitoring at Core sites, 2) suspended MPM with the exception of Bear Creek @ Kibby Rd, and 3) reduced Assessment Monitoring constituents (organochlorines including Group A pesticides, paraquat, glyphosate, all metals except copper and zinc, TKN, total phosphorus, and *E. coli*). The Coalition monitored Assessment sites on April 12, 2012 to capture a storm / high TSS event (included additional samples for organochlorines, glyphosate, paraquat, arsenic, cadmium, lead and molybdenum analysis). The Coalition received approval to reduce monitoring before Core Monitoring and MPM was scheduled in April and therefore the April monitoring followed the updated monitoring schedule approved on April 17, 2012.

Current Pesticide Use Report (PUR) data were reviewed in an effort to determine sources of WQTL exceedances of applied pesticides. All PUR data are considered preliminary and may contain some level of inaccuracy until they are finalized and made available through California Pesticide Information Portal (CalPIP). Preliminary data may include zeros or blank cells in the pounds Active Ingredient (AI) per acre column of the PUR appendix (Appendix IV). Preliminary data do not include the pounds AI per acre and therefore it must be calculated based on the amount applied and area reported. In order for the calculations to work properly it requires that the proper units be reported for the amount applied and for the area treated; if there are errors in the data these calculations cannot be performed and will result in a blank cell for AI per acre. An example of such an error includes dry product with units associated with liquid measures and/or liquid products associated with dry units. In some cases the area over which a product is applied has no reported unit; in such cases the pounds AI per acre is incalculable and left blank. Zeros in the pounds AI per acre column are due to values less than 0.0001 being rounded to zero during the calculation process; this occurs when the amount applied relative to an acre is very minimal. The original data are not rounded; only the calculated pounds AI per acre. The most recent data available from the CalPIP website are through December 2010. Table 34 lists the dates for which preliminary PUR data were available for review for Madera, Merced and Stanislaus Counties. The Coalition does not expect any outstanding PUR data to become available until August 2013; therefore, an addendum to the AMR will be submitted on August 30, 2013.

As of April 2012, the Coalition monitored constituents according to the April 17, 2012 approval to update the EJSWQC monitoring plan. At least 90% of samples collected during 2012 met data quality objectives for completeness, precision and accuracy. A discussion of all Quality Assurance/ Quality Control can be found in the Precision and Accuracy section of this report. Exceedances of WQTLs were reported to Regional Board staff within five business days upon receipt of laboratory results. Three exceedance reports required amendments due to either an overlooked exceedances (one for pH and one for nitrate) or a typo (reported an SC exceedance incorrectly). An amendment to the February 13, 2012 field exceedance report was sent on July 4, 2012 to account for an overlooked pH exceedance. An amendment to the December 18, 2012 exceedance report was sent on February 6, 2013 to account for nitrate exceedances in the grab and field duplicate samples that were previously overlooked. An amendment to the December 6, 2012 field exceedance report was sent on December 10, 2012 to correct a typo which erroneously indicated there was an exceedance of SC. A list of all WQTLs used to evaluate results is included in Table 35. Coalition monitoring from January through December 2012 resulted in exceedances of WQTLs for DO, pH, SC, *E. coli*, TDS, ammonia, nitrates, arsenic and copper (Tables 36-37). Water column toxicity to *S. capricornutum* and sediment toxicity to *H. azteca* also occurred (Tables 38 and 40). The next section summarizes all exceedance data.

A TIE was performed on 100% of the samples where survival or growth of the respective target organism was 50% or less compared to the control. Additional chemistry analysis for chlorpyrifos and pyrethroids was performed if survival of the target organism was 80% or less compared to the control. A TIE report is included in Appendix VI which evaluates the results of all TIE's performed in 2012 and any available chemistry results. Included in this report are the results from a TIE conducted on samples collected from Yori Grove @ East Taylor Road (Lateral 3 along East Taylor Rd) in January 2012. Yori Grove was removed from the Coalition's monitoring program shortly after this sample was collected (February 7, 2012) due to the water not being representative of irrigated agricultural drainage. The TIE report is the only location where Yori Grove results are included for 2012. For a full assessment of Yori Grove results, refer to Appendix X of the ESJWQC 2012 AMR.

Table 34. Obtained PUR data for January through December 2012 exceedances.

COUNTY	2012 PUR DATA OBTAINED	2012 PUR DATA OUTSTANDING
Madera	January through December	None
Merced	January through December	None
Stanislaus	January through December	None

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 & Westcot)	3
Dissolved Oxygen (minimum)	7 mg/L	Numeric	Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Rivers Basin Plan. Water Quality Control Plan for the Tulare Lake Basin.	1
	5 mg/L		Warm Freshwater Habitat	Basin Plan Objective, page III-5.00: for waters designated WARM (aquatic life). Tulare Lake Basin Plan	
Turbidity	variable	Numeric	Municipal and Domestic Supply	Basin Plan Objective - increase varies based on natural turbidity	1
Total Dissolved Solids	450 mg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & 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 Maximum Contaminant Level (MCL) (MUN, human health)	1
Carbaryl	2.53 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average	3
Carbofuran	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methiocarb	0.5 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates	3
Methomyl	0.52 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average (California Department of Fish and Game) (aquatic life)	3
Oxamyl	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Drinking Water Standards - Maximum Contaminant Levels (MCLs). California Dept of Health Services. Primary MCL	3
Pesticides – Organochlorines					
DDD(p,p')	0.00083 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR, Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
DDE(p,p')	0.00059 µg/L				
DDT(p,p')	0.00059 µg/L				
Dicofol	NA				
Dieldrin	0.00014 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) / Continuous Concentration 4-day average (total)	1

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
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 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 as a drinking water level.	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Group A Pesticides					
Aldrin	0.00013 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	3 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Instantaneous maximum	
Chlordane	0.00057 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0043 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor	0.00021 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Heptachlor Epoxide	0.0001 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0038 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Total Hexachlorocyclohexane (including lindane)	0.0039 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.95 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Maximum Concentration (1-hour Average)	
Endosulfan	110 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056 µg/L		Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR (USEPA) - Continuous Concentration 4-day average (total)	
Toxaphene	0.00073 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.0002 µg/L		Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) - Continuous Concentration 4-day average (total)	
Pesticides – Herbicides					
Atrazine	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL	1
Cyanazine	1.0 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA Health Advisory (human health)	3
Diuron	2 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water. USEPA Health Advisory. Likely to be carcinogenic to humans (U.S. Environmental Protection Agency, 2005 Guidelines for Carcinogen Risk Assessment).	3

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Glyphosate	700 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Linuron	1.4 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3
Molinate	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Paraquat	3.2 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level	3
Simazine	4.0 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Thiobencarb	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Discharge Prohibition	2
Trifluralin	5 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Cancer Risk Level. One-in-a-Million Incremental Cancer Risk Estimates for Drinking Water	3
Metals (c)					
Arsenic	10 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: USEPA Primary MCL (MUN, human health)	1
Boron	700 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Cadmium	for aquatic life; variable (see cadmium worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness	1
	5 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Copper	for aquatic life; variable (see copper worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - Varies with water hardness/	1
	1,300 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Lead	for aquatic life; variable (see lead worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Molybdenum	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan - San Joaquin River, Mouth of the Merced River to Vernalis	1
	50 µg/L			Sacramento/San Joaquin Basin Plan - Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River	
	10 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
	35 µg/L		Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level.	
Nickel	For aquatic life variable (see Nickel worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	100 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Selenium	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1

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

Category 1: Constituents that have numeric water quality objectives in the Sac-SJR Basin Plan or other Water Quality Objective (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.
MUN-Municipal and Domestic Supply
NA-Not Available. Until completion of evaluation studies and MRP Plan submittals with site specific information on beneficial uses.
ND-Not Detected
(*)-Water Quality Control Plan for the Sacramento and San Joaquin River Basins. Revised on October 2007.
Narrative WQTLs are based on Water Quality Goals Database. Updated by Jon Marshack on July 16, 2008.

SUMMARY OF EXCEEDANCE REPORTS

All exceedance reports 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 exceedances occurring in January through December 2012 are listed by constituent in Tables 36-38. Additional sediment chemistry results associated with sediment toxicity can be found in Table 40. Where applicable, exceedances are tallied by the number of NM exceedances, the number of exceedances that occurred in non-contiguous waterbodies (not connected to downstream waterbody), the number of MPM exceedances (red bolded values) and total count for all WQTL exceedances. If an exceedance occurred in both the environmental and the associated field duplicate samples, the result was counted only once.

Table 36. Exceedances of field parameter WQTLs (including DO, pH and SC).

WQTLs are listed below each constituent. Field parameters under a management plan are all classified as Priority E constituents and are monitored only as a part of Normal Monitoring (see Management Plan approved November 25, 2008, 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
Deadman Creek @ Gurr Rd	1/10/2012	Winter1 Non-contiguous		8.68	
Deadman Creek @ Hwy 59	1/10/2012	Winter1		8.66	
Dry Creek @ Wellsford Rd	1/10/2012	Winter1	6.07		
Levee Drain @ Carpenter Rd	1/10/2012	Winter1			1851
Prairie Flower Drain @ Crows Landing Rd	1/10/2012	Winter1			1669
Bear Creek @ Kibby Rd	2/7/2012	Winter2		8.59	
Deadman Creek @ Hwy 59	2/7/2012	Winter2		8.59	
Deadman Creek @ Gurr Rd	2/7/2012	Winter2		8.57	
Dry Creek @ Rd 18	2/7/2012	Winter2 Non-contiguous		8.58	
Highline Canal @ Hwy 99	2/7/2012	Winter2		9.51	
Highline Canal @ Lombardy Rd	2/7/2012	Winter2		8.85	
Hilmar Drain @ Central Ave	2/7/2012	Winter2			983
Levee Drain @ Carpenter Rd	2/7/2012	Winter2			1905
Prairie Flower Drain @ Crows Landing Rd	2/7/2012	Winter2			2231
Berenda Slough along Ave 18 1/2	3/6/2012	Winter3 Non-contiguous, SED		9.10	
Dry Creek @ Wellsford Rd	3/6/2012	Winter3 SED		8.63	
Duck Slough @ Gurr Rd	3/6/2012	Winter3		8.75	
Hilmar Drain @ Central Ave	3/6/2012	Winter3 SED			1105
Levee Drain @ Carpenter Rd	3/6/2012	Winter3 SED			1811
Prairie Flower Drain @ Crows Landing Rd	3/6/2012	Winter3 SED			2185
Levee Drain @ Carpenter Rd	4/12/2012	Storm1			1672
McCoy Lateral @ Hwy 140	4/12/2012	Storm1		8.87	
Bear Creek @ Kibby Rd	5/9/2012	Irrigation1		9.00	
Levee Drain @ Carpenter Rd	5/9/2012	Irrigation1			1942
Deadman Creek @ Hwy 59	6/12/2012	Irrigation2	6.61		
Levee Drain @ Carpenter Rd	6/12/2012	Irrigation2	5.65		905
Rodden Creek @ Rodden Rd	6/12/2012	Irrigation2	6.97		
Levee Drain @ Carpenter Rd	7/10/2012	Irrigation3			1582
Berenda Slough along Ave 18 1/2	8/14/2012	Irrigation4	3.72		
Highline Canal @ Lombardy Rd	8/14/2012	Irrigation4		9.30	
Levee Drain @ Carpenter Rd	8/14/2012	Irrigation4	1.60		1051
Deadman Creek @ Hwy 59	9/11/2012	Irrigation5	4.92		
Levee Drain @ Carpenter Rd	9/11/2012	Irrigation5	4.60		1864
McCoy Lateral @ Hwy 140	9/11/2012	Irrigation5		8.74	
Deadman Creek @ Hwy 59	10/9/2012	Fall1	3.72		
Levee Drain @ Carpenter Rd	10/9/2012	Fall1	3.93		1967
Highline Canal @ Lombardy Rd	11/13/2012	Fall2 NM, Non-contiguous		9.24	
Levee Drain @ Carpenter Rd	11/13/2012	Fall2			1810
Levee Drain @ Carpenter Rd	12/3/2012	Storm2	5.22		
		Non-contiguous Waterbody Exceedances	**0**	**4**	**0**
		Total Exceedances	**11**	**16**	**16**

SED – Sediment monitoring

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

If a field duplicate and an environmental sample both exceeded the WQTL, only the environmental sample exceedance was included in this table. If an exceedance in the field duplicate sample and not the environmental sample occurred, the field duplicate result was included and noted by (FD) at the end of the station name. Constituents under a management plan that are not applied by agriculture are classified as Priority E constituents and are monitored only as a part of Normal Monitoring and not counted toward MPM Exceedances (see Management Plan approved November 25, 2008, Prioritization of Exceedances section). Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season	*E. coli*	TDS	Ammonia	Nitrate + Nitrite	Arsenic Total	Copper Dissolved[1]
			235 MPN/100 mL	450 mg/L	1.5 mg/L	10 mg/L	10 µg/L	(hardness based trigger limit) µg/L
Highline Canal @ Hwy 99	1/10/2012	Winter1						**4.5 (2.65)**
Levee Drain @ Carpenter Rd	1/10/2012	Winter1	310	1200		25		
Prairie Flower Drain @ Crows Landing Rd	1/10/2012	Winter1	>2400	1200	5.0	30		
Highline Canal @ Hwy 99	2/7/2012	Winter2						**3.8 (2.07)**
Highline Canal @ Lombardy Rd	2/7/2012	Winter2						2.0 (1.46)
Levee Drain @ Carpenter Rd	2/7/2012	Winter2	2400	1300		23		
Livingston Drain @ Robin Ave	2/7/2012	Winter2						**12 (2.46)**
Prairie Flower Drain @ Crows Landing Rd	2/7/2012	Winter2	820	1500		33		
Rodden Creek @ Rodden Rd	2/7/2012	Winter2	240					
Duck Slough @ Gurr Rd	3/6/2012	Winter3 SED	260					
Highline Canal @ Lombardy Rd	3/6/2012	Winter3 SED						14 (7.40)
Levee Drain @ Carpenter Rd	3/6/2012	Winter3 SED		1200		24		
Prairie Flower Drain @ Crows Landing Rd	3/6/2012	Winter3 SED		1600		36		
Rodden Creek @ Rodden Rd	3/6/2012	Winter3 SED	550					
Deadman Creek @ Hwy 59	4/12/2012	Storm1	410				12	
Levee Drain @ Carpenter Rd	4/12/2012	Storm1	920	1100		17		
McCoy Lateral @ Hwy 140	4/12/2012	Storm1	1100					
Levee Drain @ Carpenter Rd	5/9/2012	Irrigation1		1300	2.6	31		
Berenda Slough along Ave 18 1/2	6/12/2012	Irrigation2						**5.7 (3.02)**
Levee Drain @ Carpenter Rd	6/12/2012	Irrigation2		570		13		
McCoy Lateral @ Hwy 140	6/12/2012	Irrigation2						2.7 (2.07)
Berenda Slough along Ave 18 1/2	7/10/2012	Irrigation3						**4.80 (3.02)**
Levee Drain @ Carpenter Rd	7/10/2012	Irrigation3		1000		13		
Levee Drain @ Carpenter Rd	8/14/2012	Irrigation4		670	3.8			
Levee Drain @ Carpenter Rd	9/11/2012	Irrigation5		1100		17		
Levee Drain @ Carpenter Rd	10/9/2012	Fall1		1300		19		
Levee Drain @ Carpenter Rd	11/13/2012	Fall2		1200		21		
Levee Drain @ Carpenter Rd	12/3/2012	Storm2		1000		17		
McCoy Lateral @ Hwy 140	12/3/2012	Storm2						4.40 (1.77)
Normal Monitoring Exceedances			**10**	**15**	**3**	**14**	**1**	**4**
Non-contiguous Waterbody Exceedances			**0**	**0**	**0**	**0**	**0**	**0**
Management Plan Monitoring Exceedances[2]			**0**	**0**	**0**	**0**	**0**	**5**
Total Exceedances			**10**	**15**	**3**	**14**	**1**	**9**

[1] If copper exceedance is the dissolved fraction of copper, the limit based on hardness is indicated in parenthesis.

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

SED-Sediment monitoring

Table 38. Water column and sediment toxicity exceedance summary.

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

Station Name	Sample Date	Season & Monitoring Type[1]	Species	Toxicity End Point	Mean	Percent Control	Toxicity Significance	Summary Comments
Levee Drain @ Carpenter Rd	3/6/2012	Winter3 NM, SED	*H. azteca*	Survival (%)	24	**26**	SL	Pyrethroids and chlorpyrifos detected.
Highline Canal @ Lombardy Rd	9/11/2012	Irrigation5, NM, SED	*S. capricornutum*	Total Cell Count (cells/mL)	221207	**45**	SL	Sample lost all toxicity prior to initiation of TIE.

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

Table 39. Water column toxicity tally.

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

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

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

Table 40. Sediment toxicity chemistry results for samples with 80% or less survival when compared to the control.

Station Name	Sample Date	Monitoring Type	*H. azteca* (% Control)	Sediment Pesticides µg/kg dw										TOC (mg/Kg dw)	Mean GS Description	Median GS (mm)
				Bifenthrin, µg/kg	Chlorpyrifos , µg/kg	Cyfluthrin, µg/kg	Cyhalothrin, lambda µg/kg	Cypermethrin, µg/kg	Deltamethrin:Tralomethrin, µg/kg	Esfenvalerate/Fenvalerate, µg/kg	Fenpropathrin, µg/kg	Permethrin, µg/kg	Tetramethrin µg/kg			
Levee Drain @ Carpenter Rd	3/6/2012	NM, SED	26	12.8	1.5	ND	J0.081	ND	ND	ND	ND	0.39	ND	14000	Sand (Fine)[1]	0.103

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

DISCUSSION OF EXCEEDANCES

Pesticide Use Report Data

Available PUR data are provided to the Coalition from each of the county Agricultural Commissioner's offices and registered products recorded in the database are evaluated for applications relevant to exceedances of WQTLs. To assess possible sources of toxicity, applications of pesticides known to be toxic to the test species are identified based on a variety of factors including the organic carbon partition coefficient (K_{oc}), chemical type, mode of action, and solubility. If sediment toxicity occurs, pesticides with a relatively high K_{oc} (1600 or greater) are considered potential causes. If water toxicity occurs, pesticides with a relatively low K_{oc} (below 1900) are evaluated. Most pesticides were queried for applications within 30 days prior to water sampling. Applications of pyrethroid pesticides, due to their long half-life, are queried for a period of 180 days prior to the date of the exceedance, and metals are queried for a period of 90 days prior to the exceedance (Table 41). If there were no applications within the specified time period, the PUR database was queried an additional 30 days prior to the standard query period. Appendix IV includes tables and maps of all pesticide applications that are relevant to exceedances of WQTLs or toxicity. When PUR data for any county are unattainable the Coalition makes a note in Appendix IV. Information regarding available and outstanding PUR is included in Table 34. Any outstanding PUR will be submitted in an addendum to the AMR on August 30, 2013.

If exceedances of WQTLs for aldrin, dieldrin, endrin, hexachlorocyclohexane (HCH), DDD, DDE, DDT or molybdenum occur, these constituents cannot be queried for associated applications since there are no longer any registered products containing these chemicals. In 2012, there were no exceedances of WQTLs of any pesticides that could not be queried.

Table 41. 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 from January through December 2012 are tabulated by zone in Tables 42-47. The tables are followed by a discussion of exceedances and an assessment of agricultural pesticide applications that are potential sources of the exceedances. All PUR data relevant to pesticide exceedances and toxicity are discussed based on pounds (lbs) of AI applied upstream of the sampling site. Measures taken to address these exceedances are described in the Actions Taken to Address Water Quality Exceedances section of this report.

Zone 1 (Dry Creek @ Wellsford Rd and Rodden Creek @ Rodden Rd)

Field Parameters and E. coli

In Zone 1, exceedances of the WQTLs for DO (2), pH (1) and *E. coli* (3) occurred from January through December 2012 (Table 42). From January through March, Dry Creek @ Wellsford Rd was monitored for Core

Monitoring constituents and MPM. Rodden Creek @ Rodden Rd was the Assessment Monitoring location in Zone 1; during November Rodden Creek @ Rodden Rd was dry.

Exceedances of water quality objectives for field parameters such as DO, SC and pH are difficult to track and source. All of these parameters are non-conserved meaning that they can increase or decrease as water moves downstream. The concentrations of these parameters are the result of processes occurring in the water column and in the sediment. These processes can vary diurnally and seasonally. Two exceedances below the WQTL of 7 mg/L for DO occurred, one at Dry Creek @ Wellsford Rd (6.07 mg/L) and one at Rodden Creek @ Rodden Rd (6.97 mg/L). One detection of pH was slightly greater than the WQTL of 8.5 at Dry Creek @ Wellsford Rd (8.63).

All three exceedances of the WQTL for *E. coli* occurred at Rodden Creek @ Rodden Rd and ranged from 240 – 550 MPN/100 mL (Table 42). There are numerous dairies located in both subwatersheds where the selling of manure compost as fertilizer to adjacent farms is possible. If environmental conditions are suitable and manure compost has not been managed and applied properly, it is possible for bacteria to grow and contribute to exceedance level detections of *E. coli* if allowed to enter the waterway. Although dairies are not allowed to discharge into the waterways, there have been instances of discharge noted in the past in the Coalition area. The exceedances of the *E. coli* WQTL in the Rodden Creek @ Rodden Rd subwatershed occurred during the spring season; it is possible the exceedances were associated with spring/fall applications of manure. It is also possible that natural populations of *E. coli* in stream sediments become active with increasing air and water temperatures during the spring.

Table 42. Zone 1 (Dry Creek @ Wellsford Rd and Rodden Creek @ Rodden Rd) exceedances.

Zone 1 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	*E. coli*, MPN/100 mL
Dry Creek @ Wellsford Rd	NM	1/10/2012	6.07		
Dry Creek @ Wellsford Rd	MPM, NM, SED	3/6/2012		8.63	
Rodden Creek @ Rodden Rd-FD	NM	2/7/2012			240
Rodden Creek @ Rodden Rd	NM, SED	3/6/2012			550
Rodden Creek @ Rodden Rd-FD	NM, SED	3/6/2012			390
Rodden Creek @ Rodden Rd	NM	6/12/2012	6.97		

FD-Field Duplicate
MPM-Management Plan Monitoring
NM-Normal Monitoring
SED- Sediment Monitoring

Zone 2 (Hilmar Drain @ Central Ave, Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd)

Field Parameters, Total Dissolved Solids, and E. coli

In Zone 2, exceedances of the WQTLs for DO (5), SC (16), TDS (17), and *E. coli* (5) occurred (Table 43). Zone 2 Assessment Monitoring occurred from January through December at Levee Drain @ Carpenter Rd. From January through March, MPM and Core Monitoring occurred at Prairie Flower Drain @ Crows Landing Rd and MPM occurred at Hilmar Drain @ Central Ave.

All five exceedances of the WQTL for DO occurred at Levee Drain @ Carpenter Rd and ranged from 1.60 to 5.65 mg/L. Exceedance level detections of SC occurred at all three sites in Zone 2 with values greater than the 700 µS/cm WQTL ranging from 905 to 2231 µS/cm (Table 43). Exceedances of the WQTLs for TDS and *E. coli* occurred at both Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd. Elevated levels of TDS and SC are common in Zone 2 subwatersheds because the sites are located in the western portion of the Coalition region with shallow, salty groundwater. This section of the Valley has inadequate subsurface drainage conditions that result in a negative impact on crop productivity. Management of subsurface drainage is necessary to prevent excessive shallow groundwater conditions which result in the accumulation of salts in the root zones of agricultural crops (http://www.water.ca.gov/drainage/index.cfm). Therefore, tile drains were installed to intercept rising groundwater and infiltrating surface water. All TDS detections above the WQTL were associated with exceedance level detections of SC.

Much of the Prairie Flower subwatershed has dairies and/or lands managed by dairies that receive manure. The presence of *E. coli* and nutrients (ammonia and nitrate) above the WQTLs at Prairie Flower Drain may be associated with dairy manure applications and/or possible discharges from dairy lagoons. All five of the exceedances of the WQTL for *E. coli* coincided with elevated nitrates in the water column. In discussions of exceedances in the Prairie Flower Drain watershed, Regional Board staff indicated that they have discovered illegal discharges from dairies in the area and have monitored in the past in an attempt to detect the discharges immediately after they occur.

Ammonia

Ammonium can enter a waterbody through three sources: 1) direct discharge of agricultural fertilizers (anhydrous ammonia), 2) direct discharge of animal waste, and 3) discharge from wastewater treatment plants. In soils, ammonium from fertilizers is typically converted to nitrite and then to nitrate over a short period of time. Therefore, ammonium from fertilizers would require a direct discharge to surface waters to detect ammonia in the receiving waterbody. The method of anhydrous ammonium application to fields is injection into soil arguing against direct discharge. Ammonium can also be formed in the waterbody through the mineralization of organic nitrogen. Previous exceedances of the WQTL for ammonia and associated water column toxicities in Zone 2 were attributed to discharge from dairies. In Zone 2, there were three exceedances of the WQTL for ammonia in samples collected from

January through December 2012; one was from Prairie Flower Drain @ Crows Landing Rd and the other two were from Levee Drain @ Carpenter Rd (Table 43).

Samples collected during the first winter event on January 10, 2012 from Prairie Flower Drain contained 5 mg/L ammonia and samples collected on May 9, 2012 and August 14, 2012 from Levee Drain @ Carpenter Rd contained 2.6 and 3.8 mg/L of ammonia, respectively. In the past, dairy wastewater discharge has been responsible for high ammonia results in the Prairie Flower Drain @ Crows Landing Rd site subwatershed. In addition, dairy discharge and/or applications of manure as fertilizer have contributed to other exceedances within the subwatershed including nitrate and *E. coli*.

Nitrates

Potential sources of nitrate in surface waters include runoff of fertilizer or organic matter from irrigated fields, leaking septic systems, waste-treatment facility effluent, and inputs from animal waste. These sources can move to surface waters through above ground runoff or shallow subsurface flows. Total Kjeldahl nitrogen and ammonium in animal waste that enter surface waters can be converted to nitrate by nitrifying bacteria. Possible sources of animal waste in a waterbody include dairies, poultry operations, pasture and/or wildlife. From years of movement of nitrate into groundwater, there is a significant amount of nitrate in the aquifers beneath the ESJWQC region. Many of these aquifers are very shallow and many of the drains in the western portion of the Coalition were constructed in the 1800s to lower the water table and allow farming. More recently, tile drains have been placed in the area, and these further remove shallow groundwater from the subsurface to surface drainages. As a result, nitrate in shallow groundwater originating from dairies may now be intercepted by the field and surface drains resulting in exceedances of the WQTL for nitrate. Deeper wells contaminated with nitrate can be a source of irrigation water. Excessive nutrients can cause eutrophication of surface waters resulting in low DO and an inability to support healthy aquatic communities. Sources of nutrients, organic carbon, and low DO are difficult to identify. Because of the extreme solubility of nitrate, the only way for nitrates in fertilizer to enter surface water is for them to move to surface waters immediately after application and it is unlikely that applications in the spring would result in exceedances of the WQTL throughout the irrigation season. Nitrates may move past the root zone to the shallow subsurface (vadose zone) and move laterally to surface waters although the extent of this potential pathway is not known.

In Zone 2, 16 exceedances of the WQTL for nitrate occurred from January through December 2012; these exceedance level detections were from samples collected from both Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd. Detections of nitrate above the 10 mg/L NO_3 as N WQTL ranged from 13 to 36 mg/L. Two of the exceedances were also associated with elevated levels of ammonia and five were associated with exceedances of the WQTL for *E. coli* (Table 43).

Toxicity

In Zone 2, a single sediment sample was toxic to *H. azteca* during Assessment Monitoring in March at Levee Drain @ Carpenter Rd (Table 43).

Sediment collected during Assessment Monitoring on March 6, 2012 from Levee Drain @ Carpenter Rd was toxic to *H. azteca* (26% survival compared to the control). Since survival was 80% or less than the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was required. Table 40 includes chemistry results for the March sample where detections of bifenthrin (12.8 µg/kg dw), chlorpyrifos (1.50 µg/kg dw), cyhalothrin lambda (J0.081 µg/kg dw) and permethrin (0.39 µg/kg dw) occurred. Total organic carbon concentration was 14,000 mg/kg for this sample with a median grain size of 0.103 mm (fine sand). The PUR data indicate that between December 15, 2011 and March 1, 2012 a total of 10 applications (pyraclostrobin, copper hydroxide and paraquat) ranging between 2.68 and 80.98 lbs AI applied. In the three months prior to the exceedance, 231 lbs AI across 467 acres were associated with this toxicity. Data from 2012 are preliminary and additional PUR data may be received. This subwatershed has had chlorpyrifos applied within its boundaries in the past to crops such as alfalfa and corn. Of the applications identified within the available PUR data, nine of the ten applications were to alfalfa with one application to almonds (Appendix IV). Sediment samples collected in September were not toxic (Table 43).

Table 43. Zone 2 (Hilmar Drain @ Central Ave, Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd) exceedances.

Zone 2 Station Name	Monitoring Type	Sample Date	DO, mg/L	SC, µS/cm	TDS, mg/L	*E. coli*, MPN/ 100 mL	Ammonia, mg/L	Nitrate + Nitrite as N, mg/L	*H. azteca*, % Control
Hilmar Drain @ Central Ave	MPM	2/7/2012		983					
Hilmar Drain @ Central Ave	MPM, SED	3/6/2012		1105					
Levee Drain @ Carpenter Rd	NM	1/10/2012		1851	1200	310		25	
Levee Drain @ Carpenter Rd	NM	2/7/2012		1905	1300	2400		23	
Levee Drain @ Carpenter Rd	NM, SED	3/6/2012		1811	1200			24	26
Levee Drain @ Carpenter Rd	NM	4/12/2012		1672	1100	920		17	
Levee Drain @ Carpenter Rd	NM	5/9/2012		1942	1300		2.6	31	
Levee Drain @ Carpenter Rd	NM	6/12/2012	5.65	905	570			13	
Levee Drain @ Carpenter Rd	NM	7/10/2012		1582	1000			13	
Levee Drain @ Carpenter Rd	NM	8/14/2012	1.60	1051	670		3.8		
Levee Drain @ Carpenter Rd	NM, SED	9/11/2012	4.60	1864	1100			17	
Levee Drain @ Carpenter Rd	NM	10/9/2012	3.93	1967	1300			19	
Levee Drain @ Carpenter Rd	NM	11/13/2012		1810	1200			21	
Levee Drain @ Carpenter Rd-FD	NM	11/13/2012			1300			21	
Levee Drain @ Carpenter Rd	NM	12/3/2012	5.22		1100			17	
Levee Drain @ Carpenter Rd-FD	NM	12/3/2012			1100			17	
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	1/10/2012		1669	1200	>2400	5.0	30	
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	2/7/2012		2231	1500	820		33	
Prairie Flower Drain @ Crows Landing Rd	MPM, NM, SED	3/6/2012		2185	1600			36	

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

Zone 3 (Highline Canal @ Hwy 99 and Highline Canal @ Lombardy Rd)

Field Parameters

In Zone 3, four exceedances of the pH WQTL occurred from January through December 2012. Highline Canal @ Hwy 99 was monitored for Core constituents and MPM from January through March and Assessment Monitoring occurred at Highline Canal @ Lombardy Rd from January through December. Highline Canal @ Hwy 99 was dry in March and Highline Canal @ Lombardy Rd was sampled as a non-contiguous waterbody in November.

Between the two Highline Canal sample sites, four exceedances of the upper level WQTL for pH (8.5) occurred. The pH levels ranged between 8.85 and 9.30 and occurred during February, August and November monitoring events (Table 44).

Copper

There are a number of possible sources of copper in waterbodies within the Coalition region. Copper is applied as a fungicide to a variety of vegetable crops, grains, and fruit and nut orchards in forms such as copper hydroxide, copper sulfide and copper oxide. Copper can also enter drainage systems from sources other than agriculture. Copper is commonly used by dairies and can also enter waterbodies through the weathering of rocks and soils. Automobile components may also contain copper and wearing of brakes can add substantial amounts of copper to surface waters that pass through urban areas. A definitive source for copper exceedances has not been clearly identified in the Coalition region; however, there are four potential sources including 1) recent agricultural applications (either through storm/irrigation runoff or spray drift), 2) dairy uses of copper sulfate in footbaths, 3) resuspension of historic copper from upstream mining, brake pads and other anthropogenic uses, and 4) copper used for algae and aquatic weed control in irrigation supply ditches.

Dissolved copper results are adjusted for the hardness of the water to determine if the bioavailable amount of copper could be toxic to aquatic life. Therefore, the WQTL for dissolved copper will be different for each sample. In Zone 3, there were four exceedances of the hardness based WQTL for dissolved copper from January through December 2012; all of the exceedance level detections of copper were from winter monitoring events (Table 44).

Samples collected for MPM during the first winter event on January 10, 2012 at Highline Canal @ Hwy 99 contained 4.5 µg/L dissolved copper (hardness based WQTL 2.65 µg/L). Upstream samples were collected on the same day at Highline Canal @ Lombardy Rd; however, the upstream samples did not result in an exceedance of the hardness based dissolved copper WQTL (Table 44, 0.76 µg/L dissolved copper). Water column toxicity was not schedule to be monitored during January MPM at Highline Canal @ Hwy 99. The PUR data indicate there were 61 applications of copper ranging from 8.68 to 21.38 lbs AI (20,380 lbs AI) across 3675 acres of almonds, apricots, and peaches from November 5, 2011 through January 3, 2012 (Appendix IV). Highline Canal is a TID supply canal and therefore does not generally accept drainage from nearby parcels; however, some growers may return irrigation tailwater or storm water to the canal. In 2013, MPM for copper will continue at Highline Canal @ Hwy 99 during months of past exceedances.

During the second winter event on February 7, 2012 both Highline Canal @ Hwy 99 (MPM) and Highline Canal @ Lombardy Rd (NM) samples resulted in exceedance level detections of the hardness based WQTL for dissolved copper (2.07 and 1.46 µg/L dissolved copper, respectively). February monitoring did not result in water column toxicity at either of the Highline Canal sampling locations. The PUR data indicate there were 72 applications of copper ranging from 8.88 to 3332 lbs AI (21,618 lbs AI) across 3845 acres of almonds, apricots, and peaches from November 15, 2011 through February 4, 2012 at Highline Canal @ Hwy 99 and 39 applications of copper ranging from 9 to 3332 (16,646 lbs AI) across 3250 acres of the same crops from November 15, 2011 through February 4, 2012 (Appendix IV).

Samples collected during the third winter event on March 6, 2012 at Highline Canal @ Lombardy Rd contained 7.40 µg/L dissolved copper. Copper MPM was not scheduled at Highline Canal @ Hwy 99 during March. Water column toxicity did not occur in samples collected at Highline Canal @ Lombardy Rd during the March sampling event. The PUR data indicate there were 58 applications of copper ranging from 15 to 1253 lbs AI (7479 lbs AI) across 1700 acres of almonds, apricots, and peaches from December 13, 2011 through February 29, 2012 at Highline Canal @ Lombardy Rd (Appendix IV). During 2013, MPM for copper will continue at the Highline Canal monitoring locations during months of past exceedances.

Toxicity

Samples collected on September 11, 2012 during Assessment Monitoring at Highline Canal @ Lombardy Rd were toxic to *S. capricornutum* (45% growth compared to the control). Algae growth was less than 50% compared to the control and therefore a TIE was initiated. However, the TIE baseline test did not detect toxicity, indicating the sample lost all detectable toxicity prior to initiation of the TIE (Appendix VI). There were no exceedance level detections of any metals or pesticides to coincide with this toxicity. The PUR data indicate there were 118 applications of potentially toxic products ranging between 0.26 and 1042 lbs AI associated with this toxicity. Applications were across 7205 acres of alfalfa, almonds, peaches, and walnuts between August 14, 2012 and September 11, 2012 (Appendix IV).

Table 44. Zone 3 (Highline Canal @ Hwy 99 and Highline Canal @ Lombardy Rd) exceedances.

Zone 3 Station Name	Monitoring Type	Sample Date	pH, none	Copper Dissolved, µg/L (hardness based trigger limit)	*S. capricornutum*, % Control
Highline Canal @ Hwy 99	MPM, NM	1/10/2012		4.5 (2.65)	
Highline Canal @ Hwy 99	MPM, NM	2/7/2012	9.51	3.8 (2.07)	
Highline Canal @ Lombardy Rd	NM	2/7/2012	8.85	2.0 (1.46)	
Highline Canal @ Lombardy Rd	NM, SED	3/6/2012		14 (7.40)	
Highline Canal @ Lombardy Rd	NM	8/14/2012	9.30		
Highline Canal @ Lombardy Rd	NM, SED	9/11/2012			45
Highline Canal @ Lombardy Rd	NM, Non-contiguous	11/13/2012	9.24		

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

Zone 4 (Bear Creek @ Kibby Rd, Livingston Drain @ Robin Ave, McCoy Lateral @ Hwy 140 and Merced River @ Santa Fe)

Field Parameters and E. coli

In Zone 4, four exceedances of the WQTL for pH occurred. From January through December, Assessment Monitoring at McCoy Lateral @ Hwy 140 and MPM at Bear Creek @ Kibby Rd occurred. From January through March MPM took place at Livingston Drain @ Robin Ave. Both Bear Creek @ Kibby Rd and Livingston Drain @ Robin Ave were sampled as non-contiguous waterbodies in January. McCoy Lateral @ Hwy 140 was dry during January, February, October and November.

Of the four exceedances of the WQTL for pH, two were from Bear Creek @ Kibby Rd and two were from McCoy Lateral @ Hwy 140. All four of the pH levels were above the upper WQTL of 8.5 and ranged from 8.59 to 9.00.

One exceedance of the WQTL for *E. coli* occurred at McCoy Lateral @ Hwy 140 (1100 MPN/100 mL) in April (Table 45). This was the only time elevated levels of *E. coli* were detected in samples collected from McCoy Lateral @ Hwy 140 during 2012. Heavy rainfall from April 1-14, 2012 was recorded and increased flows in McCoy Lateral (discharge was 3.37 cfs). The subwatershed has numerous dairies and/or lands managed by dairies that receive manure located directly upstream of the sample location. Any storm runoff carrying bacteria from dairies in the subwatershed could have contributed to the exceedance of the WQTL for *E. coli* during the April storm monitoring event.

Copper

In Zone 4, three exceedances of the hardness based WQTL for dissolved copper from January through December 2012; one at Livingston Drain @ Robin Ave during MPM and two at McCoy Lateral @ Hwy 140 during NM (Table 45). Toxicity was not associated with any of the elevated dissolved copper detections.

Samples collected for MPM during the second winter event on February 7, 2012 from Livingston Drain @ Robin Ave contained 12 µg/L dissolved copper. Samples collected for *S. capricornutum* MPM did not result in toxicity during this event. The PUR data indicate there were 49 applications of copper ranging from 16 to 727 lbs AI (9224 lbs AI) across 1415 acres of almonds and peaches from November 16, 2011 through February 6, 2012 (Appendix IV). On the day of sampling, light showers occurred; however, the trigger limit was not met with only 0.05 inches recorded in Merced. In 2013, copper will continue to be monitored at Livingston Drain @ Robin Ave during months of past exceedances as part of MPM.

Samples collected during the second irrigation event on June 12, 2012 and the second storm event on December 3, 2012 from McCoy Lateral @ Hwy 140 contained 2.7 and 4.40 µg/L of dissolved copper, respectively (Table 45). Toxicity was not associated with either exceedance of the hardness based WQTL for dissolved copper. The PUR data associated with the June 12, 2012 exceedance indicate there were 10 applications of copper ranging from 7.87 to 294 lbs AI across 187 acres of almonds, grapes and walnuts from March 22, 2012 through April 27, 2012 (Appendix IV). Heavy rainfall from November 31 through December 2, 2012 was recorded and increased flows in McCoy Lateral (the site was dry in November and discharge was 1.84 cfs in December). Storm runoff could have transported copper to the waterway contributing to the exceedance that occurred during the December event. The PUR data associated with the December exceedance were not available for review at the time of this report; all outstanding PUR will be submitted in an addendum to the AMR on August 30, 2013. During 2013, MPM for copper will continue at Livingston Drain @ Robin Ave during months of past exceedances.

Table 45. Zone 4 (Bear Creek @ Kibby Rd, Livingston Drain @ Robin Ave, McCoy Lateral @ Hwy 140 and Merced River @ Santa Fe) exceedances.

Zone 4 Station Name	Monitoring Type	Sample Date	pH, none	*E. coli*, MPN/100 mL	Copper Dissolved, µg/L (hardness based trigger limit)
Bear Creek @ Kibby Rd	MPM	2/7/2012	8.59		
Bear Creek @ Kibby Rd	MPM	5/9/2012	9.00		
Livingston Drain @ Robin Ave	MPM	2/7/2012			12 (2.46)
McCoy Lateral @ Hwy 140	NM	4/12/2012	8.87	1100	
McCoy Lateral @ Hwy 140	NM	6/12/2012			2.7 (2.07)
McCoy Lateral @ Hwy 140	MPM, NM, SED	9/11/2012	8.74		
McCoy Lateral @ Hwy 140	NM	12/3/2012			4.40 (1.77)

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

Zone 5 (Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Duck Slough @ Gurr Rd and Duck Slough @ Hwy 99)

Field Parameters and E. coli

In Zone 5, exceedances of the WQTLs for DO (3), pH (5) and *E. coli* (2) occurred from January through December 2012 (Table 46). During 2012, Assessment Monitoring occurred at Deadman Creek @ Hwy 59, Core Monitoring took place at Duck Slough @ Gurr Rd and MPM occurred at all sites in the zone. Monitoring locations within Zone 5 were dry in January (Duck Slough @ Gurr Rd), May and August (Deadman Creek @ Hwy 59). Samples were collected from non-contiguous waterbodies at Deadman Creek @ Gurr Rd (January), Deadman Creek @ Hwy 59 (July) and Duck Slough @ Hwy 99 (February).

Three exceedances of the WQTL of 7 mg/L for DO occurred at Deadman Creek @ Hwy 59 in June, September and October ranging from 6.61 to 3.72 mg/L. All locations in Zone 5 (with the exception of Duck Slough @ Hwy 99) had at least one exceedance level detection of pH; all were above the upper pH WQTL ranging between 8.57 and 8.75.

Two exceedances of the WQTL for *E. coli* occurred in samples collected from Duck Slough @ Gurr Rd in March (260 MPN/100 mL) and Deadman Creek @ Hwy 59 in April (410 MPN/100 mL). Heavy rainfall from April 1-14, 2012 increased flows in Deadman Creek @ Hwy 59 (discharge was 0.34 cfs in March and 1.68 cfs in April). The Deadman Creek @ Hwy 59 subwatershed contains numerous dairies and/or lands managed by dairies that receive manure located directly upstream of the sample location. Any storm runoff carrying bacteria from dairies in the subwatershed could have contributed to the exceedance of the WQTL for *E. coli* during the April storm monitoring event.

Arsenic

The registrations of many products with arsenic as an active ingredient have been cancelled. However, there are four products currently registered for non-agricultural purposes (arsenic acid, arsenic acid anhydride, arsenic trioxide and chromate copper arsenate) including wood protection, as a household ant killer, ditch weed control, use as weed control on non-agricultural plants, around buildings, driveways, sidewalks, rights-of-way, and fencerows. In addition, arsenic is a naturally occurring metal in the Coalition area; high concentrations of arsenic have been detected in the groundwater supply. Consequently, exceedances of the arsenic WQTL may be due to these non-agricultural uses or natural occurrence. In Zone 5, one exceedance of the WQTL for arsenic occurred in 2012 (Table 46).

Samples collected during April 12, 2012 storm monitoring at Deadman Creek @ Hwy 59 contained arsenic in exceedance of the WQTL of 10 µg/L containing 12 µg/L (Table 46). Elevated levels of arsenic appear to be common in Zone 5 and exceedances of the WQTL for arsenic have occurred every year at the Deadman Creek sample locations since 2007 (except for 2011) and therefore may be due to naturally occurring arsenic. Since there are no registered products containing arsenic for use in agriculture, no PUR data were queried for this exceedance. It is possible that the heavy rainfall during early April could have suspended the metal and transported it to the creek.

Table 46. Zone 5 (Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Duck Slough @ Gurr Rd and Duck Slough @ Hwy 99) exceedances.

Zone 5 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	*E. coli*, MPN/100 mL	Arsenic Total, µg/L
Deadman Creek @ Gurr Rd	MPM, Non-contiguous	1/10/2012		8.68		
Deadman Creek @ Gurr Rd	MPM	2/7/2012		8.57		
Deadman Creek @ Hwy 59	MPM, NM	1/10/2012		8.66		
Deadman Creek @ Hwy 59	NM	2/7/2012		8.59		
Deadman Creek @ Hwy 59	MPM, NM	4/12/2012			410	12
Deadman Creek @ Hwy 59	NM	6/12/2012	6.61			
Deadman Creek @ Hwy 59	MPM, NM, SED	9/11/2012	4.92			
Deadman Creek @ Hwy 59	NM	10/9/2012	3.72			
Duck Slough @ Gurr Rd	MPM, NM	3/6/2012		8.75	260	

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

Zone 6 (Berenda Slough along Ave 18 ½, Cottonwood Creek @ Rd 20, Dry Creek @ Rd 18)

Field Parameters

In Zone 6, exceedances of the WQTLs for DO (1) and pH (2) occurred in 2012 (Table 47). From January through December, Assessment Monitoring and MPM occurred at Berenda Slough along Ave 18 ½. From January through March, Cottonwood Creek @ Rd 20 was monitored for Core and MPM and Dry Creek @ Rd 18 was monitored for MPM only. Dry sites occurred at Cottonwood Creek @ Rd 20 (January, February and March) and Berenda Slough along Ave 18 ½ (February, April, May, September, October, November and December). Samples were collected from non-contiguous waterbodies including Berenda Slough along Ave 18 ½ (January and March) and Dry Creek @ Rd 18 (January, February and March).

The single exceedance of the WQTL for DO of 3.72 mg/L occurred at Berenda Slough along Ave 18 ½ during August (an exceedance occurs when the concentration is below the WQTL of 7.0 mg/L). Both exceedance level detections of pH occurred at sites that were sampled as non-contiguous waterbodies. The non-contiguous monitoring event during February at Dry Creek @ Rd 18 resulted in an exceedance of the pH WQTL of 8.58 which was slightly higher than the WQTL of 8.5; the other exceedance occurred at Berenda Slough along Ave 18 ½ during the non-contiguous March monitoring event with 9.1.

Copper

In Zone 6, there were two exceedances of the hardness based dissolved copper trigger limit from January through December 2012 (Table 47). Both exceedances occurred in Berenda Slough along Ave 18 ½ samples. Toxicity was not associated with either one of the exceedances. Exceedance levels of dissolved copper were common in samples collected from all sites in Zone 6 (Berenda Slough along Ave 18 ½, Cottonwood Creek @ Rd 20 and Dry Creek @ Rd 18) during the 2011 monitoring year. It is possible that geologic conditions could be contributing to the elevated copper levels found in water column samples in Zone 6.

Samples collected during the second and third irrigation events on June 12 and July 10, 2012 from Berenda Slough along Ave 18 ½ (NM) resulted in elevated levels of dissolved copper (5.70 µg/L and 4.80 µg/L, respectively). Toxicity was not associated with either exceedance. The PUR data associated with the June 12, 2012 exceedance indicated that there were 36 applications of copper across 4510 acres of grapes and walnuts ranging between 5 and 910 lbs AI from March 20, 2012 through May 31, 2012. The applications were made by ground and by air indicating a potential for spray drift from parcels being treated adjacent to the creek. The PUR data associated with the July 10, 2012 exceedance indicated that there were 11 applications of copper across 1204 acres of grapes and walnuts ranging between 23 and 910 lbs AI from April 17, 2012 through May 31, 2012 (Appendix IV). During 2013, MPM will continue at Berenda Slough along Ave 18 ½ during months of past exceedances.

Table 47. Zone 6 (Berenda Slough along Ave 18 1/2, Cottonwood Creek @ Rd 20 and Dry Creek @ Rd 18) exceedances.

Zone 6 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	Copper Dissolved, µg/L (hardness based trigger limit)
Berenda Slough along Ave 18 ½	NM, Non-contiguous, SED	3/6/2012		9.10	
Berenda Slough along Ave 18 ½	MPM, NM	6/12/2012			5.7 (3.02)
Berenda Slough along Ave 18 ½	MPM, NM	7/10/2012			4.80 (3.02)
Berenda Slough along Ave 18 ½	MPM, NM	8/14/2012	3.72		
Dry Creek @ Rd 18	MPM, Non-contiguous	2/7/2012		8.58	

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

ACTIONS TAKEN TO ADDRESS WATER QUALITY EXCEEDANCES

The Coalition conducts monitoring of ambient surface waters to characterize discharges from irrigated agriculture. Results from each event within a monitoring season are used to identify constituents, agricultural lands, crops and/or specific pesticides that need to be managed to reduce or eliminate runoff to surface water from agriculture. 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 have been described in the Discussion of Results section.

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

MANAGEMENT PRACTICES

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

The Coalition obtains management practice information by conducting focused outreach to growers in subwatersheds operating under a management plan. The Coalition's Management Plan includes a schedule of prioritized subwatersheds and details regarding this strategy (last updated in the 2011 MPUR, pages 24-29 and Table 6). The purpose of the individual interviews is to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices. The information provided in Coalition MPURs, submitted on April

1 of each year, summarize management practices for priority subwatersheds including current, recommended and additional practices implemented after Coalition outreach.

The Coalition completed focused outreach in the first and second sets of priority subwatersheds: Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99, and Prairie Flower Drain @ Crows Landing Rd (2008-2010) and Bear Creek @ Kibby Rd, Cottonwood Creek @ Hwy 20, Duck Slough @ Gurr Rd, and Highline Canal @ Hwy 99 (2010-2012). Individual grower meetings, during which current management practices and any recommended practices were documented, and follow up meetings, which assessed the implementation of new management practices, are complete for 100% of targeted growers in all seven subwatersheds. The Coalition reported final results of contacts in the Prairie Flower Drain @ Crows Landing Rd subwatershed in the 2011 MPUR Summary of Implemented Management Practices section (pages 55-56, 66-70, and 78-80). Current and recommended management practices for Dry Creek @ Wellsford Rd and Duck Slough @ Hwy 99 were reported in the 2011 MPUR (pages 50-54, 57-65), and newly implemented practices were reported in the 2012 MPUR (pages 54-65). The Coalition reported the final results of current, recommended and newly implemented management practices for the second priority subwatersheds in the 2012 MPUR Management Practices section (pages 67-99). The Actions Taken to Address Water Quality Exceedances section of the 2011 AMR (pages 134-143) and 2012 AMR (pages 138-146) include details of mailings and meetings related to the first and second priority contacts.

The Coalition continued with its management plan tracking process during 2012 in the third set of high priority subwatersheds (2011-2013): Berenda Slough, Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd and Livingston Drain @ Robin Ave. The Coalition completed individual interviews with 100% of targeted growers in the fall of 2011 (Actions Taken to Address Water Quality Exceedances section of the 2012 AMR, pages 138-146). The Coalition sent growers a copy of their individual meeting survey results on February 12, 2012 with instructions to review the results for accuracy. Results were reported in the 2012 MPUR Management Practices section (pages 100-124). The Coalition sent a follow up mailing to targeted growers with recommended practices on January 24 and April 16, 2012; the mailings were split for growers who completed their individual contact meeting before and after July 31, 2011, respectively (Table 48). The mailings contained a follow up survey and cover letter with instructions to complete and return the survey. The Coalition sent reminder follow up mailings on February 21, June 4 and September 14, 2012 and sent a Violation of Membership Agreement Mailing on October 11, 2012 to growers who had not responded to the initial follow up survey mailings (Table 48). The Coalition has since received and recorded 100% of follow up survey responses in the database. Results of follow up contacts will be reported in the 2013 MPUR.

The management plan tracking continues in the fourth set of high priority subwatersheds (2012-2014): Black Rascal Creek @ Yosemite Rd, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59 and Hilmar Drain @ Central Ave. The Coalition notified targeted growers of the management plan tracking process and the requirement to schedule an individual meeting with Coalition representatives to review their operations via mailings sent on January 24, 2012 (Table 48). A Violation of Membership Agreement Mailing was sent on October 15, 2012 to the two growers who had not yet scheduled their individual meeting (Table 48). The Coalition has since completed 100% of initial contact meetings and will present the results in the 2013 MPUR. All targeted growers were sent a copy of their individual meeting survey results on October 23, 2012 and were instructed to review the results for accuracy. The Coalition sent follow up mailings to all targeted growers on December 13, 2012; the mailing included a survey with instructions for growers to indicate any newly implemented management practices. All follow up contacts will be complete by April 30, 2013. Follow up surveys received prior to February 28, 2013 will be reported in the 2013 MPUR; any results received after February 28, 2013 will be reported during the quarterly meetings and in the 2014 MPUR.

In late 2012, the Coalition began the management plan tracking process for the fifth set of high priority subwatersheds (2013-2015): Hatch Drain @ Tuolumne Rd, Highline Canal @ Lombardy Rd, Merced River @ Santa Fe and Miles Creek @ Reilly Rd. The Coalition compiled a list of one, 22, 13 and 14 targeted growers in the Hatch Drain, Highline Canal @ Lombardy, Merced River and Miles Creek subwatersheds, respectively. On November 2, 2012, the Coalition mailed targeted growers a letter requesting growers to contact the Coalition to schedule a required meeting with a representative (Table 48). The Coalition began conducting individual grower meetings in late 2012 and will complete individual grower meetings by July 30, 2013.

OUTREACH AND EDUCATION

Outreach and education activities are an important component of the Coalition monitoring program. The Coalition continues to provide information to growers through mailings, grower meetings and workshops, meetings conducted by the County Agricultural Commissioner and by personal contact. During 2012 grower meetings, the Coalition presented information to members concerning the Coalition's progress in achieving water quality goals, site subwatershed specific monitoring results and management practices proven to be effective to reduce the discharge of pesticides to waterbodies. All outreach and education activities are documented in Table 48.

Overall, Coalition representatives conducted or participated in six meetings from January through December 2012. Topics discussed at meetings in 2012 included, irrigation and storm water quality, sediment runoff, management practices and groundwater.

From January through December 2012 the Coalition sent out 28 mailings and/or emails. Of those mailings, all addressed irrigation and storm water quality and sediment runoff, 15 reviewed management practices, and 12 addressed specific site subwatershed management plans.

The Coalition sends several mailings and emails to inform growers of monitoring results, Coalition actions, and related news. The Coalition provides members with copies of the ESJWQC AMRs; the 2012 AMR was mailed to 2,158 members on February 1, 2012. The Coalition also notifies growers of exceedances that occurred during recent monitoring via Quarterly Monitoring Report Mailings. Quarterly Monitoring Report Mailings were mailed and emailed to hundreds of members on January 26, May 16, August 8 and October 29, 2012. The Coalition keeps members informed of Coalition news via the ESJWQC Newsletter; the April edition was mailed to 2,278 members on May 18, 2012. The September and October editions were sent on September 25, and October 9, 2012; respectively. Both the September and October editions were mailed to 1,822 members and emailed to 419 members.

The Annual Grower Meetings give the Coalition an opportunity to present and discuss all aspects of the Coalition activities over the past year. The Annual Grower Meeting announcement was mailed to 1,817 growers and emailed to 414 members on November 2, 2012. Sixty-eight members attended the November 27 meeting in Stanislaus County, 35 members attended the November 28 meeting in Merced County, and 32 members attended the November 29, 2012 meeting in Madera County. At all three meetings, Coalition representatives reviewed the past year's water quality monitoring results, ESJWQC management plan strategy and status, and various Coalition activities including outreach, collaborations and member responsibilities. Coalition representatives also discussed the Waste Discharge General Order R5-2012-0116 (General Order) including the new groundwater and nutrient management requirements and anticipated impacts on Coalition members.

In addition to discussions and presentations during the Annual Grower Meetings, the Coalition took several actions during 2012 to update members on the status of the proposed General Order. The Coalition hosted three meetings on June 21, 26, and 28, 2012 in Madera, Merced and Stanislaus Counties; respectively, to inform members of the General Order. The Coalition notified members via a meeting announcement mailing sent on June 8, 2012 and encouraged non-members to attend via advertisements in the June 2012 Madera, Merced and Stanislaus Farm Bureau Newsletters. Over 320 growers attended the three meetings. Coalition representatives and Regional Board staff discussed the new regulations and their impact on growers, including the new requirements for groundwater monitoring and nitrogen budgets. The Coalition followed the meeting by providing a summary of topics covered and informative website links in an email sent on July 17, 2012 to 432 members. Coalition representative Parry Klassen also gave an interview to the Merced Sun-Star Newspaper during which he discussed the nutrient management component of the General Order; the article ran on July 19, 2012. The Regional Board adopted the General Order on December 7, 2012, and the Coalition notified members via an email on December 19, 2012.

The Coalition also hosts a website (http://www.esjcoalition.org/home.asp), which serves as a clearing house for Coalition activities and outreach on management practices. Information provided through the website can be utilized as a supplement to regular grower contacts and meetings.

The Coalition continues to collaborate with outside sponsors to secure unique opportunities that will enhance the Coalition's ability to achieve its goal of reducing the impact of agricultural discharge on water quality. As described in the 2010 AMR (page 150), the ESJWQC, along with the Coalition for Urban and Rural Environmental Stewardship (CURES), the Westside San Joaquin River Watershed Coalition, Natural Resources Conservation Service (NRCS), and the West and East Stanislaus Resource Conservation District, received an award of two million dollars annually over five years ($10 million total) from the United States Department of Agriculture (USDA) Agricultural Water Enhancement Program (AWEP) to be used in Stanislaus and Merced counties. The money is being used to fund the installation of structural management practices on farms and dairies with operations bordering waterways within subwatersheds covered by management plans. The deadline to apply for the fifth and final year of funding was November 16, 2012. The Coalition informed members in the Bear Creek, Cottonwood Creek, Dry Creek @ Wellsford, Highline Canal @ 99, Duck Slough @ Hwy 99, Duck Slough @ Gurr, and Prairie Flower Drain subwatersheds of the program and process to apply via mailings sent in previous years (see Actions Taken to Address Water Quality Exceedances sections in the 2011 and 2012 AMRs). The NRCS districts managing the allocations of funds are in the process of working with fifth year applicants on their projects and anticipate funded projects will be selected at the start of the 2013 irrigation season.

PEST CONTROL ADVISORS, AGRICULTURAL COMMISSIONERS, AND REGISTRANTS

Agricultural Commissioners from the various counties are active participants as non-voting members of the ESJWQC Board of Directors. The Coalition collaborates with County Agricultural Commissioners, Pest Control Advisors (PCAs) and pesticide registrants to provide growers within the ESJWQC region with information on effective management practices. Throughout 2012, the Coalition collaborated with each of these entities as needed to follow up on exceedances, provide management practice information and prepare strategies for compliance under the General Order.

Table 48. Outreach and education activities performed by the ESJWQC during 2012.

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

AREA	DATE	CATEGORY	DETAILS	WHO
Black Rascal Creek, Deadman Creek @ Gurr, Deadman Creek @ Hwy 59, and Hilmar Drain (4th P)	24-Jan-12	Management Practice Tracking, Grower Notification	Individual Contacts Meeting Announcement Mailing: sent to the 14 targeted growers in Black Rascal Creek (1), Deadman Creek @ Gurr (2), Deadman Creek @ Hwy 59 (8), and Hilmar Drain (3). Alerted targeted members of the Management Plan high priority tracking process and the need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	Parry Klassen, Wayne Zipser
Dry Creek @ Rd 18, Lateral 2 1/2, and Livingston Drain (3rd P)	24-Jan-12	Management Practice Tracking, Grower Notification	Follow Up Contact Mailing: sent to 4 growers with recommended practices in third priority subwatersheds who completed initial contact by July 31, 2011.	Parry Klassen, Wayne Zipser
Entire Coalition region	26-Jan-12	Grower Notification	Quarterly Monitoring Report Mailing: mailed to 198 and emailed to 175 members.	Parry Klassen, Wayne Zipser
Entire Coalition region	1-Feb-12	Grower Notification	Annual Report Mailing: mailed to 2,158 members.	Parry Klassen, Wayne Zipser
Lateral 2 1/2 and Livingston Drain (3rd P)	12-Feb-12	Management Practice Tracking, Grower Notification	Results from Individual Contact Meeting Confirmation Mailing: sent to the 3 targeted growers in Lateral 2 1/2 (1) and Livingston Drain (2). The mailing summarized management practice implementations and recommendations recorded during each grower's Individual Contact Meeting. Growers reviewed their responses for accuracy and made corrections if necessary.	Parry Klassen, Wayne Zipser
Dry Creek @ Rd 18, Lateral 2 1/2, and Livingston Drain (3rd P)	21-Feb-12	Management Practice Tracking, Grower Notification	Reminder Follow Up Contact Mailing: sent to 3 growers who did not respond to the original mailing on 24-Jan-12.	Parry Klassen, Wayne Zipser
Berenda Slough, Dry Creek @ Rd 18, and Livingston Drain (3rd P)	16-Apr-12	Management Practice Tracking, Grower Notification	Follow Up Contact Mailing: sent to 7 growers with recommended practices in third priority subwatersheds who completed initial contact after July 31, 2011.	Parry Klassen, Wayne Zipser
Entire Coalition region	16-May-12	Grower Notification	Quarterly Monitoring Report Mailing: mailed to 205 and emailed to 188 members.	Parry Klassen, Wayne Zipser
Entire Coalition region	18-May-12	Grower Notification	April 2012 Newsletter: mailed to 2,278 members.	Parry Klassen, Wayne Zipser
Madera	Jun-2012	Grower Notification	Proposed ESJWQC Waste Discharge Requirements Meeting Announcement: ran in the Madera Farm Bureau Newsletter.	Parry Klassen, Wayne Zipser
Merced	Jun-2012	Grower Notification	Proposed ESJWQC Waste Discharge Requirements Meeting Announcement: ran in the Merced Farm Bureau Newsletter.	Parry Klassen, Wayne Zipser
Modesto	Jun-2012	Grower Notification	Proposed ESJWQC Waste Discharge Requirements Meeting Announcement: ran in the Stanislaus Farm Bureau Newsletter.	Parry Klassen, Wayne Zipser
Berenda Slough, Dry Creek @ Rd 18, and Livingston Drain (3rd P)	4-Jun-12	Management Practice Tracking, Grower Notification	Reminder Follow Up Contact Mailing: sent to 4 growers who had yet to respond to initial Follow Up Contact Mailings (sent 24-Jan-12 and 16-Apr-12).	Parry Klassen, Wayne Zipser
Entire Coalition region	8-Jun-12	Grower Notification	Proposed ESJWQC Waste Discharge Requirements Meeting Announcement: send to 2,278 members.	Parry Klassen, Wayne Zipser

AREA	DATE	CATEGORY	DETAILS	WHO
Madera County	21-Jun-12	BMP Outreach and Education	Proposed ESJWQC Waste Discharge Requirements Meeting-Madera County: approximately 60 growers attended. Coalition representatives and Regional Board staff discussed the proposed new ESJWQC Waste Discharge Requirements including new regulations and its impact on growers. In particular, the new requirement for nitrogen budgets was discussed.	Parry Klassen, Wayne Zipser
Merced County	26-Jun-12	BMP Outreach and Education	Proposed ESJWQC Waste Discharge Requirements Meeting-Merced County: approximately 90 growers attended. Coalition representatives and Regional Board staff discussed the proposed new ESJWQC Waste Discharge Requirements including new regulations and its impact on growers. In particular, the new requirement for nitrogen budgets was discussed.	Parry Klassen, Wayne Zipser
Stanislaus County	28-Jun-12	BMP Outreach and Education	Proposed ESJWQC Waste Discharge Requirements Meeting-Stanislaus County: approximately 170 growers attended. Coalition representatives and Regional Board staff discussed the proposed new ESJWQC Waste Discharge Requirements including new regulations and its impact on growers. In particular, the new requirement for nitrogen budgets was discussed.	Parry Klassen, Wayne Zipser
Entire Coalition region	17-Jul-12	Grower Notification	Proposed ESJWQC Waste Discharge Requirements Meeting Follow Up Email: sent to 432 members. Summarized highlights of pending New Order and provided website links with more information.	Parry Klassen
Merced	19-Jul-12	Grower Notification	Merced Sun-Star Newspaper Article: *Proposal Would Regulate Nitrogen in Central Valley Ag*. Article discussed nitrogen requirements in new WDR and included quotes from RB staff and Coalition representatives.	Parry Klassen
Entire Coalition region	8-Aug-12	Grower Notification	Quarterly Monitoring Report Mailing: mailed to 206 and emailed to 188 members.	Parry Klassen, Wayne Zipser
Dry Creek @ Rd 18 (3rd P)	14-Sep-12	Management Practice Tracking, Grower Notification	Final Reminder Follow Up Contact Mailing: sent to 1 grower who had yet to respond to initial Follow Up Contact Mailings (sent 24-Jan-12 and 16-Apr-12).	Parry Klassen, Wayne Zipser
Entire Coalition region	25-Sep-12	Grower Notification	September 2012 Newsletter: mailed to 1,822 and emailed to 419 members.	Parry Klassen, Wayne Zipser
Entire Coalition region	9-Oct-12	Grower Notification	October 2012 Newsletter: mailed to 1,824 and emailed to 419 members.	Parry Klassen, Wayne Zipser
Dry Creek @ Rd 18 (3rd P)	11-Oct-12	Management Practice Tracking, Grower Notification	Violation of Membership Agreement Mailing: sent to 1 grower who had yet to respond to initial Follow Up Contact Mailings (sent 24-Jan-12 and 16-Apr-12). The letter informed the grower they would be in violation of their membership agreement if a response was not received by 26-Oct-12. Mailing included a letter from the Regional Board detailing Coalition member responsibilities.	Parry Klassen, Wayne Zipser
Deadman Creek @ Hwy 59 and Hilmar Drain (4th P)	15-Oct-12	Management Practice Tracking, Grower Notification	Violation of Membership Agreement Mailing: sent to 2 growers (1 in either subwatershed) who had yet to respond to the initial Individual Contacts Meeting Announcement Mailing (sent 24-Jan-12). The letter informed the grower they would be in violation of their membership agreement if the meeting was not scheduled to occur before 19-Oct-12. Mailing included a letter from the Regional Board detailing Coalition member responsibilities.	Parry Klassen, Wayne Zipser

Area	Date	Category	Details	Who
Black Rascal Creek, Deadman Creek @ Gurr, Deadman Creek @ Hwy 59, and Hilmar Drain (4th P)	23-Oct-12	Management Practice Tracking, Grower Notification	4th Priority Results from Individual Contact Meeting Confirmation Mailing: sent to the 14 targeted growers in Black Rascal Creek (1), Deadman Creek @ Gurr (2), Deadman Creek @ Hwy 59 (8), and Hilmar Drain (3). Summarized the data collected during initial, individual contact meetings and requested the grower review for accuracy. Reminded targeted growers of next steps in Management Plan high priority tracking process.	Parry Klassen, Wayne Zipser
Entire Coalition region	29-Oct-12	Grower Notification	Quarterly Monitoring Report Mailing: emailed to 188 members.	Parry Klassen, Wayne Zipser
Hatch Drain, Highline Canal @ Lombardy, Merced River, and Miles Creek (5th P)	2-Nov-12	Management Practice Tracking, Grower Notification	Individual Contacts Meeting Announcement Mailing: sent to the 50 targeted growers in Hatch Drain (1), Highline Canal @ Lombardy (22), Merced River (13), and Miles Creek (14). Alerted targeted members of the Management Plan high priority tracking process and the need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	Parry Klassen, Wayne Zipser
Entire Coalition region	2-Nov-12	Grower Notification	Annual Grower Meeting Announcement: mailed to 1,817 growers and emailed to 414 growers.	Parry Klassen, Wayne Zipser
Stanislaus County	27-Nov-12	BMP Outreach and Education	Annual Grower Meeting - Stanislaus County: 125 growers in attendance, including 68 members. Coalition representatives and RB staff discussed with growers annual monitoring results and the upcoming WDR Order, including new requirements and its impact on growers.	Parry Klassen, Wayne Zipser
Merced County	28-Nov-12	BMP Outreach and Education	Annual Grower Meeting - Merced County: 70 growers in attendance, including 35 members. Coalition representatives and RB staff discussed with growers annual monitoring results and the upcoming WDR Order, including new requirements and its impact on growers.	Parry Klassen, Wayne Zipser
Madera County	29-Nov-12	BMP Outreach and Education	Annual Grower Meeting - Madera County: 50 growers in attendance, including 32 members. Coalition representatives and RB staff discussed with growers annual monitoring results and the upcoming WDR Order, including new requirements and its impact on growers.	Parry Klassen, Wayne Zipser
Black Rascal Creek, Deadman Creek @ Gurr, Deadman Creek @ Hwy 59, and Hilmar Drain (4th P)	13-Dec-12	Management Practice Tracking, Grower Notification	Follow Up Contact Mailing: sent to 14 growers.	Parry Klassen, Wayne Zipser
Entire Coalition region	19-Dec-12	Grower Notification	New WDR Order for Irrigated Lands Adopted by CVRWQCB Announcement: emailed to 1,100 growers (all growers on Coalition email list).	Parry Klassen, Wayne Zipser

CVRWQCB – Central Valley Regional Water Quality Control Board
BMP – Best Management Practice
P – Priority

STATUS OF MANAGEMENT PLANS AND SPECIAL PROJECTS

The ESJWQC developed monitoring and management activities as required in the Regional Board's Basin Plan for the Sacramento and San Joaquin River basins as well as the ILRP MRP for Coalition Groups (Order No. R5-2008-0005). The Basin Plan includes TMDL requirements for dischargers and requires that dischargers comply with the monitoring and management criteria defined in the Basin Plan. If a single exceedance occurs for a constituent under an EPA approved TMDL (TMDL constituents include chlorpyrifos, diazinon, dissolved oxygen, and salt/boron), a management plan will be required for that constituent and site subwatershed. In addition, if there is no TMDL for a constituent, a management plan will be developed if more than one exceedance of the same parameter at the same location occurs within a three year period.

A management plan requires additional focused efforts within subwatersheds. Coalition efforts include but are not limited to: (1) continued monitoring as outlined in the Coalition's approved MRPP, (2) analysis of PUR data, (3) MPM, (4) conducting site subwatershed grower meetings, (5) encouraging and evaluating implementation of management practices, and (6) compliance with approved TMDLs. The Coalition addresses toxicity, and exceedances involving pesticides and sediment bound analytes with specific management practices whether or not there is a TMDL in place. A narrative concerning each monitoring constituent was provided in the Coalition's Management Plan approved on November 25, 2008 (pages 24-37) as well as an explanation of how the Coalition prioritizes exceedances and is meeting the TMDL requirements for Coalition members (pages 39-44). The MPUR to be submitted on April 1, 2013 will document all management plan related activities that occurred during 2012.

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

The Coalition was approved on May 30, 2012 to remove specific site/constituent pairs from active management plans. Based on 2012 monitoring, the Coalition submitted a second letter petitioning to remove specific site/constituent pairs from active management plans to the Regional Board on November 7, 2012; this letter is still pending approval. Table 49 lists all of the specific site/constituent pairs approved for removal from active management plans including when the site was last monitored for Assessment Monitoring constituents and when the site will rotate into Assessment Monitoring again. Two consecutive years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality due to improved grower cognizance of the offsite movement of agricultural constituents and/or newly implemented management practices. The Coalition will monitor the locations listed in Table 48 when the sites rotate into Assessment Monitoring.

Table 49. Status of management plan constituents at ESJWQC site subwatersheds (active - X, removed – grey cell, or pending approval to remove - P).

Site Subwatershed	Most Recent Assessment Monitoring	Future Assessment Monitoring	DO*	pH*	SC*	Arsenic	Copper (Total & Dissolved)	Lead (Total & Dissolved)	Molybdenum	Ammonia	*E. coli*	Nitrate/Nitrite	TDS	Chlorpyrifos	DDE	Diazinon	Dimethoate	Diuron	Simazine	*C. dubia* toxicity	*H. azteca* toxicity	*P. promelas* toxicity	*S. capricornutum* toxicity
Ash Slough @ Ave 21	2010	2015					X																
Bear Creek @ Kibby Rd	2008†	2023		X			P				X												
Berenda Slough along Ave 18 1/2	2012	2017	X				X				X			X									P
Black Rascal Creek @ Yosemite Rd	2008†	2025	X	X				X			X			X						X			
Cottonwood Creek @ Rd 20	2011	2014	X				X	X			X			P									
Deadman Creek @ Gurr Rd	2010	2015	X	X	X	X				X	X		X	X						X		X	X
Deadman Creek @ Hwy 59	2012	2017	X			X					X			X									P
Dry Creek @ Rd 18	2008†	2014	X	X			X	X			X			X		P		P			X		X
Dry Creek @ Wellsford Rd	2011	2014	X	X							X		X	X						X	X		
Duck Slough @ Gurr Rd**	2011	2014	X	X			X	X			X									P	X		
Hatch Drain @ Tuolumne Rd	2008†	2024	X		X	X					X	X	X								X		X
Highline Canal @ Hwy 99	2011	2014		X			X	X			X									X	P		P
Highline Canal @ Lombardy Rd	2011	2015		X			X	X			X			P						P	P		X
Hilmar Drain @ Central Ave	2008†	2020	X	X	X		X			X	X	X	X					X			X		X
Howard Lateral @ Hwy 140	2010	2029		X	X		X				X		X	X									
Lateral 2 ½ near Keyes Rd	2010	2028		X										X									
Levee Drain @ Carpenter Rd	2012	2013			X						X	X	X										
Livingston Drain @ Robin Ave	2008†	2021		X			X	P			X			X									X
McCoy Lateral @ Hwy 140	2012	after 2029		X			X																
Merced River @ Santa Fe	2011	2014						X			X			X						X			
Miles Creek @ Reilly Rd	2008†	2013	X				X	X			X			X						X	X		X
Mootz Drain downstream of Langworth Pond	2010	2015	X							X	X			X				X					
Mustang Creek @ East Ave	2010	2013	X		X		X				X	X	X		X								
Prairie Flower Drain @ Crows Landing Rd	2011	2014	X		X				X	X	X	X	X				X			X	P	X	X
Rodden Creek @ Rodden Rd	2012	2017									X												
Silvia Drain @ Meadow Rd	2008†	2027	X				X			X	X			X						X	X		
Westport Drain @ Vivian Rd	2008†	2026	X		X						X	X	X	X									X
Total Approved to be removed 2012 (Grey Cells)			**2**	**1**	**4**	**0**	**2**	**1**	**0**	**1**	**2**	**0**	**2**	**7**	**0**	**1**	**0**	**3**	**1**	**1**	**0**	**0**	**2**
Total Pending 2013 (P)			**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**1**	**0**	**2**	**3**	**0**	**3**
Total Management Plan Constituents Remaining Active (X)			**16**	**13**	**8**	**3**	**15**	**9**	**1**	**5**	**24**	**6**	**9**	**16**	**1**	**1**	**1**	**3**	**0**	**10**	**10**	**2**	**12**

*Field parameters will continue to be monitored during Assessment, Core and Management Plan Monitoring events.

**Duck Slough @ Hwy 99 site subwatershed was removed from the Coalitions monitoring schedule; all remaining management plan constituents are monitored at the Duck Slough @ Gurr Rd location.

†Site was monitored for Assessment Monitoring constituents under the 2006 MRPP where monitoring was not defined as Core or Assessment Monitoring.

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

The 2012 MPUR will include the following items:

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

SPECIAL PROJECTS

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

Chlorpyrifos and Diazinon

The TMDL Monitoring subsection of the Monitoring Objectives and Design section of this report outlines the ESJWQC and the Westside Coalition's collaborative monitoring plan for assessing compliance with the Lower San Joaquin River concentration based loads at the six compliance points identified in the Basin Plan Amendment. The three compliance points for which ESJWQC is responsible for (Hills Ferry Rd, Maze Blvd, and Airport Way) were monitored in March and from May through August 2012 (5 events). Monitoring results from the 2012 water year (October 2011 through September 2012) as well as an assessment of each Coalition's compliance with Monitoring Objectives 2- 7 will be reported in the San Joaquin River Chlorpyrifos and Diazinon TMDL 2013 AMR (to be submitted May 1, 2013).

Salt and Boron

The Coalition recognizes that salt and boron water quality impairments are a Central Valley wide concern. Coalition representatives attend Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) meetings and participate in planning and reviewing studies relevant to the development of a Basin Plan amendment for salt and boron. Coalition technical consultants participated in several CV-SALTS committees including the Technical Advisory Committee, BMP Subcommittee and Lower San Joaquin River Committee. In addition, the Coalition monitors for salt (SC and TDS), nutrients (nitrate) and boron in every zone and includes these constituents in conversations with growers about water quality impairments and applicable management practices.

DO

The Coalition continues to follow developments 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 134, Table 41). These programs include the upper San Joaquin River DO project and the performance of the Aeration Facility, located at the west (downstream) end of Rough and Ready Island at the Port of Stockton. Because DO is a field parameter, the Coalition monitors for DO at all sites scheduled for monitoring. The Coalition will continue to participate in meetings and review technical documents as they are made available.

E. coli

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

CONCLUSIONS AND RECOMMENDATIONS

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

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

The CVRWQB has determined that waters of the State receiving discharge from irrigated lands must be protective of beneficial uses (BUs) for Agricultural Supply (AG), Aquatic Life (AQ, including cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat), Water Contact Recreation (REC 1) and Municipal and Domestic Supply (MUN or Municipal). Waters of the State are protected if no exceedances of constituent specific WQTLs occur during monitoring events. Table 50 lists the constituents monitored by the Coalition and the beneficial uses impaired by exceedances of the WQTLs of the constituents. Figure 13 includes percentages of impaired beneficial uses based on 2012 Coalition wide monitoring results. Table 51 includes a summary of when overall water quality was protective of beneficial uses from 2008 through 2012.

During 2012, monitoring was reduced from April through December for certain Assessment Monitoring constituents, MPM and Core Monitoring. Therefore, the 2012 monitoring year did not include complete sets of data for interpreting accurate trends in water quality improvements. Nevertheless, the results that were attained from Assessment Monitoring from January through December and scheduled monitoring from January through March do indicate substantial improvements in water quality within the Coalition region.

Although monitoring was reduced from April through December 2012, results attained from previous years and from 2012 indicate there has been consistent improvement in reducing the discharge of pesticides. The most common exceedances of WQTLs involve physical parameters such as SC, TDS and DO which resulted in impaired Agricultural and Aquatic Life beneficial uses (Figure 13). Other causes of impairments to Aquatic Life beneficial uses were elevated levels of copper and ammonia. There were numerous exceedances of the WQTL for *E. coli* which resulted in impaired Recreational beneficial use. *E. coli* is the only constituent monitored by the Coalition that can cause impairment to Recreational beneficial use (Table 50). Therefore, any instance of impaired Recreational beneficial use is due to exceedances of the WQTL for *E. coli*. Impairment to Municipal beneficial use resulted from elevated concentrations of nitrate/nitrite, ammonia and arsenic. Even though significant improvements are evident from 2012 monitoring results, water quality is still not protective of all beneficial uses across the Coalition region.

Table 50. Impairments of beneficial uses due to exceedances of constituent specific WQTLs in 2012 (denoted by an X).

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

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

The 2012 ESJWQC monitoring results indicate that elevated levels of SC (48%) and TDS (52%) were the only parameters resulting in impairments to Agricultural beneficial use (Figure 13). High salinity levels resulting in exceedances of WQTLs for SC and TDS are common in sites monitored in Zone 2; these sites are located in the western portion of the Coalition region with shallow salty groundwater. This area has inadequate subsurface drainage conditions resulting in low crop productivity. Management of subsurface drainage is necessary to prevent excessive shallow groundwater conditions which result in the accumulation of salts in the root zones of agricultural. Therefore, tile drains were installed to intercept rising groundwater and infiltrating surface water. This water is then drained off the fields so that farming can occur. All of the detections of TDS above the WQTL were associated with exceedance level detections of SC in Zone 2. Managing the concentrations of salts is beyond the scope of what the Coalition can control through agricultural management practices and is the focus of the Valley-wide CV-SALTS process.

Monitoring results indicate that exceedance level detections of DO (48%), copper (39%), and ammonia (13%) resulted in impairments to Aquatic Life beneficial use (Figure 13). 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 patterns, fluctuations in temperature, loss of vegetation around streams, geography (region, morphology and patterns of flow) as well as excessive nutrients resulting in algal growth and decomposition. Controlling levels of DO in waterways involves many variables. During education and outreach, growers in the Coalition region receive recommendations to implement management practices designed to prevent the offsite movement of constituents and sediment into the waterway, by reducing irrigation tailwater and storm runoff. As growers implement management practices to reduce discharge, the amount of water flowing into tributaries is reduced this in turn affects water flows and potentially DO concentration in the water.

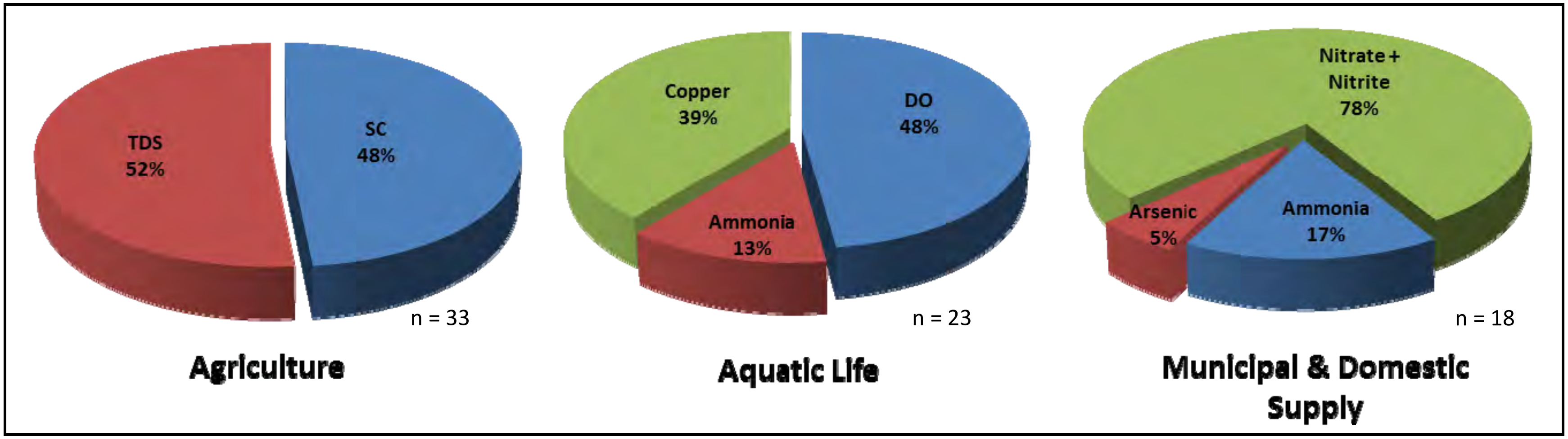
Exceedances of the hardness based WQTL for copper occurred during 2012 Assessment Monitoring two times each at Berenda Slough along Ave 18 ½, Highline Canal @ Lombardy Rd and McCoy Lateral @ Hwy 140. Samples collected for MPM from January through March resulted in exceedance level detections of copper at Highline Canal @ Hwy 99 and Livingston Drain @ Robin Ave. A definitive source for copper exceedances has not been clearly identified in the Coalition region; however, there are four potential sources including 1) recent agricultural applications (either through storm/irrigation runoff or spray drift), 2) dairy uses of copper sulfate in footbaths, 3) resuspension of historic copper from upstream mining, brake pads and other anthropogenic uses, and 4) copper used for algae and aquatic weed control in irrigation supply ditches.

Two samples collected from Levee Drain @ Carpenter Rd and one sample from Prairie Flower Drain @ Crows Landing Rd resulted in exceedances of the WQTL for ammonia. Ammonium enters waterways through three sources: 1) direct discharge of agricultural fertilizers (anhydrous ammonia), 2) direct discharge of animal waste, and 3) discharge from wastewater treatment plants. In soils, ammonia from fertilizers is typically converted to nitrite and then to nitrate over a short period of time. Therefore, ammonium from fertilizers would require almost a direct discharge to surface waters to detect ammonia in the receiving waterbody. Ammonium can also be formed in the waterbody through the mineralization of organic nitrogen. Previous exceedances of the WQTL for ammonia and associated water column toxicities in Zone 2 were attributed to discharge from dairies. All three of the exceedances of the WQTL for ammonia were above 1.5 mg/L; as a result, both Aquatic Life and Municipal beneficial uses were impaired (Figure 13).

Exceedance level detections of nitrate/nitrite (78%), ammonia (17%) and arsenic (5%) caused impairment to Municipal beneficial use (Figure 13). There were 13 exceedances of the WQTL for ammonia in 2012. Samples collected from Levee Drain @ Carpenter Rd contained elevated levels of nitrates during every monitoring event except for August and November. Prairie Flower Drain @ Crows Landing Rd samples contained exceedance level detections of nitrates during all three monitoring events that occurred at the site in 2012. As mentioned before, previous exceedances of the WQTL for ammonia and associated water column toxicities in Zone 2 were attributed to discharge from dairies. All three of the exceedances of the WQTL for ammonia were above 1.5 mg/L; as a result, both Aquatic Life and Municipal beneficial uses were impaired (Figure 13). One exceedance of the WQTL for arsenic occurred in samples collected from Deadman Creek @ Hwy 59. Registrations of many products containing arsenic as the active ingredient have been cancelled. However, products currently registered for non-agricultural purposes are used for wood protection, as a household ant killer and as a weed control on non-agricultural plants. In addition, arsenic is a naturally occurring metal in the Coalition area; high concentrations of arsenic have been detected in the groundwater supply. Consequently, exceedances of the WQTL for arsenic may be due to these non-agricultural uses or natural occurrence. The exceedance of arsenic in Deadman creek @ Hwy 59 occurred during a storm monitoring event when high rainfall occurred in the region and could have transported the arsenic to the waterway.

Figure 13. Percentages of impairments of beneficial uses due to exceedances of constituent specific WQTLs in 2012.

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



n-Total number of exceedances per each beneficial use.

Beneficial uses are listed in the Basin Plan by waterbodies; however, not all of the Coalition's monitoring sites are listed in the Basin Plan. Therefore, beneficial uses for Coalition monitoring sites are applied to the most immediate downstream waterbody. Table 51 includes a summary of when Coalition monitoring site water quality was protective of beneficial uses from 2008 through 2012.

A trend of improving water quality in the Coalition region is evident from 2008 through 2012, where monitoring data indicate a significant decrease in frequency of exceedances of WQTLs of high priority constituents. 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 Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99, Bear Creek @ Kibby Rd, Duck Slough @ Gurr Rd, Livingston Drain @ Robin Ave, and Dry Creek @ Rd 18 (Table 51). Sites contacted with the first set of high priority subwatersheds improved frequency of meeting Municipal and Agricultural beneficial uses. Even though the site was removed due to highway road construction, Duck Slough @ Hwy 99 consistently met beneficial uses in every category from the time outreach occurred up to when the site was removed from the monitoring program (Table 51). Bear Creek @ Kibby Rd and Duck Slough @ Gurr Rd are both second priority subwatersheds. Since focused outreach began in 2010, Municipal, Agricultural and Aquatic Life beneficial uses have all been protected (Table 51). Likewise, water quality in the third set of high priority subwatersheds improved. Livingston Drain @ Robin Ave and Dry Creek @ Rd 18 monitoring results indicate Municipal, Agricultural and Aquatic Life beneficial uses have been protected since outreach began in 2011 (Table 51). Monitoring from 2013 will include complete data sets for high priority subwatershed monitoring; the Coalition will be able to better assess trends in water quality improvements by reviewing a full year of monitoring results.

Waste discharged from irrigated lands is but one of many possible sources of impairments to beneficial uses. In many instances, natural conditions or other sources could potentially be the cause of impairment in waterways monitored by the Coalition. Water quality protective of beneficial uses within Coalition Group boundaries may not depend exclusively on the Coalition efforts alone; other dischargers may need to improve the quality of their discharge. The difference in geology and geography between Coalition zones influences monitoring results for constituents such as SC, TDS and copper. Monitoring sites in Zones 2 are geographically located in an area where high salinity levels are customary, resulting in exceedances of the WQTLs for SC and TDS. Due to the high salinity levels, sites in Zone 2 rarely meet Agricultural beneficial uses (Table 51). Exceedance level detections of copper are common at monitoring sites located in Zones 3, 4 and 6. It is possible that certain geologic conditions could be contributing to the elevated copper levels found in water column samples in these zones. As a result, sites in these zones commonly do not meet Aquatic Life beneficial use (Table 51). Geological and geographical factors influencing salts and copper in the waterways are outside the scope of what the Coalition is capable of improving through modified agricultural practices.

Table 51. Evaluation of beneficial uses applied to 2008-2012 monitoring locations (alphabetical by Zone).
'X' indicates no sampling occurred during the years specified.

Zone	Monitoring Site	Immediate Downstream Waterbody	Beneficial Use Immediate Downstream Waterbody	Status 2008 Meets BUs?	Status 2009 Meets BUs?	Status 2010 Meets BUs?	Status 2011 Meets BUs?	Status 2012 Meets BUs?
1	Dry Creek @ Wellsford Rd (2008-2010)	Tuolumne River (New Don Pedro Dam to SJ River)	MUN	No	No	Yes	Yes	Yes
			AG	Yes	Yes	Yes	No	Yes
			REC 1	No	No	No	No	Yes
			AQ Life	No	No	No	No	No
1	Mootz Drain downstream of Langworth Pond (2015-2017)	San Joaquin River (mouth of Merced River to Vernalis)	MUN	X	Yes	No	X	X
			AG	X	Yes	Yes	X	X
			REC 1	X	No	No	X	X
			AQ Life	X	No	No	X	X
1	Rodden Creek @ Rodden Rd (2016-2018)	Tuolumne River (New Don Pedro Dam to SJ River)	MUN	X	X	X	No	Yes
			AG	X	X	X	Yes	Yes
			REC 1	X	X	X	No	No
			AQ Life	X	X	X	Yes	No
2	Hilmar Drain @ Central Ave (2012-2014)	San Joaquin River (mouth of Merced River to Vernalis)	MUN	No	Yes	X	X	Yes
			AG	No	No	X	X	No
			REC 1	No	Yes	X	X	X
			AQ Life	No	Yes	X	X	Yes
2	Lateral 2 ½ near Keyes Rd (2011-2013)	San Joaquin River (mouth of Merced River to Vernalis)	MUN	X	No	Yes	Yes	X
			AG	X	No	Yes	Yes	X
			REC 1	X	No	Yes	Yes	X
			AQ Life	X	No	No	Yes	X
2	Levee Drain @ Carpenter Rd (2016-2018)	San Joaquin River (Merced River to Tuolumne River) / Merced River (McSwain Reservoir to SJR)	MUN	X	X	X	X	No
			AG	X	X	X	X	No
			REC 1	X	X	X	X	No
			AQ Life	X	X	X	X	No
2	Prairie Flower Drain @ Crows Landing Rd (2008-2010)	San Joaquin River (mouth of Merced River to Vernalis)	MUN	No	No	No	No	No
			AG	No	No	No	No	No
			REC 1	No	No	No	No	No
			AQ Life	No	No	No	No	No
3	Highline Canal @ Hwy 99 (2010-2012)	San Joaquin River (mouth of Merced River to Vernalis) / Merced River (McSwain Reservoir to SJR)	MUN	No	No	Yes	No	Yes
			AG	No	No	Yes	Yes	Yes
			REC 1	No	No	No	No	Yes
			AQ Life	No	No	Yes	Yes	No
3	Highline Canal @ Lombardy Rd (2013-2015)	San Joaquin River (mouth of Merced River to Vernalis) / Merced River (McSwain Reservoir to SJR)	MUN	No	X	No	Yes	Yes
			AG	No	X	Yes	Yes	Yes
			REC 1	No	X	Yes	No	Yes
			AQ Life	No	X	No	No	No

Zone	Monitoring Site	Immediate Downstream Waterbody	Beneficial Use Immediate Downstream Waterbody	Status 2008 Meets BUs?	Status 2009 Meets BUs?	Status 2010 Meets BUs?	Status 2011 Meets BUs?	Status 2012 Meets BUs?
3	Mustang Creek @ East Ave (2014-2016)	San Joaquin River (mouth of Merced River to Vernalis) / Merced River (McSwain Reservoir to SJR)	MUN	No	No	Yes	X	X
			AG	No	No	No	X	X
			REC 1	No	No	No	X	X
			AQ Life	No	No	No	X	X
4	Bear Creek @ Kibby Rd (2010-2012)	San Joaquin River (Bear Creek to SJ River)	MUN	No	X	Yes	Yes	Yes
			AG	Yes	X	Yes	Yes	Yes
			REC 1	No	X	X	X	X
			AQ Life	No	X	Yes	Yes	Yes
4	Black Rascal Creek @ Yosemite Rd (2012-2014)	Merced River (McSwain Reservoir to SJ River)	MUN	No	X	X	X	X
			AG	Yes	X	X	X	X
			REC 1	No	X	X	X	X
			AQ Life	No	X	X	X	X
4	Howard Lateral @ Hwy 140 (2015-2017)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	X	No	Yes	Yes	X
			AG	X	No	Yes	Yes	X
			REC 1	X	No	No	X	X
			AQ Life	X	No	No	No	X
4	Livingston Drain @ Robin Ave (2011-2013)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	X	X	Yes	Yes
			AG	Yes	X	X	Yes	Yes
			REC 1	No	X	X	X	X
			AQ Life	No	X	X	No	No
4	McCoy Lateral @ Hwy 140 (2016-2018)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	X	X	X	Yes	Yes
			AG	X	X	X	Yes	Yes
			REC 1	X	X	X	Yes	No
			AQ Life	X	X	X	No	No
4	Merced River @ Santa Fe Rd (2013-2015)	Merced River (McSwain Reservoir to SJ River)	MUN	Yes	Yes	Yes	No	Yes
			AG	Yes	Yes	Yes	Yes	Yes
			REC 1	Yes	Yes	No	No	Yes
			AQ Life	No	No	Yes	Yes	Yes
5	Deadman Creek @ Gurr Rd (2012-2014)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	No	No	X	Yes
			AG	Yes	No	No	X	Yes
			REC 1	No	No	No	X	X
			AQ Life	No	No	No	X	Yes
5	Deadman Creek @ Hwy 59 (2012-2014)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	X	X	Yes	No
			AG	Yes	X	X	Yes	Yes
			REC 1	No	X	X	No	No
			AQ Life	No	X	X	No	No

Zone	Monitoring Site	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?
5	Duck Slough @ Gurr Rd (2010-2012)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	Yes	No	Yes	Yes	Yes
			AG	Yes	No	Yes	Yes	Yes
			REC 1	Yes	No	No	No	No
			AQ Life	No*	No	No*	No	Yes
5	Duck Slough @ Hwy 99 (2008-2010)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	Yes	Yes	Yes	Yes
			AG	No	Yes	Yes	Yes	Yes
			REC 1	No	X	X	X	X
			AQ Life	No	No	Yes	Yes	Yes
6	Ash Slough @ Ave 21 (2015-2017)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	Yes	Yes	Yes	X	X
			AG	Yes	Yes	Yes	X	X
			REC 1	Yes	Yes	Yes	X	X
			AQ Life	Yes	No	No	X	X
6	Berenda Slough along Ave 18 ½ (2011-2013)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	X	X	X	Yes	Yes
			AG	X	X	X	Yes	Yes
			REC 1	X	X	X	No	Yes
			AQ Life	X	X	X	No	No
6	Cottonwood Creek @ Rd 20 (2010-2012)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	Yes	Yes	Yes	Yes	Yes+
			AG	Yes	Yes	Yes	Yes	Yes+
			REC 1	Yes	No	No	No	Yes+
			AQ Life	No	Yes	No	No	Yes+
6	Dry Creek @ Rd 18 (2011-2013)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	X	X	Yes	Yes
			AG	Yes	X	X	Yes	Yes
			REC 1	No	X	X	X	X
			AQ Life	No	X	X	No	Yes

AG- Agriculture
AQ Life- Aquatic 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.
Yes+-Site was dry during all monitoring events that occurred in 2012.

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

Appendix II includes all tabulated results from January through December 2012. During 2012, monitoring was reduced for MPM, Core Monitoring and certain Assessment Monitoring constituents from April through December 2012. Exceedances occurred in every zone during 2012 monitoring (Table 52). To address magnitude, Table 52 focuses on the number and percentage of exceedances compared to the number of samples collected by zone across the Coalition region. In 2012, there were no exceedances of WQTLs for Group A pesticides which were analyzed for in samples collected in April (0 of 55 samples, Table 52). Zero percent of samples analyzed resulted in exceedances of WQTLs for carbamates (0 of 342), herbicides (0 of 357), organochlorines (0 of 30) and organophosphates (0 of 692, Table 52). Only 1% of samples were toxic to a water column test species and 3% exceeded the WQTLs for metals. Exceedances of physical parameters (18%) and *E. coli* (31%) were more common than exceedances of metals (3%, Table 52). Some exceedances were more common during specific seasons. During summer months, warm water with little or no flow coincided with exceedances of the WQTL for DO.

As mentioned throughout this report, monitoring in the ESJWQC was reduced in 2012 and therefore the number of samples collected does not reflect a typical monitoring year. Normally, monitoring results indicate Coalition zones differ substantially in types of exceedances. For example, in Zone 2 (Prairie Flower Drain @ Crows Landing Rd) there were a large number of exceedances of SC, TDS, and nitrate (Table 52). Zone 2 is located in the western portion of the Coalition region with shallow salty groundwater and a high density of dairy operations where discharges are possible and could result in the intrusion of shallow groundwater into Prairie Flower Drain. Zones 1 and 5 had *E. coli* exceedances (2 of 7 samples and 2 of 6 samples, respectively) and are locations within the Coalition region with large numbers of rural dwellings near surface waters (Table 52). There is no apparent difference in the magnitude of the TDS/SC exceedances in 2012 compared to past years and the exceedances do not seem to be linked to any climatic conditions such as rainfall.

Elevated levels of dissolved copper were common in sites monitored in Zones 3, 4, and 6 (Highline Canals, McCoy Lateral @ Hwy 140 and Berenda Slough along Ave 18 ½, Table 52). This suggests that geologic conditions and/or soils with high copper content could be contributing to the exceedances. It is unlikely that growers in these watersheds eliminated discharge of pesticides but not copper which has similar application methods, while growers in other watersheds eliminated the discharge of both pesticides and copper.

Overall, Zones 2 and 6 had the greatest percentage of exceedances (11% and 3%, respectively) while Zone 1 had the lowest percentage (1%, Table 52). In comparison to the 2011 monitoring year, all analyte groups had lower percentages of exceedances (however data from 2012 is difficult to compare to a typical monitoring year since monitoring was reduced).

There were no exceedances of chlorpyrifos or any other pesticides in 2012. In 2011, there were three exceedances of the WQTL for chlorpyrifos. The exceedances during 2011 occurred in third and fourth priority subwatersheds where focused outreach and education has since occurred.

Water column toxicity occurred in one of 190 samples (<1%) in 2012, which is a decline from seven toxic samples in 2011 (2% of 375 samples). Overall, the number of samples collected for water column toxicity in 2012 was less than the number of samples collected for water column toxicity in 2011 (190 samples compared to 375 samples). More samples were collected in 2011 for toxicity than in 2010, but fewer samples were collected in 2012 than in 2011.

The other area with notable improvement was sediment toxicity. Sediment toxicity in samples occurred two times in 2011 (24 samples collected for storm and irrigation sediment monitoring) and once in 2012 (of 16 samples collected for storm and irrigation sediment monitoring, 6%) indicating a significant improvement over previous years. In 2008, sediment toxicity occurred in 24 samples.

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

Table 52. ESJWQC 2012 exceedances by constituent group and zone.

Analyte Name	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Zone 6		Total Exceed.	Total Samples	Pct. Exceed.
	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples	Exceed. Count	Samples			
Carbamates	0	66	0	72	0	72	0	48	0	60	0	24	0	342	0%
E. coli	2	7	5	7	0	6	1	5	2	6	0	1	10	32	31%
Group A Pesticides	0	11	0	11	0	11	0	11	0	11	0	0	0	55	0%
Herbicides	0	69	0	74	0	76	0	50	0	62	0	26	0	357	0%
Metals	0	68	0	72	4	76	3	60	1	70	2	26	10	372	3%
Nutrients	0	28	17	30	0	28	0	22	0	24	0	8	17	140	12%
Organochlorines†	0	6	0	6	0	6	0	6	0	6	0	0	0	30	0%
Organophosphates	0	132	0	144	0	146	0	99	0	121	0	50	0	692	0%
Physical parameters	3	56	36	66	4	56	4	65	8	60	3	28	58	331	18%
Sediment toxicity	0	3	1	4	0	2	0	2	0	2	0	3	1	16	6%
Water column toxicity	0	35	0	39	1	37	0	27	0	38	0	14	1	190	1%
Count per Zone	**5**	**481**	**59**	**525**	**9**	**516**	**8**	**395**	**11**	**460**	**5**	**180**	**Grand Total**		
Pct Exceed. per Zone	**1%**		**11%**		**2%**		**2%**		**2%**		**3%**		**97**	**2557**	**4%**

†Excludes Group A pesticides

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

For many parameters, it is not clear to what extent WQTL exceedances are from agricultural activities that result in offsite movement of farm inputs and sediment into waterways. Most exceedances are for parameters that are not applied by irrigated agriculture or which may originate with numerous sources in addition to irrigated agriculture. Source identification is difficult especially for non-conserved constituents and constituents with numerous potential sources. There are numerous non-conserved constituents that cannot be traced upstream, e.g. DO, SC and pH. Even in pristine watersheds, exceedances of these constituents may occur during normal diurnal stream processes. Locations at the west side of the Coalition region (Zone 2) had numerous exceedances of SC and TDS. The construction of drains such as Prairie Flower Drain and Levee Drain occurred in the late 1800s as a means of lowering the shallow groundwater table to a level that allowed crops to be grown. The shallow groundwater is very salty and the water in Prairie Flower Drain for a large portion of the year is not discharged by agriculture. It cannot be recirculated and must be discharged leading to the potential for exceedances of specific conductivity and pesticide WQTLs. Retention basins would fill from shallow groundwater almost as soon as construction was completed.

Exceedances of nutrient WQTLs are a major cause of impairment of the Municipal beneficial use and may or may not be a result of fertilizer runoff into waterways. Elevated concentrations of nitrate tend to occur in subwatersheds such as Prairie Flower Drain and Levee Drain where surface drains intercept shallow groundwater that has a high concentration of nitrate from decades of discharge from dairy operations. Unless sophisticated isotopic analytical analyses are performed, it is not possible to distinguish nitrate originating from inorganic fertilizers applied to crop land from nitrate originating from cows in dairy and feedlot operations.

Agricultural pesticide applications may result in pesticides entering surface waters as a result of spray drift or runoff in either storm water or irrigation return flows. During 2012 monitoring, no exceedances of WQTLs of pesticides occurred in the Coalition region. The Coalition is continuing to identify potential sources of toxicity through PUR data analysis, assessment of water quality data and evaluation of current management practices. The Coalition's sourcing strategy is further described in the Coalition's Management Plan.

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

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

The Coalition has identified eight general classifications of management practices that are effective at reducing the impacts of agricultural discharges on water quality including:

1. Reduction in application rates,
2. Spray drift management,
3. Change to low risk products,
4. Polyacrylamide (PAM),
5. Drip or microspray irrigation,
6. Recirculation/tailwater return system,
7. Retention pond/holding basin, and
8. Grass waterways or grass filter strips.

The MPUR submitted every April 1 includes details on the number of growers implementing practices and acres associated with these specific management practices. The Coalition conducted meetings with targeted growers to document current management practices in the first, second, third, and fourth priority subwatersheds. Follow up contacts occurred with those targeted growers to document newly implemented management practices in the first, second, and third priority subwatersheds. Newly implemented practices include those recommended by the Coalition as well as additional practices growers implement without a specific recommendation to do so. The Coalition only reports on newly implemented management practices that are designed to address local water quality impairments. The 2011 MPUR included a summary of all currently implemented management practices in the first priority subwatersheds, and the 2012 MPUR summarized currently implemented management practices in the second and third priority subwatersheds and newly implemented management practices in the first and second priority subwatersheds. The Coalition initiated follow up contacts in the fourth priority subwatersheds and is beginning to schedule individual meetings with targeted growers in the fifth priority subwatersheds; the Coalition will report on its findings in the 2014 MPUR.

The Coalition summarized the acres associated with newly implemented management practices designed to reduce the impacts of irrigated agriculture on the waters of the State within the ESJWQC in the first, second and third priority subwatersheds (Table 53). When evaluating management practices and the associated acreage, a parcel may be included under multiple management practices. Therefore, the acreages in Table 53 cannot be summed together across management practices for each subwatershed, but can be used to evaluate number of acres with a particular practice within the overall targeted direct drainage acreage of the subwatershed.

A majority of the practices listed in Table 53 affect the amount of irrigation and/or storm water runoff and include: installing microirrigation systems, reducing the amount of water used in surface irrigation, installing a device to control the amount and/or timing of discharge into a waterway, implementing sediment ponds and/or implementing a recirculation/tailwater return system (Table 53). Drainage basins and recirculation/tailwater return systems also have a double purpose of reducing sediment discharge in addition to reducing or eliminating agricultural waste discharge into a downstream waterbody. Grass row centers and filter strips are already commonly implemented practices and do not represent a high percentage of the targeted acreage in Table 53 (<1%); most growers are already implementing these practices when applicable. Both grass rows and filter strips can be effective in reducing the amount of pesticides and fine particulate matter in agricultural discharges to surface waters. Of the high priority subwatersheds in Table 53, only one subwatershed in the first priority set had acreage where polyacrylaminde (PAM) will be applied (150 acres in Prairie Flower Drain subwatershed). PAM is used to help fine particles settle out (as well as any pesticide or metal bound to those fine particles) prior to surface water discharge. PAM is effective in certain situations where water can be held for a certain amount of time prior to discharge. The remaining practices documented as newly implemented are specific to drift management and include: shutting off outside nozzles when spraying outer rows next to sensitive sites, spraying areas close to waterbodies when the wind is blow away from them, using air blast applications when the wind is 3-10 mph and upwind of sensitive sites, using electronic spray nozzles and using nozzles that provide the largest effect droplet size to minimize drift (Table 53). In the third priority subwatersheds, Dry Creek @ Rd 18 has 402 acres with newly implemented management practices for storm and irrigation runoff control with berms between fields and waterways. The largest percentage (8%) of recommended newly implemented management practice by growers is a reduction in the amount of water used in surface irrigation (Table 53).

Table 53. Summary of first, second and third priority subwatershed targeted acreage with newly implemented management practices.

Practice Category	Management Practices	1st Priority Subwatersheds	2nd Priority Subwatersheds	3rd Priority Subwatersheds: Berenda Slough along Ave 18 ½	3rd Priority Subwatersheds: Dry Creek @ Rd 18	3rd Priority Subwatersheds: Lateral 2 ½ near Keyes Rd	3rd Priority Subwatersheds: Livingston Drain @ Robin Ave	Sum of Acreage	Pct of Targeted Acres
	Targeted Acreage:	11,273	10,084	4,103	4,710	1,826	335	32,331	NA
Irrigation, Storm Runoff	Berms between field & waterway				402			402	
	Drainage Basins (Sediment Ponds)	271						271	1%
	Install device to control amount/timing of discharge to waterway	1,660			402			2,062	6%
	Microirrigation system	279	207				71	557	2%
	Recirculation - Tailwater return system	443						443	1%
	Reduce amount of water used in surface irrigation	1,197	1,028	48	189		71	2,533	8%
	Use Polyacrylamide (PAM)	150						150	<1%
Sediment and Erosion	Filter strips at least 10' wide around field perimeter	28	8					36	<1%
	Grass row centers	107						107	<1%
Pest, Dormant Spray	Calibrate spray equipment prior to every application					44		44	<1%
	Shut off outside nozzles when spraying outer rows next to sensitive sites	1,170	622	36		215		2,043	6%
	Spray areas close to waterbodies when the wind is blowing away from them		1,223	36	122	260	110	1,751	5%
	Use air blast applications when wind is 3-10 mph and upwind of sensitive sites		25					25	<1%
	Use electronic controlled sprayer nozzles		375					375	1%
	Use nozzles that provide largest effective droplet size to minimize drift		121			215		336	1%

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

Monitoring data from 2012 indicate that the number of exceedances of pesticides and metals decreased substantially across the Coalition relative to previous years, although the number of samples collected and sites sampled have also decreased. It is difficult to compare 2012 monitoring results with those from previous years due to the reduction in monitoring in 2012 for MPM, Core Monitoring and certain Assessment Monitoring constituents. However, based on monitoring data attained from 2012 sampling, there are substantial improvements in water quality as a result of a decrease in pesticide discharges (especially in sites monitored for Assessment Monitoring constituents). During 2012, zero exceedances of the WQTL for chlorpyrifos or any other pesticide occurred. The Coalition believes that this decline is a direct result of general and focused outreach and education visits with growers in the high priority subwatersheds.

Figure 14 includes the total percentages of exceedances from 2008 through 2012 by constituent category and graphs of the percent of exceedances of metals and pesticides from 2008 through 2012. Toxicity resampling events and exceedances during 2008 upstream MPM that was conducted as part of source evaluation were not included in the calculation. From 2008 through 2012, the majority of exceedances occurred in nutrients, physical parameters and *E. coli* (40%) and field parameters (31%). The percentages of exceedances of metals (13%), toxicity (9%) and pesticides (7%) were relatively small in comparison (Figure 14).

Figure 14 includes the percent of metals exceedances from 2008 through 2012. Copper and zinc are both metals applied to agriculture in the Coalition region; however, the graph only includes copper exceedances because copper was the only applied metal to be detected above the hardness based WQTL at sites in the Coalition region between January 1, 2008 and December 31, 2012. The most notable decline in metals exceedances occurred between the years of 2008 and 2009 which could be due to outreach, education and management practice implementation or the Coalition began monitoring for both the total and dissolved fractions of metals in October 2008 to better characterize contamination. The bioavailable fraction of metals in the water column is more accurately estimated in metals samples collected after October 1, 2008. The lack of exceedances when analyzing for dissolved metals indicates the conversion may not be accurate or appropriate for the Coalition region and it is not known if the improvement in water quality is a result of the inaccurate conversion or a reduction in the concentration of metals in surface waters.

The source of the copper is not known but the relatively restricted geographic areas of exceedances, the broader distribution of applications to the same commodities argues for a natural source rather than an anthropogenic cause. However, Coalition representatives are discussing management practices with growers that should result in reductions of dissolved copper if copper exceedances are the result of applications of copper-based pesticides. Similar discussions with growers have been successful in reducing the exceedances of various pesticide WQTLs. Copper exceedances did not decrease between 2010 (eight, 2.5% of the samples) and 2011 (30, 5.4% of the samples). During 2012, copper exceedances only occurred at five sites suggesting copper exceedances were a result of similar conditions across the Coalition region (9, 3.2% of the samples, Table 54).

The most significant decline in exceedances in pesticides occurred directly after initial outreach and education began between 2008 and 2009 (Figure 13 and Table 54). A steady decline in pesticide exceedances has continued and is evident from monitoring results recorded over the past several years. In 2012, zero pesticide exceedances occurred in 2011 there were five (0.2% of the samples) compared to nine (0.4% of the samples) in 2010.

Results from Assessment Monitoring in 2012 indicate grower outreach and management practice implementation have positive effects on water quality. Normal Monitoring at Berenda Slough @ Ave 18 ½ resulted in a single exceedance of the WQTL for chlorpyrifos in April 2011. Since then, growers in the Berenda Slough subwatershed received focused outreach and individual grower visits along with the other third priority subwatersheds during 2011. Since contacts were complete, no exceedances of the WQTL for chlorpyrifos occurred during 2012 Assessment Monitoring. Likewise, monitoring in 2011 at Deadman Creek @ Hwy 59 resulted in two exceedances of the WQTL for chlorpyrifos. Deadman Creek @ Hwy 59 is a fourth high priority subwatershed and focused outreach and education occurred in the subwatershed in 2012. Assessment Monitoring during 2012 resulted in no exceedances of the WQTL for chlorpyrifos in the subwatershed. The 2012 Assessment Monitoring results indicate that in both the third and fourth high priority subwatersheds, growers implemented new management practices and water quality improved. Furthermore, since September 2011 there have been no exceedances of the WQTL for chlorpyrifos in any of the first through third priority site subwatersheds during NM or MPM indicating that the improvements are not temporary but reflect permanent changes in management practices.

One factor influencing water quality results could be that some growers have changed products without changing management practices. Coalition representatives emphasize that regardless of the product applied, appropriate management practices must be used to protect water quality. The overall monitoring results from the summer of 2011 through 2012 indicate that visits from Coalition representatives and the presumed implementation of management practices (not just switching products) are resulting in improved water quality; hence no exceedances of any pesticides occurred in 2012.

Figure 14. Percentages of exceedances of WQTLs from 2008-2012 in the ESJWQC.

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

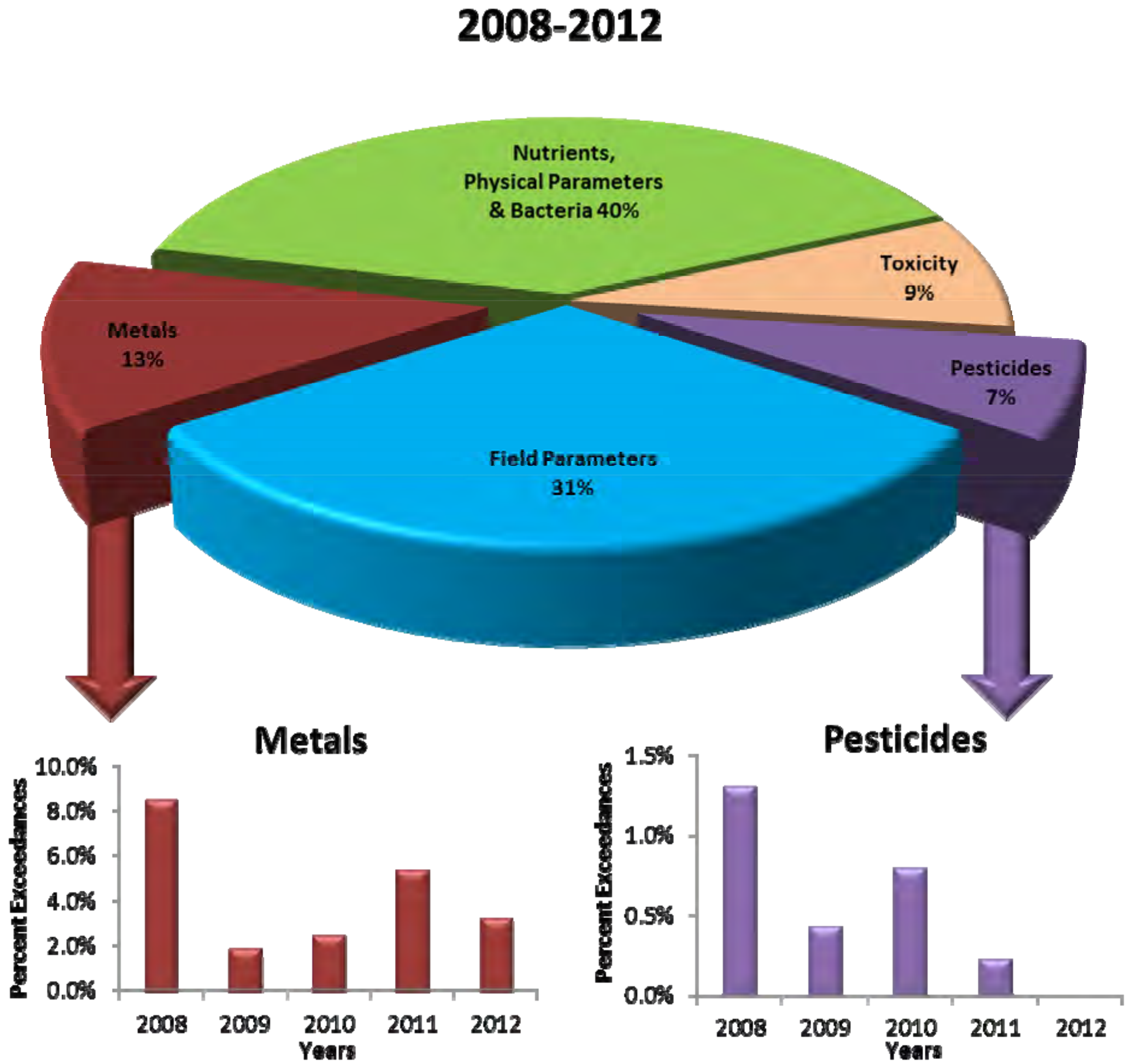


Table 54. Percentages of exceedances of WQTLs for applied metals and applied pesticides from 2008-2012 in ESJWQC.

Table excludes toxicity resampling events and 2008 upstream MPM that was conducted as part of source evaluation.

	Metals			Pesticides		
Years	Exceedances	Sampled	% of Exceedances	Exceedances	Sampled	% of Exceedances
2008	39	459	8.5%	45	3460	1.3%
2009	6	310	1.9%	6	1380	0.4%
2010	8	318	2.5%	10	1249	0.8%
2011	30	556	5.4%	5	2101	0.2%
2012	9	278	3.2%	0	951	0.0%

Although monitoring during 2012 was reduced for certain Assessment Monitoring constituents, MPM and Core Monitoring results from throughout the year indicate improved water quality. The conclusions from these data are: 1) individual grower visits continue to be an effective method of communicating with members, 2) the implementation of management practices continues to improve water quality in the Coalition region, and 3) remaining exceedances may be difficult to eliminate because the cause/source of the problems may not be irrigated agriculture and if they are, management practices that are very effective in eliminating exceedances of pesticides are not effective in reducing exceedances of WQTLs for parameters such as *E. coli*, DO, salts or pH.

Based on the information provided in the response to questions above, the Coalition will pursue the following in 2013:

1. Continue to monitor under the current approved MRPP until a new Monitoring Plan is approved based on the new ESJWQC WDR Order requirements.
2. Continue to monitor according to the ESJWQC Management Plan to evaluate water quality improvements and impairments.
3. Continue to document and assess management practices implemented by Coalition growers.
4. Continue to focus outreach and education efforts around high priority constituents while also educating growers about lower prioritized constituents such as dissolved oxygen and salinity.

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

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

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